Information Use and Attention Deferment in College Student Loan Decisions

April 2017

Rajeev Darolia Casandra Harper

Abstract: A prominent concern is that college students are harming their long-term economic prospects by making student loan decisions without full information about the implications of their choices. We designed an experiment to examine students' responses to a debt letter that provides students easily accessible information about their student loans. The debt letters are modeled after requirements in recent state laws and a broader set of policy initiatives that attempt to encourage students to make informed borrowing and educational finance decisions. Our results suggest that information alone is not sufficient to drive systematically different borrowing choices among students. The debt letter led to no change in the amount that students borrow or the likelihood that they will borrow as compared to students who did not receive the extra information. We supplement results from the experiment with semi-structured interviews that imply that student decision making is unlikely to be improved by simply designing more engaging or numerous communications. Notably, analogous to the way students can defer payments on student loan debt while in college, students are similarly purposefully deferring attention to the implications of their borrowing.
Keywords: student loans, debt letter, financial literacy, college decisions
JEL codes: D83, H52, I22, I28

Darolia: University of Missouri and Federal Reserve Bank of Philadelphia, 216 Middlebush Hall, Columbia, MO 65211, daroliar@missouri.edu; Harper: University of Missouri, 211B Hill Hall, Columbia, MO 65211, harpercas@missouri.edu. Acknowledgements: Collaboration with financial aid professionals at the University of Missouri was indispensable to the conception and execution of this project, in particular Gena Boling, Wendy Carter, and Nick Prewett. We thank Justin Chase Brown for his contribution to this project and appreciate research assistance from James Cousett, Kasey Schaumburg, Lisa Scheese, Laura Schneider, and Enyu Zhou. We benefitted from feedback from Beth Akers, Sandy Baum, Isaac McFarlin, Lesley Turner, and staff at the Federal Reserve Bank of Philadelphia, and seminar participants at the University of Kentucky, the University of Missouri, the Federal Reserve Board of Governors, the Association of Public Policy Analysis and Management, and the Association for Education Finance and Policy. The views expressed here are those of the author and do not necessarily reflect the views of the Federal Reserve Bank of Philadelphia or of the Federal Reserve System.

1. Introduction

College student borrowing has become one of the more prominent policy issues in the United States, due in part to upswings in outstanding student loan debt and rates of costly student loan default (Federal Reserve Bank of New York, 2016). Student loans can improve efficiency by enabling students to borrow against post-college incomes when earnings are expected to be higher, and in the absence of other aid, access to educational credit markets have the potential to equalize college access among disparate groups (Avery and Turner, 2012; Ellwood and Kane, 2000). There are concerns, however, that educational debt can distort post-college labor market and social decisions, make college attendance less attractive, saddle students and the economy, and disproportionately burden low-income students (e.g., Brown and Caldwell, 2013; Elliott and Lewis, 2014; Rothstein & Rouse, 2011). Given these potential benefits and threats, it is critical that college students are equipped with the knowledge and skills to make borrowing decisions that maximize their long-term economic prospects.

One strategy to encourage informed decisions is for colleges to send students "debt letters" akin to an annual financial account statement that provide students easily accessible information about their student loans and the implications of their borrowing choices. The distribution of such information is now required by law in at least two states and has become an increasingly common practice among postsecondary institutions.[1] These policy and programmatic efforts are taking place, however, while we still know relatively little about how college students make judgments

[1] Indiana Enrolled House Bill 1042 (enacted April 2015) and Nebraska Legislative Bill 726 (enacted April 106) mandate that postsecondary institutions annually inform students of the total amount borrowed, estimate of total payoff amounts and monthly repayment amounts, and the percentage of the borrowing limit encumbered. This is required of all postsecondary institutions that receive state financial aid in Indiana and all publicly funded postsecondary institutions in Indiana.

related to student debt and have limited inference on the role of information in student loan decisions relative to other structural supports.

We present the first experimental evidence on the effects of information provision in the form of debt letters. The setting for the study is the University of Missouri, a large public flagship university in the Midwest, and the experiment included all non-graduating undergraduate students who borrowed in a prior year (N = 9802). Half of the students were randomly selected to receive individually tailored letters that include a summary of borrowing to date, an estimate of expected future monthly debt payments, and data on the typical borrowing of peers. We compare the borrowing choices of the students to those of the control group that no additional information. We supplement results from the experiment with in-depth semi-structured interviews of 27 students.

Our study contributes to the literature attempting to understand how information and low-cost supports can affect educational decisions (e.g., Bettinger et al., 2012; Castleman & Page, 2015a; Castleman & Page, 2015b; Hoxby & Turner, 2015) and the prevalence of ill-informed or distorted student loan decisions (e.g., Barr et al., 2015; Cadena & Keys, 2013; Marx & Turner, 2015). Overall, the debt letter did not affect the amount or incidence of student loan borrowing. Further, we find at most limited evidence of an effect of the letter on the borrowing of student subgroups that we would expect to be more sensitive to information based on demographics or their prior borrowing amounts. Student interviews indicate that student loan decisions are being made without full knowledge, but imply that low-touch interventions will have limited potential to systematically change borrowing behavior. This result is consistent with other studies suggesting that information alone may not be able to induce action on complex educational finance decisions without other supports (e.g., Bergman, Denning, & Manoli, 2016; Bettinger et al., 2012). Further, we find that changes to behavior are unlikely to be improved by simply designing more

engaging or numerous communications. Notably, analogous to the way students can defer payments on student loan debt while in college, students similarly appear to be purposefully deferring attention to the implications of their borrowing.

Policy interest in the potential of debt letters was catalyzed by a set of interventions initiated by the Indiana University (IU) system that were touted to reduce borrowing by about 16% over a 2 year period (Kennedy, 2015). The letter received media headlines, but it is difficult to draw inference from observed reductions. During the same time period, national aggregate student loan borrowing declines of approximately the same magnitude (Baum et al., 2015) and the letter was just one of many services that the system implemented to reduce borrowing.[2] In a related intervention using non-experimental data, Stoddard, Urban, and Schmeiser (2017) found no changes to students' borrowing because of a debt letter at Montana State University (MSU) that targeted students with high borrowing and was part of a set of supplementary supports such as financial incentives to individually meet with financial planners and career coaches. In a Dutch college setting, Booji et al. (2012) found that student survey respondents who received information about their borrowing had higher knowledge about their loans but did not change borrowing behavior.[3]

[2] For example, student borrowers were given access to individual financial mentoring and the financial incentives to graduate on time. IU also started an Office of Financial Literacy that launched a series of programs aimed at reducing borrowing and enrolling in more credits per semester. One of these programs is a "MoneySmarts" website that includes tutorials about financial topics and a series of podcasts, including one titled "How Not to Move Back in With Your Parents" that averages more than 3,000 playbacks monthly (Kennedy, 2015).

[3] We also note that our study set at a 4-year research university complements work by researchers who are conducting experiments to further understand the role of information in borrowing decisions among community college students. For example, Barr et al. (2016) sent text messages to adult students at a large community college system, encouraging them to make active decisions related to loans and found substantial reductions in borrowing, particularly among minority, new, and low-income students. Marx and Turner (2016) alter the default student loan offering assigned to students at two community colleges in the Midwest and find that students are biased toward borrowing the amount listed in their financial aid offers.

This study distinguishes itself from these other contexts in important ways. First, our study is the only one of which we are aware that uses a randomized, controlled field experiment to identify the causal effect of information provision in the form of debt letter. Relatedly, we can more confidently ascribe observed effects in our study specifically to the information letter, since the university in the setting did not have the resources to implement additional systematic supports as in other settings, such as hiring certified financial planners or career coaches. These resource constraints are common to many institutions that have limited capacity. Therefore, results from the study likely correspond to what we would expect if higher education institutions implemented informational borrowing nudges at scale.

Second, while other interventions explicitly attempted to reduce student borrowing, the letter in our context neutrally attempted to encourage students to make informed and active student loan decisions and therefore targeted students with past borrowing levels of any amount.[4] Students who are most likely to default have relatively low loan amounts and college departure is predictive of student loan default (Looney and Yannelis, 2015). There is also evidence that college students are making poor financial decisions in an attempt to avoid borrowing (Cadena and Keys, 2013). Aversion to debt could lead to reduced college consumption, put students' ability to graduate at risk, and limit students' benefits from college. Therefore, information that is presented neutrally may result in some students making better decisions by borrowing more rather than less if such borrowing allows them to finish their degrees.

Finally, our in-depth interviews allow us to explore students' thinking related to their borrowing, knowledge about the financial aid process, and their reactions to the loan letter itself.

[4] Both the IU and MSU programs were explicitly focused on reducing student borrowing. For example, the MSU letter included statements such as "If you continue to accept student loans at this rate, you will accrue a debt level that may become difficult to repay, which may place you at risk for defaulting on your loans."

These qualitative data provide insight into the reasons why students do not respond to the low-touch information intervention. The interview responses also provide rich, though preliminary, suggestions for the type and manner of information that would be helpful for college students in future interventions.

2. Background

2.1. Student Loans

Over the last 20 years, educational loan disbursements grew from about $40 billion to a peak of $116 billion in 2010; estimated disbursements for the 2014 academic year were $95 billion (in inflation adjusted dollars, Baum et al., 2015). There are two prominent concerns related to observed increases in student borrowing. The first is that students are accruing debt that they are unable to repay. Panel A of Figure 1 displays the percentage of student loan balances (from any type of student loan) that are delinquent, as compared with other types of credit. While delinquency in all types of credit increased as the country emerged from the Great Recession, student loan debt delinquency has continued to rise since 2010, while delinquency in other debt categories has declined. The default rate of students on federal student loan programs (in which taxpayers are responsible for covering losses associated with delinquent debt) as measured by the U.S. Department of Education (ED) are similarly on an upward trend in default and with default doubling from trough to peak.[5] In addition to public costs, default can impair a debtor's future access to the credit market and therefore reduce opportunity to build assets. Default in the educational credit context is especially risky since debtors have legal barriers to overcome if they attempt to rebuild economically by filing bankruptcy (Darolia & Ritter, 2015).

[5] See https://www2.ed.gov/offices/OSFAP/defaultmanagement/cdr.html.

The second group of concerns are that students' benefits from attending college will be limited by onerous repayment responsibilities. The amount of outstanding student loan debt is currently estimated to exceed $1 trillion, more than double the level from a decade earlier (Federal Reserve Bank of New York, 2016). Higher levels of aggregate debt are in part due to an expansion in college enrollment over time, particularly among students who come from households with low incomes and few assets. The bottom panel of Figure 1 demonstrates the growth in overall borrowing from 2000 to 2012 came from increases in both the percentage of students who borrow and the average award for borrowing students, with the magnitude of growth equaling about 25% in either case. Research has demonstrated that borrowing can affect some post-college decisions, such as career choices (Field, 2009; Rothstein & Rouse, 2011). Some have raised concern that onerous repayment obligations could lead to lower consumption and delayed investment in assets such as homes (e.g., Brown & Caldwell, 2014), though researchers are yet to establish a causal link. And, while college attendance has traditionally been seen as a way to reduce economic disparities among students from different socioeconomic backgrounds, unequal repayment burdens can limit these equity gains (Elliott & Lewis, 2014). Finally, there is concern that the prospect of borrowing for college will limit deter some students from pursuing or persisting in college.[6]

2.2. Student Loan Decisions

These risks highlight the need for students to make informed and active student loan decisions. However, many college students are likely not equipped with the tools to make prudent

[6] Marx and Turner (2015) suggest a model of borrowing where students have a fixed cost of borrowing that can be due to both psychic costs of debt and also obstacles inherent in the financial aid application system. Other researchers have attempted to estimate the extent to which aversion to debt influences decisions, with generally mixed findings (e.g., Boatman, Evans, and Soliz, 2017; Caetano, et al., 2011).

student loan decisions without help. Student loans are a relatively complex financial instrument and college is the first time many students will make decisions related to debt.

To illustrate how lack of information and confusion about student loans can influence educational decisions, consider a simple two-period human capital model where utility is given by the sum of consumption in each period, c_1 and c_2, generally following Lochner & Monge-Narajnjo (2011). In period 1 an individual can receive a wage W_1 and enroll in college, $e = 1$ or 0.[7] Costs of college in period 1, θ, include non-financed direct costs as well as forgone wages. A student can borrow student loan money, δ, which they receive in period 1 and pay back in period 2, plus financing costs at rate R, where $R > 1$. In the second period students who enrolled in college receive a wage W_{S2} and those that did not out receive a wage W_{N2}. β is a discount factor.[8] Under standard assumptions and subject to the budget constraint,

$$c_1 + \beta c_2 \leq W_1 + e(\delta - \theta) + \beta(W_{N2} + e(W_{S2} - W_{N2} - R\delta)), \quad (1)$$

students will choose to persist in college if the discounted returns to college exceed the costs including financed and non-financed costs of college and forgone wages:

$$\theta + \beta R\delta \leq \beta(W_{S2} - W_{N2}). \quad (2)$$

This simple model implies that individuals are more likely to enroll in college when returns are higher or costs are lower and that student borrowing varies positively with expected labor market

[7] In our setting all students are already enrolled in college. The general difference between a model where a student is deciding to persist in school from and one where someone is deciding to enroll in college for the first time is that matriculated students will have some sunk cost of prior time in college and skills acquired in that time period would be incorporated in the value of W_{N2}. Additionally, expectations of students will likely differ to reflect the learning that takes place after they started school. The simple model presented here abstracts away from college choice, credit constraints, and nonpecuniary tastes for college among other factors, see also Cameron & Taber (2004) and Stinebrickner and Stinebrickner (2008). For simplicity, we assume students can work in the first period but do not have wealth.

[8] The discount factor if students borrowed at the market interest rate would be $\beta = 1/R$, but students own rate can vary with the lender and terms (e.g., government or private lender, subsidized or unsubsidized).

returns all else equal. Lochner and Monge-Naranjo (2011) further show that under standard assumptions desired borrowing increases with ability.

It is apparent how lack of knowledge or confusion about the components of the cost-benefit calculation of college in equation (2) can lead students to make poor decisions. A student who undervalues the costs related to borrowing, for example, because they underestimate the amount they borrow, δ, or their interest rate, R, may overinvest in education while a student who overestimates loan costs may underinvest. In limited settings, surveys have demonstrated that substantial proportions of students underestimate or do not know the amount of loans they borrow (Akers & Chingos, 2014; Andruska et al., 2014). There is also evidence that many prospective and matriculated students do not fully understand the total costs of college, which is likely due at least in part to the confusing nature of the financial aid system that can heavily discount published prices but for which receipt is difficult to forecast (Bleemer & Zafar, 2015; Dynarski & Scott-Clayton, 2006). Furthermore, students who do not accurately estimate their expected returns to college, $W_{S2} - W_{N2}$, are liable to over- or under-invest in education. Returns can vary by institution attended, field of study, and student ability, and there is evidence students do not accurately forecast future earnings (e.g., Bleemer & Zafar, 2015; Brewer, Eide, & Ehrenberg, 1999; Hamermesh & Donald, 2008; Wiswall & Zafar, 2015). Informational deficiencies are likely to be particularly prevalent for students who come from communities without a tradition of college-going on which they can rely (Bleemer & Zafar, 2015; Dynarski & Scott-Clayton, 2006; Tierney & Venegas, 2009).

Beyond actual knowledge about college and loan costs, it is also likely that some students make computational mistakes when whether to finance college using student debt and how much to borrow. Terms, repayment plans, and remedies for hardship vary substantially across student

loan programs increasing the complexity of estimating future payments.[9] Furthermore, loans increase students' consumption during college, but decrease it afterwards. Therefore, students may make sub-optimal decisions because individuals are prone to mistakes when forecasting future benefits and costs, because of issues with self-control, or because future payments may not be as salient to the student as the access to current funds (e.g., Cadena & Keys, 2013; Frederick, Loewenstein, & O'Donoghue, 2002; Karlan et al., 2010). These computational challenges are particularly relevant for many college students, particularly younger students, since people tend to gain financial knowledge and skills as they get older (e.g., Lusardi & Mitchell, 2014).

Online student loan counseling is required to borrow from federal programs; however, it is generally not considered effective in its current form. For example, Fernandez et al. (2015, 2016) observed that students tended to skim and skip the textual material in the counseling, since students considered it complex, tedious, and unhelpful. These reports also suggested that students were generally interested in finding out more about student loan debt, but they were not sufficiently concerned about the topic at time of college entry to sustain focus on the online counseling task.

Researchers employing experimental designs have shown that providing information, often accompanied by other supports, to college students can aid in decision making and help address informational deficiencies inherent in students' educational and financial aid decisions. For example, Hoxby & Turner (2013) demonstrate that reducing the complexity and cost of college applications resulted in low-income, high achieving students attending colleges with higher graduation rates using an experiment that provided students with tailored, simplified information about college options, along with application fee waivers. Castleman & Page (2015a, 2015b) show

[9] For example, in spring 2017, students could choose between at least eight different repayment plans for federal loan programs, including five distinct options for income-contingent repayment. Abraham et al. (2016) demonstrate substantial error by students choosing income-contingent plans appropriate for their situations, even among a positively selected group of mostly economics and STEM seniors at a selective state flagship institution.

that text messaging and relationships with peer counselors can help low-income high school students attend college. Specific to financial aid, Bettinger et al., (2012) establish that targeted assistance for financial aid forms and data about the net costs of college lead to increased attendance and persistence. In many of these settings, other supports that accompanied information appear to be important to the success of the intervention. For example, in the Hoxby & Turner (2013) and Bettinger et al. (2012) studies the most positive outcomes were among the group that received additional assistance beyond just information.

3. Experimental Design

3.1. Debt Letter

In the experiment, treatment group students received a "debt letter" that included individually tailored information about student borrowing to date. The messaging was not intended to increase nor decrease the borrowing of students but rather enable them make informed and active decisions. The letter provided a summary of annual and cumulative borrowing in total and by type of loan (e.g., subsidized, unsubsidized, private).[10] In addition, the letter included components that have the potential to address informational problems that lead to poor borrowing decisions. First, because research demonstrates that individuals do poorly with basic computations of future costs and benefits (e.g., Frederick et al., 2002), students received an estimate of their future monthly payment responsibilities based on the formula used in the ED's repayment plan estimator for the standard 10-year period.[11]. Future payments may not be as salient to the student as the access to current funds; therefore students who lack access to this information may make suboptimal decisions (Karlan et al., 2010). Second, we provided students with information about their peers' borrowing, specifically the median total loan debt of recent spring graduates at the

[10] The letter included data on loans originated to the student, but not parents (e.g., parent PLUS loans).
[11] See https://studentloans.gov/myDirectLoan/mobile/repayment/repaymentEstimator.action.

university. These data are potentially beneficial because behavioral research suggests that when navigating situations with limited knowledge, individuals will be influenced by the behavior of others (e.g., Cialdini, 2008).

Beyond curing information deficiencies, the intervention has other potential benefits. It promotes active borrowing decisions by prompting the student to think and seek information about current and future borrowing. To that end, the letters included hyperlinks to various resources to find out more about their own loans and about student loans in general. Additionally, students were encouraged to meet with a financial aid advisor and given contact information to facilitate such outreach.

The debt letter was e-mailed to the student from professionals in the financial aid office. The letter was also available on the students' online portal, which is the primary interface through which students register and interact with administrative components of the university. The financial aid office emailed letters to the treatment group at two different points. The first notice was sent in January 2015 and contained personalized data and messages related to each student's borrowing up to and including that academic year. The second notice was sent in March 2015, purposefully around the time when students received financial aid offers for the next academic year (2015-2016) since information can be particularly powerful when it draws attention to an important issue at a salient time (Stango & Zinman, 2014). The control group received the traditional financial aid award letter with no additional mailings or information at either time point.[12]

[12] It would have been possible for treatment group students to reveal to control group peers that they received a letter, and we could not measure the extent of such discussions. Interviews suggest that students typically speak in general terms about finances, but avoid detailed conversations.

3.2. Setting and Context

The experiment in this study is set at a large flagship public land-grant research university in the Midwest, the University of Missouri (MU). In recent years, MU enrolled approximately 27,000 undergraduate students, of which approximately 45% borrowed student loans. The average total loan borrowing among recent graduates is about $22,000. In Appendix Table A1, we compare general descriptive statistics for MU as compared to average 4-year universities in the United States. Compared to the national average, MU has similar annual cost of attendance and proportions of students who borrow, but higher graduation rates and student loan repayment rates. MU is also larger than the average university, with fewer minority students, and has more full-time residential students.

Using financial aid office records, the experiment included all non-graduating undergraduate students who obtained student loans in a prior year at MU (N =9802). Half of the students were randomly chosen to receive the debt letter; the other half served as the control group. We include in Table 1 summary statistics for the treatment and control groups. Before implementing the intervention, we ensured that the treatment and control groups are balanced based on observed characteristics, including race/ethnicity, gender, number of credits, financial resources, and prior borrowing levels. There are no statistically significant differences in observed characteristics between the treatment and control groups at the 95% confidence level. About 55% of the sample identifies as female. Over 80% of students identify as white, 17% identify as black, 4% identify as Hispanic, 3% identify as Asian, and 3% identify as another minority race/ethnicity (students can identify as multiple races/ethnicities). More than one-third of students are the first in their families to go to college, and more than 90% are considered financially dependent on their

parents. About three-quarters of students are charged in-state tuition, and about 14% transferred to MU from another postsecondary institution.

The bottom half of the table includes financial measures based on the academic year prior to receiving the debt letter (2014-2015). All aid-eligible students at MU are offered the maximum amount of federal loans for which they are eligible, and this is not necessarily directly tied to calculated financial need.[13] Therefore, students have the option to accept or decline all or a portion of the maximum amount of loans for which they are eligible, and this decision is not necessarily contingent on need. Average expected family contribution to college expenses (EFC) among borrowers is abou $18,000, and about one-third of students who borrow also receive a means-tested Pell Grant.

About 89% of students borrowed in the prior academic year, with an average total borrowing amount of about $6,800. The remaining 11% of students did not borrow in the immediate prior year but borrowed in an earlier year at MU. There are two major broad categories of student loans available to students and their families: from federal programs and from nonfederal lenders. Federal loan programs typically have more favorable terms than do nonfederal loans.[14] At MU, nearly 10% of students borrowed from nonfederal sources, which is generally in line with the national average (Baum et al., 2015).

[13] Maximum eligibility varies by number of credits completed, and the mix of loans is determined by financial need. See footnote 16 and https://studentaid.ed.gov/types/loans/subsidized-unsubsidized.

[14] Federal student loans are not underwritten as long as borrowers attend an eligible institution and interests rate charged in federal programs do not vary with expected default risk. As a result, federal loan programs are subsidized for most borrowers so credit is offered regardless of default risk and at lower rates than can generally be obtained from private lenders. Some programs have extra benefits, such as the ability to postpone payments and interest accrual during times of enrollment or hardship.

4. Analysis Plan

4.1. Experiment

The primary outcome of interest is the amount the student borrows in the year after receiving the loan letter. Using administrative data from the financial aid office, we estimate borrowing, Y, for student i as,

$$Y_i = \alpha_0 + \delta N_i + \alpha_1 X_i + \epsilon_i. \quad (3)$$

N_i is the treatment variable equal to one if the student received the debt letter and equal to zero for control group members, $N_i = \mathbf{1}[RecievedLetter]_i$. The coefficient of interest is the estimated parameter on the treatment indicator, δ, which represents the causal effect of receiving the informational treatment on outcomes.

We include information about students' financial resources and about the student herself in included in the X-vector, with parameter vector α, to improve precision in our preferred specification. Specifically, we include demographic characteristics including race/ethnicity and gender, EFC, cumulative GPA, credits earned, financial dependency status, and indicators for being a first-generation student, a transfer student, and in-state resident. All of these factors are measured in the pretreatment period. We also control for a lagged dependent variable. Therefore, the interpretation of the coefficient of interest in these models is the year-to-year change in the outcome for those who received the letter compared with the students in the control group. The idiosyncratic error term is ϵ_i.[15]

We also have interest in understanding whether responses to the letter vary with the intensity with which students borrowed in the pretreatment year. Students with loan amounts of

[15] We estimate this model using ordinary least squares for the continuous outcomes (e.g., amount of borrowing) and the dichotomous outcomes (e.g., whether or not the student borrowed). For this latter group of outcomes, this linear probability model yields results that are similar to a logit specification (available upon request).

various levels could have differential responses to additional information about their debt. Uninformed students who needlessly borrowed large sums may be likely to reduce borrowing once they learn more about their future repayment responsibilities. Alternatively, students who borrowed relatively low amounts may feel empowered to increase borrowing once provided with more information, either because their expected future payment is low or because their debt lags that of their peers. Loan limits for various loan programs may also influence changes to students' debt choices. Some students may not want to exceed the subsidized student loan limit (such that they would have to start borrowing unsubsidized loan funds), while others may not want to exceed the total federal loan program limit (in which case, they would have to start borrowing from nonfederal sources that would be expected to have inferior loan terms).

To examine heterogeneous responses, we group students into one of three mutually exclusive categories based on their applicable federal direct loan limits:[16] (1) *low* borrowing includes students with no loans in the prior year or prior year loan amounts up to and including the subsidized loan limit (22% of students); (2) *moderate* borrowing includes prior year loan amounts greater than the subsidized loan limit, up to and including the total annual federal direct loan limit (58% of students); and (3) *high* borrowing include students with prior year loan amounts greater than the annual federal direct loan limit (20% of students). To examine responses by students with

[16] We set these thresholds based on the maximum loan allowed for the student based on their year in school and financial dependency status. Subsidized Direct Loan Program loans are available to students based on financial need, and the ED pays the interest on the loan while the student is in school, for a grace after the student leaves school and during periods of deferment. Unsubsidized Direct Loan Program loans are also not underwritten and are available at subsidized interest rates, but interest is not paid by the government during periods of enrollment or deferment. Federal Direct Loan program loan limits vary by year in school, financial dependency status, and financial need. During the year analyzed, the total amount of direct loans first-year dependent students could borrow was $5,500, of which up to $3,500 could be in subsidized loans (first-year independent students could borrow up to $9,500, of which up to $3,500 could be subsidized loans). Second-year dependent student loan limits were $6,500, of which up to $4,500 could be subsidized ($10,500/$4,500 for independent students). Dependent students in their third year and beyond could borrow up to $7,500 in direct federal loans, of which up to $5,500 could be subsidized ($12,500/$5,500).

different loan amounts, we add a vector including indicators for moderate or high borrowing, L, and interact this vector with the debt letter receipt indicator:

$$Y_i = \beta_0 + \gamma_1 N_i + \gamma_2 (N_i \times L_i) + \beta_1 L_1 + \beta_2 X_i + \varepsilon_i \quad (4)$$

From this model, γ_1 is the estimate of the effect of the debt letter on the omitted base group, which, in this case, is students with low borrowing in the prior year. γ_2 is a vector of coefficients representing the marginal difference between the effect for the base group and each respective other group. To capture the total effect of the letter on students from the various borrowing groups, we report in the tables the linear combination of $\gamma_1 + \gamma_2[1, j]$ for each j in prior year moderate and high borrowing.

In addition, we test for heterogeneous responses among student subgroups who have been of interest to policy and research, specifically: first-generation students (i.e., students who are the first in their family to attend college), those with EFC equal to zero (this indicates that they have few personal or family resources to contribute to college expenses), and those with low GPAs (less than 2.5). Of the sample, 36% are first-generation students, 17% have an EFC equal to zero, and 25% of the students have a pretreatment GPA less than 2.5 on a 4.0 scale.

4.2. Interviews

The qualitative data for this study come from semi-structured interviews with 27 MU students. Our interest in understanding the role of the loan letter on students' decisions and behaviors led us to oversample students who were in the treatment group and received the loan letter; we sent three invitations to treatment group students for every invitation to the control group. Additionally, we oversampled first generation students because of our interest in the decision making of students who came from families with limited college experience. Because of the overlap between first generation status and other demographics this also leads to an oversampling

of minority and lower SES students. About 35% of students overall were the first in their family to attend college and we balanced our invitations to equally invite first generation and non-first generation students. Within these parameters we randomly selected six waves of students, totaling 700 invitations, which we invited via email between September, 2016 and February, 2017.

The invitation emails described the study as being about how students make decisions about their financial aid packages, whether they have the information they need to make decisions about funding options, and how they're balancing their finances with their overall undergraduate experience. We indicated that the interview was expected to last 60 minutes and would cover questions about their borrowing, finances, spending habits, and college experience. Participants were offered a $25 Amazon e-gift card that was sent after completing the interview and all participants were entered into a drawing for one $250 Amazon e-gift card.

Our interview sample includes 27 students who completed an online form consenting to be interviewed and that allowed us to access their administrative financial aid records.[17] 23 of these students received a debt letter and we also analyzed interview transcripts of four control group students because we asked broader questions about information use in student loan and financial decisions. We display summary statistics for interviewed students in Appendix Table A2. Through both intentional recruitment design and selection into the interviews, the interview sample differs from the broader borrowing population at MU. Students were more likely to be Black, female, and first generation. Interview participants all had higher GPAs, but came from more modest financial backgrounds (as measured by EFC and means-tested Pell Grant receipt).

[17] 63 students completed the online form initially expressing interest in the interview. 27 students then declined to be interviewed or did not respond to requests to schedule an interview, 9 scheduled an interview and then did not show, and 27 successfully scheduled and completed an interview.

All interviews were recorded, transcribed, and checked for accuracy by at least two members of the research team. We used an open coding strategy (Merriam, 2009) in our initial reading of the transcripts. We met as a research team to discuss and compare our codes and interpretations of the data, including major themes and patterns. We used an axial coding strategy to group codes into themes. For the purposes of this paper, we focused our attention on the themes related to our primary focus of the effectiveness and influence of the debt letter.

5. Results

5.1. Effect of the Loan Letter on Borrowing

We report effects of the letter on total borrowing with and without covariates in Table 2.[18] We do not find evidence that the information letter affected the average amount that students borrowed across all students as displayed in Panel A. Point estimates are negative with a magnitude of about 1.5% of average annual borrowing, but are not statistically different than zero and we can rule out overall effects as large as those reported in the IU setting. Specifically, we can rule out an effect size on annual borrowing greater than $258 from the preferred model with covariates in column 2 or about 4.5% of the post-treatment mean. We display a corollary result having a loan in the 2015–2016 academic year in Panel B. We observe a 1.4 percentage point decline in the probability of having a loan (this translates to an effect size of almost 2%), though this effect statistically significant at only the 10% level (we can rule out an effect size greater than about 4%).

We next examine the effect of the debt letter on the borrowing of key groups of interest in Table 3. Though point estimates continue to be negative across all groups, standard errors increase, and only the observed reduction in having a loan for students with relatively low GPAs is

[18] In Appendix Table A3, we report full output of estimates of borrowing amount and incidence from specifications with and without covariates. Coefficients on covariates generally take on expected signs. For example, borrowing is negatively related to EFC and that first-generation college students borrow more than their peers whose parents attended college.

statistically significant. Low GPA students were 4.3 percentage points less likely to have a loan because of the letter, which translates to an effect size of about 5%. A low GPA could correspond to low financial literacy, thereby increasing the efficacy of the debt letter to change these students' behavior. Additionally, the effect of the letter on students with low GPAs could be a function of negative academic feedback these students have received from the university in the form of low grades, which leads them to expect relatively low returns to their education or to be at relatively high risk of not completing their degree.

Next, we display results for varying levels of borrowing in the prior academic year in Table 4. Taken together, findings indicate that the debt letter does not lead to large scale systematic changes in student borrowing behavior across prior year borrowing levels. We observe negative point estimates of $377 on total borrowing and 3 percentage points on having a loan among previously high student loan borrowers (effect sizes of about 4% in column 1), though these results are only on the margin of statistical significance. We find no effect of the letter on those with low and moderate borrowing in column 1, with generally negative, but imprecisely estimated point estimates.

Among student subgroups, we again observe generally negative point estimates, but only the effect among the low GPA students is statistically significant. Students with low GPAs who received the letter and had low prior year borrowing were 9.7 percentage points less likely to have a loan than the control group in the next year (an effect size of nearly 22%). Among students with zero EFCs, students with high prior year borrowing groups were less likely to have a loan because of the letter (6 percentage points in column 3), but the estimate is only statistically significant at the 10% level. Therefore, while we observe generally consistently negative point estimates across

subgroups and some marginally statistically significant results, we interpret findings to be evidence that the letter did not have a meaningful systematic effect on student borrowing.

Finally, in results not displayed for brevity, we analyze whether students are likely to adjust their borrowing of in different types of loan programs (subsidized federal, unsubsidized federal, Perkins, and private loans; available upon request). It is possible that savvy students would attempt to adjust borrowing of only certainly types of loans in light of information about their borrowing, such as unsubsidized federal or private loans that have less favorable terms. However, consistent with our main results, we do not find that students systematically adjust their usage of specific loan programs.

5.2. Attention Deferment

We use interview responses to investigate why the loan letter did not result in borrowing changes for students. As previously discussed, there are important demographic differences between the interview sample and the population of borrowing students in the setting. Notably, interview participants are more likely to be sensitive to information about their borrowing and come from less advantaged financial and educational backgrounds.

A notable theme that arose from the interviews was that many students, whether in response to the loan letter or more broadly related to college finances, purposefully deferred attention to their student debt. This took a number of forms, including skimming through or ignoring the content. For example, one participant remembered the letter but said, “there’s a lot going on, ha, um honestly, I don’t read over these emails. I kinda just put them in a folder…I don’t know, yeah, I just, I don’t give them much thought.” Parental involvement was another reason cited by a participant who reported skimming the letter because if he was “doing everything myself financially then I would have, like I think I would have looked at it harder, but for me, knowing

that FAFSA like automatically deals with my parents and they just kind of go through it themselves, I just kind of look over it." Another participant noted that he thought his mom "has it all covered," and therefore didn't need to review extra information. A couple of participants admitted they did not know whether the student or the student's parent had taken out a loan, which also led to uncertainty about future repayment responsibilities.

However, other participants explained that they were intentionally inattentive to notices and information about loans because they felt like there was nothing they could do to change their borrowing if they wanted to finish school or enjoy the "college experience." One participant said the letter would not have any influence on his future borrowing choices explaining, "It's just, you know, do what you've gotta do, you know, if you have to push a loan to get into school and make it through school then by golly, you gotta do it, so that's just kinda our personal philosophy as a family." Another interviewee echoed these comments: "I think 'they have to do what they have to do' is what a lot of students' mindsets are," meaning that students will take out as many loans as they have to in order to stay enrolled. A participant said that she thought the information was "nice to know" but that "there's not anything I could do about it [because] it is what it is, just because I need that money to stay here, to live and work and, you know, go to school here. So it's like, it sucks that it's a lot but it's like there's nothing I could do about it. I mean, I can't pick up any more [work] hours than I already have without, you know, my grades failing." About a third of the participants we spoke with specifically noted that information would not influence their borrowing behavior because they needed the money to afford college and saw no other way to make ends meet.

Others acknowledged that they were not actively engaged because they would not have to deal with their debt responsibilities until the future. For example, one participant noted: "I don't

have to worry about it until I leave, so I don't really, I don't think [the letter] helps…I just don't worry about it until after I get out and I have to worry about it [then]." Other students who planned to attend graduate school commented that, "I knew I was staying another year or so for graduate school so it wasn't in the front of my mind that I'd have to be paying yet" and that they "really didn't pay much attention" to exit loan counseling meeting because repayment would be delayed and loan amounts would increase during graduate school.

There was also a clear desire among some students to avoid facing the content of the loan letter because of the negative emotions they associated with their current financial status. One participant, for example, thought the information was helpful in general but might spark an unintended emotional response when he noted that the letter "really cements my student depression." Similarly, one participant said that looking at the notice "just kind of depresses me, because of how much money I have taken out…maybe I should take out less, but I don't." Another participant said the letter provided an unwanted reality check: "I guess it kind of scares me… looking at how much I owe, so yeah." Many participants described having to take out loans in order to go to college, so they felt resigned to that reality and knowing the exact figures wouldn't change their situation.

Others wanted to enjoy their college experience without having to confront the realities that will face them after college. One student said that she borrowed so much despite being offered a tuition-free option at an institution in her home state, but she thought it was worthwhile because "this is where I met my fiancé, this is where I have great friends, and I love the [academic] department here." Another student, who also passed up a more affordable option closer to home to attend MU, noted struggling to pay for a vacation but justified the expenses by noting, "I'm only in college once, like I'm only going to be at this point in my life once, like, let's take the trip, let's,

you know, do all this kinda stuff." This attitude reflects a conflict between the desire of some students to extend their childhood and delay financial responsibilities until after college and a loan system that considers students as financially mature and able to make long-term financial decisions.

5.3. Non-Debt Outcomes

It is possible that students may have changed non-borrowing behavior in response to the letter. Faced with knowledge about college costs, instead of borrowing less, students might decide to reduce education consumption through fewer credits or by dropping out altogether. In Table 5, we display estimates that indicate that the letter did not lead to enrollment changes with small and precisely estimated null effects. A student might also decide to change the amount that they work when presented with information about student loans, but we similarly do not observe changes the amount the student worked through their federal work study job (we cannot observe non-campus employment). Finally, we do not observe any changes to students' majors in response to the letter that suggests that students switched to a field of study with a higher expected return in light of the information about borrowing.

The qualitative data also suggest only limited non-borrowing responses to the letter, though we have no way to verify if students actually changed behavior. One student said seeing those numbers probably helped her spend less (e.g., "those visual reminders of like, oh well I've borrowed this much, like, maybe I won't go get Starbucks today. Maybe I'll save that little bit, you know, more.") and probably made her a better saver. Another student said that the letter did not lead him to make any different decisions, but could have subconsciously because you're presented with your financial information and see, "oh, this is how much you borrow, then you see that number" and "so it's like a reminder; I need to make sure I am making the right choices."

6. Discussion

Though we did not design our research to systematically compare knowledge of loans to actual borrowing among all students, the interview responses also lead us to rule out the possibility students were already making fully informed student loan decisions that would have rendered extra information unnecessary. Prior research demonstrates that many students are confused about how much they have borrowed or of their college expenses (e.g., Akers & Chingos, 2014; Andruska et al., 2014; Bleemer & Zafar, 2015). Participants in our interviews displayed similar lack of knowledge. About half of our participants specifically noted not knowing how much they had borrowed, or they were confused about the different types of loans that they had taken out.

An underlying issue that students raised was that many students felt that the numbers behind their financial situation were fairly accessible, but they didn't understand how to process it. Only four participants thought that the amount borrowed through loans and the estimated repayment amounts and schedule were helpful to share with students; one of these four participants also thought the comparison of her borrowing total to the institutional average was reassuring but would not change behavior.

Instead, what was unknown to students was how to understand and interpret key terms and concepts, and how to pursue beneficial behaviors related to the financial aid process. In other words, the information by itself was not sufficient because students did not understand how to take action based on the information. For example, nearly half of the participants indicated that they needed more understanding about the differences and relative benefits among the different types of loan programs (e.g., federal vs. private, subsidized vs. unsubsidized). The distinction between unsubsidized and subsidized loans was particularly confusing for most participants and students regularly displayed confusion about interest rate levels and deferment options. Other participants

asked for information related to taxes, work study, changes to financial aid packages between years, and information about loan servicers. Many participants also described their deficient budgeting skills as a skill set that they would find valuable. These requests suggest the need for assistance and information that is presented in a more intensive way than in a low-touch letter.

Students' frustration about the way financial aid is allocated was apparent throughout many interviews and a number of students wanted to know more about the process through which financial aid decisions are made. One student remarked that "it's ultimately up to somebody else who decides, [someone] who hasn't met you; it's a numbers game." Another participant wanted to know how to get financial aid when one's parents are considered wealthy but are unwilling to help with college expenses. She noted "I never got anything because I wasn't considered financially need based because of my parent's salary, but what's not looked at a lot is, are your parents actually helping you?" It isn't clear that more knowledge about how financial aid decisions are made would change borrowing behavior, but the common belief among students that aid processes are confusing or unfair likely contributed to some students' unwillingness to engage with the financial aid process.

Additionally, there are also a number of design improvements to informational letters that could better capture students' attention, enhance motivation, and further ease the comprehension of complicated topics (e.g., Lamberton and Castleman, 2016). Some students commented that the letter was not particularly memorable or distinguishable in comparison to other information sent by the financial aid office or other offices around campus. Of the 23 students who received the debt letter, nine said they remembered receiving it, nine said they did not remember receiving a notice, and four were unsure or gave contradictory responses. Interestingly, two of the four

participants who were part of the control group reported in the interview that they received the letter even though they did not.

The participants discussed their frequent receipt of documents and updates from the financial aid office each semester, so it could be that this loan letter was assumed to be the same information as what is typically sent out to students. For example, one participant noted the frequency of receiving letters from financial aid and said, “I think it’s every semester…they send out it’s like a little email blurb that’s like, ‘hey, this is just an update of where your loans are standing, like this is what you have left for payment,’ stuff like that.” Another student responded, “I’ve seen it so many times, yes.” Other participants indicated familiarity with portions of the letter, but didn’t recall anything about what her particular loan numbers were. Clearly financial aid offices have the challenge of trying to capture the attention of students. However, these responses also suggest limitations to initiatives that result in students being deluged with nudges – this torrent of information has the potential to decrease students’ attention to any individual message or report.

We asked students directly about how information like the loan letter should be communicated with students. Surprisingly, about half of the participants thought that email was indeed the best approach to use (there is inherent selection bias likely in these responses since these were students who signed up for the interview through an email invitation). The remaining half of the sample who did not recommend email as a delivery strategy either noted reasons that were more consistent with current students’ behaviors, such as their tendency to ignore or skim emails, or they suggested other strategies that might be more effective. These strategies included: Twitter, texts, creating a song or video, offer presentations or budgeting classes, send a letter to parents, or require one-on-one meetings with a financial aid or academic advisor. Some of these strategies have been shown to be effective in college settings (e.g., Avery, 2010; Carrell &

Sacerdote, 2013; Castleman & Goodman, forthcoming), but are also resource intensive and may lead to challenges with privacy or engagement. For example, text messages are currently not allowed in this setting because current practice is that the University only texts students in cases of emergencies and the financial aid office is only allowed to share financial information with parents if students opt in.

Another potential way to address students' inattention is to make the letter more active. One participant remarked that they "looked over and scanned over it but it really didn't like [have] a lot of information on what I need to do." There are some potential issues with active inducements, however. Requirements to participate in a follow on activity may violate legal limits to what can be required of students for them to participate in federal loan programs. Furthermore, follow-on activities that accompany the letter are likely to increase the costs of a debt letter program, which could prove challenging for resource constrained financial aid offices.

Though the letter did not lead changes to borrowing, it appeared to induce information-seeking from some students. Treatment group students were two percentage points more likely to seek a meeting with a financial aid officer, an effect size of about 5%. While the increase in contact with the financial aid office does not appear to manifest itself in large-scale systematic changes in borrowing, this information seeking should nonetheless be considered a positive outcome since it creates a stronger connection with financial aid professionals that may lead to better post-graduation repayment outcomes. For example, informed students are more likely to actively choose an appropriate repayment plan and engage with their loan servicer, both of which may help students stay current on their educational debt post-college. Long-term follow-up studies examining degree attainment and repayment are needed to investigate further.

7. Conclusion

It is well documented that going to college can lead to substantial personal benefits such as higher earnings and greater economic mobility, and public benefits including increased workforce productivity and stronger community social outcomes (e.g., Goldin & Katz, 2008; Oreopoulos & Salvanes, 2011). Vast amounts of public dollars are used to support students' college enrollment and persistence, but to afford college, students are increasingly borrowing. Today, about one-third of undergraduate students obtain federal student loans (an increase of about 40% from a decade earlier) and more than half of public four-year college students graduate with debt (Avery & Turner, 2012; Baum et al., 2015).

We designed an experiment to examine what happens when students are given information about the implications of their borrowing choices in a debt letter. The debt letters are modeled after requirements in recent state laws and a broader set of policy solutions that attempt to encourage students to make sensible borrowing and educational finance decisions. Many of these initiatives only require that colleges provide information, without recognizing the role that other structural investments may have played in students' borrowing behavior.

Our results suggest that information alone is not sufficient to drive systematically different borrowing choices among students. The debt letter led to no change in the amount that students borrow or the likelihood that they will borrow as compared to students who did not receive the extra information. Only one student subgroup, students with low GPAs responded to the letter, which may be evidence that those with the lowest financial literacy are most likely to be influenced by information. It is also worth noting, however, that while the effects of the letter were at best modest, they also do not appear to cause any harm as we do not observe that the letter induced drop out or reduced the number of credits students pursued.

In-depth interviews revealed a number of key findings that should be useful for future policymaking. First, a common theme among students was their intentional inattention to the implications of their borrowing choices. This deferred attention reveals a disconnect between when student loan programs consider students able to make long-term financial decisions (starting at the beginning of college) and when many students acknowledge their financial responsibilities. Second, though many students demonstrated a lack of knowledge about borrowing, students referred to their lack of *understanding*, not their lack of data, as a hindrance to their decision making. Finally, students also cited the frequency of communication from university officials as a reason they ignore information from the financial aid office; therefore, strategies to reach students that entail increasing the number of times officials send material to students may actually decrease students' attention to any individual message or report.

All of these responses suggest that other more intensive supports are likely necessary to encourage student loan decision making. There is promising evidence on the potential for intensive, yet more costly, supports, but more work is needed to understand how to effectively encourage students to engage with and fully benefit from such services.

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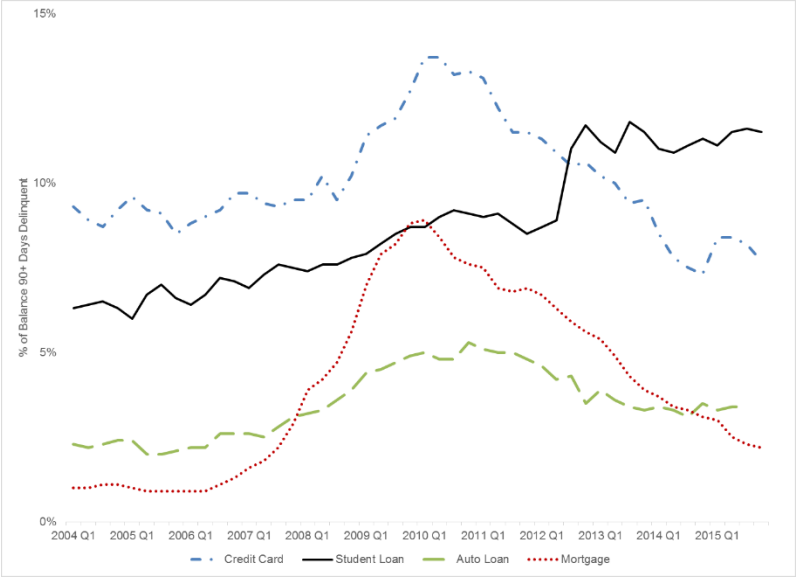
A. National Percent of Balance 90+ Days Delinquent 2004-2015



B. Per Student Undergraduate Loan Borrowing 2000-2012

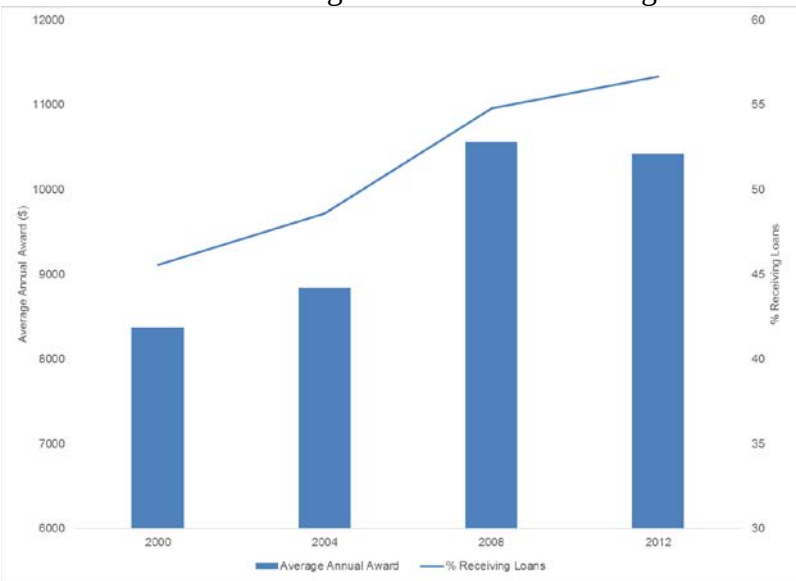


Figure 1: Student Loan Delinquency and Borrowing Trends

Source: Panel A - Federal Reserve Bank of New York Quarterly Report on Household Debt and Credit (February 2016, available at https://www.newyorkfed.org/microeconomics/hhdc.html). Panel B - Baum et al. (2015). Notes: Panel A - lines are the percentage that are at least 90 days delinquent for different segments of consumer credit. Panel B - The bars represent average annual award per borrowing undergraduate student in constant 2014 dollars for selected years (on the left y-axis). The line represents the percentage of undergraduate students who borrow in each of the years (on the right y-axis).

Table 1: Pretreatment Descriptive Statistics

	Treatment		Control	
	Mean	SD	Mean	SD
Male	0.45	0.50	0.45	0.50
Female	0.55	0.50	0.55	0.50
Non-Hispanic White	0.81	0.39	0.81	0.39
Asian	0.03	0.16	0.03	0.16
Black	0.17	0.37	0.16	0.37
Hispanic	0.04	0.20	0.04	0.20
Other minority	0.03	0.17	0.03	0.16
First generation	0.36	0.48	0.34	0.48
Financially dependent	0.93	0.26	0.92	0.27
State resident	0.72	0.45	0.73	0.44
Transfer student	0.14	0.34	0.14	0.35
GPA	2.85	0.78	2.85	0.78
Credits earned	53	27	53	27
Expected family contribution ($)	17759	30742	18253	30145
Pell Grant recipient	0.34	0.47	0.33	0.47
Total loans ($)	6841	4974	6872	5152
Has a loan	0.89	0.31	0.89	0.32
Federal loans ($)	5784	2791	5730	2823
Has Federal loan	0.89	0.32	0.88	0.32
Non-Federal loans ($)	1058	4104	1142	4353
Has Non-Federal loan	0.08	0.28	0.09	0.28
Count	4900		4902	

Source: Administrative data from the 2014-2015 academic year (the pretreatment period).

Table 2: Effect of the Loan Letter on Borrowing

	(1)	(2)
A. Loan $		
Letter	-84	-82
	(108)	(90)
% of sample mean	1.5%	1.5%
Lower Bound 95% CI	-296	-258
B. Has a Loan		
Letter	-0.010	-0.014*
	(0.009)	(0.008)
% of sample mean	1.4%	1.9%
Lower Bound 95% CI	-0.028	-0.030
Controls		X
N	9802	9802

Notes: Source: Administrative data from the 2014-2015 and 2015-2016 academic years. Notes: Each coefficient is from a different estimate. Standard errors are included in parentheses. Controls for gender, race/ethnicity, first-generation status, EFC, GPA, credits earned, transfer student status, resident status, financial dependency, and the lagged dependent variable are included but not displayed.

***p < 0.01, ** p < 0.05, * p < 0.10.

Table 3: Effects of the Debt Letter on Borrowing, Subgroups

	First Generation	EFC = 0	GPA < 2.5
	(1)	(2)	(3)
Loan $	-23	-116	-218
	(153)	(209)	(192)
Has a Loan	-0.008	-0.023	-0.043**
	(0.014)	(0.020)	(0.017)
N	3464	1644	2408

Source: Administrative data from the 2014-2015 and 2015-2016 academic years. Notes: Each coefficient is from a different estimate. Standard errors are included in parentheses Controls for gender, race/ethnicity, first-generation status, EFC, GPA, credits earned, transfer student status, resident status, financial dependency, and the lagged dependent variable are included but not displayed.

***p < 0.01, ** p < 0.05, * p < 0.10.

Table 4: Effect of Debt Letter by Prior Year Loan Amounts

	All Students (1)	First Generation (2)	EFC = 0 (3)	GPA < 2.5 (4)
A. Loan $				
Low Borrowing	-152	-401	-248	-652
	(189)	(338)	(339)	(407)
Moderate Borrowing	44	167	354	-203
	(119)	(211)	(383)	(261)
High Borrowing	-377*	-101	-380	133
	(204)	(292)	(365)	(392)
B. Has a Loan				
Low Borrowing	-0.011	-0.005	-0.037	-0.097***
	(0.017)	(0.030)	(0.033)	(0.037)
Moderate Borrowing	-0.008	-0.005	0.045	-0.020
	(0.011)	(0.019)	(0.037)	(0.024)
High Borrowing	-0.032*	-0.020	-0.060*	-0.046
	(0.018)	(0.026)	(0.035)	(0.035)
N	9802	3464	1644	2408

Source: Administrative data from the 2014-2015 and 2015-2016 academic years. Notes: Standard errors are included in parentheses. Controls for gender, race/ethnicity, first-generation status, EFC, GPA, credits earned, transfer student status, resident status, financial dependency, and the lagged dependent variable are included but not displayed.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 5: Effects of the Debt Letter on Other Outcomes

	Dropout	Credits taken	Federal Work Study ($)	Changed Major
	(1)	(2)	(3)	(4)
Letter	-0.000	-0.224	-4	0.002
	(0.004)	(0.176)	(6)	(0.010)

Source: Administrative data from the 2014-2015 and 2015-2016 academic years. Notes: Each coefficient is from a different estimate. Standard errors are included in parentheses. Controls for gender, race/ethnicity, first-generation status, EFC, GPA, credits earned, transfer student status, resident status, financial dependency, and the lagged dependent variable (FWS estimates only) are included but not displayed.

***p < 0.01, ** p < 0.05, * p < 0.10.

Appendix A. Supplementary Tables

Appendix Table A1: Experiment Setting as compared to National Averages

	University of Missouri-Columbia (1)	National Average (4-year universities) (2)
Undergraduate enrollment	27276	11223
% White	79%	58%
% Part-time	6%	20%
Average annual cost	$17238	$16127
% of students that borrow federal loans	47%	46%
6-year graduation rate	70%	42%
Repayment rate	70%	46%
3-year cohort default rate	4%	7%
Salary after attending	$46000	$33500

Sources: College Scorecard (https://collegescorecard.ed.gov/), Official Cohort Default Rates (https://www2.ed.gov/offices/OSFAP/defaultmanagement/cdr.html), and the Integrated Postsecondary Education Data System (https://nces.ed.gov/ipeds/).

Appendix Table A2: Interview Sample Descriptive Statistics

	Mean	SD
Male	0.33	0.48
Female	0.67	0.48
Non-Hispanic White	0.63	0.49
Asian	0.11	0.32
Black	0.37	0.49
Hispanic	0.00	0.00
Other minority	0.04	0.19
First generation	0.59	0.50
Financially dependent	0.96	0.19
State resident	0.63	0.49
Transfer student	0.07	0.27
GPA	3.05	0.62
Credits earned	48	26
Expected family contribution ($)	9958	12845
Pell Grant recipient	0.63	0.49
Total loans ($)	7597	4449
Has a loan	0.96	0.19
Federal loans ($)	6494	2323
Has Federal loan	0.96	0.19
Non-Federal loans ($)	1103	3278
Has Non-Federal loan	0.11	0.32
Count	27	

Source: Administrative data from the 2014-2015 academic year (the pretreatment period).

Table A3: Effects of the Debt Letter on Borrowing, Full Output

	Loan $		Has a Loan	
	(1)	(2)	(3)	(4)
Letter	-84	-82	-0.010	-0.014*
	(108)	(90)	(0.009)	(0.008)
Female		-147		-0.031***
		(93)		(0.008)
Asian		-82		-0.029
		(283)		(0.026)
Black		591***		0.081***
		(132)		(0.012)
Hispanic		-190		-0.019
		(228)		(0.021)
Other minority		44		-0.045*
		(274)		(0.025)
First-generation		38		0.019**
		(99)		(0.009)
EFC ($000)		-5***		-0.001***
		(2)		(0.000)
GPA		1,442***		0.171***
		(64)		(0.006)
Credits earned		-3*		0.000**
		(2)		(0.000)
Transfer student		-216		0.003
		(140)		(0.013)
State resident		-87		0.017*
		(110)		(0.010)
Financially independent		48		-0.042*
		(258)		(0.024)
Financial dependency unknown		-295		-0.103***
		(238)		(0.024)
Lagged DV		1***		0.457***
		(0)		(0.015)
Constant	5,677***	-1,755***	0.708***	-0.202***
	(76)	(226)	(0.007)	(0.024)
N	9,802	9,802	9,802	9,802
R-squared	0.000	0.300	0.000	0.207

Source: Administrative data from the 2014-2015 and 2015-2016 academic years. Notes: Standard errors are included in parentheses.
***p < 0.01, ** p < 0.05, * p < 0.10.