

# Does Salient Financial Information Affect Academic Performance and Borrowing Behavior Among College Students?

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## Abstract

More students than ever borrow to finance post-secondary education. However, students receive little information when choosing student loan amounts. This paper exploits a natural experiment to understand how information can change student behavior. We study a large public university where students above a given debt threshold received letters with information about their student loan debt, while students below the threshold did not. Using a difference-in-difference strategy and administrative data on individual-level academic records and borrowing, the intervention modestly reduced borrowing in the subsequent semester, but increased attention to academics: credits completed and GPAs increased in the subsequent semester.

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# 1 Introduction

Student loans are typically the first borrowing decision made by young adults and are an increasingly large financial commitment, with aggregate student loan debt totaling \$1.19 trillion as of June 2015 (Federal Reserve Bank of New York 2015). However, it is not clear whether students currently have transparent, relevant, and low-cost information about borrowing to finance postsecondary education when making their decisions. High school seniors have relatively restricted exposure to formal borrowing when they make the initial decision to attend and finance college.<sup>1</sup> After obtaining a loan, students typically receive limited information as they make subsequent borrowing decisions.<sup>2</sup> The minimal financial information provided to college students is directed toward those close to graduation and tends to focus on loan repayment options. This paper uses a unique natural experiment to causally determine how targeted provision of timely, salient, and actionable information about student loan debt can change college students' loan choices, majors, credits, and academic performance.

This study analyzes a unique financial counseling and targeted debt information intervention aimed at students whose debt levels—given by a specific debt and year formula based on their standing in school or college major—suggest that they might have difficulty repaying their student debt with their prospective income. We rely on a unique administrative dataset on the Montana University System that contains detailed information on students' academic backgrounds, loan packages, and academic outcomes to analyze the effect of this intervention. We utilize a difference-in-difference (DD) strategy to exploit two comparisons. First, we compare students who received the letters at Montana State

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<sup>1</sup>One possible way to promote improved decision-making on borrowing for postsecondary education is to provide instruction on student loans in high school financial education courses. While early research on high school financial education has reached differing conclusions about its effectiveness for improving financial behaviors and outcomes (Bernheim, Garrett and Maki 2001; Tennyson and Nguyen 2001; Walstad and Buckles 2008), recent research has shown financial education courses to be effective at improving later life financial outcomes (Brown et al. 2013), particularly when rigorously implemented (Urban et al. 2014).

<sup>2</sup>Federally required entry counseling for those looking to take on student loans is provided online and many students only skim through the material, leaving them with little or no additional information when making future loan decisions (Fernandez et al. 2015).

University to those that also had loans but were below the cutoff for receiving a letter. Second, we compare students who received the letters to those who would have received them in the years before the policy was implemented.<sup>3</sup> As a placebo test, we show that students who would have received the letters at the University of Montana, a comparable peer institution within the state, had the same policy been in place on that campus experience no change in student loan or academic outcomes.

Recent research highlights how students' limited understanding of student loan borrowing affects their borrowing choices. Dynarski and Scott-Clayton (2006) and Bettinger et al. (2012) show that the borrowing process and the details of the Federal Student Aid Application (FAFSA) are burdensome for students. Providing students with application assistance increases FAFSA completion, college attendance, and aid received, suggesting that the lack of such information limits prospective students. Further evidence of the effect of informational cues on borrowing choices is provided by Marx and Turner (2016), who find that not including loan offers in initial financial aid award letters reduces the probability that community college students take out a loan. Castleman and Page (2016), who show that text message reminders raise the probability college students refile for financial aid and increase the retention of community college students.<sup>4</sup>

Academic advising received by most college students is given independently of financial considerations, in spite of the fact that the financial status of students may influence their choice of a major, the time and effort they devote to studying, and their decision to remain enrolled (Deming and Dynarski 2009; Angrist, Lang and Oreopoulos 2009; Castleman and Long 2016; Cohodes and Goodman 2014; DesJardins and McCall 2007). To the best of our knowledge, this paper is the first to link the provision of targeted student loan information with subsequent borrowing and academic performance. In related work Schmeiser, Stoddard and Urban (2016) find that students warned about excessive student

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<sup>3</sup>While the nature of the intervention might initially suggest a regression discontinuity design, we discuss the issues with that empirical approach in Section 4 and Appendix B.

<sup>4</sup>There is also an emerging literature examining somewhat similar letter based interventions at two other public universities, although neither campus targeted high borrowers specifically. See preliminary presentations by Kennedy (2015) and Dariola (2016).

loan debt are more likely to choose higher earning majors. Rothstein and Rouse (2011) find that career choices are related to student loan packages, but there is little evidence regarding how these loan packages influence academic performance or future borrowing behavior.

This paper contributes to a growing body of research that examines how information influences borrowing decisions, showing that borrowers who lack financial knowledge tend to make suboptimal decisions (Lusardi and Tufano 2009; Calvet, Campbell and Sodini 2007, 2009; Agarwal et al. 2009). Furthermore, it contributes to the literature on how cues and decision-making contexts affect a variety of behaviors. This literature shows that cues that make information more salient influence a range of behavioral, consumption, and savings decisions.<sup>5</sup> Currently, little is known about how students respond to either cues or financial information by changing their borrowing behavior. The single paper on information and loan take-up is a study in the Netherlands, where only 35 percent of available credit is taken out in spite of generous government provisions. Somewhat surprisingly, take-up rates did not respond to the field experiment in this study (Booij, Leuven and Oosterbeek 2012). This raises the question of whether an informational intervention would change student behavior in the United States, where federal loans are less generous, the system is less transparent, but take-up rates are roughly twice those of the Netherlands.

This paper makes two contributions to the existing literature. It is the first study to examine the causal effect of an information-based intervention on both subsequent student loan amounts and academic performance.<sup>6</sup> Second, the administrative data used in this paper are unique, and allow us to examine how students re-calibrate their decisions after receiving salient information; although we cannot determine precisely whether they are

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<sup>5</sup>For example, Stango and Zinman (2014) show that drawing individuals' attention to overdraft fees using survey questions reduces subsequent overdraft usage, Busse et al. (2013) show that the first digit of an odometer reading is influential for car purchases, Chetty, Looney and Kroft (2009) find posting after tax prices makes sales taxes more salient, while Finkelstein (2009) finds electronic toll collection affects driving behavior.

<sup>6</sup>Other strands of literature focus on information-based interventions to promote savings (see e.g. Karlan et al. (2010)) or reduce fees (see e.g. Stango and Zinman (2014)).

behaving optimally.

We find that students who receive the warning letters slightly reduce their borrowing in the semester following the counseling than those who do not receive the letters. The intervention has the greatest impact on academic outcomes. First, the letter increases current semester grade point average (GPA) and credits completed. These effects are attributed to a higher rate of completing classes (instead of withdrawing). Second, the letter increases retention rates for the subsequent semester and the subsequent year. Third, receiving a letter increases GPAs and credits completed in the *subsequent* semester. We attribute this to a portion of the letter explaining the flat spot in payment for additional credits and the need to pass 67% of credits attempted. The findings suggest that early interventions that draw borrowers' attention to their relatively high student loan debt balances and that offer information and financial counseling on managing their debt, can improve student academic outcomes and change financial decisions.

## 2 Background

### 2.1 Financing Postsecondary Education

Students can finance their postsecondary education through a combination of several different sources: existing savings, parental contributions, employment income, grants, scholarships, subsidized and unsubsidized public student loans, and private student loans. Our research focuses on the federal options for borrowing. The federal government offers subsidized Stafford Loans to undergraduate students based on financial need and unsubsidized Stafford Loans to undergraduate students at all income levels. The borrowing limit for Stafford loans increases with each year of college, reaching a maximum of \$7,500 per year for college juniors and seniors who are still financially dependent on their parents and \$12,500 per year for financially independent students for the 2014-2015 academic

year.<sup>7</sup> As there is no underwriting done on Stafford loans, students are able to borrow for their education without consideration of their ability to repay the loan. Parents can also borrow for their children’s education using the Parent PLUS loan program, where students can borrow, at most, the cost of attendance minus any other aid received. The school determines the cost of attendance.

Students and their parents also have the option of borrowing from private financial institutions to finance their postsecondary education. Since 2008, the origination of private student loans to undergraduate students has declined substantially due to tighter lending standards and a drop in investor demand for the asset backed securities that funded many private student loans (Consumer Financial Protection Bureau 2012). Private student loans are generally more costly than federal student loans and have repayment terms that are much less flexible than those of federal loans (Lochner and Monge-Naranjo 2015; Consumer Financial Protection Bureau 2012). Moreover, private student loans are underwritten and therefore require a co-signer for approval unless the student has established a positive credit record. The underwriting requirements and reduced flexibility suggest that students should generally maximize their borrowing through the federal student loan programs before turning to private loans, although some students turn to private loans before exhausting their supply of public loans (Avery and Turner 2012).

## 2.2 Context for the Intervention

Montana does not have a single state flagship campus; Montana State University and the University of Montana are peer, public institutions that are complementary.<sup>8</sup> This setting allows us to use the University of Montana as a control institution in a natural experiment framework. Montana State University and the University of Montana

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<sup>7</sup>The cumulative maximums are \$31,000 and \$57,500, respectively. Students with exceptional demonstrated financial need can additionally borrow from the government through their college using the Perkins loan program. In our sample, only 7% of individuals have Parent PLUS loans and 11% have Perkins loans.

<sup>8</sup>For example, by design, Montana State University has the business school for the state, while the University of Montana has the law school.

are suitable for research into the effects of student loans on postsecondary outcomes because these institutions are comparable to many public institutions throughout the United States. Table A.1 provides additional descriptive statistics for the two campuses and for other public four year institutions in the US.<sup>9</sup> Montana State University and the University of Montana have similar student enrollment of about 15,000 and 14,000, respectively; this number is comparable to the average enrollment at public four-year universities in the United States of about 11,000 students. Admission standards are the same at both institutions: both require an ACT score of at least 22, a 2.5 high school GPA, or graduation in the top half of a student's high school class. About 60 percent of undergraduate students at both universities come from Montana. In-state tuition at the University of Montana in the 2014-15 school year was \$6,330, about 15 percent lower than at Montana State (\$6,800); out-of-state tuition is about 5 percent higher at the University of Montana. Although tuition rates at these universities are below the national average, they are comparable as a fraction of state median household income. Graduation rates are also similar, with both colleges graduating about 45 percent of students in six years. The main difference between the two is that Montana State University is the land grant institution, with larger colleges of agriculture and engineering, while the University of Montana has a larger liberal arts program.

Borrowing behavior is also similar at the two schools and approximates the national average. At Montana State, 65 percent of students graduate with student loan debt; at the University of Montana, 62 percent graduate with student loans. The national average is similar, with 69 percent of college students graduating with student loans. In 2013, the average graduate of Montana State University had about \$27,000 in debt, which is slightly less than the average debt at the University of Montana (\$30,000), and the national average (\$28,400) (TICA 2014). When comparing all Montana students to US 4-year public institutions in Table A.1, 32 percent of all Montana State students and

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<sup>9</sup>The largest difference between these campuses and other public institutions is the low share of minority students. 85 percent of students at Montana State and 78 percent of students at the University of Montana are white. The national average for four-year public schools is 69 percent.

39 percent of University of Montana students receive Pell grants; similarly the national average is 39 percent. Table A.1 also shows that while tuition is lower at the Montana schools, average federal loan amounts slightly exceed the national average.

Students at these institutions also appear to behave in ways that suggest that information and cues about their student loan borrowing might influence their behavior. First, many students have only a rudimentary understanding of their existing loans. To supplement the administrative data, we polled Fall 2015 students in Economics 101 and Economics 202, entry level courses required for many majors and overpopulated by freshmen. Based on a survey of 756 students, 40 percent took out loans. Of those, 56 percent took out both subsidized and unsubsidized loans and 25 percent took out just subsidized loans. The other 20 percent of borrowers reported either not knowing what kind of loan they took out or reported taking out only the unsubsidized loan. We also polled students on how they determined the amount to borrow. One third of borrowers said they took out the entire amount they were eligible to borrow, while 26 percent said they took out a loan amount to cover tuition. Only 8 percent reported that they “figure out how much I could afford to repay after graduation and borrowed that amount.” Another 24 report calculating the difference between projected spending and their other resources from savings, work, or parents. This suggests that the majority of students are deliberately relating borrowing amounts to factors other than just the maximum eligibility amount.

These survey results reiterate a Brookings Report by Akers and Chingos 2014 finding that only 52 percent of students at a selective Northeastern public university could state the amount they paid for their first year of college within \$5,000. Of the remaining students, 25 percent underestimated the cost, 17 percent overestimated the cost, and 7 percent said they did not know. Akers and Chingos (2014) also find that half of all first-year college students in the United States underestimate the amount of debt they hold, and less than one third of students can provide a relatively accurate estimate of their federal debt. This again highlights the lack of information students have regarding their student loans, suggesting that an information-based intervention may change behavior.



## 2.3 Student Debt Intervention at Montana State University

The intervention we study was initiated in fall 2012 by the Office of Financial Education, part of the Center for Student Success at Montana State University. During the fall semester, students with debt levels labeled as high were sent “Know Your Debt” letters. At the time, average debt upon graduation was about \$25,000. The “Know Your Debt” letters were sent to students whose debt would have placed them at or above thresholds related to this average: freshmen with more than \$6,250 in loans as of fall semester, sophomores with more than \$12,000 in debt, juniors with more than \$18,750 in debt, and any student with more than \$25,000 in debt.<sup>10</sup> A sample letter is included in Figure A.1. For context, these debt amounts targeted students whose annual borrowing represented about double the amount of in-state tuition. These thresholds exceed the federal subsidized loan limits, but not the unsubsidized loan limits for dependent juniors and seniors, or the federal loan limits for all independent students. For example, freshmen can take up to \$3,500 in federal subsidized Stafford loans. Independent students can borrow an additional \$6,000 in unsubsidized Stafford loans, for a total of \$9,500. Parent PLUS loans were also included in the total loan amount for the letter criteria. The class standing was determined by number of credits taken, rather than by number of semesters enrolled. Graduation requires 120 credits, implying 15 credits per semester to graduate in 8 semesters. Freshmen are defined by the university as students with less than 30 credits, sophomores have 30-59 credits, juniors have 60 to 89 credits, and seniors are students with more than 90 credits. As a result, letters would have been triggered by both higher than average borrowing amounts per semester as well as by slow academic progress.<sup>11</sup>

Roughly 2,300 letters were sent in the first year of the intervention.<sup>12</sup> The “Know Your

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<sup>10</sup>These thresholds were not indexed for inflation.

<sup>11</sup>A few additional letters were sent to students whose total loan amount exceeded the median annual salary by major or whose expected monthly payments were anticipated to exceed 14 percent of monthly salary. These median salary levels come from Montana State University Career Destinations Survey of recent graduates. In practice very few students met this condition who did not also meet the debt threshold conditions. We count these as untreated, as this will bias us against finding an effect.

<sup>12</sup>Appendix Table A.3 predicts loan letter receipt by year for Montana State over time. These results suggest that Pell recipients are the most likely to receive the letter across all years.

Debt” letters provided students with information about their debt levels, and contained a highlighted statement that the debt levels were high: “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.”<sup>13</sup> Letters encouraged students to learn more about how to deal with debt. In particular, they encouraged students to take more than 12 credits to take advantage of constant tuition rates above this threshold: “At MSU, tuition doesn’t cost a penny more after you’ve registered for 12 credits in a semester. Please consider registering for more credits to graduate sooner and spend less on tuition!” The letters also offered one-on-one financial counseling appointments with a financial coach. These appointments were incentivized with \$10 gift cards in the first year and \$20 gift cards in the second year, redeemable at a local grocery store and gas station. The intervention continued into the following year (2013) with the same criteria for letters and recommendations for appointments.

Counseling services were not tracked consistently in connection with the letters, making it difficult to determine the take-up of these services. The number of appointments made represents about 10 percent of the number of unique individuals receiving a letter, but it is not clear how many were repeat visits or the timing of the appointment relative to the letter receipt. As a result, this study does not attempt to distinguish between the effect of receiving a targeted debt letter, the advice in that letter, and the one-on-one counseling sessions.<sup>14</sup> Even absent take-up of counseling services, the letter itself may have influenced borrowing and academic choices. Specifically targeted letters potentially make debt levels more salient to students: a student receiving a letter indicating that their

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<sup>13</sup>The letters also discussed the benefits of graduating from college. Oreopoulos and Dunn (2013) find that providing this information can increase the perceived value of postsecondary education.

<sup>14</sup>The counseling services included a one-hour appointment with a certified financial planner who could help with a variety of topics, including formulating a budget, mapping out course schedules for the duration of the student’s college career, discussing the salary potential in the student’s major, and talking through some costly registration “mistakes” students can make. These registration mistakes include dropping a course before or after certain dates in the semester (which can cost between 10 and 90 percent of the tuition cost, depending on the date), registering for 12 credits instead of 15 (students pay the same tuition regardless of how many credits they take beyond 12 per semester), and dropping a course in the first week of class (which results in a tuition refund of less than 100 percent).

debt level is considering high by their college may take that as a clear signal to make more informed borrowing decisions. The specific recommendation to take 15 credits instead of 12 credits also provides a mental reference point, a framing that in many contexts has been shown to influence subsequent choice.

Although the University of Montana also offers financial counseling to all students, there is no parallel effort to target counseling offers and no corresponding initiative to let students know about their debt status other than through the regular process of applying for financial aid. This process is the same federal process all students are required to undergo.<sup>15</sup> We therefore use the University of Montana as a control campus, allowing us to show that our DD strategy is valid. We compare outcomes at Montana State for students who received the “Know Your Debt” letters with students who did not and further compare students with similar debt loans in years before and after the intervention. We do this same comparison at the peer institution to ensure that there is no effect at the University of Montana and our natural experiment is valid.

### 3 Data

The data for this project are administrative panel data from the Montana University System (MUS). These data include students’ high school information, demographic information, the Montana postsecondary campus attended, and the degree pursued. The MUS data are novel for the detailed individual-level college funding information provided. These data identify the source of funds (such as federal, institutional, state, or other), the type and amount of award (need-based, merit-based, athletic payments, work study, loans, etc.), and the fraction of tuition covered by the loans. Our data do not include any information on private loans; however, private student loans are only a small fraction (roughly 7%) of student debt at the undergraduate level (National Center for Education Statistics 2013). These data also include semester-by-semester enrollment, credits, major,

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<sup>15</sup>See Fernandez et al. (2015) for a discuss of the details of federal counseling.

GPA, courses taken, and retention. To our knowledge, we are among the first researchers to use administrative individual student loan data to examine the effects of borrowing on postsecondary education outcomes.

Our data span the years 2003 through 2014, or 34 semesters of data, allowing us to follow 57,334 undergraduate students with loans for at least some portion of their time in college. The sample yields a total of 221,240 undergraduate student-semester observations with full coverage across all variables. For the purpose of this study, we limit our analysis to the two largest four-year campuses in the state of Montana: the University of Montana and Montana State University. We also limit our analysis to in-state undergraduate students to abstract away from tuition and loan differences due to the choice of an out-of-state institution. Finally, we limit our analysis to all students who have some form of public student loan, as those without loans are systematically different from those with loans and would never be the target of this type of intervention.

Table 1 reports summary statistics on the loan, demographic, and academic characteristics of the students we study by campus and before and after the intervention. The campuses are similar across academic outcomes including GPA, semester credits, and retention rates. The average student across both campuses enrolls in 12 credits per semester, or approximately four classes, which is less than a recommended course load of 15 credits per semester that typically would enable graduation in four years. Average student loan amounts are approximately \$4,000 for each school in the pre-period, which covers about 94 percent of annual tuition charges. In the post-period, both average loan amounts increase to \$5,700 and \$5,200 for Montana State and the University of Montana, respectively. This reflects the national trend in increasing student loan amounts over time.

The two campuses have similar student characteristics. Approximately one-third of students within our sample are Pell grant recipients, meaning they come from a low-income household.<sup>16</sup> Both schools have populations that are predominantly white, and

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<sup>16</sup>According to the US Department of Education’s 2012-13 report, about three quarters of Pell Grant recipients have a family income of \$30,000 or less (<http://www2.ed.gov/finaid/prof/resources/data/pell-2012-13/pell-eoy-2012-13.html>).

Montana State has a higher fraction of males (55%) than the University of Montana (48%). This is potentially due to the relatively larger share of STEM majors at Montana State.

We obtain data from the American Community Survey on demographic characteristics for the student's ZIP code of high school graduation. These variables include educational attainment, racial composition, median household income, and population density of the ZIP code. Finally, we control for whether or not the student came from a metropolitan area of over 25,000 residents to proxy for urbanicity.

Figure 1 documents the persistence in borrowing behavior across semesters. Specifically, students in the sample tend to take out roughly the same amount each spring semester as they did in the fall semester. Between 80 and 90 percent of students borrow within 1 percent of the previous semester's amount.

A histogram of loan debt by class for students at Montana State University after the intervention took place is presented in Figure A.5. The first thin line in the figure represents the maximum subsidized loan amount by class; the second thin line represents the combined subsidized and unsubsidized annual loan amounts by class. The thicker line signifies the threshold for receiving a letter. These limits are only relevant for dependent students: the limits for independent students will exceed the thick blue line in all cases. Beginning at the top left panel, we see that it is common for freshmen to take the full subsidized amount or the full subsidized and unsubsidized amount conditional on taking out loans. After their first year, students deviate from taking out solely the maximum subsidized limit and move to other points, although again these deviations are driven by both changes in loan amounts and students taking different numbers of semesters to reach the credits required for the next academic standing (e.g., 30 credits to be considered a sophomore, 60 credits to be considered a junior, and 90 credits for senior standing).

## 4 Methods

As described in Section 2.3, beginning in fall 2012, Montana State University extended warning letters and targeted offers of intensive financial counseling to all students who were at risk of graduating with high levels of debt. Letters were sent based on debt as of the fall semester relative to a threshold that depended on the student’s standing (freshmen, sophomore, etc) in school.<sup>17</sup>

In our data, we use the information on student loan amounts to determine freshmen, sophomores, juniors, and seniors who would have received the letters based on the debt criteria established by MSU. Table 2 reports the counts of individuals assigned to receive the letter at Montana State and those that would have received the letter using the same criteria at the University of Montana.

We examine the impact of these letters on academic outcomes by comparing students who received warning letters in fall 2012 or fall 2013 to those who did not, as well as to those who had similar levels of debt in years prior to the letter program and *would have* received letters if the program had existed. In these models, it is important to control for some measure of parental income given its role in the determination of eligibility for grants, loans, and financial aid. The best measure we have for parental income in our data is the student’s Pell Grant status, a signal for having come from a very low-income family. We also control for ZIP code-level demographics for a student’s home ZIP code to capture other dimensions of socio-economic status. These variables include percent non-white, median household income, educational attainment, urbanicity, and population density. We further control for students’ race, gender, the number of credits taken up to that semester, the number of semesters the student has completed, the amount of non-loan aid a student receives (e.g., grants, scholarships), the type of semester (fall, spring, or summer), and include year fixed effects. We also control for total loans amounts, to

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<sup>17</sup>Letters were also sent to students whose total debt exceeded the median salaries for Montana State graduates in their major field. These salaries were based on responses to MSUs Career Destinations Survey given to graduating seniors. The salary requirement is only binding for a handful of students who receive the letter. Thus, we leave it out of the estimation strategy.

account for the correlation with getting a letter as well as other outcomes that may be correlated with loans. Specifically, we estimate the Equation 1 for students with loans.

$$\begin{aligned}
Y_{i,t} = & \alpha_0 + \beta_1 \text{Letter}_{i,t} + \beta_2 \text{Letter}_{i,t} \times \text{Post}_t \\
& + \alpha_1 \text{White}_i + \alpha_2 \text{Male}_i + \alpha_3 \text{Pell}_{i,t} + \alpha_4 \text{Credits}_{i,t} + \alpha_5 \text{Loan Amount}_{i,t} \\
& + \alpha_6 \text{Non Loan Aid}_{i,t} + \alpha_7 \text{Zip}_i + \alpha_8 \text{Semesters}_{i,t} + \gamma_{\text{semester}} + \delta_{\text{year}} + \epsilon_{i,t}
\end{aligned}$$

Note that the indicator variable “Letter” is equal to 1 for a student in any year whose debt levels would have qualified them for the “Know Your Debt” letters at Montana State University in 2012 or later. This varies by time because students may be letter eligible one semester and not the next. The primary parameter of interest is  $\beta_2$ , as it captures the difference-in-difference (DD) estimate of the effect of the counseling intervention. This estimate should be thought of as an “intent to treat” measure, as it captures the effect on all students whose borrowing reaches the key thresholds, not just those who attended the one-on-one counseling sessions. The outcome  $Y_{i,t}$  represents the outcome of a variety of decisions students can make in the subsequent semester after receiving the letter and, potentially, counseling. We cluster standard errors at the individual student level. Our choice to cluster at the student level was guided by Cameron and Miller (2015), which notes that clustering is not necessary if (1) a key regressor is as good as randomly assigned, or (2) if the model included fixed effects and the correlation of the errors is solely driven by a common shock process (pg 17). Because the level that triggered the letter was somewhat arbitrarily determined it is therefore closer to random assignment and the estimation includes year fixed effects.

In order for our DD estimation strategy to produce causal estimates of the effect of the “Know Your Debt” letters on student outcomes several assumptions must hold. The first is the parallel trends assumption that in the absence of the treatment (letters) the trends in the various outcomes across the debt groupings would have remained the same.

We plot the trends across our dependent variables of interest in Figures A.2-A.4. The second is that there are no spillover effects from the treatment to the control group (e.g. students receiving the letters will not talk with others who are just below the threshold and do not receive the letter). However, if this assumption is violated it would only lead to our estimates being biased downwards since some of the control group would have then received a weak version of the treatment.<sup>18</sup>

We validate our DD estimation strategy by replicating the same analysis for the University of Montana, assigning letter receipt to those who would have received the intervention had it been in place at that campus. We verify that the letter assignment at this campus does not have an effect on outcomes.

## 5 Results

Table 3 reports outcomes achieved in the both the subsequent semester (spring) and the current semester (fall). The financial outcomes include the semester loan amount taken out in spring and a dummy reflecting that an individual’s loan amount decreased from the fall to the spring semester. Academic outcomes include the semester credits and GPA for both the fall semester in which the letter was received and the subsequent spring semester. Academic outcomes also include the probability of retention between fall and spring semesters, as well as retention the following year (for non-seniors). These results are based on the sample of all Montana State students with loans in any period. The second panel shows the same DD exercise with the University of Montana. If our experimental setup is valid, we expect to see no effect of the letters on outcomes at this institution, since there was no program in place.

Table 3, Column (1) shows that students subject to the intervention reduced the amount they borrowed in student loans in the semester following receipt of the letter

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<sup>18</sup>Although we use a DD framework for the analysis, the causal effect of the intervention could also be identified using a regression discontinuity design (RD). In practice, however, we do not have sufficient observations within reasonable bandwidths on either side of the threshold for each class of students to systematically validate the continuity assumptions with regards to the other control variables.



by approximately \$74, though this is not statistically significant at the 5 percent level. The magnitude of this effect is small, representing roughly 2 percent of mean borrowing amounts. While this represents the average decrease in borrowing, it does not speak to whether the decrease in subsequent borrowing was concentrated among a few students with large changes, or many students with smaller changes in borrowing. The dependent variable in Column (2) instead is a binary variable for whether or not the amount borrowed in the subsequent semester was smaller than in the semester when the letter was sent. It shows that about 5 percent of students had lower loan amounts in the subsequent (spring) semester relative to the control groups, indicating a reduction in borrowing among a relatively concentrated group. The targeted letters and offer of one-on-one counseling appear to result in some students either reducing their spending or finding alternative ways to finance their subsequent semesters in school.

The placebo DD results for the University of Montana are roughly the same as the effects for Montana State. However, the effect of the letter on the binary outcome for decreasing loan amounts is a tightly estimated zero effect for the University of Montana. These results suggest that there is an increase in students re-calibrating their loan amounts at Montana State, though they reduce by very small amounts. This could be a result of budgeting instead of just choosing the default maximum amount.

With these data, it is difficult to unambiguously identify financial “mistakes” that students make and potentially correct subsequent to the intervention. The closest approximation to potential “mistakes” we can identify relate to the number of credits taken. Students must enroll in at least 6 credit hours to be eligible for most federal and state aid (with the exception of Pell Grants), and they must be full time (12 credits or more) to receive a full Pell Grant or scholarship. Tuition and fees are constant above 12 credits, implying that the marginal financial cost for enrolling in more than 12 credits is zero. In order to complete the standard graduation credit requirements in four years, students need to enroll in 15 credits each semester. This objective implies that one potential improvement for many students would be to enroll in 15 credits instead of 12 credits, with

no marginal financial cost. Students may be especially likely to enroll in more credits in the semester after they receive the letter. A second mistake would be to withdraw from classes in the current semester and jeopardize financial aid in the subsequent semester. To be eligible for aid in the subsequent semester, students must complete at least 67 percent of credits attempted. For example, a student taking 9 credits could not withdraw from a 3-credit class without losing eligibility for aid the next semester. For students taking more than 9 credits, withdrawing from a single 3-credit class would not affect future financial aid. Indeed, the letter provides explicit information both about the need to pass 67 percent of classes and suggested registering for 15 or more credits a semester.

Because the letters were distributed in November, around the time when students make decisions about withdrawing from courses and studying for finals, we examine performance and credits completed in the semester of the intervention. The deadline to withdraw from classes at Montana State University is roughly the third week of November. At the University of Montana, students can withdraw without the signature of the dean up until the 45th day of class (roughly the first week of November), but can withdraw with a signature up until finals week. Table 3 (Column (3)) shows that the targeted students are more likely to complete the courses they are enrolled in, finishing the semester with 0.14 additional credits, although this effect is not statistically significant. Late withdrawal from classes has the same effect on GPA as earning an “F.” The intervention increased students’ semester GPAs by 0.074 points (Column (4)). The bottom panel indicates that there are no effects on credits or grades for students at the University of Montana.

Columns (5) and (6) indicate that these academic effects are even stronger in the subsequent semester. Students increase their credits in the subsequent semester by 0.211, although this effect is not statistically significant at the 5 percent level. GPAs in spring semester are .21 points higher for targeted students. While these effects are modest (both represent about 2 percent of mean values), they do suggest some positive effects for students that were exposed to the intervention. This could be a direct response to the advice in the letter suggesting that students taking over 12 credits can do so at no

additional cost. The warning element of the letter could direct students' attention to the importance of finishing their degrees.<sup>19</sup> Importantly, we find no effect of the letter on academic outcomes for students at the University of Montana.

The findings thus far indicate that current and subsequent semester behaviors are affected by the intervention in ways that suggest that students are correcting previous mistakes after receiving additional information. However, it may be that the letters have negative effects on academic outcomes if they cause students to become discouraged and drop out of the university. If subsequent semester outcomes are driven by the fact that some students select out of college completion, the results may overstate the positive effects on academic achievement. This does not appear to be the case. Table 3 Columns (7)-(8) examine the effect of the intervention on student retention. This table reports retention two different ways. Column (7) reports whether the student was still enrolled and taking courses in the subsequent semester, and Column (8) reports whether the student was still enrolled and taking courses in the subsequent fall semester (one year later). For the latter measure, we omit students who graduate in the spring from the sample. The one year retention results only include those exposed to the intervention in 2012, since we do not have data for the 2014-2015 academic year at this point.

The results indicate that the intervention increased retention in the subsequent semester by 1.8 percentage points and in the following year by 3.2 percentage points. This is roughly 2 and 4 percent of mean retention rates (86.5 percent and 78.5 percent) for one semester and one year, respectively. We attribute the greater effect on one year retention rates in part due to the timing of the letter. Students who receive letters in November may already have made plans for the following semester, particularly those who planned to drop out. Over the following year, students have more time to adjust their decisions. As retaining students is often a university goal, particularly at public universities, this targeted intervention could be an important way to retain at-risk students (i.e., those with

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<sup>19</sup>We find no change in work-study participation as a result of the intervention. We do not have any data on external employment while in college.

higher loan amounts). Students at the University of Montana who would have received letters again saw no change in retention probabilities.

Since these results suggest that those subject to the intervention are most likely to be retained, causing more treated students to show up in the sample the subsequent semester and year, concern may arise that sample selection affects the estimates on GPA and credit hours taken. We argue that the students retained due to the policy are marginal students who might have considered dropping out. The retention of marginal students would downwardly bias our estimates for GPA and credits in the spring semester, suggesting that the true magnitude of the effect of this intervention could be greater than what we report.

## 5.1 Heterogeneity

We next look at potentially heterogeneous effects of the intervention in Table 4. Panel A begins by replicating next semester outcomes from Table 3 for four different subsamples: freshmen, Pell recipients, females, and non-white students. Panel B replicates current semester and retention outcomes from Table 3 for the same subgroups.

Freshmen in the fall did not change their loan amounts in the subsequent semester, though receiving a letter caused 3.7 percent of freshmen to reduce their loan amounts from the fall to spring semesters. Since we see no change in amount, these differences are very small in magnitude. Freshmen further responded to the intervention by increasing their average credits by 0.41 in the subsequent semester and improved their GPAs by 0.116 points in the subsequent semester, which is slightly greater than the average effect. This could be a direct response to the cautions in the letter about maintaining Satisfactory Academic Progress. In the current semester (Panel B), freshmen exposed to the intervention finish, on average, with a 0.124 point higher GPA and 0.36 more credits; they are 0.65 percentage points more likely to be retained in the next year.

The next group we study is Pell grant recipients, who come from the lowest-income

households. Like for freshmen, we do not see a difference in loan amounts due to the intervention, but we do see that 6 percent of individuals decreased their loan amount from the fall to the spring semester. Pell recipients respond slightly more than the average effect from Table 3. These students increase subsequent semester GPAs by 0.091 points and credits attained by 0.361. Pell recipients also seem to respond to the letter by focusing on the current semester. The effect size for this group is larger for current-semester GPA and current-semester credits, meaning that these students are most likely to complete courses they would have otherwise dropped and to focus on doing well in their final exams. One year retention rates also improve more for this group than the average effect. Pell recipients are 3.8 percentage points more likely to stay enrolled in the following semester due to the intervention.

Female students seem to respond closest to the average effect found in Table 3. They are 4.3 percent more likely to reduce loan amounts, though again the magnitude is small. Females exposed to the intervention increased their GPAs by 0.1 points in the subsequent semester and 0.08 points in the current semester. This effect size is smaller than that of freshmen or Pell recipients. The intervention changes females' probability of retention in both the following semester and following year in an almost identical fashion to Pell recipients: next year retention increases by 3.8 percentage points.

We find that the intervention produced no changes for non-white students in next-semester GPA, next-semester credits completed, current-semester GPA, current-semester credits, or retention. However, 8 percent of these students did reduce their loan amounts. Note that in our data, only 13 percent of the student body is non-white, and these students are disproportionately American Indian. Caution should be taken in extending these results to other groups. The small sample results in findings that have large standard errors.

## 5.2 Discussion

There are a few components to the experimental design that are worth mentioning. First, while we know the specific rules used to determine who would receive the letters, we do not know who exactly received the letters. In addition, the number of students who should have received letters, according to our counts, is slightly smaller than the number of students to whom the Center for Student Success actually sent letters.<sup>20</sup> This slight discrepancy would lead to a downward bias in our results relative to the actual effect size, as we classify students as not receiving the intervention when they did.

Second, we do not know which students who received letters also chose the one-on-one counseling. Counseling was available for all students on both campuses, though it was not incentivized for the general population (no gift card was provided). Although we know that approximately 10 percent of letter recipients made counseling appointments, we do not know who these individuals are and cannot separately identify the effects of the counseling and the letter. It could be the case that the letter, even without the counseling option, is producing the estimated effects by making students cognizant of how much they are borrowing, that their borrowing levels are determined to be risky, and by providing advice about credits, pass rates, and future repayment options. The letter may also be a signal for students to visit with their academic advisor or talk with their parents about their finances. The letter could also result in the students independently deciding to change their borrowing and academic behavior because of the way their debt amount was singled out, while their friends or roommates may have not received a similar letter.

Third, there may be spillover effects from the letter recipients to the non-recipients. For example, at-risk students who received a letter may see the counseling option and tell their roommates about their financial struggles or their experience at a counseling session. Even if the at-risk student does not go to counseling, his roommate can still see a one-on-one financial counselor at no charge. If the roommate attends the counseling,

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<sup>20</sup>This difference could be due to refunds of student loans or a difference in the loan amounts at the given date in the data versus the loan amount on the given date in the Centers records.

or makes more thoughtful borrowing decisions in the future, this downwardly bias our estimates the true effects of the intervention. Fourth, while we know that the letter provided some relevant information for student borrowers, we do not know if it is the information, the nudges in the letter, or the getting the letter when your peers did not that changed behavior. Fifth, this is a sample of students in Montana, and the results should be extended to other states, private schools, and two-year schools with caution.

## 6 Conclusion

In June of 2015, the 90 or more day delinquency rate on student loans reached 11.5% (Federal Reserve Bank of New York 2015). This high rate of delinquency on a large amount of consumer debt has prompted widespread concerns about student loan debt. Much of the existing research and policy effort has focused on addressing student loan debt once the borrower has entered repayment. In contrast, we find that providing college students with information when they still have the flexibility to alter their borrowing and career trajectory is a highly effective strategy for improving their outcomes. Furthermore, we focus on effects at public four year institutions. Much of the recent discussion about default has centered on the rising cost of college at high-end private universities, as well as the high default rates for low-quality for-profit and community college students (Looney and Yannelis 2015). However, public four-year institutions educate 72% of all postsecondary students (National Center for Education Statistics 2013) and three year cohort default rates at public institutions are 12 percent.<sup>21</sup> This paper provides insight into this understudied yet large portion of student loan borrowers.

Our study suggests that a relatively low-cost intervention as simple as sending at-risk students a letter about their student loan debt and offering financial counseling could make a substantial difference in students' academic outcomes. The MUS data allow us to precisely identify the effects of providing targeted and salient information, as the

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<sup>21</sup>Data accessed at <http://www2.ed.gov/offices/OSFAP/defaultmanagement/cdr.html>.

policy varied both within a given university and across institutions. This emphasizes the importance of high-quality administrative data for understanding student loans at the individual, as opposed to aggregate, level. We find that students who received a letter about their debt levels and were offered financial counseling modestly reduced borrowing levels at no cost to their academic outcomes. In fact, the intervention increased GPAs and credits in the current and the subsequent semester relative to their peers. These estimates rely on comparisons with similar students in pre-intervention periods and other borrowers with loans below the thresholds.

The magnitudes we find in this paper exceed those of some information-based interventions, although others also find economically large effects (Stango and Zinman 2014). The most related study finds modest effects of information on filling out the FAFSA (Bettinger et al. 2012). One distinguishing factor is that the students themselves are making decisions in our study at an actionable point in their college careers, whereas Bettinger et al. (2012) focus on parent behavior. Given the complexity of the decision to take out student loans, the amount to take out, which major to declare, how many courses to take each semester, and whether to stay in college, direct information at this stage may be more influential. It may also be the case that targeted information, rather than widespread distribution, makes that information more relevant: a clear signal of at-risk borrowing behavior leads to significant responsiveness.



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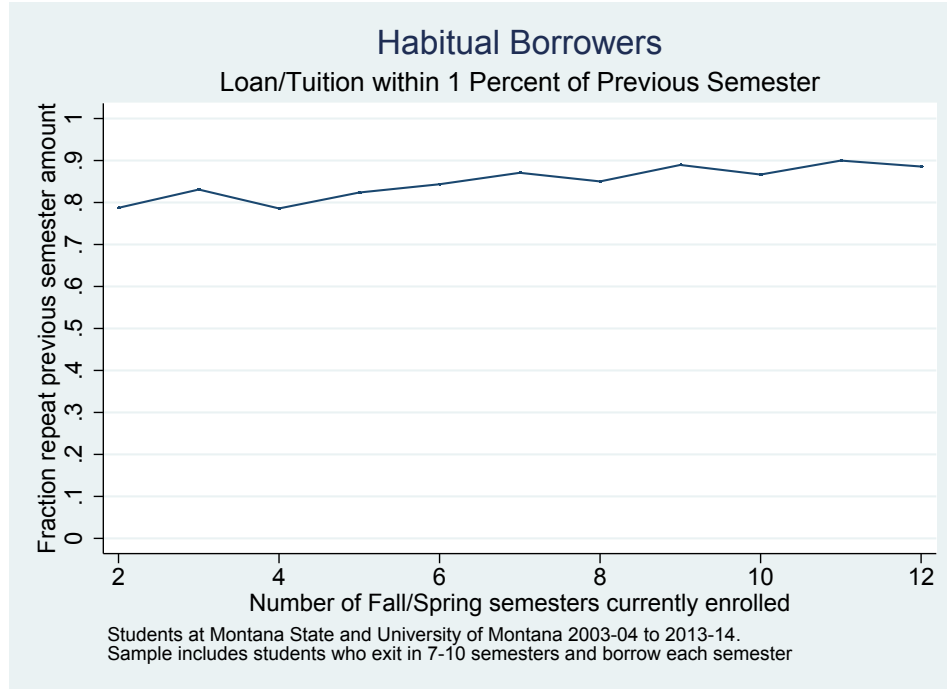
## 7 Tables

Table 1: Letter Descriptive Statistics

	Montana State		University Montana	
	Pre	Post	Pre	Post
<b>Academic Characteristics</b>				
Semester GPA	2.79 (1.02)	2.85 (1.03)	2.77 (1.04)	2.81 (1.06)
Semester Credits	12.16 (4.51)	12.33 (4.68)	12.10 (4.62)	12.05 (4.79)
Retained Following Semester	0.87 (0.34)	0.86 (0.34)	0.87 (0.34)	0.87 (0.34)
Retained Following Year	0.77 (0.42)	0.80 (0.40)	0.77 (0.42)	0.80 (0.39)
<b>Loan Characteristics</b>				
Loan Amount for Borrowers	4.071 (2.546)	5.692 (4.087)	3.885 (2.437)	5.195 (3.142)
Non-loan aid for borrowers	1.410 (1.626)	2.062 (2.319)	1.446 (1.495)	2.105 (1.948)
<b>Student Characteristics</b>				
White	0.89	0.87	0.85	0.85
Male	0.55	0.55	0.48	0.47
Pell	0.28	0.30	0.32	0.36
Observations	92,764	23,494	87,839	18,250

Notes: Data for all periods where Pre signifies before the intervention and Post contains all years after the intervention. Means reported with standard deviations in parentheses. Loan amounts in thousands.

Figure 1: Students Borrow the Same Amount Every Semester



Notes: This graph plots the percent of students that come within 1% of their fall semester loan amount to tuition ratio in the subsequent spring semester by the number of semesters in which the student is enrolled.

Table 2: Letter Descriptive Statistics

	<u>Intended Letter</u>		<u>No Letter</u>	
	Montana State	University Montana	Montana State	University Montana
Number Freshmen	1,474	807	5,585	4,089
Number Sophomores	1,607	1,394	3,915	3,551
Number Juniors	941	1,028	1,963	2,177
Number Seniors	450	511	1,205	1,403
Cumulative Loan amount Fall	17.71	17.85	7.19	7.16
Semester Loan amount Fall	3.55	3.37	1.91	1.93

Notes: Data for Fall 2012 and Fall 2013 only. Cumulative loan amounts in thousands.

Table 3: Effect of Letters on Loan and Academic Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Loan	Amount	Loan	Fall	Fall	Spring	Spring	Retained	Retained
Amount	Amount	Amount	GPA	Credits	GPA	Credits	1 Semester	1 Year
DD: Within Montana State								
Letter $\times$ Post	-0.074 <sup>+</sup> (0.044)	0.051*** (0.010)	0.074*** (0.022)	0.137 (0.092)	0.082** (0.025)	0.211 <sup>+</sup> (0.113)	0.018 <sup>+</sup> (0.010)	0.032** (0.011)
Observations	51,990	51,990	59,492	59,492	51,989	51,989	29,398	27,134
DD: Within University of Montana								
Montana State $\times$ Post	-0.075 <sup>+</sup> (0.041)	0.011 (0.010)	-0.001 (0.024)	-0.048 (0.101)	0.002 (0.026)	0.075 (0.119)	-0.001 (0.011)	0.002 (0.012)
Observations	54,291	54,291	61,797	61,797	53,931	53,931	30,050	27,557

Notes: Standard errors are clustered at the individual student level and are reported in parentheses. <sup>+</sup>  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Loan Amount Fell is a dummy variable equal to one if the semester loan in the spring semester was lower than the Fall semester loan amount. Specifications condition on having loans in Fall semester. All models control for ZIP codelevel characteristics from the American Community Survey, including percent no high school education, percent high school education, percent some college, percent non-white, population density, and median household income. We also control for whether or not the individual is from a metropolitan statistical area (MSA) with over 25,000 residents as a proxy for urbanicity. All models include year fixed effects.

Table 4: Heterogeneous Effects

Panel A: Next Semester Outcomes				
	Loan Amount	Loan Amount Fell	GPA	Semester Credits
<b>Freshmen</b>				
Letter $\times$ Post	0.007 (0.090)	0.037* (0.018)	0.116* (0.047)	0.409* (0.207)
Observations	18,279	18,279	18,279	18,279
<b>Pell Recipients</b>				
Letter $\times$ Post	-0.002 (0.059)	0.060*** (0.014)	0.091* (0.037)	0.361* (0.163)
Observations	26,002	26,002	26,002	26,002
<b>Female</b>				
Letter $\times$ Post	-0.079 (0.061)	0.043** (0.014)	0.109** (0.036)	0.271+ (0.155)
Observations	26,017	26,017	26,017	26,017
<b>Non-White</b>				
Letter $\times$ Post	-0.015 (0.144)	0.079** (0.030)	0.043 (0.075)	0.213 (0.332)
Observations	5,652	5,652	5,652	5,652
Panel B: Current Semester Outcomes and Retention				
	GPA	Credits	Retained 1 Semester	Retained 1 Year
<b>Freshmen</b>				
Letter $\times$ Post	0.124** (0.041)	0.359* (0.148)	0.019 (0.014)	0.065*** (0.016)
Observations	21,086	21,086	17,808	16,036
<b>Pell Recipients</b>				
Letter $\times$ Post	0.093** (0.032)	0.278* (0.132)	0.018 (0.015)	0.038* (0.017)
Observations	30,246	30,246	14,029	12,788
<b>Female</b>				
Letter $\times$ Post	0.081** (0.031)	0.055 (0.126)	0.021 (0.014)	0.038* (0.015)
Observations	29,826	29,826	14,408	13,272
<b>Non-White</b>				
Letter $\times$ Post	0.034 (0.069)	0.214 (0.280)	0.038 (0.030)	0.034 (0.033)
Observations	6,581	6,581	3,140	2,838

Notes: Standard errors clustered at the student level and reported in parentheses. <sup>+</sup>  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$  Specifications condition on having loans in current semester. All models include the same controls as Table 3.

# Appendix A: Descriptive Statistics and Figures

Figure A.1: Sample “Know Your Debt Letter”

«First\_Name» «Last\_Name»  
«Address\_Line1»  
«City», «State» «Zip»

Dear «First\_Name»,

At Montana State University, we are serious about your education. We know higher education requires a real investment in time, energy, and financial resources, and we think you made a good choice by investing in yourself. However, we want to be sure the financial choices you make now do not negatively impact your future.

To that end, we want you to *know your debt* and be informed of important programs and options at MSU as well as Federal Student Loan terms and conditions:

- As of September 18, 2014, you have accepted \$ in student loan debt at Montana State University.\*
- Current federal loans for undergraduate students have interest rates as high as 6.8%.
- In order to remain in good financial aid standing, you must pass 67% of your classes each semester to meet the Satisfactory Academic Progress requirements to continue receiving student loan financing.
- When you are in the repayment period of your loans, there are multiple repayment plans available for you. For example, The Public Service Loan Forgiveness plan allows borrowers who work full-time at a qualifying public service organization to have the balance of their loans forgiven if they have made 120 on-time, full, scheduled monthly payments.
- For more information about your current loan amount, please visit [www.NSLDS.ed.gov](http://www.NSLDS.ed.gov).
- At MSU, tuition doesn't cost a penny more after you've registered for 12 credits in a semester. Please consider registering for more credits to graduate sooner and spend less on tuition! Check out [montana.edu/freshman15](http://montana.edu/freshman15) for more information.

Again, we want you to know we think you made an excellent decision to invest in your future. Generally, college graduates earn more, have a lower unemployment rate, and live longer than those who do not have a college degree. We want to be sure you find the right balance so that student loan debt isn't going to negatively affect your financial future.

Schedule an appointment with a Financial Coach to learn more about repayment options, budgeting, and tips for managing your debt. To set up an appointment with a Financial Coach, call the Office of Financial Education at 406.994.4388 or email [MakeChange@montana.edu](mailto:MakeChange@montana.edu). 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.

**We are so certain an appointment with a Financial Coach will be beneficial we are willing to pay you to attend. When you meet with one of the Financial Coaches in the office by DATE, you will receive a \$20 gift card to help supplement grocery or gas expenditures.**

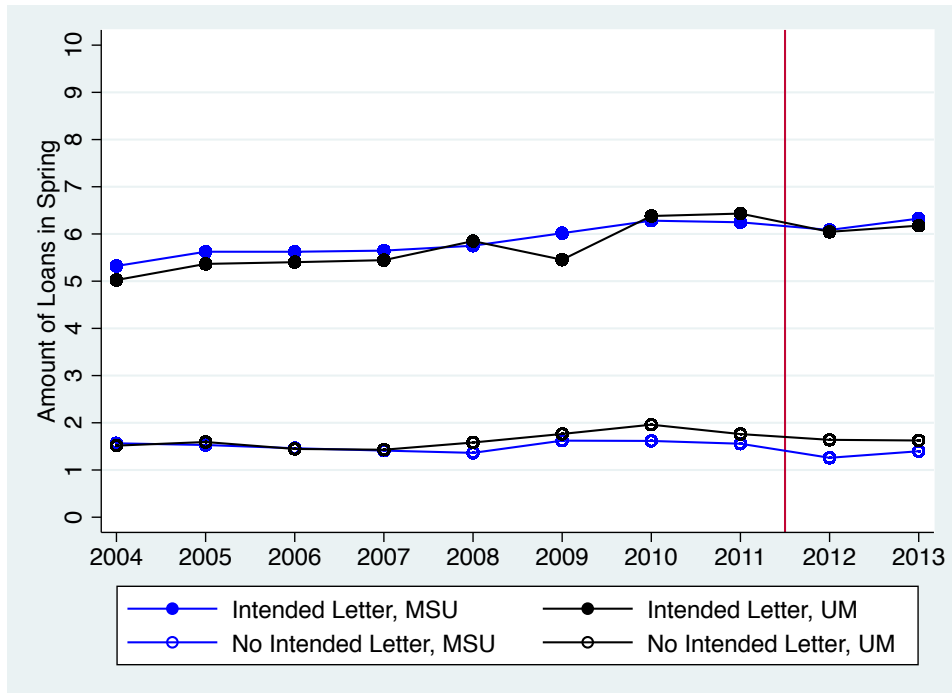
We also recommend you meet with a Career Coach. Outside of earning a degree, we believe one of the most important steps you can take to secure a solid financial future is to develop an internship and career plan. Your Financial Coach will refer you to a Career Coach during your first meeting to assist with this effort.

Sincerely,

\*Please note, Nursing Loans, private education loans, and debt accrued at another institution are not included in this debt total. Loan balance does not reflect any payments or repayments made on the loans. To view your complete federal student loan borrowing history at all schools attended, please visit the National Student Loan Data System ([NSLDS.ed.gov](http://NSLDS.ed.gov)).

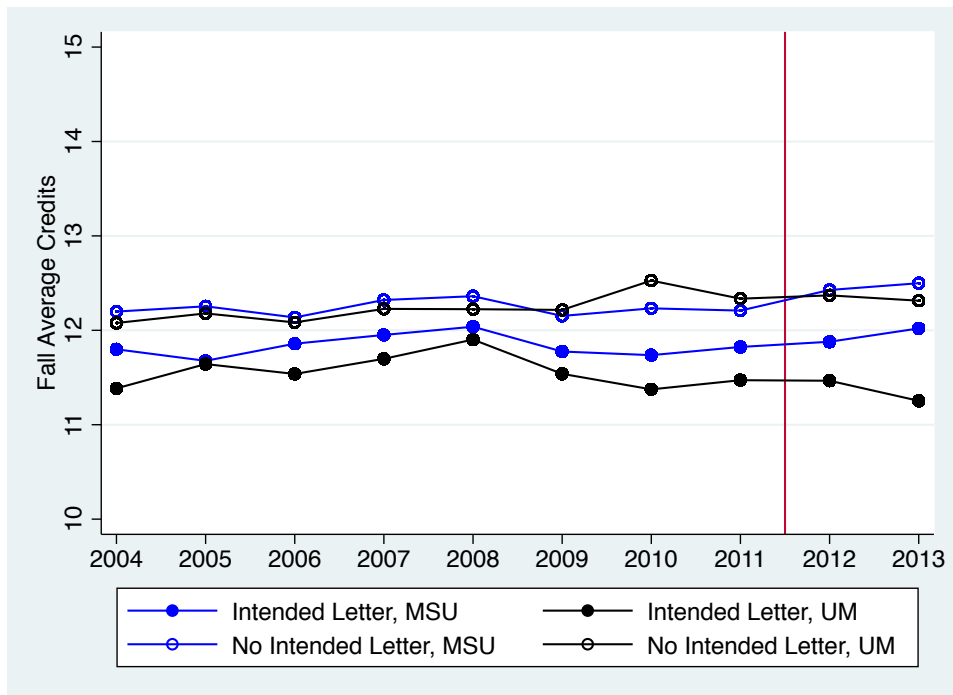


Figure A.2: Loan Amounts over time and across Campuses



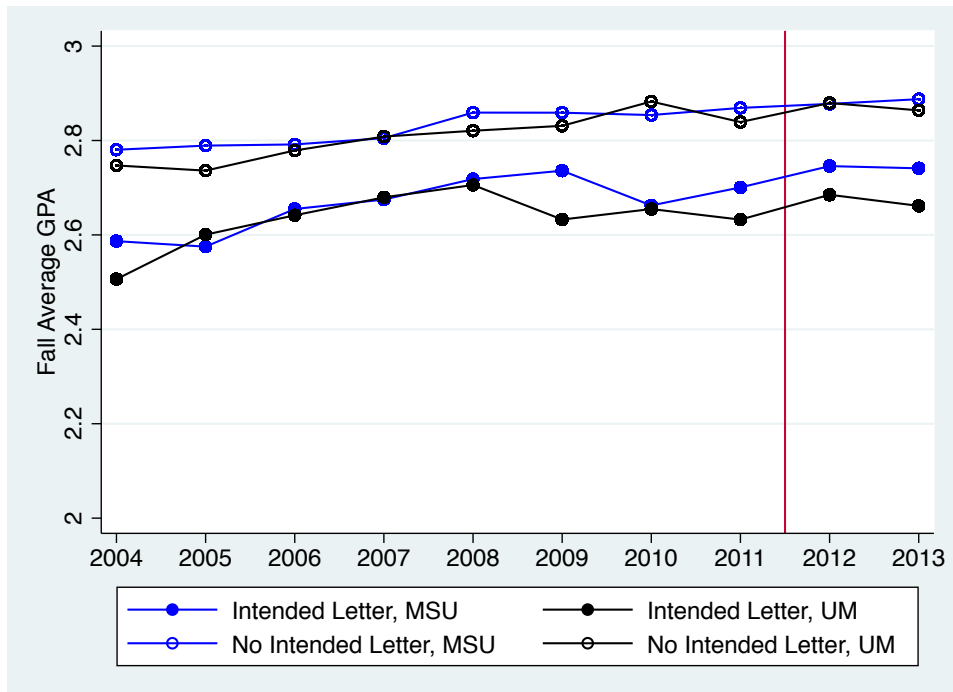
Notes: This graph plots the average loan amount by school and letter eligibility over academic years for the spring semester only.

Figure A.3: Credits over time and across Campuses



Notes: This graph plots the average credits by school and letter eligibility over time for the fall semester only.

Figure A.4: GPA over time and across Campuses



Notes: This graph plots the average GPA by school and letter eligibility over time for the fall semester only.

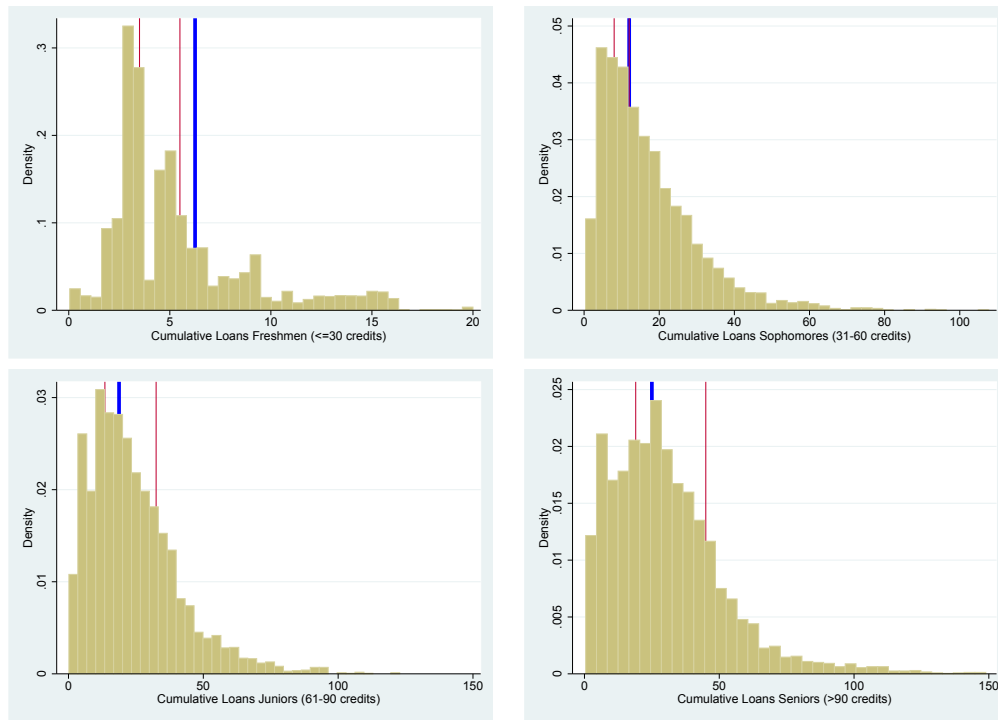


Figure A.5: Histogram of Loan Amounts Across Class Standing

Notes: The figures above shows trends in cumulative loan amounts across classes for Montana State University from Academic years 2012-2013 and 2013-2014 (the two years after the intervention). The thin, red lines, signify the Stafford subsidized amount and Stafford combined subsidized amount that can be borrowed each year, and the thicker, blue line signifies the threshold for the intervention. Histograms are censored such that juniors and seniors with over \$100,000 in loans are labeled as \$100,000 and sophomores with over \$80,000 in debt are coded as \$80,000 for the purpose of the figures. Standing is determined by the number of credits completed (Freshmen  $\leq 30$ , Sophomores  $\leq 60$ , Juniors  $\leq 90$ , and Seniors  $\leq 120$ ).

Table A.1: Representativeness of Sample

	<u>Montana State</u>	<u>University Montana</u>	<u>US 4-year Public</u>
Undergraduate Enrollment	14,098	14,753	11,028
In-state Tuition and Fees	6,752	6,275	7,756
% White	85	78	69
% Male	54	46	44
% Pell	32	39	39
% Ugrads with Fed Loans	49	56	51
Avg Fed loan	7,113	7,467	6,873
3 Year Default Rate	6%	10%	9%
% In-state	55	74	83
Avg Annual Cost	16,236	12,776	18,735
6 Year Graduation Rate	49%	47%	47%
Salary After Attending	39,700	34,100	

Notes: 4-year public institution data from the 2013 IPEDS. This information differs from Table 1 in that it includes in and out of state students.

Table A.2: Stafford Limits & Tuition Over Time

Academic Year	Tuition		Freshmen		Sophomores		Juniors +	
	Montana	University	Stafford	Stafford	Stafford	Stafford	Stafford	Stafford
	State	Montana	Subsidized	Combined	Subsidized	Combined	Subsidized	Combined
2001	3,079	3,178	2,625	2,625	3,500	3,500	5,500	5,500
2002	3,381	3,648	2,625	2,625	3,500	3,500	5,500	5,500
2003	3,807	4,102	2,625	2,625	3,500	3,500	5,500	5,500
2004	4,145	4,260	2,625	2,625	3,500	3,500	5,500	5,500
2005	4,577	4,546	2,625	2,625	3,500	3,500	5,500	5,500
2006	5,221	4,894	2,625	2,625	3,500	3,500	5,500	5,500
2007	5,673	5,174	3,500	3,500	4,500	4,500	5,500	5,500
2008	5,749	5,338	3,500	5,500	4,500	6,500	5,500	7,500
2009	5,798	5,377	3,500	5,500	4,500	6,500	5,500	7,500
2010	5,988	5,533	3,500	5,500	4,500	6,500	5,500	7,500
2011	6,168	5,722	3,500	5,500	4,500	6,500	5,500	7,500
2012	6,428	5,985	3,500	5,500	4,500	6,500	5,500	7,500
2013	6,705	6,045	3,500	5,500	4,500	6,500	5,500	7,500
2014	6,752	6,099	3,500	5,500	4,500	6,500	5,500	7,500

Table A.3: Predicting Letter Receipt at Montana State from 2011-2014

	(1)	(2)	(3)	(4)
	2010	2011	2012	2013
White	-0.003 (0.011)	0.012 (0.010)	-0.005 (0.011)	0.002 (0.009)
Male	0.005 (0.007)	- 0.001 (0.007)	-0.014* (0.006)	0.002 (0.006)
Pell Dummy	0.045*** (0.009)	0.064*** (0.009)	0.125*** (0.010)	0.077*** (0.009)
Cumulative Semesters	0.035*** (0.002)	0.034*** (0.002)	0.030*** (0.002)	0.032*** (0.002)
Amount of Loans in Fall Semester	0.086*** (0.001)	0.087*** (0.001)	0.092*** (0.001)	0.083*** (0.001)
Amount Non-Loan	-0.003** (0.001)	-0.005*** (0.001)	-0.008*** (0.001)	-0.003** (0.001)
Observations	9,366	9,576	9,850	10,328
Adjusted $R^2$	0.426	0.444	0.483	0.475

Notes: Standard errors reported in parentheses. <sup>+</sup>  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Specifications condition on having loans in current semester. All models control for total credits, zip code level population density, education, race, and income, as well as urbanicity. Models only include Montana State University, and Columns (1)-(2) predict hypothetical letter receipt given the same rules as were in place in 2012 and 2013. Regressions only include the fall semester.