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The Effects of Default Choice on Student Loan Borrowing: Experimental Evidence from a Public Research University

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Abstract

We explore the role of defaults and choice architecture on student loan decision-making, experimentally testing the impact pre-populating either decline or accept decisions compared to an active choice, no pre-population, decision. We demonstrate that the default choice presented does influence student loan borrowing decisions. Specifically, compared to active choice, students presented within a pre-populated decline decision were almost five percent less likely to accept all packaged loans and borrowed between 4.6 and 4.8 percent less in federal educational loans. The reductions in borrowing appears to be concentrated within unsubsidized loans with those assigned to the opt-in condition borrowing 8.3 percent less in unsubsidized loans. These changes in borrowing did not induce substitution towards private or Parent PLUS loans nor did they negatively impact enrollment, academic performance, or on-campus work outcomes in the same academic year.

Keywords: Financial Aid, Student Loans, Experimental Design
JEL Codes: I22, I23, C93, G40

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1 Introduction

Successfully obtaining federal student financial aid is a significant, positive predictor of student access to and success in college (Deming and Dynarski, 2010). However, the complexities of the federal financial aid system — and the student loan program specifically — undermine the goal of increasing access to appropriate levels of financial aid and supporting success through college (Castleman et al., 2015; Bettinger et al., 2012; Castleman and Page, 2015; Dynarski and Scott-Clayton, 2008). Prior research has focused on the ways in which system complexity may hinder students from accessing any financial aid, for example, due to the cumbersome nature of the Free Application for Federal Student Aid (Bettinger et al., 2012). However, complexity in other aspects of the federal financial aid system may lead to other adverse outcomes, even for students who successfully receive financial aid. For example, there is a growing concern about student loan debt burden. Elevated student loan debt levels are associated with a lower likelihood of college persistence and completion (Kim, 2007; Zhan et al., 2016), lower rates of post-baccalaureate enrollment (Rothstein and Rouse, 2011), and higher rates of loan default and future financial challenges (Baum and Steele, 2010; Ratcliffe and McKernan, 2013). Further, underrepresented minorities and first-generation college students disproportionately carry student loan debt (Hillman, 2014), making student borrowing an issue relevant to current patterns of socioeconomic inequality. Given these patterns, policy efforts addressing the student financial aid system should focus not only on reducing barriers to obtaining aid, but also on supporting students decisions about how much debt to take on to financing their postsecondary education.

In response, scholars have turned to behavioral economic principles to address this complexity and to improve college-going outcomes (Castleman and Page, 2015, 2014; Dynarski and Scott-Clayton, 2008; Hoxby and Turner, 2013). Studies related to financial aid processes have focused on tasks such as successfully filing (or refiling) the FAFSA (Bettinger et al., 2012; Bergman et al., 2017; Castleman and Page, 2016; Page et al., 2018) and on the role of information in student loan borrowing decisions and repayment (Darolia, 2016; Marx and

Turner, 2019). Prior work by Darolia (2016) increased the salience of information regarding the students loan borrowing and repayment processes and found that information alone may not be enough to change student loan borrowing. Marx and Turner (2019) experimentally modified the financial aid award level and the presentation of available loans. They found that students receiving a loan offer on their award level were 40% more likely to borrow than those who did not receive a loan on their financial aid award letter.[1] Finally, Charles et al. (2019) found providing institutional cost information at the point of loan decision-making significantly influenced borrowing decisions of the community college students – suggesting that capitalizing on the decision-making platform may be a more effective mechanism to deliver information or other interventions aimed at influencing student loan decision-making.

Despite a robust literature on the impact of financial aid on college access and success outcomes (Page and Scott-Clayton, 2016), limited research has focused on the specifics of the financial aid disbursement process or has not yielded promising results. No study, to our knowledge, has experimentally examined the influence of institutionally defined default choice within the financial aid disbursement process. Prior work suggests that when a choice is complex and the consumer possesses little knowledge or prior experience with the topic, the default option is typically the most attractive or commonly accepted consumer option (Agnew and Szykman, 2005; Thaler and Sunstein, 2009). For example, when considering a multifaceted, employer-sponsored retirement plan – a decision employees face infrequently – participation in such retirement plans is significantly higher when the default is for employees to opt in rather than to opt out (Madrian and Shea, 2001). Similar to the retirement planning process, students and families find the postsecondary financial aid borrowing process confusing and intimidating (Johnson, 2012) – suggesting default options are likely to influence student loan borrowing behaviors. Nevertheless, there is little regulation of the default setting, particularly within student financial-aid processes. Accordingly, postsecondary

[1] A financial aid award letter is provided annually by postsecondary institutions to students who complete the FAFSA form. While there is no standard format for these letters, each letter outlines a student's cost of attendance estimates, calculated expected family contribution, and the total financial assistance (grants and loans) that will be provided.

institutions have substantial latitude in establishing default choice policies that could impact the extent of student borrowing.

Our intervention capitalizes on prior experimental work on student loan borrowing and advances our understanding of no-cost interventions. Specifically, Marx and Turner (2019) show that institutions may influence borrowing behaviors through more paternalistic policy decisions. Building on prior work, we examine the causal impact of default choices, within the decision-making platform, on student loan borrowing for undergraduates enrolled in a four-year, public institution. Using an experimental design, we randomly assign students to one of three conditions experienced at the time of making decisions about their federal student loans. In the first condition, the loan disbursement interface prompted students to make an active choice to either accept, reduce, or decline loans (active choice) – defacto business-as-usual condition. In the second condition, students were presented with a pre-populated decision of "Accept" their loans as awarded. In the third condition, students were presented with a pre-populated decision of "Decline" their loans as awarded. Consistent with the default choice literature, the default choice presented significantly influences borrowing behaviors. Students randomly assigned to an opt-in default choice condition were less likely to borrow, and they borrowed less, on average, than peers who were assigned either to the active choice or opt-out default choice condition. The reduction in loan borrowing associated with the opt-in condition is concentrated on the extensive margin and within unsubsidized loans – signaling a potentially more desired outcome.

Different from the application of default choice architecture to actions such as saving for retirement, the question surrounding student loan borrowing is more ambiguous. Current popular and policy conversations, as those noted above, would suggest that reductions in borrowing are preferred. On the other hand, reduced borrowing is non-optimal if students replace the federal loan resources they turned down with less favorable loans or increased work hours or if their ability to persist and succeed in higher education is made more precarious by insufficient resources. Given the ambiguity in the desired behavior around student loans,

this study makes a unique contribution in the role of default choice. Unlike the prior work of Marx and Turner (2019) – which tests the availability of student loans on financial aid offer sheets – this study examines not only the effects of an opt-in versus opt-out environment, but also a non-directional active choice condition. Additionally, this work examines the default effect at the point of decision-making rather than a change in the financial aid award letter presentation or supplemental information provided outside of the loan borrowing decision process. Given the ambiguity in the desired behavior around student loans, we examine the downstream effects of assignment to the different default conditions on subsequent loan substitution, college enrollment, academic performance and campus employment. We observe no effects on these outcomes, suggesting our experimental reductions in borrowing do not necessarily foretell a decline in students' educational experience. The concentration of our results within the opt-in condition, and no difference between opt-out and active choice, suggest that students in this context may be borrowing more than is necessary.

2 Student Loan Borrowing

U.S. Federal Financial Aid Process and Federal Student Loans

Miller et al. (2019) reports that the United States' federal government, through the U.S. Department of Education, holds over 92% of all U.S. student loan debt – surpassing $ 1.5 trillion in outstanding debt for over 42 million borrowers as of the end of the 2020 fiscal year. The process for accessing federal financial aid within the U.S. begins with the completion and submission of the Free Application for Federal Student Aid (FAFSA). The information included on the FAFSA – including parental and family income, assets, dependents in the home, and the number of the other individuals attending college – is used to calculate the student's individual expected family contribution (EFC). The EFC used to determine the amount of federal need-based aid and federal loans an individual is eligible for and impacting the level of state-based and institution-based financial aid a student can be distributed.

While presented in a dollar amount, the EFC is not the amount of money an individual or family will have to pay for college, nor is the amount of federal student aid an individual will receive.

The federal financial aid process begins with the FAFSA. After calculating the EFC, the federal government relies on institutions to administer accepted federal aid. While each institution retains some uniqueness in the processing and awarding of financial aid, many of them require students to make an active choice on either accepting or declining federal subsidized, if eligible, and unsubsidized loans.[2] [3] Postsecondary institutions typically present students with their awarded financial aid through a financial aid award letter and then require students to make an active decision, usually through the institution's student information system, on whether they accept or decline each component of their financial aid award. Students receiving a financial aid award letter, but not actively accepting or declining their award, would not be awarded any of their non-grant-based aid – most institutions automatically accept grant-based aid on behalf of students because it does not require them any future financial commitments.

General Effects of Federal Student Loan Borrowing

The benefits of a college degree are well documented: A college education is linked to higher lifetime earnings, economic mobility, family stability, and social returns (Dynarski, 2015; Hout, 2012; Kjelland, 2008; Marcotte et al., 2005; Moretti, 2004). However, the costs and bureacratic complexities are a barreir for many to access higher education. Although educational loans are intended to ease the financial barriers students face to accessing higher education, excessive borrowing can be disadvantageous for students, impacting their chances of completing a degree and resulting in lifelong economic and social consequences. Students

[2]Subsidized loans do not accrue interest while borrowers remain actively enrolled in school. Unsubsidized loans begin to accrue interest from the day they are disbursed to students, even while they are enrolled in school. The interest rates for subsidized and unsubsidized are fixed over the lifetime of the loan and are generally lower rates than found in privately borrowed loans.

[3]Colleges and university have the option to opt-out of offering federal student loans to their enrolled students. Work by Cochrane and Szabo-Kubitz (2016) suggests that nearly one-million enrolled students do not have access to federal student loans based on institutions opting out of offering federal student loans.

who carry a high level of debt, particularly in their first year of college, as well as students whose financial aid packages comprise loans exclusively are less likely to persist and to graduate (Kim, 2007; John and Starkey, 1995). Student loan indebtedness could hinder those positioned to benefit most from higher education, as the detrimental effect of excessive borrowing is greater for low-income students. For example, Kim (2007) estimates that an additional $1,000 in loans is associated with a 1.6% decreased likelihood of completing a degree program for low-income students (Kim, 2007).

Student loan indebtedness has consequences beyond college persistence and degree attainment outcomes. In a regression discontinuity analysis, Rothstein and Rouse (2011) found that, conditional on family financial circumstances, undergraduate debt is negatively associated with students' plans to attend graduate school. Furthermore, debt at graduation influences students' future career choices, with higher levels of debt reducing the likelihood that a college graduate will pursue employment in the nonprofit or public sector (Rothstein and Rouse, 2011). Presumably, educational debt burden drives college graduates to pass over lower-paying or public-sector jobs in favor of earning a salary sufficient to cover their loan payments and living expenses.

Black and Hispanic students disproportionately carry the burden of educational debt (Addo et al., 2016; Baum and Steele, 2010; Ratcliffe and McKernan, 2013; Scott-Clayton and Li, 2016). Conditional on enrollment, an estimated 34% of African American students and 28% of Hispanic students incur student loan debt, as opposed to 16% of their white peers (Ratcliffe and McKernan, 2013). Recent estimates suggest that Black and Hispanic borrowers are also 9 to 27% more likely to default than their white peers (Hillman, 2014; Scott-Clayton and Li, 2016) – significantly impacting both their access to future postsecondary federal aid and other credit impacts.

Methods of Controlling Borrowing Levels

Scholars and policy makers have attempted to design decision system and disclosure requirements to limit student loan borrowing. The U.S. Department of Education sets both

annual and lifetime borrowing limits while providing plain language disclosure and entrance and exit counseling requirements that are meant to inform borrowers about the obligations associated with incurring student loan debt – with little evidence supporting their effectiveness (Anderson, Collins, Goldrick-Rab, 2016). Darolia (2016) found that providing students with individually tailored letters about their aggregate indebtedness, anticipated future monthly payments, and peers' borrowing levels showed no significant effects in reducing borrowing. Similarly, an intensive month-long text messaging campaign, that included access to advisers and information about long-term costs of borrowing significantly reduced community college students borrowing. Specifically, Barr et al. (2016) found that the intervention reduced borrowing by three to four percentage points and reduced overall borrowing amounts by $359, on average. Effects of this reduction were concentrated in unsubsidized loans (Barr et al., 2016). Finally, the decision to include a student loan offer on an institution's financial aid award letter has been found to influence borrowing decisions (Marx and Turner, 2019). Community college students who received a letter listing their full loan eligibility were 40% more likely to borrow than those who were not offered a loan.

Overall, efforts to reduce student loan borrowing have produced mixed results. Providing generalized information about student loans produced modest changes to borrowing behavior (Barr et al., 2016), while personalized data on indebtedness has no effect(Darolia, 2016). Providing information about college costs during the student loan decision-making process may increase information salience and have a larger effect on borrowing decisions (Charles et al., 2019). Omitting loans from a financial aid award letter may reduce borrowing, but this may be considered overly paternalistic, and little is known about potential unintended consequences, such as students borrowing under less favorable terms. Applying default options at the point of loan acceptance, rather than aid packaging, might be a comparatively preferred communication strategy and application of choice architecture. This approach would ensure that students still enjoy the freedom of all possible choices while benefiting from the nudge of the default option.

3 Default Choice and Complex Decision-Making

"Choice architecture" refers to the design of choices and their presentation to consumers. Although traditional economic models assume that humans make fully rational decisions that are consistent with their own self-interest, decision-making can, in reality, be influenced by factors such as the presentation of information (or lack thereof), the recommended or pre-selected option, and the cognitive bias of anchoring (Thaler and Sunstein, 2009). For the decision-maker who has bounded rationality, there is no neutral presentation of choices. The way in which information is displayed, the order in which alternatives are listed, the presence of a default option, and even a warning message can all influence consumers' choices. Thus, the choice architecture can be shaped to "nudge" a consumer toward a desired decision.

Perhaps one of the most straightforward and influential tools in choice architecture is the default option. A default option is the setting or choice that a consumer will receive if he/she does not actively choose otherwise (Brown and Krishna, 2004). A default option does not preclude the making of an active choice, but its presence does send a powerful signal about the endorsed optimal choice (Thaler and Sunstein, 2009). Specifically, the default option may be viewed as an implicit endorsement. Individuals perceive the pre-selected default as the recommended course of action or the most frequently selected or popular choice (Thaler and Sunstein, 2009; Dinner et al., 2011). Additionally, accepting the default option requires little to no additional effort. The decision-maker does not have to evaluate alternatives, expend mental energy on determining the individual impact of each alternative, or proactively act to select another option (Balz et al., 2014; Dinner et al., 2011; Johnson and Goldstein, 2003).

Jachimowicz et al. (2019) discuss three mechanisms by which the default choice architecture influences decision-making: endorsement, ease, and endowment. The establishment of a default choice serves as a perceived endorsement of the desired choice (McKenzie et al., 2006). The influence of this endorsement is directly related to an individual's trust and belief in the choice architect (in our case, the institution's financial aid office) and alignment of perceived intentions between the decision-maker and the choice architect (Tannenbaum

et al., 2017). Second, the default choice may influence decision making by simply being the easiest options. Decision-makers may be less likely to evaluate other available options when a default choice is specified. Jachimowicz et al. (2019) notes that "the harder it is for decision-makers to switch away from the pre-selected option, the more effective the default is likely to be" (p. 173). The final mechanism that influences a default choice's effectiveness is the perception that the selected default choice is the status quo – endowment (Jachimowicz et al., 2019). Kahneman and Tversky (2013) articulate that higher levels of the endowment with the default choice will lead to increased likelihoods of staying with the default choice to avoid loss and engagement with reference-dependent encoding.

4 Research Design

4.1 Research Site

We conducted this experiment at Public U, an anonymous selective public four-year university, during the 2017-18 and 2018-19 academic years. Given the structure of the current financial aid disbursement system at Public U, the experiment pertains only to federal Direct Student Loans (both subsidized and unsubsidized). Disbursement of other student loans (i.e., ParentPLUS or private loans) is handled through other processes outside of the system with which we were able to experiment. Additionally, all state, federal, and institutional grant-based aid was automatically accepted, as is standard practice at Public U.[4] Concurrent with our experiment, Public U undertook a comprehensive redesign of its financial aid disbursement software. This change in the public-facing interface for all the students meant that no student, currently or newly enrolled, had prior experience or knowledge of the disbursement platform prior to our experiment, thus reducing the potential for prior knowledge bias and increasing the validity of our estimates.

In Table 1, we report institutional descriptive information comparing Public U and other

[4]Students wishing to not accept any grant-based financial aid would need to contact Public U's financial aid office directly.

public four-year institutions across the United States. Public U's tuition is substantially lower for in-state residents than for out-of-state students. It is larger than the average public four-year institution and has a larger fraction of its student population pursuing graduate studies than the average public four-year institution across the US. Its racial and ethnic composition generally aligns with peer institutions, but Public U enrolls fewer Pell grant recipients [5] and is more selective. Public U also has higher four- and six-year bachelor's degree completion rates, suggesting that students at this institution may be more academically gifted than the average enrolled student at a public four-year institution.

Of note for this study, students enrolled at Public U are more likely to receive a state or local grant than are students at other public, four-year institutions (82% compared to 38%). This trend results from Public U's location within a state that provides a broad-based merit-aid scholarship. Accordingly, only 25% of students at Public U participate in the federal student loan borrowing process compared to 48% at the average public four-year institution. Surprisingly, the median debt levels are similar between Public U and other public four-year institutions, on average, potentially signaling higher than expected borrowing levels for students who decide to take out federal student loans. Despite slightly higher median student loan debt, the three-year cohort loan default rate is lower at Public U (3%) than at the average public four-year institution (9%).

— Table 1 Here —

4.2 Experimental and Intervention Design

The experiment involved individual-level random assignment of undergraduate students to one of three experimental default choices present during the online student loan decision-making processes. Each year in May, Public U's financial aid office begins compiling FAFSA information for all returning and incoming (accepted admissions) students. As part of the FAFSA process, information about available federal financial aid in provide and combined

[5]The Pell Grant is a federal grant program that is awarded only to undergraduate students who display exceptional financial need and have not earned a bachelor's, graduate, or professional degree. The maximum Pell Grant during our experimental school year was $5,920.

with other state, institutional, or private aid provided to students. The financial aid office then compiles a comprehensive individual financial award package that includes grants, scholarships and federal student loans. After completing the initial aid packaging, we worked directly with the financial aid office randomly assigned each undergraduate student who was projected to be offered a federal subsidized and/or unsubsidized student loans to one of three conditions.

To increase the precision of our estimated effects and ensure balance on key characteristics, we blocked our randomization on the following baseline characteristics: 1) year of enrollment and 2) prior borrower status. This approach allowed us to generate balanced estimates by year enrolled and prior borrowing engagement. After randomization, we provided the financial aid office with the experimental assignment for each ID number provided. The financial aid office incorporated the default choice assignment into the new financial aid system. The presentation of the default choice was assigned to individual students; thus, individual timing of system access did not influence the default choice that each study participant saw. Additionally, students saw the same default choice option regardless of how many times they logged into the system.[6]

As mentioned previously, Public U developed and was implementing a new financial aid disbursement portal, which allowed us to design our default choice intervention. [7] Our study' intervention design was purposeful and built on the business as usual conditions present at Public U before our study. Prior work by Marx and Turner (2020) suggests the potential for information overload within the student loan decision-making process and that the design of our default choice conditions may streamline decision-making. Since the welfare effects of student loans are unclear, we wanted to test the relative impacts of all possible default

[6]The sequence in which financial aid is packaged and disbursed is as follows: 1) students are packaged awards and notified that their financial aid package is available and then 2) students then log-on to the financial aid portal to take a decision on accepting or declining their packaged federal loans (all grants and scholarships are automatically accepted). Conditional on accepting any loans greater than zero, students are presented with a checklist of items to complete to meet the requirements of entrance counseling. Public U does not require promissory notes or entrance counseling to be completed prior to originating an award.

[7]The new financial aid disbursement portal also allowed us to include all students in our experimental sample since no student had any prior interactions making their student loan decisions within the new portal.

choices. Students were assigned to one of the following treatment conditions [8]:

1. **Default: None ("Active Choice")**: Participants had to actively choose "accept," "decline," or "reduce" for packaged student loans — both subsidized and unsubsidized — independently. This condition is the relevant counterfactual condition and is the institution's business-as-usual practice.

2. **Default: Decline ("Opt-In")**: Participants were assigned a default decision of "decline" for each of their subsidized and unsubsidized loans. Students wishing to receive a student loan were required to actively change the selection from "decline" to either "accept" or "reduce." Regardless of whether a change was made, participants then had to "submit" their decision. Students who logged into the system but did not submit their decision were not disbursed a student loan based on their assignment.

3. **Default: Accept ("Opt-Out")**: Participants were assigned a default decision of "accept" for each of their unsubsidized and subsidized student loans. As with the opt-in condition, participants had to actively submit their decision. Students who submitted without changing their default choice were disbursed the full amount of the packaged loan(s).

The active choice control condition allows us to uniquely baseline our experimental year borrowing behaviors with prior borrowing behaviors. The inclusion of both an opt-in and opt-out default choice condition allows us to extrapolate the range of default choice influences relative to the active choice condition. Based on our informal review of financial aid systems across similar institutions, most do not utilize a default choice but rather have students make an active choice without any institutional endorsement. The active choice group's results further allow us to generalize to institutions with similar baseline borrowing and academic outcomes.

4.3 Data and Descriptive Statistics

[8] See Appendix A for screenshots of our default choice interventions and the student loan decision portal.

We limited our sample to undergraduates who had active student identification numbers in the 2018–19 academic year and who submitted a completed FAFSA form (n = 21,407).[9] An additional 604 students were not packaged any federal student loans as part of their annual financial aid award[10], and 612 did not enroll in any fall credits. In total, 20,193 completed the FAFSA, enrolled in fall credits, and were awarded with at least one federal student loan. Of the 20,193 in our analytical sample, 6,768 were assigned to the active choice (control) condition, 6,650 to the opt-out default choice condition (decision of accept pre-populated), and 6,775 to the opt-in default choice condition (decision of decline pre-populated). Of all students packaged with at least one federal student loan, approximately 58% (11,837 students) logged into the financial aid portal to decide on their federal student loans – our conditional sample. Within our conditional sample, 3,939 were assigned to the active choice (control) condition, 3,910 to the opt-out default choice condition, and 3,988 to the opt-in default choice condition. The 58% log-in rate to the financial aid portal is consistent with system usage in prior years. These students who engaged with the online portal comprise our focal analytic sample; however, we do include those who did not access the portal in our initial intent to treat analysis.

A potential concern is that our treatment assignment induced differential access to the financial aid portal. Because students had no insight into the operations of the experiment and had no knowledge of the experimental condition to which they were assigned without accessing the online portal, it is reasonable to assume that log-in behavior is independent of assignment to any of our three experimental conditions. We further test this assumption in a formalized way. First, we examine the relationship between group assignment and log-in behavior. We find that our three treatments had a similar financial aid platform log-in rate of approximately 58%. This portal log-in rate is consistent with prior borrowing behaviors

[9]The completion of the FAFSA is not required for eligibility to receive aid through state's merit-aid financial aid program.

[10]These students did not have any unmet need after allocating federal and student grant-aid and/or private scholarships. Public U's institution policy is to not offer or award any financial aid that exceeds a student's total cost of attendance

at Public U. We formally tested this assumption and estimate the impact of our treatment condition assignment on the likelihood of making a decision and find a precisely estimated near-zero effect. Appendix B provides a formal presentation of these results.

It is important to note that the effect of our treatment assignment is conditional on accessing the financial aid portal and confirming a decision. Meaning, students assigned to the opt-out condition who did not access the financial aid portal would not be automatically distributed student loans. Additionally, a lack of active decision to access the financial aid portal is due to both purposeful non-action and packaging of students in the spring semester who did not plan to return for the fall semester –, but this lack of system engagement was not systematically different across each of our experimental groups.

In Table 2, we present descriptive statistics for key covariates for the sample overall (Column 1) and for each of the three experimental conditions (Columns 2 – 4). Our experimental sample is 54% white, 9% Black and 24% Hispanic. Consistent with college-going patterns nationwide, 60% of our sample is female. Finally, our descriptive data suggests that federal loan eligibility is more prevalent among students as they progress through the university. This may be due to comparatively more generous grant-based aid provided to first- and second-year students or changes in state and institutional financial aid packages for returning students. Across our experimental conditions, we observe minimal differences on observable baseline characteristics, suggesting that the sample is well balanced.

— Table 2 Here —

We formally tested the balance of key observable characteristics using an omnibus equivalency test proposed by Hansen and Bowers (2008). In Table 3, we report p-values from comparisons between each pair of experimental groups. We found no evidence of systematic differences across experimental groups on the set of observable baseline characteristics on which we report in Table 2.

— Table 3 Here —

4.4 Empirical Strategy

Our primary goal is to estimate the impact of the default choice presentation on student loan borrowing. Among students who logged into the online platform, compliance with the treatment assignment was perfect, as students were unable to change the presentation of their default choice and were always presented the same condition on subsequent exposures to the platform. We estimated the intent to treat effect of our treatment on student loan borrowing outcomes using the following model structure for both continuous and binary outcomes on all students in our sample:

$$y_{ij} = \alpha_j + \beta_1 Out_{ij} + \beta_2 In_{ij} + X\lambda_{ij}{}' + \epsilon_{ij} \tag{1}$$

where y_{ij} is the outcome of interest (e.g., loan take-up and borrowing levels) for student i in blocked random assignment group j, α_j represents a set of fixed effects for the groups within which we randomized students, Out_{ij} is an indicator for random assignment to the opt-out condition, and In_{ij} is an indicator for random assignment to the opt-in condition. To reduce the residual variation, we include X_i, a vector of baseline covariates, including demographic characteristics and prior loan borrowing. ϵ_{ij} represents our HC2 corrected standard errors.[11] Our primary interest is in the coefficients β_1 and β_2. If our estimates of these coefficients are statistically different from zero, then we will have evidence that the structure of the default option indeed influences students' loan-taking behavior. We also condition Eq.(1) on students who accessed the financial aid system.

We use equation 1 to estimate the direct effects of the default choice on loan borrowing behavior. If the default choice significantly impacts borrowing levels, the induced change to the borrowing levels might affect other subsequent outcomes, such as enrollment / persistence and substituted borrowing behaviors (i.e., private or ParentPlus loans). To explore this possibility, we employ a two-stage least squares (2SLS) instrumental variables (IV) approach.

[11] We follow the recommendation of Angrist and Pischke (2009) and apply a HC2 robust variance estimation approach. We further tested these assumptions by running our models with standard robust standard errors. Our estimates are not sensitive to standard error estimation procedure.

In the first stage model of our IV strategy we use randomized treatment assignment to predict exogenously produced variation in the key endogenous behavior – either a binary measure for engaging in borrowing or a continuous measure for total amount borrowed. In the second stage of our model, we relate this exogenously produced variation to variation in the subsequent outcomes noted above.

We reason that the necessary IV assumptions hold in this application. Regarding the exclusion restriction, we can think of no potential paths by which default choice assignment in the student loan process might influence loan substitution or enrollment behaviors, except through changes in subsidized and unsubsidized borrowing. By the very nature of our experimental design, we can confirm that the values of the variables we use as instruments (default choices) were randomly assigned and therefore unrelated to other factors that might impact our outcomes of interest. Across each of our instrumental variable estimates, our indicators for treatment assignment serve as sufficiently strong instruments with first-stage F-statistics between 12 and 15.

4.5 Multiple Comparison Adjustment

Because we are interested in the effects of multiple treatment arms over multiple outcomes, we include several robustness tests to account for the increased likelihood of Type I errors.[12] Specifically, we apply the Sidak-Holms multiple comparison adjustment (Guo and Romano, 2007).[13]

[12]Multiple comparison adjustments approaches may be implemented as either a p-value correction or an α-value correction. We apply the p-value correction approach as it allows for direct interpretation against conventional α-value and aligns with prior work in the field.

[13]Our reasons for choosing Sidak–Holms instead of the more traditional Bonferroni method were twofold: The Sidak–Holms adjustments allowed us to maintain significantly more power in our estimates while maintaining the same validity under known assumptions and also allowed us to control for the family-wise error rate (FWER). In adjusting p-values to account for multiple treatment arms and outcomes, we order our m p-values from smallest to largest, then take the smallest generated p-value that satisfies the condition $p_k > \frac{\alpha}{m+1-k}$, where k is the p-value's index value and m is the number of generated p-values from the initial treatment effects. Any p-values equal to or greater than the value of k would be statistically insignificant, and all p-values less than k statistically significant, after accounting for the multiple comparison.

5 Results

5.1 Main Effects

Figure 1 presents overall loan participation rates and average loan borrowing amounts for both all students including our sample (Panel A) and students who logged onto the financial aid disbursement portal (Panel B). The error bars represent the unadjusted confidence interval associated with each group mean. Of all FAFSA filers, 35% of control group students – those assigned to the active choice condition – engaged in any student loan borrowing (61% of those logging on), while the rate was 36% for those in the opt-out group (63% of those logging on) and less than 34% for those in our opt-in groups (less than 60% for active decision makers). A similar pattern emerges with the average amount of total loans taken. Students assigned to the opt-out group borrowed, on average, more than both active choice control group and our opt-in treatment group for both students in Panel A and Panel B. Appendix C provides means and standard deviations for all our outcomes of interests by experimental group.

— Figure 1 Here —

Table 4 presents the corresponding model-based estimates of changing default options on students' borrowing behavior. In Panel A, we estimate our intent-to-treat (ITT) estimate on all packaged borrowers. In Panel B, we limit our estimates on those who actively logged onto the financial aid disbursement and either made and active or passive decision – our treatment-on-treated (ToT) estimates for those who actually consider borrowing. While our ITT estimates may represent a more policy relevant point estimate, our ToT estimates are preferred in practice.

Across both our panels of students, our results point strongly to the conclusion that being presented an opt-in default choice reduces student borrowing, particularly regarding unsubsidized student loans. More specifically, students randomly assigned to the opt-in condition were 1.9 percentage points (or 3%) less likely to engage in any student loan borrowing (Panel

B: Column 1). Both our ITT and ToT estimates suggest that students were approximately 5% less likely to accept all loans offered (Panel A and Panel B: Column2) when to the opt-in condition compared to our control active choice group. This reduction in the likelihood of engaging in borrowing and borrowing all loans offered amounted to a significant reduction in borrowing, for borrowers, of $189.45 (Panel B: Column 3). Compared to the active choice control condition, those interested in borrowing and assigned to the opt-in condition borrowed 4.9% less. In contrast, student loan borrowing behavior did not differ between those assigned to the active choice control and the opt-out conditions across both our samples.

The impact of the default options differs by loan type (e.g. subsidized vs. unsubsidized). Student borrowing of subsidized loans does not differ across the experimental conditions (Columns 5 and 6) – with suggestive evidence of slightly elevated likelihood of borrowing for our conditional (Panel 2) sample on subsidized loans. In contrast, the default conditions have a stronger influence on decisions related to unsubsidized loans (i.e., loans with immediate interest accrual) (Columns 7 and 8). Students in our conditional sample (Panel B) randomly assigned to the opt-in condition were 2.5 percentage points less likely to borrow an unsubsidized loan and borrowed $191.50 less, on average, a relative decrease of 8.3% compared to the active choice control group.

Post-hoc comparisons, for our conditional sample, between the opt-in and opt-out conditions reveal significant differences across all outcomes with students assigned to the opt-out condition engaging in higher levels of borrowing than those assigned to the opt-in condition (Table 4, Row 3). These results are generally robust to adjusting for multiple comparisons (see Appendix D). Given the consistency of our results across our unconditional and conditional sample, we focus the remaining results on the treatment effects on our conditional sample – those actively logging onto the financial aid disbursement portal.

— Table 4 Here —

In Appendix E, we estimate our intervention's effects by several subgroups of students – dependent vs. independent students and Pell Grant and non-Pell Grant recipients, along with

the state residency and state aid receipt status. In summary, our heterogeneous results mirror the direction and magnitude of our main effects, with some notable exceptions. Dependent students assigned to the opt-out conditions were significantly more likely to borrow a student loan and borrowed more than dependents students in the active choice control group. Finally, out-of-state and in-state aid recipients were influenced more by the opt-in condition.

5.2 Effect on the Intensive Margin

For our group of students making an active decision on their student loans, we observe that our default treatment groups, the opt-in default in particular, reduced borrowing and the amount borrowed. This reduction in amount borrowed could be driven by a reduction in loan acceptance (i.e., by some students opting to borrow $0), a reduction in loan amount (i.e., some students reducing their loans to below the maximum allowable), or by the combination of the two. In Table 5, we examine evidence of effects on the extensive and intensive margins of borrowing. To do so, we estimate treatment effects for two additional outcomes: 1) an indicator for borrowing the maximum amount of loans offered and 2) an indicator for borrowing an amount less than the maximum offered but more than zero. The combination of these two effects will equal the total change in borrowing associated with either treatment. We examine these effects separately for subsidized and unsubsidized loans, given heterogeneity in loan packaging and the differential effects by loan type observed in Table 4.

In Table 5, we find evidence that changes in the likelihood of borrowing and the amount borrowed are driven primarily by students turning down loans offered entirely rather than borrowing less than the maximum loan offered. For students assigned to the opt-out condition, we find evidence that the opt-out conditions significantly increased the likelihood of accepting the max subsidized loan by 2.8 percentage points. We fail to find any evidence that assignment to the opt-out condition either influenced the likelihood of borrowing less than the max offered subsidized loan or any change in unsubsidized loan borrowing decisions. We also find evidence that assignment to the opt-in significantly reduces the likelihood of borrowing the full amount of unsubsidized loan offered by 2.1 percentage points. We fail to

find any evidence that assignment to the opt-in condition influenced the likelihood of borrowing less than the full amount of the unsubsidized loan offered or any effect of subsidized loan borrowing. Thus, the default choice setting induces changes in the overall decision to take out a loan that is offered, rather than encouraging "fine-tuning" in students' thinking about how much they need to borrow. Further, the default choice may induce students to think that the financial aid administrators have done the calculation for them in terms of how much they should borrow and, thus, should follow the implicit recommended course of action.

The results in Table 5 provide important context to the effect of the default choice on student loan borrowing. Prior, in Table 4, we documented an average treatment effect of nearly $200 for those assigned to the opt-in condition. However, Table 5 demonstrates that the impact of the presented default choice on those influenced to change their borrowing decisions is much larger. Specifically, for those assigned to the opt-out condition, students induced into borrowing the max experienced an increase of $ 4,187 in the total amount borrowed. Students assigned to the opt-in condition who were influenced to decline their offered unsubsidized loan would have experienced an average reduction in their loans borrowed of approximately $4,310. The federal student loan interest rates for undergraduate borrowing loans in our experimental year was approximately 5%. If we assume a standard student loan repayment plan, students assigned to the opt-in default condition and who changed their borrowing decision would have a lifetime reduction in student loan liabilities of $5,173 or $50 per month based on our single intervention year.

— Table 5 Here —

5.3 Multiple Loans and Actions

Given the structure of the financial aid decision interface, the system requires students to make decisions on each of their subsidized and unsubsidized student loans separately. Based on financial need, some students are packaged with both subsidized and unsubsidized

loans, while others are packaged with only an unsubsidized loan.[14] [15] Since nearly 90% of our sample was packaged with an unsubsidized loan, we examined the impact of default conditions on repeated decisions. Table 6 presents results for the effects of the default treatment conditions by the number of loans packaged. Students assigned to opt-in condition and packaged only an unsubsidized loan significantly reduced their borrowing of unsubsidized loans by 4.4 percentage points and their total unsubsidized loan amount borrowed by more than 10% – compared to our control condition. Effects of the opt-in condition are in the same direction for those with loan packages including both subsidized and unsubsidized loans, but they are smaller in magnitude and not significant. For students assigned to the opt-out condition, we find no effects for those packaged with only an unsubsidized loan and slightly higher likelihood of borrowing (2.7 percentage points) and 5% increase in total borrowing for student packaged loan types.

In sum, much of the reduction in borrowing associated with the opt-in condition is concentrated among students who are only packaged an unsubsidized loan (e.g., those with comparatively less financial need). This further suggests that switching to an opt-in default may reduce borrowing levels for students who need them less.

— Table 6 Here —

5.4 Downstream Effects

As previously mentioned, in the context of student loan borrowing, there is ambiguity in optimal borrowing direction that might be preferred by individual students. On one hand, a change in default may help to prevent students from over-borrowing by reducing borrowing likelihoods. On the other hand, it may prevent students from accessing the financing that they need to succeed or lead students to seek other, less-preferred channels for borrowing. Here, we explore the impact of changes in federal loan borrowing on students' borrowing

[14]To be eligible for a subsidized loan, a student must demonstrate financial need, calculated as cost of attendance minus expected family contribution.

[15]Within our sample, 10.4% (n=1,245) were only packaged a subsidized loan due to their level of financial need being met by other grants, scholarships, and state-based financial aid.

of other types of available federal student loans, their employment activities, enrollment intensity, and academic performance. We provide the control group means of these outcomes in Table 7 (Panel A).

We consider two different approaches to estimating the downstream effects of our treatment assignment. First, we estimate the reduced form, or direct, effect of treatment assignment on downstream outcomes (Panel B). Second, we estimate the impact of the induced changes in borrowing due to assignment to the opt-in condition using three instrumental variables (IV) specifications with a single instrument.[16] [17] Borrowing from similar experimental work of Marx and Turner (2019), we specify three different instrumented outcomes – 1) likelihood of borrowing any loans (Panel C); 2) likelihood of borrowing all loans offered (Panel D), and 3) treatment induced change in the amount amount of student loans borrowed in in $100 increments (Panel E).

Substitution Effects. One concern with influencing the federal borrowing behaviors of undergraduates is that they will seek other, less favorable student loan options to cover the cost of college. Our administrative data allows us to examine private and ParentPLUS loan borrowing, both of which were not subject to the same default choice randomization process. Table 7 reports reduced form and IV estimates of the effect of assignment to the opt-in condition on private and ParentPLUS loan borrowing. We find no evidence of any changes in the likelihood of borrowing a private or ParentPLUS loan as a result of our randomly assigned default choice. Additionally, we fail to find any evidence of changes in Federal Work Study earnings. It should be noted that only a small fraction of our control group borrowed a private loan (2%) or ParentPLUS loan (7%), while their average Federal Work Study earnings was $115 per semester.[18] Nevertheless, the estimated null results signal

[16]Note in our IV analyses we pool the active choice and opt-out conditions, given the preponderance of evidence discussed above that borrowing behavior tends to be similar for students assigned to these two experimental groups. Therefore, we employ a binary indicator of treatment that is equal to 1 for students who are randomly assigned to the opt-in condition and is zero otherwise.

[17]We ran our IV specifications restricting our sample to only opt-in vs. opt-out assigned students as well as opt-in vs. active choice assigned students. The results from our IV estimates are similar.

[18]Students and families wishing to borrow private or ParentPLUS loans would need to access a separate borrowing system and application process. Our institutional partner does not allow ParentPLUS loans to

that the reductions in federal student loan borrowing induced by the opt-in default choice assignment does not lead to significant substitution with less favorable student loan options. We are, however, unable to observe the extent to which students turn to even less favorable financial options, such as credit cards, to finance educational expenses – which is a limitation that merits further study.

— Table 7 Here —

Indirect Impact on Short-Term Enrollment. Scholars have linked student loan borrowing to enrollment intensity (Barr et al., 2016; Charles et al., 2019; Marx and Turner, 2019), engagement in work study and other campus employment (Broton et al., 2016), and academic GPA (Barr et al., 2016; Marx and Turner, 2019). We test the impact of shifts in federal loan borrowing on a set of enrollment and academic performance outcomes (Table 8). Similar to results in Table 7, we find no evidence that default choice induced changes in federal student loan borrowing influenced academic year enrollment intensity or academic performance. This finding suggests to us that the opt-in default choice may reduce the long-term costs of higher education while not significantly impacting bachelor's degree pursuit or academic performance.

— Table 8 Here —

6 Conclusion

We experimentally tested the effect of various default choice options on student loan borrowing decisions at a selective public four-year university. Randomly assigning students to either an opt-in or opt-out condition, compared to the business-as-usual active choice condition, we found consistent evidence that assignment to the opt-in condition reduced borrowing between 4.6% and 4.8%. We found inconsistent evidence that assignment to the opt-out condition increased the likelihood to borrow or the total amount borrowed as we would have

be offered a default choice for student borrowers.

expected based on prior default choice literature. We did fine that for more than half of the student subgroups we considered, the opt-out condition significantly increased borrowing by approximately 3% to 6% when compared to the active choice control group. Loan take-up differences between the opt-in and opt-out assigned students were largest for non-Pell, dependent, and out-of-state students at 10.5%, 8.4%, and 7% respectively. Despite these effects on federal loan borrowing, we find no evidence of downstream effects on other less favorable student loan borrowing options, subsequent enrollment, academic performance, or federal work study participation.

Prior work by Barr et. al. (2017) and Marx and Turner (2019) found that information-based interventions and changes to the structure of loan eligibility notification that led to changes in student loan borrowing behaviors significantly influenced subsequent enrollment and academic performance. We consider two reasons why our results may diverge from these prior studies. First, these studies demonstrate larger reduced form effects on borrowing and thus would have the potential to induce larger effects on downstream outcomes. Second, these studies all focus on students enrolled in community colleges rather than in a four-year college, as was the case for our sample. Community college students are often more institutionally transient (Calcagno et al., 2007), have a higher likelihood of enrollment interruptions (Calcagno et al., 2007), and borrow a higher proportion of their lifetime loan limits to cover the educational expenses of their first two years than students initially enrolling at a four-year institution (McKinney and Burridge, 2015). In sum, community college students' ability to enroll and continue in college may be more sensitive to their borrowing opportunities and choices. Our findings that potential shift towards an opt-in default choice decision environment reduces federal student loan borrowing levels without the potential of shifting towards less favorable ParentPLUS or privately-held commercial loans – at least in the context of selective public four-year institutions.

Our results add to the postsecondary student loan literature and add to our understanding of the influence of default choice architecture. Unlike more binding and paternalistic default

choice policies – requiring no active decision to actualize the default choice – our default choice presentation was non-binding. Specifically, the default choice presented here required students to first log-in to the financial aid portal and then actively confirm a student loan decision. Of the three mechanisms discussed by Jachimowicz et al. (2019), our default choice intervention acts as an institutionally endorsed decision. Despite requiring students to actively confirm the default decision, presenting students with an opt-in choice architecture still significantly impacted the decision to borrow a federal student loan or not.

We have several theories as to why the size of default choice effects is relatively small compared to prior default choice studies (Madrian and Shea, 2001). First, we speculate that requiring students to confirm the default decision, combined with the dropdown decision-making platform's design, increases the ease with which potential borrowers could change the decision (Jachimowicz et al., 2019). Second, the growing necessity of student loans as a financing avenue for higher education (Perna, 2006) may create a misalignment between initial individual beliefs and the populated default choice (Tannenbaum et al., 2017). Students may enter the financial portal expecting to borrow all available loans – potentially explaining the lack of difference between our opt-out and active choice conditions. Finally, our default choice's smaller effects may be related to our conscious decision to reduce the paternalistic nature of binding default choice – overcoming a critique of the default choice literature (Thaler and Sunstein, 2009).

Our findings are relevant to policymakers, postsecondary institution leaders, financial aid administrators, and future research into default choice architecture changes in an educational setting. Given that postsecondary institutions have significant discretion on the platform for accepting and distributing federally packaged student loans, applying small changes to the default choice presentation within the financial aid disbursement process may have a significant effect on borrowing. With the understanding that students enrolled at our research site may be comparatively more affluent and higher achieving than the average student enrolled in a higher education, our findings suggest that moving toward an opt-in default

choice presentation may reduce the long-term costs of attending higher education, while not negatively impacting short-term academic pursuits.

As discussed earlier, our intervention design balances both the document influence of default choice architecture with active confirmation retention. Given the ethical considerations around default choice and student loan borrowing, preserving some level of individual active conformation is preferred. We suggest that the design of a pre-populated default choice combined with active confirmation and a relatively easy platform to change the default choice is an optimal policy balance between presenting an institutionally supported endorsed choice with enough freedom for individuals to optimize their borrowing behaviors. While the average effects of our intervention are relatively small, the borrowing effects on those whose decision is changed by the presence of pre-populated choice is significantly larger. To this end, policymakers and institutional leaders need to balance their assumption of optimal borrowing behaviors with individual student preferences. While providing information only has largely been ineffective in changing borrowing behaviors, evidence from our study and Marx and Turner (2019) suggest that larger structural changes may influence student loan borrowing decisions.

The student financial aid disbursement process is complex. Although several scholars have focused on behavioral approaches to increasing FAFSA completion, research that considers other aspects of the financial aid process is less robust. Recent work by Marx and Turner (2019) and Darolia (2016) reveal that small changes to the presentation of a financial aid award may influence student borrowing and enrollment. Our study adds to this growing body of literature and provides an additional no-cost mechanism through which to assist students as they make decisions about student loans. Future research should examine the long-term and temporal effects of default choice within the student loan disbursement process.

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Tables

Table 1: Research Site Characteristics and National Averages

	Public U	*All Public Four-Years*
Price #		
In-State Published Tuition and Fees ($)ˆ	6,381	8,199
Out-of-State Published Tuition and Fees ($)ˆ	28,659	18,338
Cost of Attendance: In-State -On Campus ($)ˆ	21,131	23,661
Cost of Attendance: Out-of-State -On Campus ($)ˆ	43,409	34,620
Student Body Characteristics +		
12-Month Headcount Undergraduate (#)ˆ	37,851	23,574
Undergraduate Proportion (%)ˆ	64	84
Race: White (%)ˆ	55	52
Race: Black (%)ˆ	7	11
Race: Hispanic (%)ˆ	21	18
Race: Other (%)ˆ	17	19
Pell Grant Recipients (%)ˆ	25	44
Admission Selectivity (%)ˆ	46	69
Completion +		
4-Year BA Graduation Rate (%)ˆ	67	27
6-Year BA Graduation Rate (%)ˆ	87	48
Financial Aid Engagement+		
Undergraduates Awarded State or Local Grant (%)ˆ	82	38
Undergraduates Awarded Institutional Grant (%)ˆ	29	45
Undergraduate Federal Loan Borrowers (%)ˆ	25	48
Median Student Loan Debt ($)*	15,000	13,283
3-Year Cohort Loan Default Rate (%)*	3	9

Note: All data is the most recently available through the Integrated Postsecondary Education Data System (IPEDS) or the College Scorecard. ˆdenotes data extracted from IPEDS and * denotes data extracted from the College Scorecard. # indicates data is from the 2017-18 academic year and + indicates data is from the 2016-17 academic year.

Table 2: Descriptive Statistics of Key Sample Covariates

	(1) Total Sample	(2) Active Choice	(3) Opt-Out	(4) Opt-In
Covariates				
Race: White	0.55	0.55	0.55	0.55
	(0.50)	(0.50)	(0.50)	(0.50)
Race: African American / Black	0.08	0.08	0.08	0.08
	(0.27)	(0.27)	(0.26)	(0.27)
Race: Hispanic	0.24	0.24	0.23	0.24
	(0.42)	(0.43)	(0.42)	(0.42)
Race: Other	0.13	0.13	0.13	0.13
	(0.34)	(0.34)	(0.34)	(0.33)
1st Year	0.13	0.14	0.13	0.13
	(0.34)	(0.34)	(0.33)	(0.34)
2nd Year	0.23	0.23	0.24	0.23
	(0.42)	(0.42)	(0.43)	(0.42)
3rd Year	0.25	0.25	0.24	0.26
	(0.43)	(0.43)	(0.43)	(0.44)
4th + Year	0.39	0.38	0.39	0.38
	(0.49)	(0.49)	(0.49)	(0.49)
Gender: Female	0.59	0.59	0.60	0.59
	(0.49)	(0.49)	(0.49)	(0.49)
EFC ($1,000)	28.68	29.71	28.32	28.51
	(63.22)	(67.54)	(61.40)	(60.44)
Dependent Status (%)	0.90	0.90	0.90	0.90
	(0.30)	(0.30)	(0.29)	(0.30)
Pell Grant Recipient (%)	0.40	0.40	0.41	0.40
	(0.49)	(0.49)	(0.49)	(0.49)
Non-Resident Student (%)	0.20	0.21	0.21	0.20
	(0.40)	(0.40)	(0.41)	(0.40)
Prior Loan Borrowing ($1,000)	4.30	4.30	4.30	4.31
	(8.27)	(8.34)	(8.24)	(8.24)
Cumulative GPA (#)	3.41	3.41	3.40	3.41
	(0.49)	(0.49)	(0.49)	(0.48)
Analytical Sample	20,193	6,768	6,650	6,775
% Making a Decision	0.58	0.58	0.58	0.59
	(0.49)	*(0.49)*	*(0.49)*	*(0.49)*

Notes: Sample includes all undergraduates who completed a FAFSA and have a financial aid award package that includes a federal student loan. Sample is further limited to undergraduates who enrolled in atleast one course for the fall semester. Table displays means and standard deviations (in parentheses) for the entire analytical sample and by experimental group at baseline and prior to the packaging of any student aid.

Table 3: P-values from Omnibus Tests of Baseline Covariate Equivalence

	p-value
Active Choice vs. Opt-In	*0.291*
Active Choice vs. Opt-Out	*0.215*
Opt-In vs. Opt-Out	*0.486*

Notes: Cells report p-values based on Hansen and Bowers' (2008) omnibus test for assessing baseline equivalence.

Table 4: Impact of Default Choice on Borrowing

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Any Loans	All Loans		Subsidized Loans		Unsubsidized Loans	
	%	%	$	%	$	%	$
Panel A: Unconditional							
Treatment 1: Opt-Out	-0.001	0.001	-20.440	0.002	20.907	-0.000	-38.371
	(0.007)	(0.007)	(43.697)	(0.009)	(42.173)	(0.007)	(35.255)
Treatment 2: Opt-In	-0.009	-0.014*	-101.911*	-0.006	-29.657	-0.012+	-85.761*
	(0.007)	(0.007)	(43.323)	(0.009)	(42.653)	(0.007)	(35.171)
Opt-In = Opt-Out (F test)	*1.43*	*5.12**	*3.51+*	*0.68*	*1.43*	*3.18+*	*1.84*
Active Choice (Control) Mean	0.357	0.303	2,197.99	0.411	1,747.39	0.283	1,226.62
n	20,193	20,193		12,184		18,888	
Panel B: Conditional							
Treatment 1: Opt-Out	0.011	0.011	72.640	0.018	85.823	0.008	33.987
	(0.010)	(0.010)	(64.773)	(0.012)	(54.987)	(0.010)	(50.580)
Treatment 2: Opt-In	-0.019*	-0.028**	-189.451**	-0.003	-4.939	-0.027*	-191.499***
	(0.010)	(0.010)	(64.191)	(0.012)	(54.730)	(0.010)	(50.987)
Opt-In = Opt-Out (F test)	*9.71***	*15.77****	*16.62****	*4.21**	*2.78+*	*16.73****	*19.84****
Active Choice (Control) Mean	0.626	0.529	3,903.94	0.642	2,725.95	0.517	2,297.21
n	11,836	11,836		8,065		10,729	

Notes: See Table 2 for sample description; Panel 1 is our ITT sample with all students packaged with a student loan(s) in their financial aid package; Panel 2 is our ToT sample with students accessing the financial aid portal. reference group = active choice; HC2 robust standard errors in parentheses; + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; all regressions include baseline controls for: 1) student demographics; 2) student/parent income and financial situation; 3) year enrolled; 4) dependency status; 5) prior loan borrowing behaviors; and 5) blocked fixed-effects. Variations in in the sample size are due to students not being packaged a subsidized or unsubsidized loan based on EFC and financial need.

Table 5: Impact of Default Choice on Intensive Margin

	(1)	(2)	(3)	(4)	(5)	(6)
	Subsidized			**Unsubsidized**		
	Borrowed	Borrowed Max	Borrowed Less Than Max	Borrowed	Borrowed Max	Borrowed Less Than Max
Treatment 1: Opt-Out	0.018	0.028*	-0.010	0.008	0.015	-0.007
	(0.012)	(0.012)	(0.009)	(0.010)	(0.011)	(0.006)
Treatment 2: Opt-In	-0.003	-0.006	0.003	-0.027**	-0.021*	-0.006
	(0.012)	(0.012)	(0.009)	(0.010)	(0.010)	(0.006)
Active Choice (Control) Mean	0.642	0.485	0.157	0.517	0.425	0.091
Covariates Included	Yes	Yes	Yes	Yes	Yes	Yes
Block Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
n	8,065	8,065	8,065	10,729	10,729	10,729
R	0.195	0.148	0.078	0.232	0.162	0.124

Notes: See Table 2 for sample description; sample is conditional on accessing the financial aid portal; reference group = active choice; HC2 robust standard errors in parentheses; + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; all regressions include baseline controls for: 1) student demographics; 2) student/parent income and financial situation; 3) year enrolled; 4) dependency status; 5) prior loan borrowing behaviors; and 5) blocked fixed-effects. Variations in in the sample size are due to students not being packaged a subsidized or unsubsidized loan based on EFC and financial need.

Table 6: Impact of Default Choice on Unsubsidized Loan Borrowing by Loans Available

	(1)	(2)	(3)	(4)
	One Loan		**Two Loans**	
	%	*$*	*%*	*$*
Treatment 1: Opt-Out	-0.000	-32.594	0.027*	79.378+
	(0.017)	(111.788)	(0.013)	(45.426)
Treatment 2: Opt-In	-0.044**	-367.234***	-0.012	-74.925
	(0.017)	(109.808)	(0.013)	(46.534)
Active Choice (Control) Mean	0.548	3,617.18	0.499	1,559.67
Covariates Includes	Yes	Yes	Yes	Yes
Block Fixed-Effects	Yes	Yes	Yes	Yes
n	3,907		6,822	
R	0.254	0.386	0.238	0.455

Notes: See Table 2 for sample description; sample is conditional on accessing the financial aid portal; reference group = active choice; HC2 robust standard errors in parentheses; + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001; all regressions include baseline controls for: 1) student demographics; 2) student/parent income and financial situation; 3) year enrolled; 4) dependency status; 5) prior loan borrowing behaviors; and 5) blocked fixed-effects. Variations in in the sample size are due to students not being packaged a subsidized or unsubsidized loan based on EFC and financial need.

Table 7: Impact of Default Choice Option on Loan Substitution and Employment

	(1)	(2)	(3)
	External Borrowing		**Employment**
	Private Loans (Y/N)	Parent PLUS (Y/N)	Work Study Earnings ($)
Panel A: Control Group Mean			
Active Choice	0.021	0.074	115.485
	(0.143)	(0.262)	(641.944)
Panel B: Reduced-Form Estimates (OLS)			
Opt-In	0.000	0.003	-2.178
	(0.003)	(0.005)	(12.127)
Panel C: IV Estimates			
Accept Any Loans	-0.021	-0.119	114.137
	(0.130)	(0.239)	(637.992)
Panel D: IV Estimates			
Accept All Loans	-0.014	-0.081	*78.790*
	(0.088)	(0.160)	(439.692)
Panel E: IV Estimates			
Amount Borrowed ($100)	-0.002	-0.012	11.787
	(0.013)	(0.024)	(65.762)
Observations	11,836	11,836	11,836

Notes: See Table 2 for sample description for our conditional sample. Panel A is the control group mean and standard deviations in a parentheses. Panel B contains reduced-form (OLS) estimates of assignment to the opt-in treatment condition; control condition is a pooled set of students assigned to either active choice or opt-out conditions. Panels C, D, and E contain IV estimates of accepted any loans (Panel C); accepting all loans (Panel D), and the amount borrowed in $100 increments (Panel E). Assignment to the opt-in default condition serves the excluded instrument. all regressions include baseline controls for: 1) student demographics; 2) student/parent income and financial situation; 3) year enrolled; 4) dependency status; 5) prior loan borrowing behaviors; and 5) blocked fixed-effects. Variations in in the sample size are due to students not being packaged a subsidized or unsubsidized loan based on EFC and financial need. HC2 standard errors in parentheses; + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 8: Impact of Default Choice Option on Academic Performance

	(1)	(2)	(3)
		Academic Year	
	Credits Attempted	Credits Passed	GPA
Panel A: Control Group Mean			
Active Choice	25.787	22.521	3.019
	(5.046)	(8.828)	(1.108)
Panel B: Reduced-Form Estimates (OLS)			
Opt-In	-0.010	0.042	0.005
	(0.088)	(0.153)	(0.012)
Panel C: IV Estimates			
Accept Any Loans	0.517	-1.919	-0.334
	(4.597)	(7.012)	(0.886)
Panel D: IV Estimates			
Accept All Loans	0.357	-1.302	-0.227
	(3.174)	(4.731)	(0.596)
Panel E: IV Estimates			
Amount Borrowed ($100)	0.053	-0.196	-0.034
	(0.474)	(0.713)	(0.090)
Observations	11,836	11,836	11,836

Notes: See Table 2 for sample description for our conditional sample. Panel A is the control group mean and standard deviations in a parentheses. Panel B contains reduced-form (OLS) estimates of assignment to the opt-in treatment condition; control condition is a pooled set of students assigned to either active choice or opt-out conditions. Panels C, D, and E contain IV estimates of accepted any loans (Panel C); accepting all loans (Panel D), and the amount borrowed in $100 increments (Panel E). Assignment to the opt-in default condition serves the excluded instrument. all regressions include baseline controls for: 1) student demographics; 2) student/parent income and financial situation; 3) year enrolled; 4) dependency status; 5) prior loan borrowing behaviors; and 5) blocked fixed-effects. Variations in in the sample size are due to students not being packaged a subsidized or unsubsidized loan based on EFC and financial need. HC2 standard errors in parentheses; + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figures

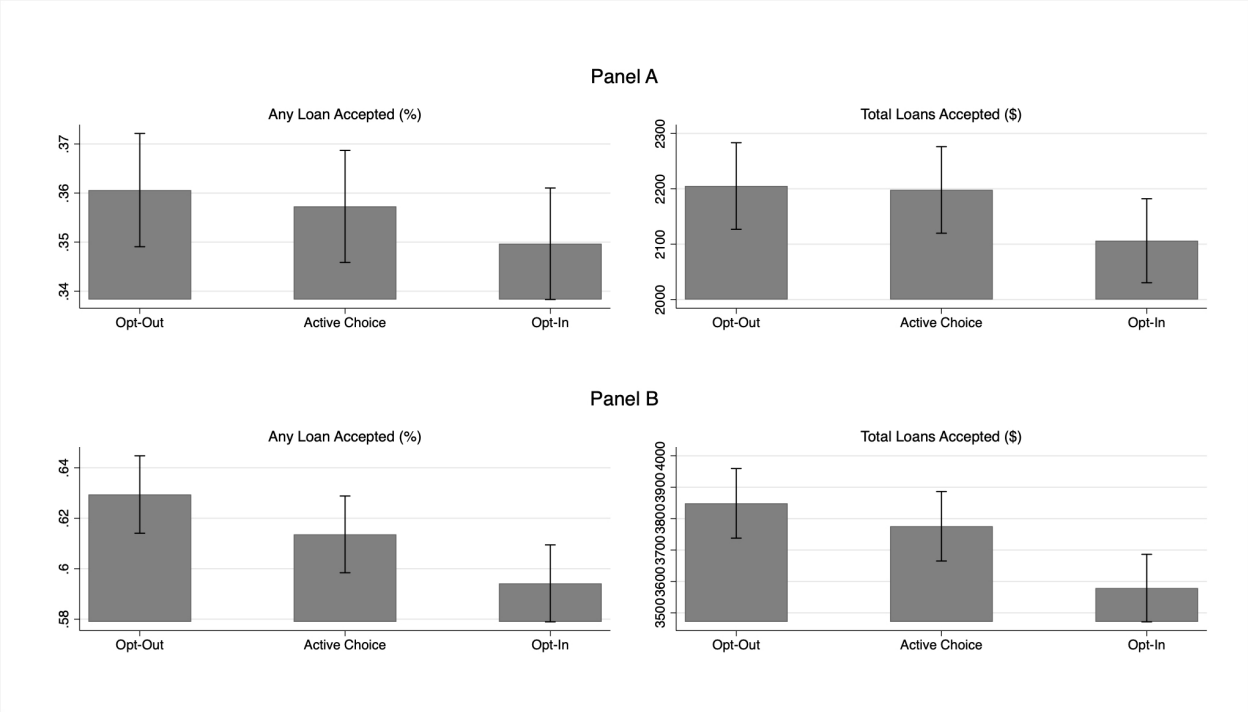
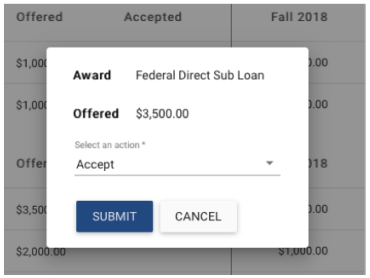


Figure 1: Mean borrowing by treatment condition

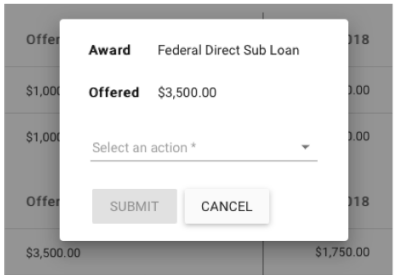
Appendices

Appendix A

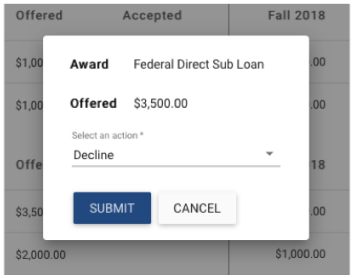
Opt-Out



Active Choice



Opt-In



Appendix B

Table B: Impact of Default Choice on Portal Access

	(1)	(2)
Treatment 1: Opt-Out	-0.009	-0.012
	(0.009)	(0.008)
Treatment 2: Opt-In	0.006	0.006
	(0.008)	(0.008)
Active Choice (Control) Mean	0.582	0.582
n	20,193	20,193
Baseline Controls	No	Yes

Notes: See Table 2 for sample description; reference group = active choice; HC2 robust standard errors in parentheses; + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001; baseline controls includes in (2) are : 1) student demographics; 2) student/parent income and financial situation; 3) year enrolled; 4) dependency status; 5) prior loan borrowing behaviors; and 5) blocked fixed-effects.

Appendix C

Table C: Mean Outcomes by Treatment Group

	Unconditional Sample				Conditional Sample			
	Total Sample	Active Choice	Opt-Out	Opt-In	Total Sample	Active Choice	Opt-Out	Opt-In
Total Loans								
Accepted Any Loans	0.36	0.36	0.36	0.35	0.61	0.61	0.63	0.59
	(0.48)	(0.48)	(0.48)	(0.48)	(0.49)	(0.49)	(0.48)	(0.49)
Accepted All Loans	0.30	0.30	0.31	0.29	0.52	0.52	0.54	0.49
	(0.46)	(0.46)	(0.46)	(0.45)	(0.50)	(0.50)	(0.50)	(0.50)
Total Loan Amount	2,169.49	2,197.99	2,205.02	2,106.13	3,732.53	3,775.70	3,848.66	3,578.90
	(3241.48)	(3281.51)	(3254.65)	(3187.40)	(3499.20)	(3541.82)	(3487.58)	(3463.14)
Subsidized Loans								
Offered Subsidized	0.60	0.60	0.61	0.60	0.68	0.68	0.68	0.67
	(0.49)	(0.49)	(0.49)	(0.49)	(0.47)	(0.47)	(0.47)	(0.48)
Accepted Subsidized	0.41	0.41	0.41	0.41	0.64	0.63	0.65	0.63
	(0.49)	(0.49)	(0.49)	(0.49)	(0.48)	(0.48)	(0.48)	(0.48)
Subsidized Loan Amount	1,754.44	1,747.39	1,780.70	1,734.93	2,717.52	2,674.53	2,804.73	2,674.86
	(2281.41)	(2272.22)	(2297.88)	(2274.25)	(2333.53)	(2329.04)	(2333.38)	(2336.73)
Unsubsidized Loans								
Offered Unsubsidized	0.94	0.93	0.93	0.94	0.89	0.89	0.89	0.89
	(0.25)	(0.25)	(0.25)	(0.24)	(0.31)	(0.31)	(0.31)	(0.30)
Accepted Unsubsidized	0.28	0.28	0.29	0.27	0.51	0.51	0.52	0.48
	(0.45)	(0.45)	(0.45)	(0.45)	(0.50)	(0.50)	(0.50)	(0.50)
Unsubsidized Loan Amount	1,187.47	1,226.62	1,191.23	1,144.96	2137.51	2,209.04	2,182.46	2,025.48
	(2312.50)	(2376.93)	(2284.04)	(2274.63)	(2756.01)	(2829.35)	(2719.39)	(2714.78)

Notes: Table displays means and standard deviations (in parentheses) for both our conditional and unconditional samples and by experimental group.

Appendix D

Table D: Multiple Comparison Robustness Check (Conditional Sample)

	Any Loans	**All Loans**		**Subsidized Loans**		**Unsubsidized Loan**	
	%	*%*	*$*	*%*	*$*	*%*	*$*
Opt-Out vs. Active Choice	0.011	0.011	72.640	0.022	85.823	0.017	33.987
	(0.009)	(0.010)	(64.289)	(0.012)	(51.762)	(0.010)	(50.580)
Opt-In vs. Active Choice	-0.019+	-0.028+	-189.451**	-0.002	-4.939	-0.025*	-191.499***
	(0.009)	(0.009)	(64.289)	(0.012)	(51.762)	(0.010)	(50.987)
Opt-In vs. Opt-Out	-0.030**	-0.040***	-262.09***	-0.002	-90.761	-0.042***	-225.486***
	(0.009)	(0.009)	(64.289)	(0.012)	(51.762)	(0.010)	(50.628)
Covariates Included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Block Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: See Table 2 for sample description; Sidak-Holm adjusted; HC2 robust standard errors in parentheses; + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; all regressions include baseline controls for: 1) student demographics; 2) student/parent income and financial situation; 3) year enrolled; 4) dependency status; 5) prior loan borrowing behaviors; and 5) blocked fixed-effects. Variations in in the sample size are due to students not being packaged a subsidized or unsubsidized loan based on EFC and financail need.

Appendix E. Heterogeneous Effects

We further explored the impact of our treatment conditions on a variety of subgroups.[19] First, we investigated differences between independent and dependent students.[20] Avery and Turner (2012) suggest that independent and dependent students engage with the student loan process differently, while Charles et al. (2019) found that dependent students are more likely to respond to informational nudges within the student borrowing process. Table E1 provides our treatment effect estimates by dependency status. Both dependent and independent student borrowers who were assigned the opt-in condition were less likely to borrow all packaged loans (2.4 and 5.8 percentage points less likely respectively) and borrowed less ($146.47 and $514.49, respectively) than their peers assigned the active choice control group. The opt-in reduction in borrowing for dependent students equates to a 4.2% decrease relative to the active choice control group, while for independent students the opt-in conditions reduces borrowing by 7.9%.

Opt-out assignment appears to affect the borrowing behaviors of dependent students only, although we have less power to detect effects for independent students, given the relatively small share of independent student borrowers in our sample. Opt-out assigned dependent students were 1.6 percentage points more likely to engage in borrowing, were 1.5 percentage point more likely to accept all their packaged loans, and borrowed $135.72 – or 3.9%– *more* than dependent students assigned to the active choice control condition.

Table E2 presents treatment estimates according to whether students have a Pell Grant included in their financial aid package. Both non-Pell and Pell students were significantly less likely to accept all packaged loans (3.1 percentage points) and borrowed significantly less ($237.76 and $157.35 or 6.0% and 4.1%, respectively) when they were assigned to the opt-in condition. Non-Pell students assigned to the opt-out condition borrowed more than those in the active choice condition – on average borrowing $155.23 or 3.9% more – and were 2.5 percentage points more likely to engage in borrowing.

We further test the role of the other financial aid and postsecondary costs by examining treatment effects across residency (in-state versus out-of-state) status and state financial aid program participation in Table E3.[21] We find consistent effects by which the opt-in

[19] We do not originally block on these subgroups; however, our balance test indicate no statistical difference for the assignment of these groups across our three conditions.

[20] An independent is defined as a student who is at least 24 years of age, married, a graduate or professional student, a member or veteran of the armed forces, an orphan, a ward of the court, someone with legal dependents other than a spouse, an emancipated minor or someone who is homeless or at risk of becoming homeless. Dependent students are defined as those who do not meet the definition of an independent student.

[21] The state merit-aid scholarship located within the state of our institutional partner is comprehensive in nature but is restricted to in-state students who qualify based on their secondary and postsecondary academic performance. Recipients of the state's merit-aid scholarship covers between 75% and 100% of tuition and applicable fees for cohorts of students included in our analysis.

default choice significantly reduces the likelihood of borrowing and the amount borrowed for all groups. Out-of-state students were influenced by the opt-in conditions as they were 5.5 percentage points less likely to engage in student loan borrowing, were 6.1 percentage points less likely to accept all loans offered, and borrowed $426.39 dollars (or 7.6%) less than out-of-state students assigned to the active choice default condition. In-state students were also significantly impacted by an opt-in default. On average, in-state students presented with an opt-in choice borrowed 4.8% less ($181.39) in total loans, were 2.8 percentage points less likely to accept their entire loan package, and were 1.9 percentage points less likely to borrow a student loan than in-state students assigned to make an active choice on their loans. In sum, for out-of-state students, we observe some evidence that the opt-out condition also led to some reduction in borrowing.

Within our sample 57% of in-state students received a large merit-based state financial aid subsidy that covered the majority of, if not all, tuition and fees. We tested for any differential treatment effects by those receiving and not receiving the merit-aid subsidies – Columns (3) and (4)— and again found statistically significant and generally consistent evidence that both recipients and non-recipients of the merit-aid subsidies reduced their borrowing behaviors when assigned to the opt-in condition. In-state merit-aid recipients borrowed 7.3% less, while in-state non-merit-aid recipients in the opt-in condition reduced their borrowing by 3.2% – both relative to peers assigned to the active choice control condition.

Table E1: Default Choice Difference by Dependency Status

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent			**Independent**		
	Any Loans	All Loans		Any Loans	All Loans	
	%	%	$	%	%	$
Treatment 1: Opt-Out	0.016	0.015	135.718*	-0.025	-0.013	-281.379
	(0.010)	(0.011)	(62.963)	(0.024)	(0.025)	(233.907)
Treatment 2: Opt-In	-0.024*	-0.027*	-146.474*	-0.013	-0.058*	-514.489*
	(0.010)	(0.011)	(62.395)	(0.024)	(0.026)	(235.104)
Active Choice (Control) Mean	0.607	0.519	3,462.87	0.737	0.585	6,489.30
Covariates Included	Yes	Yes	Yes	Yes	Yes	Yes
Block Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
n	10,127	10,127		1,709	1,709	
R	0.252	0.234	0.324	0.209	0.258	0.357

Notes: See Table 2 for sample description; sample is conditional on accessing the financial aid portal; reference group = active choice; HC2 robust standard errors in parentheses; + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001; all regressions include baseline controls for: 1) student demographics; 2) student/parent income and financial situation; 3) year enrolled; 4) dependency status; 5) prior loan borrowing behaviors; and 5) blocked fixed-effects. Variations in in the sample size are due to students not being packaged a subsidized or unsubsidized loan based on EFC and financail need.

Table E2: Default Choice Difference by Pell Status

	(1)	(2)	(3)	(4)	(5)	(6)
	Non-Pell			**Pell**		
	Any Loans	All Loans		Any Loans	All Loans	
	%	*%*	*$*	*%*	*%*	*$*
Treatment 1: Opt-Out	0.025+	0.018	155.225+	-0.008	0.002	-31.798
	(0.013)	(0.014)	(85.117)	(0.014)	(0.014)	(97.388)
Treatment 2: Opt-In	-0.024+	-0.031*	-237.760**	-0.018	-0.031*	-157.350+
	(0.013)	(0.013)	(84.567)	(0.014)	(0.014)	(96.720)
Active Choice (Control) Mean	0.631	0.575	3,948.80	0.620	0.475	3,851.61
Covariates Included	Yes	Yes	Yes	Yes	Yes	Yes
Block Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
n	6,439	6,439		5,397	5,397	
R	0.232	0.200	0.347	0.236	0.248	0.377

Notes: See Table 2 for sample description; sample is conditional on accessing the financial aid portal; reference group = active choice; HC2 robust standard errors in parentheses; + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; all regressions include baseline controls for: 1) student demographics; 2) student/parent income and financial situation; 3) year enrolled; 4) dependency status; 5) prior loan borrowing behaviors; and 5) blocked fixed-effects. Variations in in the sample size are due to students not being packaged a subsidized or unsubsidized loan based on EFC and financial need.

Table E3: Default Choice Difference by Residency and State Aid Status

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Any Loans				**All Loans**				**Total Loan Amount**			
	Out-of-State	**In-State**			**Out-of-State**	**In-State**			**Out-of-State**	**In-State**		
		All	*Merit*	*Non-Merit*		*All*	*Merit*	*Non-Merit*		*All*	*Merit*	*Non-Merit*
Treatment 1: Opt-Out	-0.045+	0.015	0.009	0.015	-0.054+	0.016	0.017	0.012	-302.189+	106.666	49.179	128.756+
	(0.026)	(0.010)	(0.015)	(0.013)	(0.029)	(0.010)	(0.016)	(0.013)	(179.790)	(67.615)	(119.490)	(75.534)
Treatment 2: Opt-In	-0.055*	-0.019+	-0.003	-0.029*	-0.061*	-0.028**	-0.031+	-0.027*	-426.392*	-181.385**	-204.229+	-168.919*
	(0.025)	(0.010)	(0.015)	(0.012)	(0.029)	(0.010)	(0.017)	(0.012)	(182.047)	(66.932)	(122.229)	(73.319)
Active Choice (Control) Mean	0.866	0.603	0.511	0.756	0.807	0.502	0.428	0.624	5,605.05	3,738.60	2,798.97	5,296.11
Covariates Included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Block Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
n	1,103	10,733	4,112	6,621	1,103	10,733	4,112	6,621	1,103	10,733	4,112	6,621
R	0.145	0.230	0.179	0.285	0.131	0.229	0.229	0.274	0.352	0.362	0.331	0.346

Notes: See Table 2 for sample description; sample is conditional on accessing the financial aid portal; reference group = active choice; HC2 robust standard errors in parentheses; + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; all regressions include baseline controls for: 1) student demographics; 2) student/parent income and financial situation; 3) year enrolled; 4) dependency status; 5) prior loan borrowing behaviors; and 5) blocked fixed-effects. Variations in in the sample size are due to students not being packaged a subsidized or unsubsidized loan based on EFC and financial need. Merit-aid scholarship is restricted to in-state students who qualify based on their secondary and postsecondary academic performance. Merit scholarship covers between 75% and 100% of tuition and applicable fees.