Income-Driven Student Loan Repayment Plans and Moral Hazard in Career Choices

Chao Fu* Xiaomeng Li† Basit Zafar‡

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Abstract

Income-Driven Repayment (IDR) plans for student loans lower one's repayment during low-income periods and forgive one's unpaid debt after certain years post education. We investigate how these features affect one's career choices through a survey where the same student is asked to select job profiles under various repayment plans. Consistent with our Ben-Porath style model, the survey results reveal that IDR is a double-edged sword. On the one hand, IDR allows some students to increase their human capital investment toward their would-be investment level under a debt-free (unconstrained) scenario. On the other hand, IDR leads to moral hazard concerns: An economically and statistically significant fraction of students choose job profiles with lower initial wage and higher growth under IDR plans than their choices under a debt-free scenario, leaving part of their debt forgiven. A simple calculation indicates that this type of moral hazard alone would make IDR plans inviable were they carried out by private lenders; however, IDR plans are viable for the Government because of its capacity to collect individuals' life-time income taxes.

*University of Wisconsin-Madison and NBER. Email: cfu@ssc.wisc.edu
†University of Michigan. Email: lixiaom@umich.edu
‡University of Michigan and NBER. Email: basitak@gmail.com

1 Introduction

Student loans play a fundamental role in facilitating individuals' educational investment (college access and retainment); however, they also carry risks associated with the return to higher education. For individuals, student loan balances have grown rapidly in recent decades and are now the second-largest source of household debt in the US. For society, the burden of student loans is significant: from 2016-2020, student loan default rates hovered between 10-11.5%, and currently the total student loan debt is $1.753 trillion, with outstanding federal loans representing 91.2% of this burden. Traditionally, student loans are repaid under the standard plan (SP), where the borrower repays a fixed amount per period for 10 years to clear one's debt. In recent years, income-driven loan repayment plans (IDRs) have gained growing popularity, with two distinctive features relative to SP. First, IDRs adjust payments based on the borrower's income, thus lowering borrower's repayment burden during low-income periods. Second, one's debt is typically forgiven after a certain number of years of repayment, further lowering one's repayment burden.

While reducing one's repayment burdens, IDRs can also lead to moral hazard problems (since income is endogenous), which is largely understudied in the literature (Yannelis and Tracey, 2022). A recent paper by de Silva (2023) shows that borrowers reduce their labor supply to lower repayments under IDRs, although to a limited extent. Besides potentially affecting labor supply, loan repayment plans may affect borrowers' career choices in terms of wage profiles and/or the trade-off between wages and non-pecuniary benefits. In particular, borrowers may overinvest in human capital and earn less during the repayment period, while enjoying higher income growth from overinvestment in later periods.

How does loan repayment structure affect borrowers' post-education human capital investment decisions through career choices characterized by initial wage and wage growth? Moreover, what are the implications of these behavioral responses on government revenue? The fact that both debt repayment and income taxes contribute to government revenue adds ambiguity to the answer. For example, while reduced income during the repayment period decreases the debt repayment the government can collect, higher income growth in later periods may contribute to higher tax revenues. In this paper, we design and conduct a student survey to rigorously test the role of repayment plans on students' career path choices and their implications for government revenues.

We begin by developing a college-loan borrower's post-education decisions in a simple three-period model, with an early-career repayment period, a later-career repayment-free period, and a retirement period. An individual makes decisions on college loan repayment plan choice, post-college human capital investment (ala Ben-Porath, 1967), and savings/borrowing, subject to borrowing constraints and the burden of college loan repayment. To highlight the key differences across repayment plans, we consider two representative plans: a standard plan (SP) with fixed payments and an income-driven repayment plan (IDR). We show that IDR can distort human capital investment similarly to an income tax under certain conditions. When an individual's borrowing constraint is non-binding, they overinvest in human capital and earn less early in their career compared to a case where one's debt is totally forgiven, indicating a clearly defined moral hazard problem with IDR. Conversely, when an individual is borrowing-constrained, the debt burden suppresses investment in human capital compared to the debt-forgiven case. We further derive that all else being equal, moral hazards are more likely to occur with higher discount rates, smaller initial balances, larger borrowing limits, and lower IDR repayment rates.

Next, we present explicit evidence of how the repayment structure impacts career choices using a survey administered to freshmen and seniors at the University of Michigan. The survey assigns a given hypothetical end-of-college loan amount to a respondent and asks them to choose from the same set of three job profiles repeatedly, each time under a different repayment plan. These jobs differ in terms of the trade-off between initial wage and wage growth but are otherwise identical. In the survey, we study students' career choices under four repayment regimes: the Standard Payment (SP), two income-driven plans: Income-Based Repayment (IBR) and Saving on a Valuable Education (SAVE), and a case with zero repayment burden (Forgiven). By comparing one's choices across repayment plans, we find that repayment structures significantly influence preferred career paths, holding all other factors constant. Specifically, we document a moral hazard behavior response consistent with the model prediction: a significant fraction of respondents switch to a steeper job profile with lower initial wages and higher growth under an income-driven plan, especially under SAVE.

First, we observe that the distributions of job choices significantly differ across repayment plans, indicating the influence of these plans on career choices. Specifically, as the repayment plan becomes more generous, the percentage of students opting for the low-growth

job decreases from 39% under SP to 22% under SAVE, and 19% under Forgiven when the loan repayment burden is eliminated. Conversely, the percentage of students selecting the high-growth job is the lowest (44%) under SP and the highest (66%) under SAVE.

Second, investigating changes in individual-level responses across repayment plans, we find that a significant proportion of students choose a steeper job profile under an income-driven repayment plan, especially under SAVE, compared to Forgiven, where they are free from the loan repayment burden. This indicates a clear moral hazard: to reduce loan repayment, these students overinvest in their early career by choosing overly steep job profiles. Furthermore, when transitioning from the least generous plan, SP, to the most generous repayment plan, SAVE, 37% of students switch to a steeper profile. This suggests that choices are most likely to be distorted towards underinvestment under SP and overinvestment under SAVE.

Third, to assess the extent to which job market frictions can curb moral hazard problems, we designed a survey question asking students, each with their most preferred Job X under SAVE, to choose their jobs again if they had to experience an N-month delay (with zero earnings) before starting Job X but no delay if opting for other jobs. With a 2-month delay, about 60% of students switch to a different job, and this fraction increases to 76% with a 4-month delay and 85% with a 6-month delay. Among these switches, more than two-thirds change to a flatter job profile, suggesting a moderate role of labor market frictions in reducing moral hazard.

Fourth, to examine the implications of behavioral responses in plan-specific job choices on the government's budget, we calculate the government's discounted net revenue (the sum of lifetime income taxes and loan repayment minus loan amount) using students' job profile choices under each of the repayment regimes in the survey. Our results suggest that despite the existing debt repayment avoidance and moral hazard issue with IDR, SAVE still generates the highest net government revenue ($225.6K per student), while SP yields the lowest ($212.8K per student). This is due to students opting for higher lifetime-income career paths under SAVE compared to SP. However, when considering only profits from college loans, SAVE incurs an average loss of $3.2K per student, making SAVE an unsustainable repayment plan for private lenders. In addition, our calculation also highlights the importance of accounting for behavioral responses in the design of repayment policies.

Finally, we also find additional dimensions of behavioral response as suggested in the

literature (Luo and Mongey, 2019). After learning about income-driven repayment from the survey, 17% of students reported that they would change their career trade-off between wage and amenities, favoring jobs with higher amenities.

Related literature and contribution: We mainly contribute to the literature on financing human capital. Starting from Friedman (1955), a thread of literature has studied the optimal design of income-based financing in higher education, advocating its insurance value as well as acknowledging the distortionary costs of state-contingent contracts (Gary-Bobo and Trannoy, 2015; Chapman, 2006; Barr et al., 2017; Nerlove, 1975; Del Rey and Verheyden, 2011; Findeisen and Sachs, 2016; Jacobs, 2021). The insurance value of income-driven loans has been empirically verified, as they appear effective in reducing delinquencies (Herbst, 2023), mortgage defaults (Mueller and Yannelis, 2019), and the pass-through of income to consumption (Gervais, Liu and Lochner, 2023). IDR plans are also a way to target transfers to low-income borrowers, as Catherine and Yannelis (2023) find that IDR policies are more progressive in terms of targeting forgiveness to lower-income borrowers.

One potential issue is adverse selection in state-contingent contracts, where the earnings distribution of would-be enrollees can differ from the overall distribution. This has drawn researchers' attention to explain the missing markets for private provision of these contracts (Herbst and Hendren, 2024; Herbst, Palacios and Yannelis, 2022). Empirically, Herbst, Palacios and Yannelis (2022) and Mumford (2020) attempt to measure the degree of adverse selection in income share agreements (ISA), finding little evidence of selection. In countries operating universal IDR programs administered through their respective tax authorities, Karamcheva, Perry and Yannelis (2020) find that this limits concerns about selection.

There are also potential concerns regarding moral hazard, as IDR shares the same insurance-moral hazard tradeoff as social insurances (Chetty and Finkelstein, 2013). While much of the literature agrees that IDR plans operate similarly to income taxes and may disincentivize borrowers from working, little empirical research has been done on moral hazard (Yannelis and Tracey, 2022). Out of the limited literature on this topic, Chapman and Leigh (2009) and Britton and Gruber (2020) find no effect on labor supply, and in a learning-by-doing framework, de Silva (2023) conclude that labor supply responses are too small to justify fixed repayment contracts.[1]

[1]These results are consistent with the small labor supply elasticities (for a review, see Saez, Slemrod and

We contribute to the literature by adding the perspective that moral hazard issues can extend beyond the reduction in labor supply. Our model, based on the classical Ben-Porath framework, predicts that significant moral hazard problems can occur under IDRs as individuals change their career choices in terms of the trade-off between initial earnings and earnings growth. Our survey results provide empirical support to this prediction. Importantly, in our hypothetical scenarios, the adverse selection channel is shut down. So even in the absence of selection, our results show that moral hazard could be a serious concern with IDRs.

2 Model

An important feature of typical college loan repayment plans is the time limit: One makes repayment within certain years post college, and under some plans, one's unpaid debt is forgiven afterwards. This time-limit feature can have important implications for one's career choice. For illustration, we study a college-loan borrower's post-education decisions in a simple three-period model, with an early-career repayment period ($t = 1$), a later-career repayment-free period ($t = 2$), and a retirement period ($t = 3$). An individual makes decisions on college loan repayment plan choice, post-college human capital investment (ala Ben-Porath, 1967), and savings/borrowing, subject to borrowing constraints and the burden of college loan repayment. For simplicity, and consistent with our survey design, we assume that the individual works full time before retirement, hence shutting down another margin for moral hazard (for example, de Silva, 2023).

2.1 Primitives

Endowment Upon college graduation, an individual is characterized by a college loan amount l_0, a type χ (which enters one's preferences and borrowing constraints), and an initial human captial level k_1. The three variables (l_0, χ, k_1) are correlated with one another. We denote a_{t-1} as one's other asset/debt (other than l_0) at the beginning of period t and assume that $a_0 = 0$.

Giertz (2012)).

College Loan Repayment Plans To highlight the key differences across repayment plans, we consider two (simplified) plans: a standard plan (SP) and an income-driven-repayment plan (IDR). Catering to this simple model, under SP, one is required to pay off her college debt in $t = 1$, regardless of her income. Under IDR, one's repayment in $t = 1$ depends on her income y_1, and the unpaid loan amount is forgiven afterwards. The plan–specific payment is given by

$$D^p(l_0, y_1) = \begin{cases} l_0 \text{ if } p = SP, \\ \tau y_1 \text{ if } p = IDR. \end{cases}$$

Critically, $D^p(\cdot)$ is blind to one's type and human capital (χ, k_1), while one's decisions depend on (χ, k_1). This asymmetry is the root to adverse selection and/or moral hazard problems in college loan programs. However, quantifying these problems is challenging because k_1 and χ are unobserved by the researcher (at least not fully observed).

To deliver the essential message, in this simple model, we use a special type of IDR plan, i.e., an equity contract in which borrowers make uncapped income-driven repayments for a fixed horizon. Moreover, we also abstract from the fact that different loan payment plans may differ in the number of repayment years and hence in the accummulated interests. In our survey, we calculate repayments following the specifics of each repayment plan.

Earnings and Human Capital Production A worker can use a fraction of her human capital for skill-enhancing human capital investment and rent the rest to the labor market. Human capital investment therefore involves an opportunity cost in the form of foregone earnings. In particular, for a worker who uses a fraction $i_t \in [0, 1]$ of her human capital (k_t) for skill investment and hence rents $k_t(1 - i_t)$ amount of human capital to the labor market, her earnings in t are given by:

$$y_t = k_t(1 - i_t). \tag{1}$$

In return, her next-period human capital is given by:

$$k_{t+1} = K(k_t, i_t).$$

2.2 Worker's Problem

Upon graduation, one chooses between SP and IDR as her college loan repayment plan, which determines one's repayment accordingly. In $t = 1, 2$, one makes decisions on human capital investment $i_t \in [0, 1]$ and (non-college loan) end-of-period asset level a_t subject to the borrowing constraints:

$$a_t \geq \begin{cases} -B(k_t, \chi) \text{ for } t < 3 \\ 0 \text{ for } t = 3 \end{cases}. \tag{2}$$

That is, in working periods $t = 1, 2$, one's borrowing constraint $B(k_t, \chi) \geq 0$ may vary with her human capital and type; in $t = 3$, one is not allowed to leave debt upon death ($a_3 \geq 0$). Given this constaint, a retiree simply consumes her savings; we solve a worker's pre-retirement problems via backward induction, where we use $V_t^p(\cdot)$ to denote a worker's value function in period t under repayment plan p.

Period 2 In $t = 2$, one is free of the college debt burden (either through paying off or through debt forgiveness), the state variables in this period include one's type χ, one's human capital k_2, and asset from last period a_1. Given that one will retire in $t = 3$, the optimal human capital investment decision is $i_2 = 0$, and hence one's income is given by $y_2 = k_2$. A worker's asset choice solves the following problem:

$$\begin{aligned} V_2^p(\chi, k_2, a_1) &= \max_{a_2} \{u(c_2) + \beta_\chi u(a_2(1+r))\}, \\ s.t.\ c_2 &= k_2 + (1+r)a_1 - a_2 \\ a_2 &\geq -B(k_2, \chi). \end{aligned}$$

where $u(\cdot)$ is a concave function of consumption, $\beta_\chi \in (0, 1)$ is a type-specific discount factor, and r is the interest rate. It is clear that the borrowing constraint in this period is not binding: one will optimally choose $a_2 > 0$ to save for retirement.

Period 1 In $t = 1$, the state variables include one's loan amount l_0, type χ, and human capital k_1. A worker's period-1 problem is given by:

$$\begin{aligned} V_1^p(l_0, \chi, k_1) &= \max_{i, a_1} \{u(c_1) + \beta_\chi V_2^p(\chi, k_2, a_1)\} \\ s.t.,\ k_2 &= K(k_1, i) \\ y_1 &= k_1(1-i) \\ c_1 &= y_1 - D^p(l_0, y_1) - a_1 \\ a_1 &\geq -B(k_1, \chi). \end{aligned}$$

Notice that we abstract away from frictions, other than borrowing constraints, that may obstruct one's investment choice. One leading example is frictions on the labor market (e.g., search friction); we assess the effect of such frictions on one's choices and moral hazards in our survey.

Loan Repayment Plan Upon graduation, one chooses the loan repayment plan that yields a higher value:

$$\max\left\{V^{SP}(l_0, \chi, k_1), V^{IDR}(l_0, \chi, k_1)\right\}.$$

2.3 Model Predictions

To shapen the illustration, we adopt functional forms commonly used in the literature that allow us to solve the model analytically. In particular, we assume a CRRA utility function

$$u(c) = -\frac{1}{c},$$

and the following production function

$$k_{t+1} = K(k_t, i_t) = (1-\delta)k_t + Ak_t^{\alpha_1} i_t^{\alpha_2},$$

where δ is the rate of human capital depreciation, A, α_1, and α_2 are parameters governing the effectiveness of human capital production.

Denoting i^{IDR}, i^{SP} and $i^{Forgiven}$ as one's optimal period-1 human capital investment under IDR, SP and loan forgiven cases, respectively, Online Appendix A proves the following results.

1. Under IDR, when one's borrowing constraint is non-binding, i^{IDR} increases with the repayment rate τ and $i^{IDR} > i^{Forgiven}$; when one's borrowing constraint is tight and binding, $i^{IDR} < i^{Forgiven}$.

2. Under SP, when one's borrowing constraint is non-binding, $i^{SP} = i^{Forgiven}$; otherwise, $i^{SP} < i^{Forgiven}$.

3. All else being equal, borrowing constraints are less likely to bind with a larger borrowing limit (B), a higher discount rate (β), smaller initial loans (l_0), and under IDR, a lower repayment rate (τ).

An IDR plan acts essentially as a (distorionary) tax on one's income. The extent to which an individual may game against an IDR plan is constrained by frictions (e.g., borrowing constraints, labor market frictions), but it depends critically on how one's gaming actions affect one's earnings path under and after the loan-repayment period. For example, in a learning-by-doing model, one can lower her loan repayment by "doing" less during the loan-repayment period. However, this choice will lower not only one's current but also one's future income, making the gaming action or moral hazard very costly for the individual. In various other settings (e.g., Ben-Porath and back-loaded labor contracts), one's choice of lower income today is accompanied with higher earnings potential tomorrow, making moral hazard a more relevant concern.

3 Survey Design

In the early winter of 2024, we invited a random sample of freshmen and seniors at the University of Michigan to participate in our online survey. Given our focus on federal student loan programs, only US citizens and permanent residents were eligible to participate in the

survey. Moreover, students must use a computer or laptop to participate in the survey[2]. Of the 8,854 eligible students, 627 participated (a 7% response rate); each respondent who completed the survey received a $15 Amazon gift card. Table 1 provides a comparison between the survey sample and the overall student population. As is common with student surveys, there is a slight over-representation of female, lower-income, and high-achieving students.

Table 1: Summary statistics and comparison with the survey sample

	(1) Survey population		(2) Survey sample	
	Mean	S.D.	Mean	S.D.
Age	20.43	2.23	19.89	2.50
Female	0.52	0.50	0.60	0.49
White	0.61	0.49	0.66	0.47
URM	0.18	0.38	0.17	0.38
GPA	3.58	0.45	3.65	0.36
SAT	1,408.47	126.18	1,399.47	119.33
Household income less than $99,000	0.25	0.44	0.36	0.48
Household income more than $100,000	0.52	0.50	0.46	0.50
Observations	17,352		627	

Notes: Column 1 summarizes student characteristics for the survey population of all current freshmen and seniors, while column 2 summarizes characteristics for the survey sample. "URM" represents U.S. citizens or U.S. permanent residents who have self-identified as belonging to specific race/ethnicity categories, including Hispanic, Native American, Black or African American, Native Hawaiian, or Other Pacific Islander. GPA refers to the cumulative GPA at the start of Winter 2024 for columns 1 and 2. Household income represents a student's self-reported estimated gross family income. This data is missing for 27% of the survey population and 18% of the survey sample.

The survey was designed to examine how college loan repayment policies may affect one's career choices, focusing mainly on the trade-off between starting wage and wage growth. Answering this question using observational data is challenging: Besides the self-selection into different loan amounts and repayment plans (when multiple plans are available), one

[2]A screening question detects the device and will opt out students if a mobile device is detected. Students can request a new link to participate if they missed the device requirement by accident.

never observes counterfactual career choices for the same individual[3]. Our survey addresses these challenges by assigning a given hypothetical end-of-college loan amount to a respondent and asking her to choose from the same set of job profiles repeatedly, each time under a different repayment plan.

The Repayment Regimes We study students' career choices under 4 repayment regimes: Standard Payment (SP), Income-Based Repayment (IBR), Saving on a Valuable Education (SAVE), and zero repayment burden (Debt Forgiven). The SP plan involves a fixed payment over 10 years with no loan forgiveness. The IBR plan requires payments of 10% of discretionary income, capped by the standard repayment plan amount, with discretionary income defined as income above 150% of the poverty guideline. Under IBR, interest capitalization does not occur until the monthly payment reaches the standard 10-year repayment amount, and loans are forgiven after 20 years. The SAVE plan requires payments of 10% of discretionary income, which is defined as income above 225% of the poverty guideline.[4] In the survey, when calculating payments, we assume the individual remains single, and this is made explicit in the scenario.[5] Unlike IBR, SAVE has no cap on monthly payments and eliminates interest capitalization so the balance never grows, with loans forgiven after 20 years. Both IBR and SAVE are income-driven repayment (IDR) plans, but SAVE is more generous due to its lower payment percentage and higher threshold for discretionary income.[6] Finally, the Forgiven case allows us to study one's choices in the absence of student debt.

[3] de Silva (2023) relies on the fact that the only available contract is a government-provided income-driven loan, while Herbst (2023) exploits variation in assignment to an agent to address selection issues in IDR enrollment.

[4] Additional benefits went into effect in July 2024: 10 years for low-balance borrowers (less than $12,000), with each additional $1,000 borrowed above that level adding an additional 12 payments (equivalent to one year of payments), up to a maximum of 20 years for only undergraduate loans.

[5] Accordingly, the calculations are based on a single taxpayer using the 2023 Poverty guidelines published annually by the U.S. Department of Health and Human Services, which will adjust based on inflation estimates. For example, the poverty line for a single individual is $14,580. The Congressional Budget Office only provides inflation estimates for the next 10 years. For years beyond this 10-year period, we assume that the Congressional Budget Office's estimate from the 10th year will apply to all subsequent years.

[6] In fact, the most recent SAVE plan proposed by the Biden administration is even more generous. Specifically, borrowers with undergraduate loans will have their payments reduced from 10% to 5% of their discretionary income. As of now, the SAVE plan is on hold due to a sweeping injunction issued in August 2024 by the U.S. Court of Appeals for the 8th Circuit.

The Scenario Respondents are presented with three jobs, and are randomized into either a high-debt case ($40,000) or a low-debt case ($30,000). These loan amounts are close to the average loan debt of UM students. Among students who graduated in 2023, the average cumulative principal borrowed by undergraduate borrowers is $27,474, including all loan programs. This figure rises to $54,713 when restricted to private loans (Common Data Set, 2023). Nationally, among federal student loan borrowers, the average amount borrowed four years after completing a bachelor's degree in 2015–16 is as high as $45,300 (National Center for Education Statistics, 2023). Therefore, we used $30,000 and $40,000 as representative debt levels in the scenario. By including both levels, we aim to explore the potential role of debt size in influencing the prevalence of moral hazard issues.

Under each repayment regime, respondents are asked to rank the three job profiles presented in Table 2. Job A offers the highest initial income but the lowest growth rate, while Job C provides the lowest initial income but the highest growth rate. These jobs differ in terms of their annual earnings and earnings growth but are otherwise identical.

We ask the respondents to make choices first as a consultant for a hypothetical college graduate, "Wolverine", and then for themselves in the same situation. This approach ensures that respondents understand the job differences when making choices for themselves.[7]

Given the complicated nature of student loan repayment plans, we chose to convey the information through videos. We first ask respondents to watch two videos that explain the details of each plan for "Wolverine". In the first 3.5-minute video, we explain SP and IBR, detailing how monthly repayments are determined, the length of payments, and using an example of a recent UM bachelor's graduate with the middle-profile Job B to illustrate how repayments may (or may not) depend on one's income. In the second 4-minute video, we introduce the SAVE plan, its repayment rules, and loan forgiveness rules. We again use the same example to highlight the differences between SP, IBR, and SAVE in terms of average annual repayments, average annual income net of loan repayments, and debt forgiveness. Appendix E contains the scripts from the videos, and the videos are available at https://youtube.com/playlist?list=PLOTetj27R3Y4vu4cCYSR3Hn39IdMz0Lu0&si=mbLs18uukVWTq88C.

For each video, the first time respondents cannot forward it but can pause it at any time. On the next page, they can review the video as many times as they want. This approach ensures that respondents indeed watch the videos initially and allows them to revisit the

[7]The Forgiven case is presented toward the end of the survey and the choices are only for oneself.

content if needed. We also designed understanding checks, which allow two attempts before showing the explanation for the correct answer [8]. Specifically, after each video, there is an understanding question highlighting key characteristics of the repayment plans[9]. Before making a recommendation, students are asked for each plan—SP, IBR, and SAVE—which job involves debt forgiveness and which job has the lowest average annual loan repayment in years 1-5. These procedures ensure that respondents grasp the information about loan forgiveness and differences in repayments across the plans.

After watching the videos, respondents first report their advice for Wolverine under each repayment plan by ranking the three jobs. Figure 1, for example, shows the screenshot for a respondent assigned to the high-debt case and asked for their recommendation for Wolverine under the SAVE plan.

A detailed table comparing three job offers—Job A, Job B, and Job C—under the SAVE plan is presented to the students. The table outlines key financial aspects of each job, including wage profiles, loan repayment conditions, and net income after debt repayment, which are critical for evaluating the financial implications of each job for students.

The wage profile section provides the starting annual and monthly salaries for each job in the first year, along with the annual earnings growth rate. For instance, while Job A starts at \$62,500 with an annual growth rate of only 1.5%, Job C has the lowest starting annual salary at \$45,000 but features a growth rate as high as 4.25%.

In the loan repayments section, the table details the number of years with positive loan repayments, the total loan repayments made, and the amount of debt forgiven by the end of the repayment period. This information allows for a clear comparison of the financial burden each job imposes in terms of loan repayment. Under Job A, the initial high salary results in the debt being fully paid off within 19 years, leaving no debt to be forgiven. In contrast, under Job B and Job C, \$3,350 and \$9,933, respectively, remain after 20 years of repayment and are forgiven, leading to a lower total amount paid on the loan.

The table also presents the average annual loan repayments across three distinct periods: years 1-5, years 6-10, and years 11 until the final year of positive loan repayment. Due

[8] On average, approximately 3% of respondents answered the understanding checks incorrectly on their second attempt after each video.

[9] For example, true or false questions such as "Monthly loan repayments are NOT fixed under SP" and "Under IBR, it is possible that there is some remaining debt forgiven after 20 years of repayments" emphasize the fixed payment feature of SP and the possibility of debt forgiveness under IBR.

to Job C's high growth rate and lower initial salary, only $1,453 is required for repayment during years 1-5, whereas Job A requires an average of $2,994. As income increases, Job C eventually has the highest annual salary, resulting in a higher average repayment than Job A, which reflects the income-dependent feature of SAVE—the higher the income, the greater the repayment required.

Finally, the net annual income after debt repayment is presented for the same time intervals, showing how much income remains after fulfilling loan obligations. The key trade-off between loan repayment and job characteristics can be explicitly observed: Job C, with a low starting wage but high growth, results in lower repayments during the early years and a substantial portion of the debt forgiven after 20 years. Conversely, Job A provides a higher initial net income and a flatter income trajectory, with no debt being forgiven and higher average repayments in the first ten years.

Next, we elicit their own job preferences under each repayment plan (see Appendix Figure B.1). For the analysis, we focus on their personal choices, as the moral hazard issue might be more or less severe when it comes to their own choices compared to recommending choices for someone else.

The baseline questions elicit one's choices without job market frictions. We then introduce frictions under SAVE in the following way: For a respondent who chooses Job X under SAVE without friction, we ask her to choose among the three job profiles again (for herself) if she has to wait for N months (with zero earnings) upon graduation before Job X can start, while if she chooses either of the other two jobs, she can start working without delay. We start with N=2; if the respondent switches to a job other than X, we stop asking additional questions; otherwise, we increase N to 4. If she still chooses Job X, we increase N to 6. We use this set of questions to examine the extent to which job market frictions can curb/exacerbate moral hazard problem.

Finally, we also asked respondents whether they would change their major choice and/or other aspects of career choices after learning about IDR through the survey. For the latter, we asked respondents, "How do you think the characteristics you would look for in jobs/careers would be different?" The options included seeking riskier jobs with higher pay but more instability, jobs with better life-work balance or less stress, jobs more related to their interests even if it means lower take-home pay, jobs with more benefits, or being more selective in job acceptance even if it means waiting longer to find a job.

Figure 1: Screenshot of Making Recommendations for Wolverine under the SAVE Plan

SAVE	Job A	Job B	Job C
Starting annual salary in the first year	**$62,500**	**$52,500**	**$45,000**
Starting monthly salary in the first year	**$5,208**	**$4,375**	**$3,750**
Annual earnings growth	**1.5%**	**3%**	**4.25%**
Loan repayments			
# Years with positive loan repayment (n)	19	20	20
Total loan repayments paid	$56,761	$58,997	$55,458
Amount of debt forgiven	$0	$3,350	$9,933
Average annual loan repayments in			
Years 1-5	$2,994	$2,128	$1,453
Years 6-10	$3,093	$2,617	$2,187
Year 11 to the last year with positive loan repayment (n)	$3,196 (n=19)	$3,527 (n=20)	$3,726 (n=20)
Net annual income net of debt repayment in			
Years 1-5	$61,410	$53,618	$47,539
Years 6-10	$66,288	$62,008	$58,138
Years 11-20	$74,755	$77,357	$79,147
Years 21-30	$90,094	$108,702	$125,654

If the UM graduate were on SAVE, which job offer would you recommend? Please rank these jobs from your most recommended job (Rank 1) to your least recommended job (Rank 3)

	1: Most recommended	2	3: Least recommended
Job A	○	○	○
Job B	○	○	○
Job C	○	○	○

Notes: This figure displays a screenshot where participants rank three jobs in order of preference, making job recommendations for a UM bachelor's graduate.

Table 2: Comparison of Job Profiles under High and Low Debt Cases

Panel A: High Debt Case			
Debt		$40,000	
	Job A	**Job B**	**Job C**
Initial income	$62,500	$52,500	$45,000
Income growth	1.50%	3.00%	4.25%
40 years PV ($\beta = 0.95$)	$1.29m	$1.38m	$1.48m
Panel B: Low Debt Case			
Debt		$30,000	
	Job A	**Job B**	**Job C**
Initial income	$55,000	$47,000	$37,500
Income growth	1.50%	3.00%	4.75%
40 years PV ($\beta = 0.95$)	$1.14m	$1.24m	$1.36m

Notes: This table shows the set of three job profiles under a high debt case ($40,000) in Panel A and a low debt case ($30,000) in Panel B. Initial income is the annual income after graduation, income growth is the yearly income growth, and 40 years PV is the present value of 40 years of income discounted at 0.95.

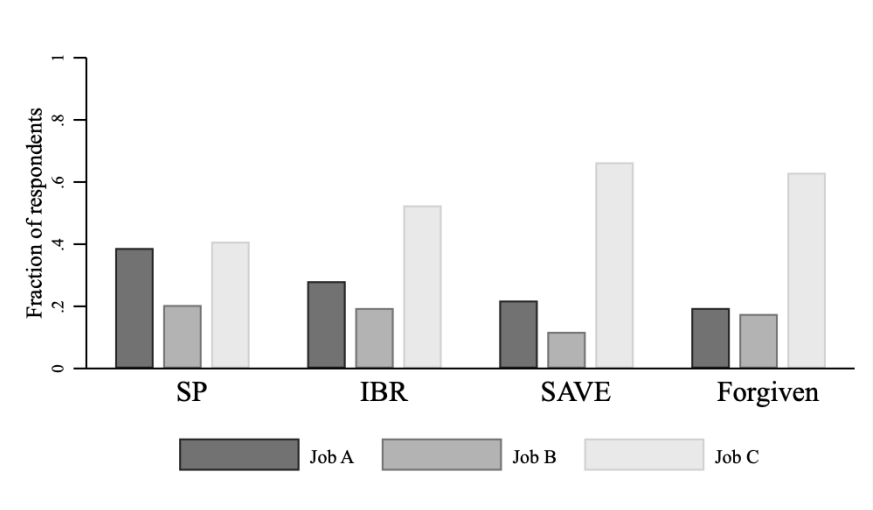
4 Survey Evidence

In this section, we present results from our survey, pooling the responses from all students. Overall, the behavioral responses are qualitatively similar between these two groups.

Result 1: Distribution of job choices varies by repayment plans.

Figure 2 presents the distributions of job choices among students under four different repayment plans with increasing degrees of generosity: Standard Payment (SP), Income-Based Repayment (IBR), Saving on a Valuable Education (SAVE), and Debt Forgiven. Under each plan, we show the fractions of students who prefer Job A (high starting wage and low growth), Job B (medium starting wage and medium growth), and Job C (low starting wage and high growth), respectively. Under SP, 39% of students perfer Job A, 20% prefer Job B, and 41% prefer Job C. As the repayment plan becomes more generous, the fraction of students choosing the low-growth Job A decreases monotonically to 28% under IBR, 22% under SAVE, and 19% under Forgiven when loan repayment burden is eliminated. Changes in the fraction of students choosing the high-growth Job C are, however, non-monotone: It

Figure 2: Job Choice Distributions Under Repayment Plans



Notes: This figure shows the distributions of job choices among students under four different repayment plans with increasing degrees of generosity: Standard Payment (SP), Income-Based Repayment (IBR), Saving on a Valuable Education (SAVE), and Debt Forgiven. The job profiles are as follows: Job A (high starting wage and low growth), Job B (medium starting wage and medium growth), and Job C (low starting wage and high growth).

increases to 52% under IBR, peaks at 66% under SAVE, and then decreases slightly to 63% under Forgiven. The distributions of choices differ across plans, suggesting the relevance of repayment plans in governing one's choices. The Kolmogorov-Smirnov two-sample test and simple regression results suggest that the job choice distribution differs significantly between Forgiven and SP, as well as between Forgiven and IBR. In Appendix Figure B.2, we present the results separately for the two randomly assigned low- and high-debt groups, and the pattern remains similar across both groups.

However, Figure 2 masks the changes made at the individual level as behavioral responses of different students can go in the opposite direction. The next set of results examine individual-level responses.

Result 2: Repayment plans affect investment in human capital, reflected as moral hazard issues through overinvestment and debt burden effects through underinvestment.

First, we examine how students' job choices change when moving from Forgiven to various repayment plans (SP, IBR, and SAVE). The first row shows that 22% of students choose a

Table 3: Changes in job choices from all forgiven to a repayment plan

Forgiven to	(1) SAVE	(2) IBR	(3) SP	(1) v.s. (3) P-value	(2) v.s. (3) P-value
Steeper	0.219***	0.163***	0.115***	0.000	0.001
	(0.017)	(0.015)	(0.013)		
Flatter	0.198***	0.271***	0.364***	0.000	0.000
	(0.016)	(0.018)	(0.019)		
Same	0.584***	0.566***	0.522***	0.000	0.056
	(0.020)	(0.020)	(0.020)		
Observations	627	627	627		

Notes: This table shows how students' job choices change when moving from a debt forgiven scenario to various repayment plans (SP, IBR, SAVE). "Steeper" means that students switch to a job profile with a higher growth rate and lower initial earnings. Conversely, "flatter" means that students switch to a job profile with a lower growth rate and higher initial earnings. Standard errors are reported in parentheses. ***, **, and * denote that estimates are statistically significant at the 1%, 5%, and 10% levels, respectively.

steeper (lower initial wage and higher growth) job profile under SAVE than they do under Forgiven; this fraction is 16% under IBR and 11% under SP. This last change under SP is inconsistent with the simple model laid out in Section 2, which may arise from noises in the survey and/or factors not captured by our model. However, the last two columns suggest that the change under an income-driven plan is significantly different from the change under SP. That is, accounting for potential survey noises, we find that a significant fraction of students choose a steeper job profile under an income-driven repayment plan, especially under SAVE, than they do under Forgiven, in which individuals are free from the loan repayment burden. This provides evidence of strictly-defined moral hazards: To reduce one's loan repayment, one overinvests during one's early career (with an overly steep job profile). On the other hand, Row 2 shows that 20% of students choose a flatter (higher initial wage and lower growth) job profile under SAVE than they do under Forgiven; this fraction is 27% under IBR and 37% under SP. This result is consistent with the hypothesis that the burden of college debt may lead some borrowers to under-invest in their human capital during their early career and this distortion increases with the stringency of repayment plans. Finally, more than 50% of the students' job choices remain the same with or without loan burden (Row 3). Given the limited choice set, some of the students in Row 3 may be constrained: An even steeper

(flatter) job profile is not available for those who prefer Job C (Job A) under Forgiven. As such, Row 1 of Table 3 provides a lower bound on the severity of the moral hazard problem, while Row 2 provides a lower bound on the severity of underinvestment. Although the lower bounds may be even lower due to the existence of noise in survey responses, the differences between columns (1) or (2) and column (3) in Table 3 are significantly different from zero. This suggests that the moral hazard and underinvestment problems we document are significantly more than just noise. Table C.1 in the appendix presents upper bounds on over- and under-investment by using a weakly steeper/flatter classification. The table indicates that 68% and 57% of students switch to weakly steeper job profiles when moving to SAVE and IBR from debt forgiven, respectively. This suggests a significant moral hazard issue with IDR plans. Additionally, 28%, 36%, and 49% of students switch to weakly flatter jobs from debt forgiven to SAVE, IBR, and SP, respectively, suggesting that loan burden suppresses human capital investment. Finally, about 4%, 7%, and 8% of students' job choices remain the same when switching from debt forgiven to SP, IBR, and SAVE, respectively.

Table 4: Across plan changes in job choices

	(1) SP to IBR	(2) SP to SAVE	(3) IBR to SAVE
Steeper	0.289***	0.372***	0.273***
	(0.018)	(0.019)	(0.018)
Flatter	0.140***	0.096***	0.139***
	(0.014)	(0.012)	(0.014)
Same	0.571***	0.533***	0.589***
	(0.020)	(0.020)	(0.020)
Observations	627	627	627

Notes: This table details how job choices vary across different repayment plans. It examines transitions from one plan to a more generous plan (SP to IBR in column (1), SP to SAVE in column (2), IBR to SAVE in column (3)), indicating the likelihood of choosing steeper, flatter, or the same job profiles under each scenario. "Steeper" means that students switch to a job profile with a higher growth rate and lower initial earnings. Conversely, "flatter" means that students switch to a job profile with a lower growth rate and higher initial earnings. Standard errors are reported in parentheses. ***, **, and * denote that estimates are statistically significant at the 1%, 5%, and 10% levels, respectively.

Next, we examine how students' job choices change across the three repayment plans, moving from a less generous plan to a more generous plan in Table 4: SP to IBR (Column 1),

SP to SAVE (Column 2), IBR to SAVE (Column 3). Unsurprisingly, the fraction of students switching to a steeper profile is the highest (37%) when the plan goes from the least generous plan SP to the most generous plan SAVE: One's choice is most likely distorted toward underinvestment under SP while one's choice is most likely distorted toward overinvestment under SAVE. In contrast, only 27% of students switch to a steeper profile with the relatively mild plan change from IBR to SAVE. Appendix Table C.2 shows the changes in job choices across plans based on a classification of weakly steeper or flatter. The percentage of students choosing weakly steeper job profiles when moving between plans is as follows: 84% for any weakly steeper movement, 60% from SP to IBR, 71% from SP to SAVE, and 56% from IBR to SAVE. This indicates that a significant number of students are opting for jobs with higher growth rates and lower initial earnings when switching to more generous repayment plans, highlighting a serious moral hazard issue. Moreover, the percentage of students switching to weakly flatter job profiles is 45% for any weakly flatter movement, 32% from SP to IBR, 24% from SP to SAVE, and 22% from IBR to SAVE. Finally, the percentage of students whose job choices remain the same across these transitions is 12% from SP to IBR, 8% from SP to SAVE, and 5% from IBR to SAVE. This implies that a small proportion of students' job choices are not significantly affected by changes in repayment plans.

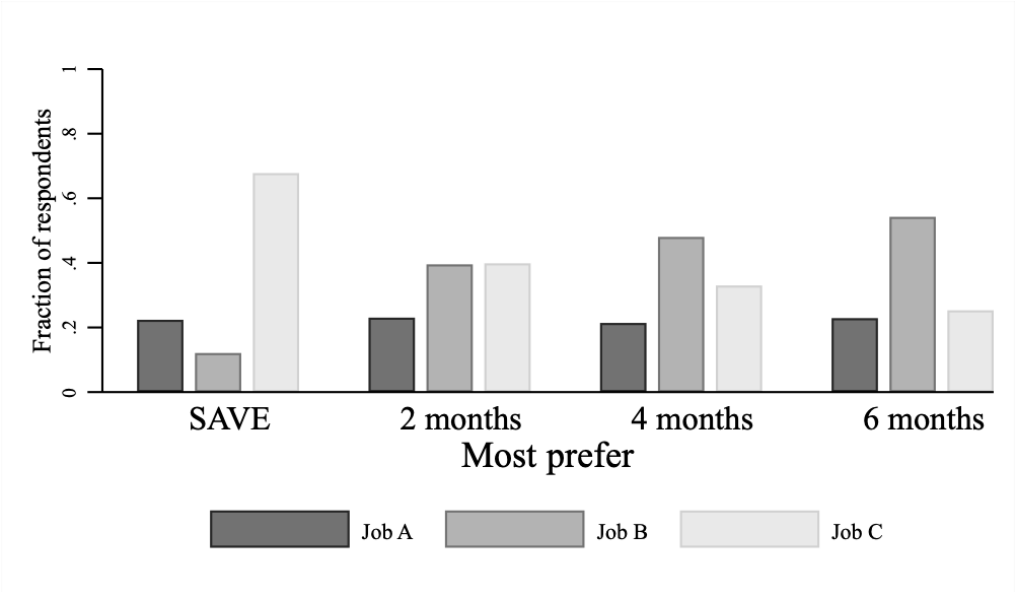
Result 3: Delays in job start times reduce moral hazard issues.

Figure 3 illustrates the impact of job market frictions on students' job preferences under SAVE. The first three bars re-present the distribution under baseline SAVE without friction (the same as in Figure 2): The fractions of students choosing Jobs A, B and C are 22%, 12% and 66%, respectively. We then introduce frictions in the following way: For a student who chooses Job X under SAVE without friction, we ask her to choose among the three job profiles again if she has to wait for N months (with zero earnings) upon graduation before Job X can start, while if she chooses either of the other two jobs, she can start working without delay. We start with N=2, if the student chooses a job other than X, we stop asking; otherwise, we increase N to 4, if she still chooses Job X, we increase N to 6.[10]

In the 2-month delay case (the second set of bars in Figure 3), 22% of students choose Job A, 38% choose Job B, and 39% choose Job C. Compared to the baseline no-delay case,

[10]We show the counterpart of Figure 2 for subgroups of students in Appendix Figure B.3 separately for subgroups who choose Job A, Job B, and Job C under the frictionless SAVE case.

Figure 3: Distribution of Job Choices with Job Start Delays Under the SAVE Plan



Notes: This figure illustrates the distributions of students' most preferred job choices under the baseline SAVE plan without friction, and with job start delays of 2, 4, and 6 months. The job profiles are defined as follows: Job A (high starting wage and low growth), Job B (medium starting wage and medium growth), and Job C (low starting wage and high growth).

the fraction of Job B (Job C) takers increases (decreases) significantly. When students face a 6-month delay in starting their preferred jobs, the fraction of Job B takers increases to 53% while that of Job C takers decreases to 25%.

Table 5 shows more details about how job market frictions may change students' job choices under SAVE. The upper panel shows that when students face a 2-month delay in starting their preferred jobs under SAVE, about 60% of students switch to a different job, the fraction of switchers increases to 76% (85%) when we extend the delay to 4 (6) months. Most of these changes are toward a flatter job profile, for example, with a 2-month delay in starting their preferred jobs, 40% of all students switch to a flatter job. Notice that the frictions we introduced in the survey is asymmetric in that the delay only applies to one's most preferred job (which is Job C for 66% of students under SAVE without job market frictions) while no delay is involved for other jobs. This asymmetry is biased toward lowering the fraction of Job C takers under SAVE and hence overstating the extent to which job market frictions can curb moral hazards (Job C leads to significant amount of debt forgiven under SAVE).

Table 5: Changes in job choices with frictions

	Have changed job choice			**Flatter job choice**		
	(1)	(2)	(3)	(4)	(5)	(6)
	2 months	4 months	6 months	2 months	4 months	6 months
All	0.596***	0.761***	0.847***	0.404***	0.512***	0.590***
	(0.020)	(0.017)	(0.014)	(0.020)	(0.020)	(0.020)
Observations	627	627	627	627	627	627
	Subsamples: job choices from all forgiven to SAVE					
Steeper	0.647***	0.787***	0.860***	0.610***	0.743***	0.816***
	(0.041)	(0.035)	(0.030)	(0.042)	(0.038)	(0.033)
Observations	136	136	136	136	136	136

Notes: This table shows the fraction of students who change their most preferred job choices when job start is delayed by 2, 4, and 6 months in columns (1) to (3). Columns (4) to (6) show the fraction of students who switched to a flatter job, i.e., a job profile with a lower growth rate and higher initial earnings. The lower panel is restricted to a subsample of students who switched to a steeper job with a higher growth rate and lower initial earnings from Forgiven to SAVE. Standard errors are reported in parentheses. ***, **, and * denote that estimates are statistically significant at the 1%, 5%, and 10% levels, respectively.

The lower panel of Table 5 focus on the subgroups of students who choose a strictly steeper job profile under (frictionless) SAVE than they do under Forgiven, i.e., the group exhibiting strictly-defined moral hazard. These students are not significanlty more likely to change their choices in response to job market frictions. However, they are more likely to change to a flatter job profile, which is not surprising given that they are, by definition, more likely to prefer a steeper profile in the frictionless SAVE case.

Result 4: Impact of Job Switching by Repayment Plans on Discounted Government Revenue

We now investigate the implication of students' plan-specific choices on the government's budget in Table 6. Column 1 presents the discounted net revenue per student, which is the sum of one's lifetime (40 working years) income taxes (calculated using the current Federal tax schedule[11]) and loan repayment minus the loan amount, all discounted to the year of

[11]In calculating government revenue, we assumed the 2023 federal income tax rate, applied the standard tax deduction of $13,850 for an individual, considered the taxpayer as filing singly, and did not include any additional tax credits.

loan initiation.[12] Column 2 shows the discounted per-student loan repayment minus the loan amount, i.e., not accounting for tax revenues; this amount would be the profit for a private lender (we refer it as the loan profit).

Table 6: Government Total Net Revenue and Loan Repayment Under Different Plans

($1,000)	(1) Government total net revenue	(2) Repayment - loan
Panel (a): Frictionless		
Forgiven	193.04	-34.82
SP	212.83	0.69
IBR	222.08	1.46
SAVE	225.56	-3.15
Panel (b): With Job Market Friction		
SAVE 2m	214.23	-1.92
SAVE 4m	212.14	-1.63
SAVE 6m	209.01	-1.24
Panel (c): Fixing Job Choice under SP		
IBR with SP choice	213.59	1.45
SAVE with SP choice	210.59	-1.55

Notes: This table illustrates the implications of students' plan-specific choices on the government's budget. Column 1 presents the discounted net revenue per student, which is the sum of one's lifetime (40 working years) income taxes and loan repayment minus the loan amount, all discounted to the year of loan initiation. Column 2 shows the discounted per-student loan repayment minus the loan amount. In Panel A, we perform these calculations for the four repayment policy regimes (Forgiven, SP, IBR, SAVE) without job market frictions. Panel B presents the cases where we introduce 2-, 4-, and 6-month delays for one's most preferred job under SAVE. Panel C re-computes government revenues and loan profits under IBR and SAVE, assuming individuals' career choices are made under SP.

In Panel (a), we carry out these calculations for the 4 repayment policy regimes (Forgiven, SP, IBR, SAVE) without job market frictions. The dramatic loan forgiven policy leads to the lowest government net revenue. Now, we focus on the latter three more realistic cases: SAVE yields the highest government revenue ($225.6K per student), while SP yields the lowest revenue ($212.8K per student). This is driven by the fact that individuals tend to

[12]We assume that the total hypothetical loan amount in our survey is distributed evenly over 4 college years; all dollar amounts are discounted at the annual interest rate of 4% and expressed in the present value of Year 1 in college.

choose higher lifetime-income career paths under SAVE than they do under SP. In terms of profits from college loan per se, SAVE is the least profitable, yielding a *loss* of \$3.2K per student.

Panel (b) show the cases where we introduce 2-, 4-, and 6-month delays for one's most preferred job under SAVE. The loan profits remain negative, although to lesser degrees, when we introduce frictions to discourage students from choosing their preferred job profiles (recall that most students prefer the low-starting wage and hence low repayment profiles under SAVE). These negative profit results suggest that SAVE is unlikely to be a viable loan plan for a private lender.

Finally, Panel (c) re-computes government revenues and loan profits under IBR and SAVE but with individuals' career choices under SP. The comparison between Panel A and Panel C highlights the importance of accounting for behavioral responses to loan repayment plans. For example, were one to ignore behavioral responses, one would draw the mistaken conclusion that government's total net revenue is lowest, rather than highest, under SAVE (Column 1). Moreover, one would also significantly under-estimate the loss from SAVE were SAVE carried out by a private lender (Column 2).

In our survey, the three job profiles exhibit linear wage growths, while a typical lifetime income growth slows down later in one's career. We therefore re-compute government revenue assuming that after 30 working years, one's income stops growing and remains flat for the last 10 years. Table C.3 in the appendix shows that the conclusion stays the same: Although SAVE results in a negative loan profit, it leads to the highest government total revenue.

Result 5: Distortion in Job Choices Along Non-Pecuniary Dimensions Due to Loan Repayment

As suggested in previous literature, college loan repayment can also distort one's choices of jobs along non-pecuniary dimensions. We also find such patterns in Table 7: 17% of students report that they would change their career trade-off between wage and amenities (toward jobs with higher amenities along at least one dimension) after learning about income-driven repayment (IDR) from the survey. Specifically, 37% of them mentioned that they would now look for a job with a better work-life balance or less stress, 30% indicated that they would seek a job more aligned with their interests, and 29% said they would look for a job with more benefits (such as vacations or flexible work schedules), even if it meant lower take-home

pay. For the subsample of students who switch to steeper jobs from debt forgiven to SAVE, about eighteen percent of them report a career trade-off change. For students who switch to a steeper job from one plan to a more generous plan, fifteen percent report a career trade-off change. Finally, for students who switch to flatter jobs from debt forgiven to the Standard Payment (SP) plan, seventeen percent report a career trade-off change.

Table 7: Career trade-off changed v.s. steeper job choices

	(1) All	(2) Forgiven to SAVE steeper	(3) Any across plans steeper	(4) Forgiven to SP flatter
Changed career	0.169	0.176	0.154	0.171
Unchanged	0.831	0.824	0.846	0.829
Observations	627	136	331	228

Notes: This table shows the proportion of students who report that they would change their career trade-off between wage and amenities (toward jobs with higher amenities along at least one dimension) after learning about income-driven repayment (IDR) from the survey. Column (1) includes all students, Column (2) restricts to students who switch to steeper jobs from Debt Forgiven to SAVE, Column (3) restricts to students who switch to a steeper job from one plan to a more generous plan, and Column (4) restricts to students who switch to flatter jobs from Debt Forgiven to the Standard Payment (SP) plan.

5 Conclusion

TBD

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Online Appendix

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A Proofs

A.1 Backward Induction to Derive interior Optimal Investment i^*

Period 3

In period 3, we have:

$$C_3 = a_2(1+r)$$

The utility from consumption in period 3 is:

$$u(C_3) = -\frac{1}{C_3} = -\frac{1}{a_2(1+r)}$$

Period 2: Express a_2 as a Function of i and a_1

In period 2, we have:

$$C_2 = (1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} - a_2 + a_1(1+r)$$

$$u(C_2) + \beta u(C_3) = -\frac{1}{(1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} - a_2 + a_1(1+r)} - \frac{\beta}{a_2(1+r)}$$

Using the first-order condition for optimal a_2:

$$\frac{\beta(1+r)}{C_3^2} = \frac{1}{C_2^2}$$

Substitute $C_3 = a_2(1+r)$:

$$a_2 = \sqrt{\frac{\beta}{1+r}} C_2$$

Substitute a_2 into C_2:

$$C_2 = (1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} - \sqrt{\frac{\beta}{1+r}} C_2 + a_1(1+r)$$

$$C_2 \left(1 + \sqrt{\frac{\beta}{1+r}}\right) = (1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} + a_1(1+r)$$

$$C_2 = \frac{(1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} + a_1(1+r)}{1+\sqrt{\frac{\beta}{1+r}}}$$

We now have a_2 as a function of i and a_1:

$$a_2 = \sqrt{\frac{\beta}{1+r}} \frac{(1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} + a_1(1+r)}{1+\sqrt{\frac{\beta}{1+r}}}$$

Period 1: Solve for a_1 and i

In period 1, under IDR we have:

$$C_1 = k_1(1-\tau)(1-i) - a_1$$

The total utility function is:

$$U = u(C_1) + \beta u(C_2) + \beta^2 u(C_3)$$

$$U = -\frac{1}{C_1} - \frac{\beta}{C_2} - \frac{\beta^2}{C_3}$$

The FOC for a_1 is:

$$\frac{\partial U}{\partial a_1} = -\frac{1}{C_1^2} - \beta \frac{\partial}{\partial a_1}\left(\frac{1}{C_2}\right) - \beta^2 \frac{\partial}{\partial a_1}\left(\frac{1}{C_3}\right) = 0$$

Since $C_2 = \frac{(1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} + a_1(1+r)}{1+\sqrt{\frac{\beta}{1+r}}}$, we have:

$$\frac{1}{C_2} = \frac{1+\sqrt{\frac{\beta}{1+r}}}{(1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} + a_1(1+r)}$$

Differentiating with respect to a_1:

$$\frac{\partial}{\partial a_1}\left(\frac{1}{C_2}\right) = -\frac{(1+\sqrt{\frac{\beta}{1+r}})(1+r)}{((1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} + a_1(1+r))^2}$$

Given $C_3 = \sqrt{\beta(1+r)}C_2$, we have:

$$\frac{1}{C_3} = \frac{1}{\sqrt{\beta(1+r)}C_2}$$

Differentiating with respect to a_1:

$$\frac{\partial}{\partial a_1}\left(\frac{1}{C_3}\right) = -\frac{(1+\sqrt{\frac{\beta}{1+r}})(1+r)}{\sqrt{\beta(1+r)}((1-\delta)k_1 + Ak_1^{\alpha_1}i^{\alpha_2} + a_1(1+r))^2}$$

The FOC becomes:

$$\frac{1}{C_1^2} = \frac{\beta(1+r)(1+\sqrt{\frac{\beta}{1+r}})^2}{((1-\delta)k_1 + Ak_1^{\alpha_1}i^{\alpha_2} + a_1(1+r))^2}$$

$$\sqrt{\beta(1+r)}(1+\sqrt{\frac{\beta}{1+r}})(k_1(1-\tau)(1-i) - a_1) = (1-\delta)k_1 + Ak_1^{\alpha_1}i^{\alpha_2} + a_1(1+r)$$

Similarly for SP, the FOC becomes:

$$\sqrt{\beta(1+r)}(1+\sqrt{\frac{\beta}{1+r}})(k_1(1-i) - l_0 - a_1) = (1-\delta)k_1 + Ak_1^{\alpha_1}i^{\alpha_2} + a_1(1+r)$$

Using the FOC for i under IDR:

$$\frac{\partial U}{\partial i} = -\frac{k_1(1-\tau)}{C_1^2} - \beta\frac{\partial}{\partial i}\left(\frac{1}{C_2}\right) - \beta^2\frac{\partial}{\partial i}\left(\frac{1}{C_3}\right) = 0$$

We need to differentiate both C_2 and C_3 with respect to i.

$$C_2 = \frac{(1-\delta)k_1 + Ak_1^{\alpha_1}i^{\alpha_2} + a_1(1+r)}{1+\sqrt{\frac{\beta}{1+r}}}$$

$$C_3 = \sqrt{\beta(1+r)}C_2$$

Differentiating with respect to i:

$$\frac{\partial C_2}{\partial i} = \frac{A k_1^{\alpha_1} \alpha_2 i^{\alpha_2 - 1}}{1 + \sqrt{\frac{\beta}{1+r}}}$$

$$\frac{\partial}{\partial i}\left(\frac{1}{C_2}\right) = -\frac{A k_1^{\alpha_1} \alpha_2 i^{\alpha_2 - 1}(1 + \sqrt{\frac{\beta}{1+r}})}{((1-\delta)k_1 + A k_1^{\alpha_1} i^{\alpha_2} + a_1(1+r))^2}$$

$$\frac{\partial C_3}{\partial i} = \sqrt{\beta(1+r)}\frac{\partial C_2}{\partial i} = \sqrt{\beta(1+r)}\frac{A k_1^{\alpha_1} \alpha_2 i^{\alpha_2 - 1}}{1 + \sqrt{\frac{\beta}{1+r}}}$$

$$\frac{\partial}{\partial i}\left(\frac{1}{C_3}\right) = -\frac{\sqrt{\beta(1+r)} A k_1^{\alpha_1} \alpha_2 i^{\alpha_2 - 1}(1 + \sqrt{\frac{\beta}{1+r}})}{\left(\sqrt{\beta(1+r)}((1-\delta)k_1 + A k_1^{\alpha_1} i^{\alpha_2} + a_1(1+r))\right)^2}$$

The FOC becomes:

$$\frac{k_1(1-\tau)}{C_1^2} = \beta\frac{A k_1^{\alpha_1} \alpha_2 i^{\alpha_2 - 1}(1 + \sqrt{\frac{\beta}{1+r}})}{((1-\delta)k_1 + A k_1^{\alpha_1} i^{\alpha_2} + a_1(1+r))^2} + \beta^2\frac{\sqrt{\beta(1+r)} A k_1^{\alpha_1} \alpha_2 i^{\alpha_2 - 1}(1 + \sqrt{\frac{\beta}{1+r}})}{\left(\sqrt{\beta(1+r)}((1-\delta)k_1 + A k_1^{\alpha_1} i^{\alpha_2} + a_1(1+r))\right)^2}$$

Simplify these terms:

$$\frac{k_1(1-\tau)}{(k_1(1-i)(1-\tau) - a_1)^2} = \beta\frac{A k_1^{\alpha_1} \alpha_2 i^{\alpha_2 - 1}(1 + \sqrt{\frac{\beta}{1+r}})^2}{((1-\delta)k_1 + A k_1^{\alpha_1} i^{\alpha_2} + a_1(1+r))^2}$$

Similarly for FOC under SP:

$$\frac{k_1}{(k_1(1-i) - l_0 - a_1)^2} = \beta\frac{A k_1^{\alpha_1} \alpha_2 i^{\alpha_2 - 1}(1 + \sqrt{\frac{\beta}{1+r}})^2}{((1-\delta)k_1 + A k_1^{\alpha_1} i^{\alpha_2} + a_1(1+r))^2}$$

Combine and Solve for i

Using both conditions, we can solve for i under IDR:

$$\beta \frac{Ak_1^{\alpha_1}\alpha_2 i^{\alpha_2-1}(1+\sqrt{\frac{\beta}{1+r}})^2}{((1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} + a_1(1+r))^2} = k_1(1-\tau)\frac{\beta(1+r)(1+\sqrt{\frac{\beta}{1+r}})^2}{((1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} + a_1(1+r))^2}$$

$$i = \left(\frac{(1-\tau)(1+r)}{\alpha_2 A k_1^{\alpha_1-1}}\right)^{\frac{1}{\alpha_2-1}}$$

Similarly for i under SP:

$$\beta \frac{Ak_1^{\alpha_1}\alpha_2 i^{\alpha_2-1}(1+\sqrt{\frac{\beta}{1+r}})^2}{((1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} + a_1(1+r))^2} = k_1\frac{\beta(1+r)(1+\sqrt{\frac{\beta}{1+r}})^2}{((1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} + a_1(1+r))^2}$$

$$i = \left(\frac{(1+r)}{\alpha_2 A k_1^{\alpha_1-1}}\right)^{\frac{1}{\alpha_2-1}}$$

Therefore, we have

$$i^* = \begin{cases} \left(\frac{(1-\tau)(1+r)}{\alpha_2 A k_1^{\alpha_1-1}}\right)^{\frac{1}{\alpha_2-1}} & \text{if IDR,} \\ \left(\frac{(1+r)}{\alpha_2 A k_1^{\alpha_1-1}}\right)^{\frac{1}{\alpha_2-1}} & \text{if SP.} \end{cases}$$

A.2 Comparative Statics for Optimal Investment i^*

Since we have

$$i^* = \begin{cases} \left(\frac{(1-\tau)(1+r)}{\alpha_2 A k_1^{\alpha_1-1}}\right)^{\frac{1}{\alpha_2-1}} & \text{if IDR,} \\ \left(\frac{(1+r)}{\alpha_2 A k_1^{\alpha_1-1}}\right)^{\frac{1}{\alpha_2-1}} & \text{if SP.} \end{cases}$$

Given that α_1 and α_2 are between 0 and 1, we have the following properties for i^*:

- Increases with A, τ, α_1.
- Is independent of β, l_0.

- Decreases with k_1, r.

A.3 Corner Solution for Optimal Investment i^*

At the corner solution, we have $a_1 = -B$. The FOC for a_1 becomes:

$$\sqrt{\beta(1+r)}\left(1+\sqrt{\frac{\beta}{1+r}}\right)(k_1(1-\tau)(1-i)+B) < (1-\delta)k_1 + Ak_1^{\alpha_1}i^{\alpha_2} - B(1+r)$$

$$B < \frac{(1-\delta)k_1 + Ak_1^{\alpha_1}i^{\alpha_2} - \sqrt{\beta(1+r)}\left(1+\sqrt{\frac{\beta}{1+r}}\right)k_1(1-\tau)(1-i)}{\sqrt{\beta(1+r)}\left(1+\sqrt{\frac{\beta}{1+r}}\right)+1+r}$$

Similarly, for SP, the FOC becomes:

$$\sqrt{\beta(1+r)}\left(1+\sqrt{\frac{\beta}{1+r}}\right)(k_1(1-i)-l_0+B) < (1-\delta)k_1 + Ak_1^{\alpha_1}i^{\alpha_2} - B(1+r)$$

The FOC for i is:

$$\frac{k_1(1-\tau)}{(k_1(1-i)(1-\tau)+B)^2} = \beta\frac{Ak_1^{\alpha_1}\alpha_2 i^{\alpha_2-1}\left(1+\sqrt{\frac{\beta}{1+r}}\right)^2}{((1-\delta)k_1 + Ak_1^{\alpha_1}i^{\alpha_2} - B(1+r))^2}$$

$$\frac{\sqrt{k_1(1-\tau)}}{k_1(1-i)(1-\tau)+B} = \frac{\sqrt{\beta Ak_1^{\alpha_1}\alpha_2 i^{\alpha_2-1}}\left(1+\sqrt{\frac{\beta}{1+r}}\right)}{(1-\delta)k_1 + Ak_1^{\alpha_1}i^{\alpha_2} - B(1+r)}$$

Note that the RHS is decreasing with i given $\alpha_2 < 1$, as the denominator is increasing with i but the numerator is decreasing with i.

Comparing $LHS(\tau = 0)$ and $LHS(\tau > 0)$ at $i^{\tau=0}$:

$$LHS(\tau = 0) = \frac{\sqrt{k_1}}{k_1(1-i^{\tau=0})+B}$$

$$LHS(\tau > 0) = \frac{\sqrt{k_1(1-\tau)}}{k_1(1-i^{\tau=0})(1-\tau)+B}$$

When

$$B < k_1(1 - i^{\tau=0})\sqrt{(1-\tau)} \Rightarrow LHS(\tau = 0) < LHS(\tau > 0)$$

Moreover, LHS is increasing with i. Therefore,

$$LHS(\tau = 0) < LHS(\tau > 0) \Leftrightarrow i^{\tau=0} > i^{\tau>0}$$

In summary, if the borrowing constraint is not overly slack,

$$B < k_1(1 - i^{\tau=0})\sqrt{(1-\tau)}$$

and in the corner solution

$$B < \frac{(1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} - \sqrt{\beta(1+r)}\left(1 + \sqrt{\frac{\beta}{1+r}}\right) k_1(1-\tau)(1-i)}{\sqrt{\beta(1+r)}\left(1 + \sqrt{\frac{\beta}{1+r}}\right) + 1 + r}$$

we have

$$i^{\tau=0} > i^{\tau>0}, \quad \text{i.e.,} \quad i^{\text{forgive}} > i^{\text{IDR}}.$$

Similarly, for the FOC under SP:

$$\frac{k_1}{(k_1(1-i) - l_0 + B)^2} = \beta \frac{Ak_1^{\alpha_1}\alpha_2 i^{\alpha_2 - 1}\left(1 + \sqrt{\frac{\beta}{1+r}}\right)^2}{((1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} + a_1(1+r))^2}$$

$$\frac{\sqrt{k_1}((1-\delta)k_1 + Ak_1^{\alpha_1} i^{\alpha_2} - B(1+r))}{(k_1(1-i) - l_0 + B)\sqrt{\beta A k_1^{\alpha_1}\alpha_2 i^{\alpha_2 - 1}}} = 1 + \sqrt{\frac{\beta}{1+r}}$$

LHS increases with l_0, so i needs to decrease as l_0 goes up to keep the LHS unchanged, which leads to $i^{l_0=0} > i^{l_0>0}, \quad i^{\text{forgive}} > i^{\text{SP}}$.

Therefore, we have

$$i^{\text{forgive}} > i^{\text{IDR}} \quad \text{if} \quad B < k_1(1 - i^{\text{forgive}})\sqrt{(1-\tau)},$$

$$i^{\text{forgive}} < i^{\text{IDR}} \quad \text{if} \quad B > k_1(1 - i^{\text{forgive}})\sqrt{(1-\tau)},$$

$$i^{\text{forgive}} > i^{\text{SP}}$$

A.4 Condition for Entering Corner Solution

The condition for entering the corner solution is

$$\sqrt{\beta(1+r)}\left(1+\sqrt{\frac{\beta}{1+r}}\right)(k_1(1-\tau)(1-i)+B) < (1-\delta)k_1 + Ak_1^{\alpha_1}i^{\alpha_2} - B(1+r)$$

$$B < \frac{(1-\delta)k_1 + Ak_1^{\alpha_1}i^{\alpha_2} - \sqrt{\beta(1+r)}\left(1+\sqrt{\frac{\beta}{1+r}}\right)k_1(1-\tau)(1-i)}{\sqrt{\beta(1+r)}\left(1+\sqrt{\frac{\beta}{1+r}}\right)+1+r}$$

Similarly, for SP:

$$B < \frac{(1-\delta)k_1 + Ak_1^{\alpha_1}i^{\alpha_2} - \sqrt{\beta(1+r)}\left(1+\sqrt{\frac{\beta}{1+r}}\right)(k_1(1-i)-l_0)}{\sqrt{\beta(1+r)}\left(1+\sqrt{\frac{\beta}{1+r}}\right)+1+r}$$

It is trivial to show that the RHS is increasing with A, α_1, τ, and l_0. As a result, larger values of these parameters will make this condition more likely to hold, i.e., enter the corner solution. Larger B will more likely violate this condition, thereby reducing the likelihood of becoming a corner solution. The RHS is decreasing with β as the denominator is increasing with β but the numerator is decreasing with it. Hence, larger β will make it less likely to be a corner solution.

Therefore, the probability of not entering a corner solution is:

- Smaller with higher A, α_1, τ, and l_0.
- Larger with higher B and β.

B Appendix figures

Figure B.1: Screenshot of Eliciting Students' Job Preferences under the SP and IBR Plans

(a) Preferences under the SP Plan

Under the SP for debt repayment, your student debt repayments, net earnings will be as follows for the three jobs:

SP	Job A	Job B	Job C
Starting annual salary in the first year	**$62,500**	**$52,500**	**$45,000**
Starting monthly salary in the first year	**$5,208**	**$4,375**	**$3,750**
Annual earnings growth	**1.5%**	**3%**	**4.25%**
Loan repayments			
# Years with positive loan repayment	10	10	10
Total loan repayments paid	$48,598	$48,598	$48,598
Amount of debt forgiven	$0	$0	$0
Average annual loan repayments in			
Years 1-5	$4,860	$4,860	$4,860
Years 6-10	$4,860	$4,860	$4,860
Year 11 onwards	$0	$0	$0
Net annual income net of debt repayment in			
Years 1-5	$59,544	$50,886	$44,131
Years 6-10	$64,521	$59,765	$55,465
Years 11-20	$77,631	$80,884	$82,873
Years 21-30	$90,094	$108,702	$125,654

If you were on the SP, which job offer would you choose? Please rank these jobs from your most preferred job (Rank 1) to your least preferred job (Rank 3)

(b) Preferences under the IBR Plan

Under IBR, student debt repayment repayments would **depend on earnings**, your student debt repayments, net earnings will be as follows for the three jobs:

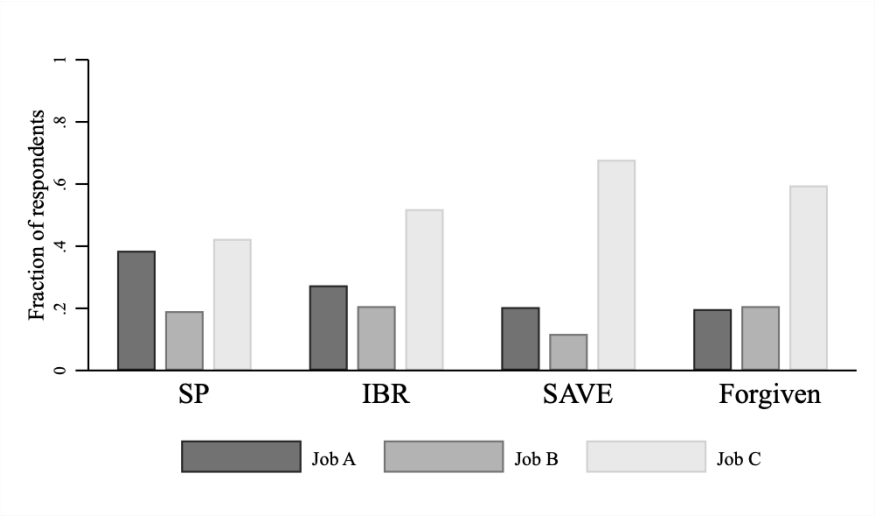
IBR	Job A	Job B	Job C
Starting annual salary in the first year	**$62,500**	**$52,500**	**$45,000**
Starting monthly salary in the first year	**$5,208**	**$4,375**	**$3,750**
Annual earnings growth	**1.5%**	**3%**	**4.25%**
Loan repayments			
# Years with positive loan repayment (n)	12	14	16
Total repayments paid	$50,516	$53,652	$56,591
Amount of debt forgiven	$0	$0	$0
Average annual loan repayments in			
Years 1-5	$4,143	$3,277	$2,601
Years 6-10	$4,374	$3,899	$3,469
Year 11 to the last year with positive loan repayment (n)	$4,535 (n=12)	$4,543 (n=14)	$4,576 (n=16)
Net annual income net of debt repayment in			
Years 1-5	$60,261	$52,469	$46,390
Years 6-10	$65,006	$60,726	$56,856
Years 11-20	$76,724	$79,067	$80,128
Years 21-30	$90,094	$108,701	$125,654

If you were on IBR, which job offer would you choose? Please rank these jobs from your most preferred job (Rank 1) to your least preferred job (Rank 3)

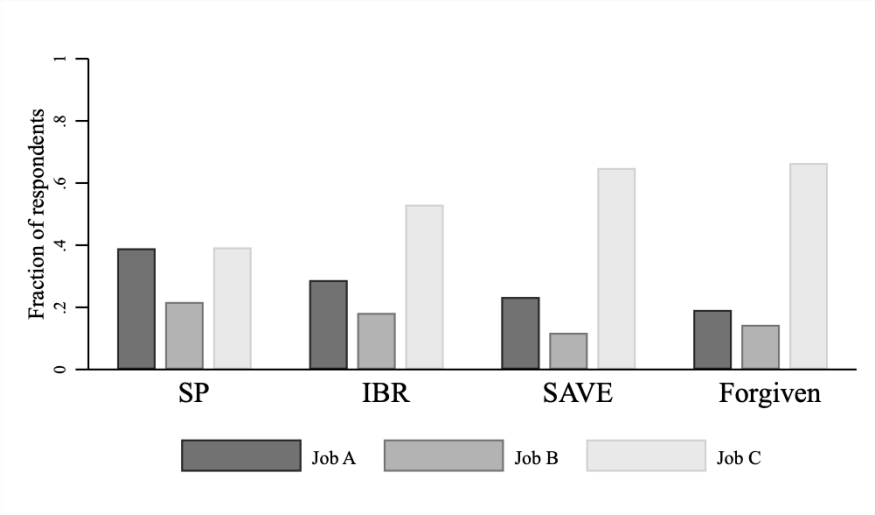
Notes: Notes: This figure displays screenshots where participants rank three jobs in order of preference under the Standard Payment (SP) plan (panel (a) and the Income-Based Repayment (IBR) plan (panel (b)).

Figure B.2: Job Choice Distributions Under Repayment Plans for Low and High Debt Cases

(a) Low debt case



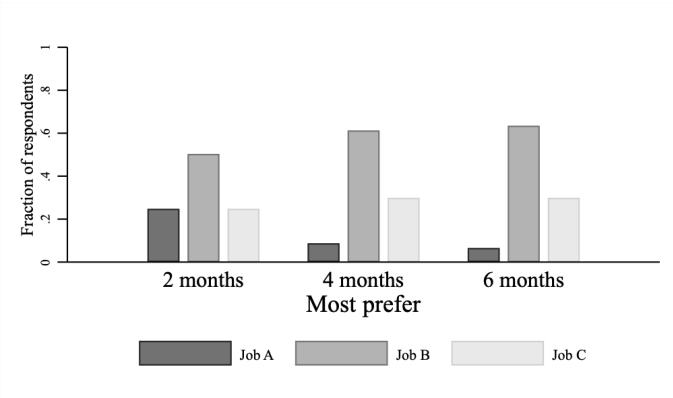
(b) High debt case



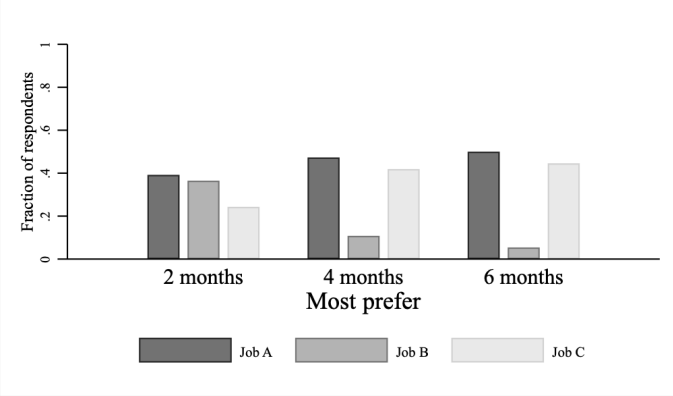
Notes: This figure shows the distributions of job choices among students under four different repayment plans with increasing degrees of generosity: Standard Payment (SP), Income-Based Repayment (IBR), Saving on a Valuable Education (SAVE), and Debt Forgiven. The distributions are shown separately for the low debt case ($30,000) in panel (a) and the high debt case ($40,000) in panel (b). The job profiles are defined as follows: Job A (high starting wage and low growth), Job B (medium starting wage and medium growth), and Job C (low starting wage and high growth).

Figure B.3: Distribution of Job Choices with Job Start Delays Under the SAVE Plan

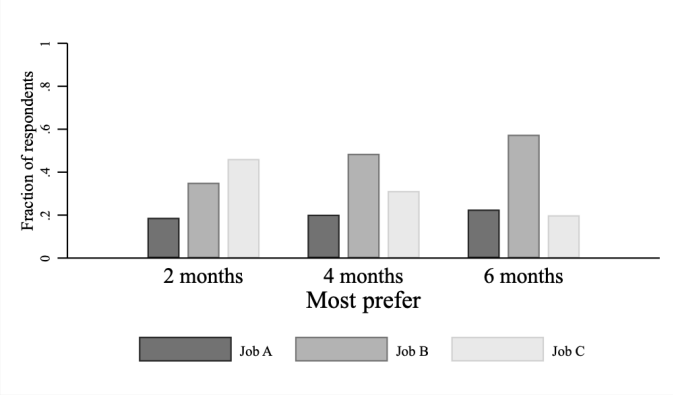
(a) Prefer Job A under SAVE



(b) Prefer Job B under SAVE



(c) Prefer Job C under SAVE



Notes: This figure illustrates the distributions of students' most preferred job choices under the SAVE plan with job start delays of 2, 4, and 6 months. Panels (a) to (c) respectively show the preferences of students who initially prefer jobs A, B, and C under the SAVE plan without frictions. The job profiles are defined as follows: Job A (high starting wage and low growth), Job B (medium starting wage and medium growth), and Job C (low starting wage and high growth).

C Appendix tables

Table C.1: Job Choice Shifts from Full Forgiveness to Repayment Plans

	(1)	(2)	(3)	(1) v.s. (3)	(2) v.s. (3)
Forgiven to	SAVE	IBR	SP	P-value	P-value
Weakly steeper	0.683***	0.565***	0.429***	0.000	0.000
	(0.019)	(0.020)	(0.020)		
Weakly flatter	0.282***	0.360***	0.491***	0.000	0.000
	(0.018)	(0.019)	(0.020)		
Same	0.035***	0.075***	0.080***	0.000	0.631
	(0.007)	(0.011)	(0.011)		
Observations	627	627	627		

Notes: This table shows how students' job choices change when moving from a debt forgiven scenario to various repayment plans (SP, IBR, SAVE), using a weakly steeper/flatter classification. "Weakly steeper" means that students either switch to a job profile with a higher growth rate and lower initial earnings, or they already chose Job C (the steepest job profile) and do not change plans. Conversely, "weakly flatter" means that students either switch to a job profile with a lower growth rate and higher initial earnings, or they already chose Job A (the flattest job profile) and do not change plans. Standard errors are reported in parentheses. ***, **, and * denote that estimates are statistically significant at the 1%, 5%, and 10% levels, respectively.

Table C.2: Across Plan Changes in Job Choices

	(1) Any	(2) SP to IBR	(3) SP to SAVE	(4) IBR to SAVE
Weakly steeper	0.837***	0.598***	0.713***	0.557***
	(0.015)	(0.020)	(0.018)	(0.020)
Weakly flatter	0.450***	0.319***	0.239***	0.217***
	(0.020)	(0.019)	(0.017)	(0.016)
Same	0.124***	0.083***	0.048***	0.057***
	(0.013)	(0.011)	(0.009)	(0.009)
Observations	627	627	627	627

Notes: This table details how job choices vary across different repayment plans using a weakly steeper/flatter classification. It examines transitions from one plan to a more generous plan (SP to IBR in column (2), SP to SAVE in column (3), IBR to SAVE in column (4), and any of these movements in column (1)), indicating the likelihood of choosing weakly steeper, weakly flatter, or same job profiles under each scenario. "Weakly steeper" means that students either switch to a job profile with a higher growth rate and lower initial earnings or they already chose Job C (the steepest job profile) and do not change plans. Conversely, "weakly flatter" means that students either switch to a job profile with a lower growth rate and higher initial earnings or they already chose Job A (the flattest job profile) and do not change plans. Standard errors are reported in parentheses. ***, **, and * denote that estimates are statistically significant at the 1%, 5%, and 10% levels, respectively.

Table C.3: Changes in government revenue from SP to SAVE

($1,000)	(1) Government total net revenue	(2) Repayment - loan
Panel (a): Frictionless		
Forgiven	174.08	-34.82
SP	198.28	0.69
IBR	205.16	1.46
SAVE	206.28	-3.15
Panel (b): With Job Market Friction		
SAVE 2m	198.65	-1.92
SAVE 4m	197.29	-1.63
SAVE 6m	195.23	-1.24
Panel (c): Fixing Job Choice under SP		
IBR with SP choice	199.04	1.45
SAVE with SP choice	196.04	-1.55

Notes: This table illustrates the implications of students' plan-specific choices on the government's budget. Column 1 presents the discounted net revenue per student, which is the sum of one's lifetime (40 working years, with income growth stopping after 30 years and remaining flat for the last 10 years) income taxes and loan repayment minus the loan amount, all discounted to the year of loan initiation. Column 2 shows the discounted per-student loan repayment minus the loan amount. In Panel A, we perform these calculations for the four repayment policy regimes (Forgiven, SP, IBR, SAVE) without job market frictions. Panel B presents the cases where we introduce 2-, 4-, and 6-month delays for one's most preferred job under SAVE. Panel C re-computes government revenues and loan profits under IBR and SAVE, assuming individuals' career choices are made under SP.

Table C.4: Keep this? Changes in government revenue from SP to SAVE, flat last 10 years

	Total revenue	Repayment
All	8.00	-3.84
Steeper	37.04	-5.29
Flatter	-39.39	0.63
Same	-3.63	-3.63

D Student survey

The survey is structured as follows. Given the complicated nature of student loan repayment plans, we chose to convey the information through videos. We first ask respondents to watch two videos that explain the details of each plan for a hypothetical student named "Wolverine". In the first 3.5-minute video, we explain SP and IBR, detailing how monthly repayments are determined, the length of payments, and using an example of a recent UM bachelor's graduate with the middle-profile Job B to illustrate how repayments may (or may not) depend on one's income. In the second 4-minute video, we introduce the SAVE plan, its repayment rules, and loan forgiveness rules. We again use the same example to highlight the differences between SP, IBR, and SAVE in terms of average annual repayments, average annual income net of loan repayments, and debt forgiveness. Appendix E contains the scripts from the videos, and the videos are available at https://youtube.com/playlist?list=PLOTetj27R3Y4vu4cCYSR3Hn39IdMz0Lu0&si=mbLs18uukVWTq88C.

For each video, the first time respondents cannot forward it but can pause it at any time. On the next page, they can review the video as many times as they want. This approach ensures that respondents indeed watch the videos initially and allows them to revisit the content if needed. We also designed understanding checks, which allow two attempts before showing the explanation for the correct answer, to ensure that respondents grasp the information about loan forgiveness and differences in repayments across the plans.

After watching the videos, we first ask respondents to give advice for the hypothetical character regarding job choices under each repayment plan by ranking the three jobs. Next, we inquire about their own job preferences under each repayment plan, imagining they are in the same situation [13] as the hypothetical character. Under the SAVE plan, we also ask if a delay of 2, 4, or 6 months in starting their preferred job would prompt them to change to another job. This allows us to measure how moral hazard issues can be reduced by job search frictions. Additionally, we ask respondents to rank the three scenarios in which they choose their most preferred job under each repayment plan. Finally, we ask about their job preferences if all the debt is forgiven.

[13] Respondents were asked to imagine they are in the same situation as the UM bachelor graduate with $40,000 ($30,000) in federal student debt. They have three job offers: Job A with the highest starting salary, Job C with the highest earnings growth, and an intermediate option. They were to assume they would accept one of these jobs, stay with it until retirement, and remain single.

Student loan survey

Start of Block: Intro

consent Please indicate your agreement to participate in this research study:

- ○ Yes (1)
- ○ No (2)

Skip To: End of Survey If Please indicate your agreement to participate in this research study: = No

End of Block: Intro

Start of Block: mobile

Q242 You must use a **computer or laptop (NOT mobile phones)** to answer the survey questions. If would like to take the survey, please email xxx.edu to request for a new link.

End of Block: mobile

Start of Block: screening

Timing1 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

Qscreening1 .Skin #Logo { display:none; } Which school year are you in currently?

- ○ Freshman (1)
- ○ Sophomore (2)
- ○ Junior (3)
- ○ Senior (4)

E Video scripts

Video scripts for the high debt case. Numbers used in the low debt case are changed accordingly.

E.1 Video 1

In this video, we will explain various student loan repayment plans. Historically, student loan borrowers have primarily used the "Standard Plan" (SP) for repayment. Under the SP, you make fixed monthly payments over a 10-year period to pay off your debt plus interest. In recent years, the US government has been offering the Income-Based Repayment (IBR) plan. It caps debt repayments at 10% of your "discretionary" income, and during any month, you never pay more than the monthly amount you would pay under the Standard Plan. You make loan repayment according to this formula until you pay off your debt plus interests or until 20 years of payment, whichever comes first. Any remaining debt is forgiven after 20 years. Discretionary income is defined as the difference between one's income and 1.5 times the federal poverty line; no loan repayments are made during periods when one earns less than 1.5 times the federal poverty line. The federal poverty line is $14580 for an individual and increases with family size. So, for an individual, they would only need to pay student loans if their annual income is above $21870. IBR requires low or zero repayment during times when one's income is low and hence lowers the repayment burden when one needs it the most. Lower-income individuals may spend more than 10 years in student debt and hence pay more in interest payments, and they may have some of their debt forgiven after 20 years of payment. Let's go through an example. Let's imagine Wolverine, a recent UM bachelor's graduate with $40,000 in federal student debt and a 4% annual interest rate. Wolverine has secured a job with a starting annual salary of $52,500 and the salary grows by 3% each year. Wolverine is committed to this long-term career. For simplicity, we assume Wolverine remains single. Under the Standard Plan, Wolverine would make fixed payments for 10 years, totaling about $48600 in repayments. No debt is forgiven, and the annual payments are fixed at about $4800 for each of the first 10 years. The last panel shows the average annual income net of student loan payments. Since income rises over time but student debt payments are fixed, the student debt payments are a larger share of income in one's early career. Under IBR, the repayment period is longer. Wolverine will pay off his debt in 14

years with a total payment of about $53600. Since Wolverine will pay off his debt within 20 years, there is no debt forgiven. In the first few years, the payment burden is low relative to Wolverine's earnings. For example, Wolverine will only pay an average of $3300 during the first five years, as Wolverine's income increases over time, the monthly repayment also grows.

E.2 Video 2

But wait, there's more! The Biden administration has introduced a third plan, "Saving on a Valuable Education" (SAVE). Under the current SAVE plan, debt repayment is capped at 10% of one's discretionary income. The definition of discretionary income is different here: it is defined as the difference between one's income and 2.25 times the federal poverty line. So, for an individual, they would only need to pay student loans if their annual income is above $32,805. Under the SAVE plan, borrowers whose original federal student debt is $12,000 or less will receive forgiveness after 10 years of repayment. For those with larger original debt, loan forgiveness requires more years of payment, up to 20 years. In addition, SAVE ensures that borrowers never see their balance grow as long as they keep up with their required payments. Now, let's revisit our example for Wolverine with the SAVE plan: Under the SAVE plan, Wolverine will make student loan payments for a full 20-year term, totaling about $59000 in payments. In this example, a significant portion of the debt, about $3350, is forgiven. Similar to the IBR plan, the SAVE plan's monthly payments depend on the income level. In particular, in the first five years, Wolverine only needs to pay an average of about $2,100. We have just given you a lot of information. Now, let's look at the same statistics but, this time, with the three plans next to each other. First, let's examine the average annual repayments. Under SP, the annual repayments remain fixed at about $4,800. In contrast, IBR and SAVE adjust repayments based on income. Both plans put smaller burdens on individuals when their income is lower; as the individual's income increases, their repayment also grows. For example, during the first five years, Wolverine only needs to pay an average of $3300 per year under IBR, $2100 under SAVE The next panel highlights the Average Annual Income net of student loan repayments. Due to the lower repayments under IBR and SAVE, students experience a higher net annual income during the initial years of repayment. However, the downside of lower monthly repayments is a longer time one spends

in repayment. In this example, Wolverine makes repayments for 10 years under SP, 14 years under IBR and 20 years under SAVE. The extended repayment duration also leads to higher accrued interest. As a result, the total loan repayment is highest under SAVE, and lowest under SP.

Lastly, let's assess Wolverine's debt forgiveness in this scenario. By design, Wolverine needs to pay off his debt in 10 years under SP. IBR offers debt forgiveness after 20 years of payment, but Wolverine pays off his debt in less than 20 years and hence has no debt forgiven. Under SAVE, after 20 years of repayment, Wolverine still has an outstanding balance of about $3,350 and this amount is forgiven.

In general, which student loan repayment plan is most suitable for an individual depends on many factors, but here are two key factors that should be considered by any student loan taker:

1. The total amount of student debt they owe.

And

2. Their post-college earnings profile, especially during the loan repayment years. Later in this survey, we will show you different job profiles and how repayment differs under SP, IBR, and SAVE for a given job profile.