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# The Effect of Reduced Student Loan Borrowing on Academic Performance and Default: Evidence from a Loan Counseling Experiment

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Student loan borrowing for higher education has emerged as a top policy concern. Policy makers at the institutional, state, and federal levels have pursued a variety of strategies to inform students about loan origination processes and how much a student has cumulatively borrowed, and to provide students with greater access to loan counseling. We conducted an experiment to evaluate the impact of an outreach campaign that prompted loan applicants at a large community college to make informed and active borrowing decisions and that offered them access to remote, one-onone assistance from a loan counselor. The intervention led students to reduce their unsubsidized loan borrowing by 7 percent, resulted in worse academic performance, and increased the likelihood of loan default during the three years after the intervention occurred. Our results suggest policy makers and higher education leaders should carefully examine the potential unintended consequences of efforts to reduce student borrowing, particularly in light of growing evidence regarding the counter-intuitive positive relationship between reduced borrowing levels and worse student academic and financial outcomes.

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Abstract:

Student loan borrowing for higher education has emerged as a top policy concern. Policy makers at the institutional, state, and federal levels have pursued a variety of strategies to inform students about loan origination processes and how much a student has cumulatively borrowed, and to provide students with greater access to loan counseling. We conducted an experiment to evaluate the impact of an outreach campaign that prompted loan applicants at a large community college to make informed and active borrowing decisions and that offered them access to remote, one-on-one assistance from a loan counselor. The intervention led students to reduce their unsubsidized loan borrowing by 7 percent, resulted in worse academic performance, and increased the likelihood of loan default during the three years after the intervention occurred. Our results suggest policy makers and higher education leaders should carefully examine the potential unintended consequences of efforts to reduce student borrowing, particularly in light of growing evidence regarding the counter-intuitive positive relationship between reduced borrowing levels and worse student academic and financial outcomes.

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## I. Introduction

Student loan borrowing for higher education has emerged as a top policy concern. Total student debt now exceeds one trillion dollars, second only to mortgages in consumer debt. While student loans are designed to help students finance a high-cost, potentially high-return investment, a growing number of researchers and policy makers question whether student debt burden negatively affects future economic decisions, from occupational choice to the timing of when people get married or purchase homes (Rothstein and Rouse, 2011; Brown et al., 2014). Of particular concern is the rising rate of defaults on student loans, particularly among students at community colleges. Thirty-one percent of borrowers at community colleges in 2010 defaulted on their loans, up from 18 percent in 2000 (Dynarski, 2015). The consequences of defaulting for borrowers are substantial, including loss of future eligibility for federal student aid, difficulty accessing credit markets, wage garnishments, and withholding of other government disbursements.

The likelihood of default may be influenced by borrowing decisions that stem from a confusing and overly complex loan origination process. While federal subsidized and unsubsidized student loans are offered by the U.S. Department of Education, each college and university has its own policies and procedures surrounding application for and disbursement of these loans. Researchers have shown that many students lack a basic understanding of the student loan borrowing process. Most students are not able to accurately report how much they have borrowed in student loans, and a substantial share of borrowers are unaware that they have taken out loans to finance their postsecondary education (Akers and Chingos, 2014).[1] Furthermore, many

[1] Using NPSAS data, Akers and Chingos show that fewer than 20% of first-year borrowers' estimates of loan debt are within 10% of the actual amount and over half were more than 50% off, with most students underestimating

borrowers lack clarity about how much they will owe in monthly payments after leaving college.[2] While these expenses are likely to be years in the future, the financial needs of current student borrowers are immediate, and therefore more salient (Karlan et al., 2010; Thaler and Bernartzi, 2004; Thaler and Sunstein, 2009). The complex loan borrowing process may lead students to make suboptimal choices in student borrowing, such as borrowing the maximum loan amount because that is what is automatically included in their loan package, even if this is more than they need to cover college-related expenses. Recent work by Denning and Jones (2019) demonstrates that when the maximum amount students are allowed to borrow increases, 26 percent of students increase their borrowing. In recent years, attention to the negative consequences of overborrowing has resulted in an increasingly common position articulated in the media and by policymakers that students should borrow less, presumably under the assumption that reduced debt would decrease the likelihood of default (Avery and Turner 2012).[3]

We provide the only rigorous evidence we know of on how reduced borrowing affects both academic outcomes and a post-college financial outcome, student loan default. Furthermore, we provide the only evidence of the effect of any student borrowing intervention on a measure of post-schooling financial well-being, student loan default. Default both provides an indication of post-college financial well-being (i.e., ability to repay) and has serious negative consequences in its own right.[4]

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their debt. Calculations from our survey of all loan applicants at the Community College of Baltimore County (CCBC) indicate similar levels of mis- and under-estimation of loan debt, with the median absolute difference between actual and estimated loan debt around $5,000.

[2] A recent, but non-random, survey of college graduates found that only 6 percent knew their repayment terms (https://lendedu.com/blog/January-student-loan-survey).

[3] Avery and Turner (2012), in part motivated by the media attention to this issue, provide a thoughtful discussion of the descriptive evidence on whether students are borrowing too much (or not enough), concluding in part that the media's depiction of the extent of overborrowing is overblown.

[4] Once in default, all remaining balance on student debt becomes due. Furthermore, the Department of Education can garnish up to 15 percent of borrowers' wages or withhold their tax returns to collect on defaulted debt. Unlike other forms of debt, student loans cannot be discharged by declaring bankruptcy and defaulted borrowers are not

In collaboration with the Community College of Baltimore County (CCBC), a large, urban community college in Maryland, we implemented a month-long outreach campaign to prompt loan applicants to make active and informed decisions about their student loan borrowing amounts, and to offer remote, one-on-one assistance from a financial aid counselor if they had questions or needed help. We designed the messages to address common hurdles which prior research has shown can negatively affect behavior and outcomes in related domains. Specifically, we designed our messages to overcome prevailing status quo biases; increase the salience of the future costs and benefits of borrowing; and mitigate the lack of access to personalized assistance.[5] Starting in December 2014 and continuing until December 2015, we randomly assigned weekly waves of loan applicants to receive these texts, leading to an experimental sample of just under 3,000 loan applicants.

Our intervention occurred alongside widespread and ongoing discussion of rising student loan debt and rates of default, frequently focused on the negative consequences of overborrowing. Policy makers at the institutional, state, and federal levels have pursued a variety of strategies to inform students about loan origination processes and how much a student has cumulatively borrowed, and to provide students with greater access to loan counseling. Several state flagship institutions, including the University of Indiana and Montana State University, send students letters and notifications of their borrowing levels to date, often with encouragement to consider borrowing less and with opportunities to meet financial counselors on campus. In August 2016 the

eligible for any future aid. Finally, many states suspend professional and/or driver's licenses for those who default on their student loans (https://www.nytimes.com/2017/11/18/business/student-loans-licenses.html).

[5] While our initial intervention design framed all messages neutrally (with regards to how much students borrow), our partners at CCBC requested we include framing in two messages that normed moderate borrowing levels, with the goal of reducing cohort default rates at the institution. For instance, one message read, "Did you know that most CCBC students who keep annual borrowing between $3000-$4000 are able to pay back their loans?" As a result, the overall messaging campaign (the content of which we present in the Appendix) has a modest emphasis on avoiding high levels of borrowing.

United States Department of Education announced a new initiative to strengthen loan counseling at institutions across the country. The motivating principle for this effort was that "accurate and timely loan information can help students make informed decisions about borrowing."[6]

Implicit in these institutional and governmental efforts is the premise that additional information about and assistance with loan borrowing decisions will lead to improved financial well-being (often through reduced debt) without negatively impacting students' academic performance. However, the empirical evidence to support this premise is quite limited and inconclusive. Research from the Netherlands found that varying the amount of information students received about government loans for higher education had no impact on student borrowing (Booij, Leuven, and Oosterbeek, 2012). Darolia (2016) conducted an experiment at a flagship university in the Midwest in which students were sent letters with information about their cumulative borrowing to date and their likely monthly payments after leaving college. He found no significant overall effect on borrowing levels or academic outcomes. Stoddard, Schmeiser, and Urban (2017) evaluate the effect of a letter sent by a flagship university in an attempt to reduce borrowing among students with high debt levels. Using a difference-in-differences strategy, they find that sending students letters with information about cumulative borrowing *and* a reminder about the course performance required for continued loan eligibility led to modest reductions in borrowing (two percent). This effect was accompanied by modest increases in academic performance, potentially attributable to the satisfactory academic progress guidance provided in the letters or a result of financial counselor interactions prompted by the letter. These latter two papers focus on flagship universities with more traditional student populations (younger, whiter, better off) and a likelihood of default that is generally much lower than at community colleges –

[6] See https://www.ed.gov/news/press-releases/us-department-education-announces-loan-counseling-experiment-and-new-college-completion-toolkit for the formal announcement.

which suggests that the students at these institutions may have been making borrowing decisions that were relatively close to optimal for their financial and academic circumstances.[7]

Among community college students there is little evidence on the impact of student loan information or counseling on borrowing and academic outcomes, with the closest being a recent and important paper that explores the effects of changes in how loan offers are presented in students' financial aid award letters to students rather than attempts to advise students on their borrowing decisions (Marx and Turner, forthcoming).[8]

The results of our experiment extend the evidence base on the effect of loan borrowing among community college students on both academic and post-college financial outcomes. We find that the outreach campaign led to declines in student borrowing. Students who were sent the texts borrowed roughly $200 less (7 percent) in unsubsidized Stafford loans than their control group counterparts during the semester immediately following the intervention. Impacts on borrowing appear to occur in the middle and upper end of the borrowing distribution, with some evidence of an increase in the share of students deciding not to take out unsubsidized loans.

We also find that the intervention led to worse academic outcomes for students in the semester immediately following the intervention (i.e., the semester for which they are applying to receive loans). Students in the treatment group were four percentage points less likely to earn any credits and three percentage points more likely to fail a course in that term. While we see no statistically significant difference in enrollment during the semester immediately following the intervention or the semester after that, students in the treatment group appear slightly (1 percentage point, 1 percent) less likely to be enrolled. A year after the intervention, we find a significant

[7] For example, the 3-year cohort default rate at Montana State has hovered around five percent in recent years, less than a third of the default rates at community colleges (and CCBC) over the same period.

[8] We reconcile our results with this study, which also explores the effects of reduced borrowing on academic attainment, in a few paragraphs.

reduction in the likelihood of any enrollment (3.6 percentage points, 6 percent), although this effect disappears three semesters after the intervention. We see no statistically significant effect on degree attainment, although the point estimate is negative (-0.9 percentage points) and meaningful in magnitude (4.4 percent of the control mean). Overall, these findings are quite consistent with Marx and Turner's (forthcoming) evidence that a reduction in borrowing negatively affects academic performance.

We take this line of inquiry one step further by providing the first evidence of the effects of reduced student borrowing on loan default. Likely as a result of the observed worse academic performance, proactive loan counseling also appears to have reduced financial well-being for students, at least in the short term. Treated students were 2.5 percentage more likely to have defaulted on their loans during the three years since the intervention occurred. These effects occur despite similar patterns of half-time or more enrollment following the intervention, indicating that the effects are not a result of differential timing of entry into repayment.[9]

Student responses to a post-intervention survey suggest that the intervention provided new information and helped borrowers to think clearly about their borrowing decisions. While we designed our intervention to minimize barriers to students accessing personalized loan counseling, our analysis of text message interactions between students and the loan counselor at CCBC indicate that, despite students requesting personalized loan guidance, the counselor responded with only general responses.

In the discussion section of the paper we explore further the potential mechanisms that could contribute to this default impact. We begin with a discussion of the potential for diminished labor market opportunities as a result of the worse academic performance among treated students.

[9] Falling below half-time enrollment triggers the start of the grace period that precedes loan repayment. We discuss the timing of loan repayment further below.

These short-term measures of academic performance are predictive of default even when conditioning on subsequent degree attainment. Furthermore, the effects of the intervention on academic performance appear to be almost entirely driven by students with a high predicted risk of default based on pre-intervention observable characteristics; these students also account for the entirety of the default effect. Combined, these results suggest the academic channel as a likely explanation for the observed effects. In contrast, we see little evidence of higher rates of transfer to for-profit institutions (which have higher rates of default) or increased financial stress which could lead students to avoid future loan payments. While we are limited by our data and imprecision to either strongly support or rule out these hypotheses, the evidence suggests worsened academic performance as a likely channel.

Our results suggest that policy makers from the institutional level on up should carefully evaluate whether efforts to reduce student borrowing are achieving their desired objectives or whether these initiatives have the potential to impair students' academic progression and financial well-being. Our results also raise a broader question about whether we should expect reduced borrowing to lead to better academic or financial outcomes for students. On this point, our findings are consistent with several studies that show a positive relationship between borrowing levels and academic performance (Dunlop, 2012; Marx and Turner, forthcoming; Wiederspan, 2015). We explore this broader question further in the discussion that concludes our paper.

## II. Background and intervention design

*Conceptual framework*

We begin with a conceptual framework for the loan origination process, with particular attention to the behavioral biases students may encounter that contribute to sub-optimal borrowing

decisions. In a world of perfect information, students would choose an optimal borrowing level that allowed them to pursue a course of study at a particular institution where they maximized the expected benefits, net of the combination of the expected monthly costs of repaying their loan and any additional costs (either direct financial or effort) the student would have to invest to pursue the higher education opportunity that the loan would make possible. To the credit of the Department of Education, it attempts to provide students with high-quality information about loan origination through an online loan counseling module that students are required to complete before they can access federal loan dollars, in order to encourage students to identify optimal borrowing levels. In practice, however, the information presented in the counseling is highly complex and may lead to more confusion than clarity (Lieber, 2014).[10] In the face of this complexity, students may avoid making an active choice and accept whatever loan amount the institution offers them (Bashears et al., 2012; Madrian and Shea, 2001). Marx and Turner (forthcoming) show that status quo bias in how loans are packaged can exert a strong effect on students' borrowing decisions: Students who were randomly assigned to receive a financial aid award letter that included a positive loan offer were more likely to borrow, and performed better academically, than students who did not automatically receive loans on their award letter.

Present-biasedness may also lead students to make sub-optimal borrowing decisions (Ross et al., 2013; Thaler and Bernartzi, 2004). Students may either not be aware of the future monthly payments associated with their level of borrowing, or may underweight these future payments relative to near-term financial constraints that loans help students overcome. This may particularly be the case at community colleges, where students sometimes receive a refund check which can

[10] Indeed, a review of the efficacy of student loan counseling suggests that students retain little information from mandatory counseling (Klepfer 2015).

be used to cover personal or familial expenses if the combination of their grants and loans exceed the cost of tuition and fees.

Finally, students—particularly those with lower levels of financial literacy—may struggle to make informed choices about the borrowing amount that maximizes their utility in the absence of access to professional financial advising. Prior experimental evidence demonstrates that providing students with high-quality financial aid advising can increase the probability students follow through on their intentions to pursue college, can improve the quality of institution they attend, and can substantially increase the probability they receive financial aid for college (Barr and Castleman, 2016; Bettinger et al., 2012; Castleman, Page, and Schooley, 2014; Hoxby and Turner, 2015). Yet most open enrollment and less selective institutions have limited capacity within their financial aid offices to provide students with individual loan counseling (Scott-Clayton, 2015). Assistance may not be available at locations or during times when they are free, or students may not be comfortable asking for help with their aid (Castleman, 2015a; Castleman, 2015b; Scott-Clayton, 2015). Without access to professional assistance, students may struggle to make decisions that best position them for financial success during and after college.

*Intervention design*

Based on this conceptual framework, we designed an intervention to support students to make more active and informed loan borrowing decisions with three primary principles in mind:

1. **Active choice:** Convey to students that it is their choice whether and how much to borrow in student loans; they are not bound to or limited by what their institution offers (or doesn't offer) them in their financial aid award.

2. **Salience of future costs:** Encourage students to actively consider the future payments associated with their present borrowing decisions.
3. **Personalized financial counseling:** Minimize barriers to students accessing professional financial aid counselors who can help guide students through the loan origination process and answer any questions they have.

We designed an interactive text messaging campaign around these principles to support community college students to make more informed borrowing decisions, though given the size of our experimental sample we are not able to experimentally evaluate the specific mechanisms driving the results we observe.

Starting in November 2014, we partnered with the Community College of Baltimore County to modify its loan application to collect students' cell phone numbers and consent to send them text messages about financial aid and loans. Approximately 90 percent of new loan applicants consented to participate. Within roughly one week of applying for a loan, we randomly assigned roughly half of all eligible students to receive a month-long campaign of eight text messages about the loan origination process. The text messages were designed to address the behavioral biases and information frictions described above, and covered the following topics:

- (Active choice): Students get to choose how much to borrow. They can borrow less, or sometimes more, than the institution offers. Consistent with similar information campaigns at other colleges, aid counselors felt that student should borrow less. This resulted in messages that were somewhat more suggestive that students should reduce borrowing than we initially intended, although this may be consistent with how similar campaigns would be conducted if implemented more broadly.

- (Salience of future costs): Monthly payments can be substantially higher or lower depending on how much students borrow and what repayment plan they select. Students face lifetime limits on how much they can borrow in federal student loans.
- (Personalized assistance): Each of the messages invited students to write back with questions or if they needed help from a CCBC financial aid counselor. The counselor was able to read and respond to student messages on an online portal and respond just as one would with web-based email. Over the course of the campaign 70 percent of students replied to at least one text.

Appendix B contains the complete list of eight text messages sent during the campaign. We did not message individuals in the control group.

*Community College of Baltimore County*

The Community College of Baltimore County (CCBC) is a large, urban community college with three primary campuses and several extension centers in Maryland. It serves approximately 23,000 undergraduates, and is similar to many large community college systems in the country in terms of student demographics and academic outcomes. Compared to the overall undergraduate population in the U.S., CCBC students are relatively old; they are also more likely to be black, the first in their family to go to college, and from lower-income backgrounds. Based on data from the United States Department of Education College Scorecard, 14 percent of first-time, full-time students at CCBC earn a degree within four years, and the median financial aid recipient who was working earned $34,200 within ten years of graduating. Most relevant for our study, approximately one in five CCBC students borrows federal loans to finance the cost of their education, slightly higher than the national average for community college students (18 percent).[11] Consistent with

[11] Authors' calculations from the 2012 NPSAS.

the higher default rates often observed at community colleges, three-year cohort default rates at CCBC ranged from 18.5 percent for the 2010 cohort to 15.5 percent for the 2012 cohort. Only 33 percent of borrowers repay at least $1 in loan principle within three years of leaving school, compared to over 40 percent of community college borrowers nationwide.

Potential borrowers at CCBC first need to complete the Free Application for Federal Student Aid (FAFSA). Through the Spring 2015 term, CCBC did not include loans in students' financial aid award letters. Students who wanted to borrow had to complete a supplementary loan application; after processing their application the CCBC financial aid office would then inform students how much they were eligible to borrow. Starting with the Fall 2015 term, CCBC switched to including loan offers in all financial aid applicants' award letters, though students still needed to complete the supplementary loan application to obtain a loan. While CCBC encourages its students to complete the loan application prior to the beginning of the term, it is possible for a student to apply for a loan at any point during the financial aid award year. In the cases when the student applies after already having paid tuition bills out of pocket, CCBC will refund the students tuition payment and apply the loan funds instead.

Federal eligibility for subsidized loans is determined by a student's dependency status, class level, and unmet financial need. Financial need is the difference between a student's cost of attendance (COA) and expected family contribution (EFC), where the EFC is the federal government's formula-driven measure of a student's ability to pay. A student's unmet financial need is his financial need minus all non-loan financial aid provided to the student. The maximum subsidized loan available to a student is the minimum of that student's unmet financial need or the federally mandated maximum of annual subsidized loan borrowing, whichever is lower. Eligibility for unsubsidized loans is similarly determined, but importantly excludes consideration

of financial need.[12] Federally mandated maximums vary based on a student's year in school, dependency status, and attendance level. For example, a full-time first-year dependent student can borrow a maximum of $5,500 in Direct loans (with no more than $3,500 in subsidized loans), while a full-time first-year independent student can borrow $9,500 (with no more than $3,500 in subsidized loans). Borrowing levels are also constrained by lifetime borrowing limits.

As is the case at many community colleges across the country (Scott-Clayton, 2015), the CCBC financial aid office has experienced staffing declines over the last several years, and has limited ability to provide one-on-one financial aid advising or loan counseling to students. CCBC administrators were open to investigating scalable strategies to provide students with prompts to make active choices about the loan origination process and to provide a sustainable staffing solution for answering questions students had about their loans. For this study, one adviser at the CCBC financial aid office was primarily responsible for responding to students' text messages.

## III. Empirical Strategy

*Sample*

Our sample is comprised of 2,876 students who applied for a loan between November 2014 and December 2015. In Table 1 we present summary statistics on students in our experimental sample. Over half (54 percent) of those reporting race were black and roughly two-thirds of students were female. The mean age was 30, and accordingly only one-third of students were classified as dependents for the purposes of financial aid. Just over half of students were the first in their family to go to college, and the average expected family contribution to college was

[12] The maximum unsubsidized loan available to a student is the minimum of the student's net cost (COA minus financial aid, including subsidized loans) and the difference between the federally mandated maximum direct federal loan and the amount of the subsidized loan taken by the student.

approximately $5,750.[13] Before applying for loans for the Spring or Fall 2015 terms, students with prior loan debt had already accumulated roughly $16,000 in loans, on average. Just under a third of students in the sample were new college students.

*Data*

The data we use in our analysis come from CCBC administrative data, the National Student Clearinghouse (NSC), and the National Student Loan Data System (NSLDS). We have access to all demographic, socioeconomic, and academic information provided on students' admissions, financial aid, and loan applications to CCBC. Our outcome data on student financial aid disbursements come from CCBC records as well as borrowing data that CCBC obtains from the NSLDS. We also have data on students' subsequent academic outcomes at CCBC, including course enrollment, completion, and grades.

To track longer-term effects of the intervention we leverage enrollment and graduation data from the NSC (obtained in January 2018). Finally, we explore effects on longer-term measures of financial well-being using student loan default information from the NSLDS (obtained June 20, 2018).

To obtain subjective measures of participants' views of the intervention effectiveness and to better understand mechanisms, we also fielded a follow-up survey in February 2016. The survey was designed to measure students' understanding of their loan packages, employment while enrolled, and financial well-being. Appendix B shows the full set of survey questions. Because of the relatively low response rate (18 percent), differential response rate by experimental condition (11 percent for treatment versus 23 percent for control), and the selected nature of respondents (those who completed the survey were somewhat more likely to be female and white

[13] The EFC for the median student in our sample was $2,152. For comparison, the maximum EFC for Pell eligibility was $5,198 for the 2015-16 award year.

and have higher GPAs), we use the survey data mainly to provide suggestive evidence about mechanism.

Finally, we also have access to all text message interactions between students and the financial aid counselor, which we use to describe student engagement with the messaging campaign.

*Randomization*

We conducted our randomization at the student-level, within weekly waves (36 total) of loan applicants for the Spring and Fall 2015 terms.[14] For example, all students who applied for a student loan between July 31st and August 6th 2015 were randomly assigned to the treatment or control condition on August 7th, and began receiving text messages on August 10th. Because the intervention began in the middle of the 2014-15 academic year, most (2,494 of the 2,910) of the sample participants were applying for loans for the Fall 2015 term. In Table 1, we report baseline equivalence for the experimental sample.[15] Across eighteen baseline measures we only find one statistically significant difference between the treatment and control group at the 5 percent level, which is probabilistically what we would expect given the number of tests we conduct. We therefore conclude that randomization was successful in creating two statistically-equivalent experimental groups at baseline.

*Empirical Strategy*

To assess overall impacts, we utilize an intent-to-treat model of the following general form:

$$BORROW_{ij} = \alpha_j + \beta_1 TREATMENT_{ij} + \boldsymbol{X\gamma} + \varepsilon_{ij},$$

where for student $i$ in wave $j$, $BORROW_{ij}$ is one of several measures of student borrowing during the term for which they applied for a loan, including a binary indicator for whether they borrowed

[14] We did not conduct the intervention with loan applicants for the Summer 2015 term.
[15] Baseline equivalence comparisons are nearly identical with the inclusion of wave fixed effects.

at all and continuous measures of how much they borrowed in different loan types. In our preferred specification, we include a set of wave fixed effects $\alpha_j$ and student-level covariates $\boldsymbol{X}$, including indicator variables for race, gender, age, dependency status for financial aid, and student type (new, returning, transfer), and linear controls for baseline earned credit hours, baseline GPA, EFC, and baseline accumulated loan debt.[16] $TREATMENT_{ij}$ is an indicator for assignment to the treatment condition. The parameter of interest $\beta_1$ represents the causal effect of being assigned to the text messaging intervention on students' borrowing outcomes. We also fit this model with a set of academic outcomes, including indicators for whether students earned any credits and whether students failed any courses. We examine impacts of the intervention on academic outcomes both in the term in which students received the intervention (i.e. Fall 2015 outcomes for students treated in the Fall 2015 term) and in the term subsequent term (i.e. Spring outcomes for students treated in the Spring 2016 term). Finally, we explore effects of the intervention on longer-term outcomes such as enrollment duration, degree attainment, and student loan default.

## IV. Results

We begin by presenting in Table 2 impacts of the intervention on students' borrowing outcomes. All loan outcomes we consider refer to student borrowing that originated during the semester immediately following the intervention; i.e. Spring 2015 for the first 383 participants, and Fall 2015 for the remaining participants. The first column only includes the wave fixed effects as a design control; subsequent columns include additional controls, as shown at the bottom of the table.

[16] We set missing values for control variables equal to zero and include indicators for missing values.

The bottom row of Panel A shows that the text campaign led to a $220 decline in total borrowing. This effect was driven by a $194 decline in unsubsidized Stafford loans disbursed, which represents a 7 percent decline from the control group mean of $2,792. The first two rows show that while the text campaign did not affect the share of students who received a subsidized loan, the text campaign may have decreased the share of students who received an unsubsidized loan by around 3 percentage points, or 4 percent of the control mean of 68 percent.

For the most part, point estimates only change slightly upon inclusion of additional controls. One exception is the impact on total unsubsidized Stafford loan borrowing, which is attenuated upon inclusion of EFC, dependency status, baseline loan debt, and student type. This attenuation is driven by students in the treatment group having a slightly lower EFC on average, and being slightly more likely to be new students. New students borrow lower amounts of unsubsidized Stafford loans on average. Therefore, including controls for student type reduces the treatment effect somewhat. Throughout the paper we focus on impacts from our fully controlled models (column 5 in Table 2).

In Figure 1, we present a histogram displaying borrowing levels of treatment and control students at different points in the distribution of unsubsidized loan borrowing. The histogram suggests that shifts in student borrowing happened throughout the distribution of unsubsidized loan borrowing rather than impacts being concentrated among one part of the distribution. The most common borrowing outcome for students in both groups was to borrow zero dollars in unsubsidized loans, with a larger number of treated students in this category. The two other most common unsubsidized loan borrowing amounts are at the maximums of unsubsidized Stafford loan borrowing for full-time independent and dependent students who also qualify for the maximum

subsidized loans.[17] Figure 1 shows that slightly fewer treatment students borrowed these modal amounts compared to control students, while other treatment gaps exist elsewhere in the distribution. Overall, Figure 1 suggests that the intervention caused some students to reduce borrowing from the maximum allowable and caused other students to refrain from borrowing unsubsidized loans all together.[18]

In the lower half of Table 2, we present analogous statistics for course outcomes. While not statistically significant, the direction of the point estimates suggest that treated students were less likely to enroll in courses and earned fewer overall credits.[19] Students in the treatment group were 4.2 percentage points less likely to earn any credits (5.4 percent of the control mean) and 3.0 percentage points more likely to fail a course in the term of the intervention (10.2 percent of the control mean).[20]

Table 3 explores effects of the intervention on longer-term outcomes. Treated students are somewhat less likely to be enrolled in the semester after the intervention, but this effect is not statistically significant. A year (two semesters) after the intervention, treated students are significantly (3.6 percentage points) less likely to be enrolled, although this difference in enrollment fades by the following semester (three semesters after the intervention).[21] Perhaps as

[17] For example, the annual Stafford loan limit for an independent freshman attending full-time is $9,500, up to $3,500 of which may come from subsidized Stafford loans, depending on the student's level of unmet financial need. If the independent freshman is eligible for the full $3,500 in subsidized Stafford loans, then she may also borrow up to $6,000 in unsubsidized Stafford loans for the full year, or $3,000 per semester.
[18] Unfortunately, CCBC does not retain the loan levels offered to students in their award package and we do not have the data necessary to impute individual loan maximums.
[19] Conditioning our loan results on enrollment reduces them by less than a quarter.
[20] With the exception of GPA, which is conditioned on enrollment out of necessity, all regressions are run on the full sample. If we instead examine binary GPA categories, which allows us to include the full sample, we observe a non-significant increase in the fraction of sample participants with a GPA of less than 2.0 (1.5 percentage points) and non-significant decreases in the fraction with GPAs of 2.0-3.0 or 3.0-4.0. Non-enrolled students are included as zeroes in these regressions.
[21] Total borrowing is also reduced by a modestly smaller percentage in the following year (not significantly different from zero), but it is difficult to disentangle changes in enrollment or intensity of enrollment (which we cannot observe in that year) from changes in borrowing conditional on enrollment.

a result of their worse academic performance during the semester immediately following the intervention and potentially thereafter[22] and reduced enrollment in subsequent semesters, treated students were also somewhat less likely to have obtained a degree by early 2018 (0.9 percentage points, 4.3 percent). While not statistically significant, this point estimate is statistically indistinguishable from that in Marx in Turner (forthcoming), and quite similar to their estimate when scaled by the effect on borrowing.

In the final column of Table 3, we present estimates of the effect of the intervention on loan default. Students who were sent the messages were 2.5 percentage points more likely to have defaulted on a loan by June 2018, indicating that the intervention had negative effects on financial well-being, at least in the short term.

An immediate question is whether these differences in default rates are generated by treated students entering repayment earlier than control students. If this were the case, the estimates might merely reflect a mechanical shift in the timing of default. We can explore effects on the timing of entry into repayment by examining when student enrollment falls below half-time. As the 6-month grace period is triggered by falling below half-time enrollment, we can examine the distribution of dates when student enrollment falls below half-time. Figure 2 plots the cumulative distribution of the end date of the last period of half-time or more enrollment pursued by a student. As seen in the figure, the patterns of entry into 6-month grace periods (and thus repayment) is quite similar across the two groups. In fact, treated students are somewhat slower to drop below half-time

[22] We do not have access to detailed academic outcomes after the semester immediately following the intervention. While we obtained partial data for Spring 2016, we quickly became aware that a number of waves of randomized students were not included. The resulting point estimates, on a subset of the waves, continue to suggest negative academic effects, but we put little weight in them given the missing data and large confidence intervals.

enrollment, suggesting that (if anything) they are entering repayment slightly later; this would reduce the likelihood of default, which is the opposite of what we find.[23]

Another way to think about this is to examine default rates by the number of months that have passed since an individual dropped below half-time enrollment. In Figure 3, we plot average default rates by treatment status within bins of number of months since an individual fell below half-time enrollment (i.e. the number of months between falling below half-time enrollment and June 2018). The bins are constructed such that each one contains 20 percent of the individuals in the control or treatment group. The figure provides two main takeaways. First, the bins (dots) for the treatment and control groups align almost exactly, confirming the findings in Figure 2 that the distributions of entry into repayment are quite similar across groups. Second, there is a higher rate of default among treated students at each point in the distribution, confirming that the estimates in Table 3 are not a result of timing. While we find no effect of the intervention on the timing of entry into repayment, we recognize that the intervention may have affected the decision to fall below half-time enrollment, so this figure should be interpreted with that in mind.[24]

## V. Exploring Mechanisms

While the intervention clearly affected student behavior, we have yet to address exactly how this messaging campaign affected students' borrowing decisions, academic outcomes, and loan

[23] Appendix Table A1 presents the point estimates for half-time or more enrollment by semester. We also present estimates of gaps in half-time or more enrollment in Appendix Table A2. We find no evidence of differential gaps in half-time or more enrollment between treatment and control.

[24] In other words, we recognize that we are splitting the sample on a variable that is potentially affected by the intervention. While we observe no effect of the intervention on this variable, we do not claim that the resulting figure illustrates causal effects of the intervention at different points in the default-timing profile. That said, we think the results are suggestive.

repayment. We begin with a discussion of the various channels through which the intervention may have affected behavior.

*Information Frictions*

One of the primary questions addressed by the experiment is the extent to which simplified information, delivered via an accessible and frequently-used channel, can overcome information frictions faced by loan applicants. Panel A of Table 4 contains summary statistics from the survey we conducted of message recipients' subjective impressions of the intervention. Across a number of areas, individuals were asked to rate the helpfulness of the messages on a scale from 1 (not helpful) to 10 (extremely helpful). The average scores indicate that the intervention was quite helpful in "providing new information" (6.7 out of 10) and helping individuals think "more clearly about whether and how much to borrow for the fall term" (7.1 out of 10). Across these measures, roughly half of respondents indicated that the messages were at least an 8 out of 10 in terms of being helpful. We interpret the survey evidence cautiously due to the relatively low response rates, but these statistics suggest that the messages provided new and helpful information, which may have led individuals to make more active and informed borrowing decisions.

*Access to assistance*

Evidence suggests that the texts may have helped students overcome barriers to accessing help with the financial aid process. Respondents to the survey indicated that the messages were helpful "connecting [them] to a CCBC financial aid counselor who provided helpful answers to questions … about student loans," with 50 percent of respondents indicating at least an 8 out of 10. Indeed, the student response rate to this intervention was very high; 70 percent sent a text back to the CCBC counselor, and roughly half of these individuals sent at least five messages.

Many of the students who texted back first expressed some confusion as to why they were receiving text messages about their loans – many of these students had forgotten that they had signed up for text messages on their loan application, and a few students had forgotten that they had applied for a student loan altogether. This pattern of response likely underscores the general confusion that students have about the loan origination process, which we discuss earlier in the paper. After the CCBC counselor made clear the purpose of the text messages, students used the texting service to ask general administrative questions, e.g. whether their loan application had been processed and approved, or how to purchase books if their loan had not yet been processed, or if they would still be eligible for the loan if they dropped a class. In these cases, students were either given a status update of their loan, directed to check the status of their loan through their CCBC financial account, or given or directed towards the relevant resources they requested. Consistent with student privacy policies, the counselor was also not able to provide specific information about a student's financial aid account (e.g. the amount they are eligible to borrow, or the total amount they had already borrowed) via text message, even when requested. Instead, students were directed to come into the financial aid office with these types of questions. A number of students responded that they would rather discuss their financial aid in person or over the phone, in which case the counselor directed them to the financial aid office hours, locations, and phone numbers.

Some students also asked advice on how much they should borrow. Following CCBC guidelines, the counselor refrained from recommending specific loan amounts, and instead advised students to "take out enough to cover classes, and an amount you are OK with having to repay." Our general impression of the text-based interactions was that while the scripted text messages prompted students to think more carefully about their borrowing amounts (and perhaps suggested that students borrow less), the CCBC counselor did not provide additional substantive guidance

about loan borrowing. A few students responded to the text messages by generally asking for help with making decisions about their loans, but these requests weren't directly addressed by the counselor; instead, the counselor instructed the students that he/she would answer specific questions the student had.

In short, our analysis of the text message interaction data suggests that the CCBC financial aid counselor was not able to provide the level of personalized loan counseling that we had aspired to provide when we designed the intervention with CCBC.

*Understanding effect on academic outcomes*

As in many other policy domains, the evidence from our intervention suggests that the provision of simplified information and access to assistance influences decisions that individuals make. What is unclear, however, is the channel(s) through which the intervention negatively affected academic outcomes.

The leading explanation is that reduced borrowing hindered students' performance in their coursework. While much of the media attention focuses on the downsides of borrowing, recent research suggests that changes in access to or packaging of loans that generates increased borrowing leads to improved outcomes, at least in regards to enrollment, credit completion, and transfer to four-year colleges (Dunlop, 2012; Marx and Turner, forthcoming; Wiederspan 2015). We find a similar positive relationship between borrowing levels and academic outcomes: the text intervention reduced borrowing among students who had applied for loans, and this borrowing reduction preceded reductions in course completion and performance.

While survey response rates were relatively low, we have also explored whether the intervention appeared to have any negative effects on students that may have contributed to worse performance (Table 4). There is no evidence that the intervention resulted in meaningful changes

in the amount that individuals worked and the survey responses suggest that while loan applicants generally had some financial worries, message recipients were actually somewhat less worried about financial issues and repaying their loans.

*Understanding effect on loan default*

There are several channels through which the near-term reductions in academic performance could potentially affect loan default rates. First, the higher withdrawal and course failure rates we observe in the semester immediately following the intervention could lead to lower rates of enrollment and degree attainment in subsequent years. Indeed, we find evidence of reduced rates of enrollment a year after the intervention and the point estimates are negative across semesters. While we don't find a significant difference in degree attainment between the treatment and control groups, our point estimate is negative (-0.9 percentage points) and meaningful in magnitude (4.3 percent).

The effects of the intervention on academic outcomes are even stronger when we restrict the sample to individuals with an above-median risk of default at baseline (Table 5).[25] Among this high-risk group, the intervention generated significant reductions in credit accumulation (0.37 fewer credits) and course performance (0.162 lower GPA), alongside large increases in course failure and withdrawal. This is despite similar patterns of semester course enrollment and GPAs at baseline.[26] While there are no significant reductions in enrollment or degree attainment, the point estimates continue to be negative and the magnitudes of the implied percentage effects on degree attainment are nearly twice as large (due primarily to lower rates of graduation in the high-

[25] Specifically, we predict default using the baseline observables from our main specification in the control group (following a leave one out procedure to avoid bias for control group observations). We then estimate our basic specification for individuals with a predicted risk of default above the median (0.114).

[26] More generally, treatment and control students are balanced on this predicted index, with students assigned to treatment actually predicted to have a slightly lower default risk (-.0031, se .0036).

risk group). Perhaps unsurprisingly, the estimated effect on default is substantially larger among this high-risk group. In contrast, we observe no effect on default or academic outcomes among students with below median default risk. Given the preponderance of negative point estimates on course performance, enrollment, and degree attainment, we believe it is likely that the intervention decreased educational attainment for the treatment group. It is likely that this in turn negatively affected students' labor market opportunities and made it harder for them to pay back their loans.

Indeed, if we examine the predictive effect of these near-term outcomes on default, we find that GPA and credits earned are both negatively associated with default, while failing a course is strongly positively associated; this is true even if we condition on eventual associate degree attainment, suggesting that the short-term academic effects of the intervention are likely at least partially responsible for the observed increase in the likelihood of default (Table A3). Those who fail a course during the semester are 7 percentage points more likely to default, which is larger in magnitude than the association between associate degree receipt and default (4.3 percentage points).

While we think that the human capital channel is the most likely explanation for the default results, another possible avenue is that the intervention resulted in more students transferring to for-profit institutions where default rates are typically higher (Dynarski, 2015). On the margin, changes in the decision to enroll in a for-profit institution could have been driven by worse academic outcomes or the impression that CCBC was less supportive of student borrowing. We do not find evidence of higher transfer rates to for-profits and can rule out effects of the size necessary to generate the default result (Appendix Table A4).

Another possibility is that the intervention created financial stress about borrowing, and that this created longer-term negative associations with students' loans that led students to avoid

payments. As we describe above, our survey data do not support this hypothesis (Table 4). Treated respondents reported fewer worries about repayment, but again we are limited in drawing conclusions from the survey given low and differential response rates.

Finally, it is possible that the student loan default we observe reflects a shifting of repayment priorities from student loans to other debts such as credit card debt. For example, perhaps the intervention resulted in students compensating for reduced student loan borrowing with increased credit card usage while in school, resulting in higher payments that students were unable to keep up with, eventually resulting in an inability to repay their student loans as well. While possible, we think this is unlikely for two reasons. First, the limited available evidence on student loan default suggests that those likely to default are substantially less likely to have credit card debt at the point of repayment (24 versus 62 percent) and have much lower median levels conditional on borrowing ($1,500 versus $7,400), perhaps because of their lower credit scores (Blagg 2018). This suggests that those at high risk of default may be unable or unwilling to increase credit card debt substantially. Second, it is unclear why a shift in the source of debt (as opposed to a reduction in available resources) would influence student course performance.

## VI. Discussion

In line with a growing body of research investigating behaviorally-informed strategies to help people navigate complex decisions, our results show that community college students' borrowing decisions are influenced by simplified information about the loan origination process. The magnitude of the results is noteworthy given that (1) students only received eight text messages about loan origination, and (2) our analyses of students' interactions with the CCBC

financial aid counselor suggested that students received little in the way of active direction about how much to borrow, even when students explicitly requested guidance.

While much of the media attention focuses on the downsides of borrowing, our results are more consistent with recent evidence that suggests borrowing leads to improved outcomes, at least in regards to enrollment, credit completion, and transfer (Marx and Turner, forthcoming). In our intervention, those who borrowed less did worse academically. We extend this evidence one step further, demonstrating effects on student loan default.

Our results are particularly relevant in the context of growing media and policy rhetoric about a student debt and default crisis, and descriptive research suggesting that higher borrowing levels are correlated with worse economic outcomes. In light of a growing number of institutions proactively sending students information about cumulative debt levels, an increasingly important question is whether rhetoric about the debt crisis will translate into explicit direction to students to reduce their borrowing levels. It is not clear, based on the evidence from our paper as well as results from other studies (Dunlop, 2012; Marx and Turner, forthcoming; Wiederspan, 2015) that encouraging students to borrow less would actually improve their academic outcomes. Further, and perhaps counterintuitively, our findings suggest that encouraging students to borrow less (when they likely do not have access to other financial resources) may actually make the default problem worse and negatively affect students' financial well-being.

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**Table 1: Baseline Equivalence**

| | Control | Treatment | Difference | T-statistic | |
|---|---|---|---|---|---|
| Black | 54.6% | 53.7% | 0.9 pp | 0.282 | |
| White | 31.2% | 30.0% | 1.2 pp | 0.423 | |
| Hispanic | 11.7% | 11.1% | 0.6 pp | 0.303 | |
| Other Race | 3.1% | 5.0% | -1.9 pp | -1.569 | |
| Missing Race | 63.4% | 63.9% | -0.5 pp | -0.271 | |
| Female | 66.2% | 64.8% | 1.4 pp | 0.762 | |
| Age | 30.3 | 29.8 | -0.5 | 1.144 | |
| Dependent | 33.3% | 34.4% | -1.1 pp | 0.652 | |
| First Generation | 51.6% | 52.6% | -1 pp | -0.508 | |
| New Student | **27.0%** | **31.2%** | **-4.2 pp** | **-2.447** | ** |
| Returning Student | 54.2% | 51.8% | 2.4 pp | 1.332 | |
| Transfer Student | 18.7% | 17.0% | 1.7 pp | 1.165 | |
| Previous credits earned | 24.8 | 24.2 | -0.6 | 0.687 | |
| Term Hours | 8.8 | 9 | 0.2 | 1.239 | |
| Prior GPA | 2.66 | 2.65 | -0.01 | 0.214 | |
| EFC | **$6,153** | **$5,357** | **-796** | **1.823** | * |
| Parents' AGI | $75,145 | $72,782 | -2363 | 0.811 | |
| Student's AGI | $27,581 | $27,520 | -61 | 0.056 | |
| Previous student loan debt | $11,655 | $10,741 | 914 | 1.626 | |
| Any previous loan debt | 67.6% | 65.4% | 2.2 pp | 1.250 | |
| N | 1427 | 1449 | | | |

Notes: based on a sample of 2,876 students who applied for Title IV loans at CCBC between December 2014 and December 2015, and consented to receive text messages.

**Table 2: Treatment effects on borrowing and course outcomes**

*Panel A: Student Borrowing (NSLDS)*

| | Control Mean | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|---|
| Any Subsidized Loans | 74.7% | 0.00631 | 0.00929 | 0.000184 | -0.000967 | -0.00149 |
| | | (0.0160) | (0.0159) | (0.0145) | (0.0145) | (0.0144) |
| Any Unsubsidized Loans | 68.2% | -0.0385** | -0.0365** | -0.0311* | -0.0291* | -0.0275 |
| | | (0.0173) | (0.0172) | (0.0171) | (0.0169) | (0.0169) |
| Any Loans | 87.5% | -0.0142 | -0.0134 | -0.0114 | -0.0115 | -0.0119 |
| | | (0.0124) | (0.0124) | (0.0124) | (0.0124) | (0.0124) |
| Subsidized Stafford Loans ($) | $2,222 | -38.29 | -27.93 | -54.71 | -60.00 | -63.37 |
| | | (60.05) | (59.36) | (55.25) | (54.93) | (54.73) |
| Unsubsidized Stafford Loans ($) | $2,792 | -261.1*** | -240.2*** | -208.3** | -199.4** | -194.4** |
| | | (93.52) | (91.14) | (89.36) | (88.73) | (88.84) |
| Total Loans ($) | $5,031 | -267.1** | -233.4* | -228.7* | -224.6* | -222.3* |
| | | (125.5) | (121.7) | (120.0) | (119.8) | (119.8) |

*Panel B: Course Outcomes During Intervention Semester*

| | | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|---|
| Enrolled (NSC) | 94.9% | -0.0107 | -0.0109 | -0.0108 | -0.0110 | -0.0111 |
| | | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) |
| Enrolled in CCBC (NSC) | 94.8% | -0.0126 | -0.0128 | -0.0128 | -0.0130 | -0.0131 |
| | | (0.00870) | (0.00869) | (0.00868) | (0.00869) | (0.00871) |
| Enrolled in Courses (CCBC) | 92.4% | -0.0131 | -0.0127 | -0.0134 | -0.0141 | -0.0148 |
| | | (0.0102) | (0.0102) | (0.0101) | (0.0101) | (0.0101) |
| Credits Earned | 6.2 | -0.190 | -0.219 | -0.189 | -0.202 | -0.225 |
| | | (0.171) | (0.168) | (0.167) | (0.167) | (0.161) |
| Earned Any Credits | 78.1% | -0.0413*** | -0.0418*** | -0.0385** | -0.0393** | -0.0418*** |
| | | (0.0158) | (0.0158) | (0.0157) | (0.0157) | (0.0154) |
| Failed Any Classes | 29.5% | 0.0368** | 0.0359** | 0.0295* | 0.0288* | 0.0302* |
| | | (0.0171) | (0.0171) | (0.0170) | (0.0170) | (0.0166) |
| GPA* | 2.06 | -0.0863* | -0.0840* | -0.0634 | -0.0644 | -0.0640 |
| | | (0.0504) | (0.0500) | (0.0497) | (0.0497) | (0.0474) |
| Wave Fixed Effects | | X | X | X | X | X |
| Gender, Race, Age | | | X | X | X | X |
| EFC, Dependency Status | | | | X | X | X |
| Baseline Loan Debt | | | | | X | X |
| Student Type (New, Returning, Transfer) | | | | | X | X |
| Baseline credits earned and GPA | | | | | | X |

Notes: based on sample of 2,876 students who applied for Title IV loans at CCBC between December 2014 and December 2015, and consented to receive text messages. All outcomes variables refer to semester of the intervention (for NSLDS outcomes, this includes loans where the academic period overlapped with the semester of the intervention. *The sample size for estimating the treatment effects on GPA is 2,639, as GPAs cannot be calculated for students who did not enroll. The full sample is used for all other outcomes.

**Table 3: Treatment effects on educational attainment and default**

| | Enrolled (t+1) (1) | Enrolled (t+2) (2) | Enrolled (t+3) (3) | Any Degree (4) | Associate Degree (5) | Any Default (6) |
|---|---|---|---|---|---|---|
| Treatment | -0.00994 | -0.0361** | -0.00283 | -0.0075 | -0.0087 | 0.0246** |
| | (0.0158) | (0.0180) | (0.0184) | (0.0127) | (0.0126) | (0.0125) |
| Control Mean | 75.9% | 61.6% | 49.7% | 20.4% | 20.0% | 13.4% |

Notes: based on sample of 2,876 students who applied for Title IV loans at CCBC between December 2014 and December 2015, and consented to receive text messages. Degree outcomes from the NSC are as of January 2018. Default outcomes from the NSLDS are as of June 20, 2018.

**Table 4: Subjective Measures of Message Effectiveness from Post Survey**

| | Mean (1-10 Scale) | 8 or Higher (1-10 Scale) |
|---|---|---|
| *Panel A: How Helpful Were Messages In …* | | |
| Providing New Information | 6.73 | 45.3% |
| Connecting You to a Counselor Who Helped Answer Loan Questions | 6.88 | 49.6% |
| Helping You Think Clearly About Whether and How Much to Borrow | 7.10 | 54.1% |
| Influencing Whether or How Much You Borrowed | 6.51 | 47.6% |
| *Panel B: How Did Messages Influence Other Decisions Such As …* | | |
| How Many Hours You Worked | 5.12 | 30.3% |
| How Much Time You Put Into Classes | 6.14 | 44.8% |
| Your Overall Level of Financial Stress | 6.43 | 39.5% |
| Whether You Used Other CCBC Support Services | 5.85 | 35.1% |
| How Much You Borrowed in Private Loans | 5.20 | 52.0% |

Notes: The table provides summary statistics for survey respondents in the treatment group (n=168). Panel A contains responses to the question "During the fall term we sent you text messages about applying for student loans at CCBC. Please indicate how helpful these messages were in: (1) Providing you with information you didn't have before about student loans, (2) Connecting you to a CCBC financial aid counselor who provided helpful answers to questions you had about student loans, (3) Getting you to think more clearly about whether and how much to borrow for the fall term, and (4) Influencing whether or how much you borrowed in loans this fall." The possible answers ranged from 1 (Not Helpful) to 10 (Extremely Helpful). Panel B contains responses to the question "How, if at all, did receiving the text messages about student loans influence other decisions you made during the fall 2015 term?: (1) How many hours you worked, (2) How much time you put into classes, (3) Your overall level of financial stress, (4) Whether you used other support resources available at CCBC, (5) How much you borrowed in private loans." The possible answers ranged from 1 (No Influence) to 10 (Greatly Influence).

**Table 5: Treatment effects by Predicted Default Risk**

*Panel A: Short-term*

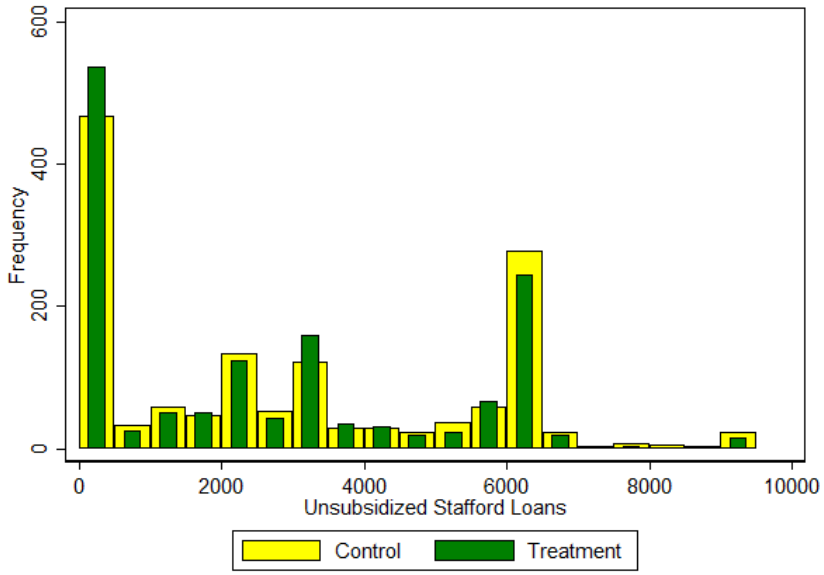
| | Total Loans | Enrolled | Credits Earned | Earned Any Credits | Failed Any Classes | GPA* |
|---|---|---|---|---|---|---|
| | (1) | (2) | (2) | (1) | | |
| High Risk | -211.2 | -0.00408 | -0.367* | -0.0571** | 0.0644*** | -0.162** |
| | (179.3) | (0.0148) | (0.218) | (0.0236) | (0.0247) | (0.0711) |
| Low Risk | -250.6 | -0.0240* | -0.103 | -0.0253 | 0.001 | 0.0249 |
| | (161.5) | (0.0137) | (0.239) | (0.0200) | (0.0224) | (0.0631) |
| p-value (High versus Low): | 0.858 | 0.504 | 0.113 | 0.004 | 0.035 | 0.032 |
| Control Mean High Risk | 5339 | 91.4% | 5.2 | 73.2% | 32.2% | 1.88 |
| Control Mean Low Risk | 4715 | 93.5% | 7.2 | 82.9% | 26.7% | 2.21 |

*Panel B: Long-term*

| | Enrolled (t+1) | Enrolled (t+2) | Enrolled (t+3) | Any Degree | Associate Degree | Any Default |
|---|---|---|---|---|---|---|
| | (2) | (2) | (3) | (4) | (5) | (6) |
| High Risk | -0.0129 | -0.0358 | -0.0001 | -0.0097 | -0.0086 | 0.0470** |
| | (0.0225) | (0.0254) | (0.0255) | (0.0148) | (0.0145) | (0.0211) |
| Low Risk | -0.00846 | -0.0409 | -0.0178 | -0.00568 | -0.0102 | 0.0089 |
| | (0.0221) | (0.0258) | (0.0268) | (0.0210) | (0.0209) | (0.0131) |
| p-value (High versus Low): | 0.860 | 0.883 | 0.635 | 0.862 | 0.939 | 0.036 |
| Control Mean High Risk | 73.5% | 58.2% | 45.6% | 12.3% | 11.9% | 20.0% |
| Control Mean Low Risk | 78.6% | 65.5% | 54.4% | 29.7% | 29.3% | 6.5% |

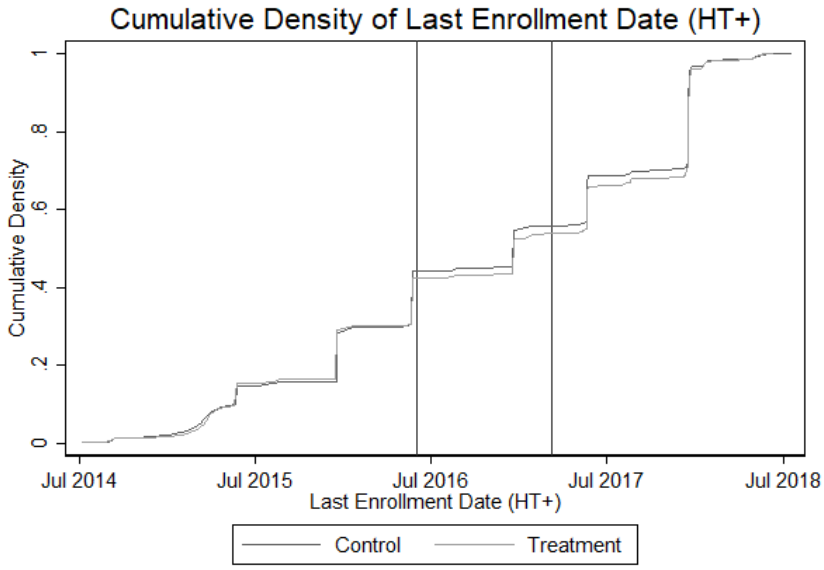
Notes: based on sample of 2,876 students who applied for Title IV loans at CCBC between December 2014 and December 2015 and consented to receive text messages. We predict default using the baseline observables from our main specification in the control group (following a leave one out procedure to avoid bias for control group observations). We then estimate our basic specification for individuals with a predicted risk of default above and below the median (0.114) separately; each cell represents a separate regression. Treatment and control students are balanced on this predicted index, with students assigned to treatment actually predicted to have a slightly lower default risk (-.0031, se .0036). Degree outcomes from the NSC are as of January 2018. Default outcomes from the NSLDS are as of June 20, 2018.

**Figure 1: Histogram of Unsubsidized Loan Borrowing, by Experimental Status**



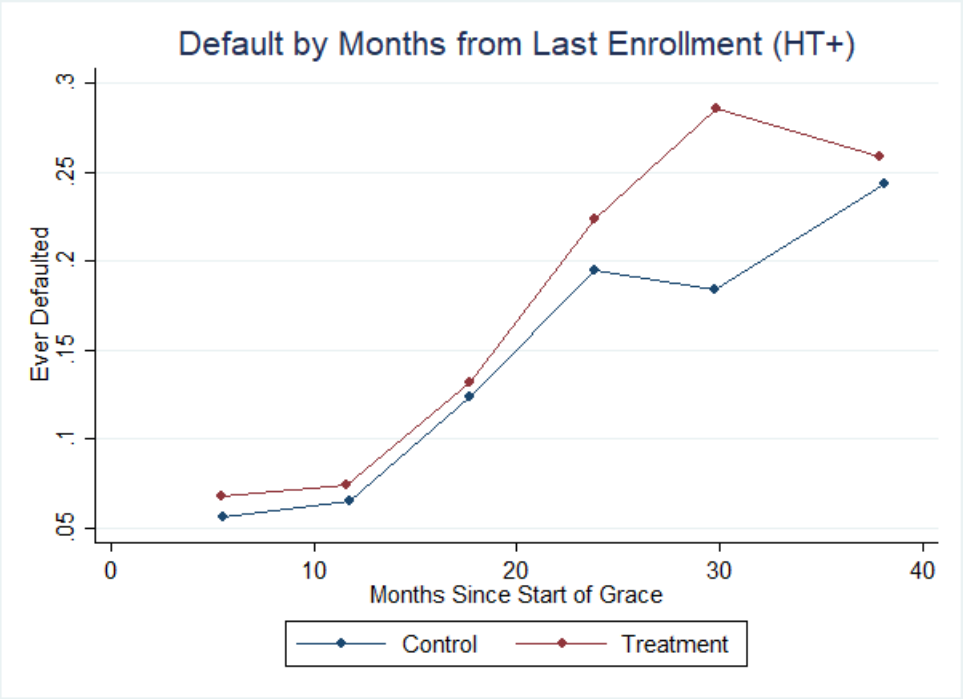

Note: Based on sample of 2,876 students who applied for Title IV loans at CCBC between December 2014 and December 2015, and consented to receive text messages. This includes loans where the academic period overlapped with the semester of the intervention.

**Figure 2: Distribution of Estimated Start of Grace Period, by Experimental Status**




Note: Based on sample of 2,876 students who applied for Title IV loans at CCBC between December 2014 and December 2015, and consented to receive text messages. Last enrollment date (HT+) indicates the end date of the last period of half-time or more enrollment in the NSC data.

**Figure 3: Default Rate Patterns, by Experimental Status**




Note: Based on sample of 2,876 students who applied for Title IV loans at CCBC between December 2014 and December 2015, and consented to receive text messages. "Months Since Start of Grace" is calculated as the number of months between the last period of half-time or more enrollment in the NSC data and June 20, 2018 (the date at which default status is observed). Each dot is generated from a separate subsample, which explains why the share having defaulted goes down slightly between 23 and 30 months since start of grace.

**Table A1: Treatment effects on Half-time or More (HT+) Enrollment**

| | Enrolled HT+ (t+1) (1) | Enrolled HT+ (t+2) (2) | Enrolled HT+ (t+3) (3) |
|---|---|---|---|
| Treatment | -0.0074 | 0.000310 | 0.0194 |
| | (0.0184) | (0.0180) | (0.0172) |
| Control Mean | 50.1% | 37.1% | 30.2% |

Notes: based on sample of 2,876 students who applied for Title IV loans at CCBC between December 2014 and December 2015, and consented to receive text messages. Enrollment outcomes are from the NSC.

**Table A2: Treatment effects on Gaps in HT or More Enrollment**

| | 6 Month Gap | 6 Month Gap (After) | 12 Month Gap | 12 Month Gap (After) | 18 Month Gap | 18 Month Gap (After) |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Treatment | 0.008 | -0.003 | 0.007 | 0.004 | 0.007 | 0.005 |
| | (0.009) | (0.011) | (0.013) | (0.016) | (0.014) | (0.017) |
| Control Mean | 93.4% | 89.8% | 85.4% | 73.6% | 82.9% | 68.6% |

Notes: based on sample of 2,876 students who applied for Title IV loans at CCBC between December 2014 and December 2015, and consented to receive text messages. Enrollment andd degree outcomes from the NSC are as of January 2018. Default outcomes from the NSLDS are as of June 20, 2018.

**Table A3: Factors Correlated with Loan Default**

| | Any Default (1) |
|---|---|
| Baseline GPA | -0.0278*** |
| | (0.0088) |
| Credits Earned | -0.0078*** |
| | (0.0023) |
| Earned Any Credits | -0.0323 |
| | (0.0226) |
| Failed Any Classes | 0.0707*** |
| | (0.0155) |
| Associate Degree | -0.0430** |
| | (0.0181) |
| Control Mean | 13.4% |

Notes: based on sample of 2,876 students who applied for Title IV loans at CCBC between December 2014 and December 2015, and consented to receive text messages. Degree outcomes from the NSC are as of January 2018. Default outcomes from the NSLDS are as of June 20, 2018.

**Table A4: Treatment effects on subsequent for-profit enrollment**

| | All | Fall |
|---|---|---|
| | (1) | (1) |
| Treatment | 0.000 | 0.001 |
| | (0.006) | (0.006) |
| Control Mean | 2.4% | 2.4% |

Notes: based on sample of 2,876 students who applied for Title IV loans at CCBC between December 2014 and December 2015, and consented to receive text messages. Enrollment andd degree outcomes from the NSC are as of January 2018. Default outcomes from the NSLDS are as of June 20, 2018.

**Appendix B: Text Messages**

Fields in green would be customized to the student.

**1. Purpose: Introductory Message**
**Part 1:** Hi [student name], this is [fin aid counselor] from CCBC. We know loans can be confusing so we're here to help you decide the loan amount that is right for you!
**Part 2:** You can text me back at this # & I'll write back as soon as I can. Want to confirm this is from CCBC? Stop by the aid office or call us XXX-XXX-XXXX

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**2. Purpose: Inform students that they choose how much to borrow**
Did u know that how much to borrow is YOUR choice? Accepting the maximum loan may not be right for everyone. Want to chat about the loan amount best for you?

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**3. Purpose: Inform students about what their monthly payments will be**
**Part 1:** [Student name], your loan payments can be $100s higher or lower each month depending on how much you borrow and which repayment plan you choose.
**Part 2:** Visit
https://studentloans.gov/myDirectLoan/mobile/repayment/repaymentEstimator.action
to see examples of payment amounts. Text me back to discuss how your borrowing choices will affect the payments you owe.

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**4. Purpose: Set a positive norm for keeping borrowing around a certain amount**
Part 1: Hi [Student name]. Did u know that most CCBC students who keep annual borrowing between $3000-$4000 are able to pay back their loans?
Part 2: Paying back loans keeps future choices open, like getting financial aid again or qualifying for auto loans or credit cards. Text me if u want to discuss

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**5. Purpose: Encourage students to complete loan entrance counseling**
[Student name], have you completed loan counseling @ www.studentloans.gov? This step is required for CCBC to process your loans & pay your bill.

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**6. Purpose: Inform students about lifetime limits on how much they borrow**
Part 1: Do you plan to transfer? There are government limits on borrowing for college over ur lifetime. Taking the max. loan now may not leave you enough down the road
Part 2: Text me to discuss how what you borrow now can impact your future college plans.

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**7. Purpose: Message for students who have requested private loans**
Hi [Student name], did you know that private loans can have higher interest rates & less flexible repayment plans than government loans? Text back if you'd like to discuss your options.

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**8. Purpose: Encourage students to complete promissory notes**
[Student name], have you completed your promissory note @ www.studentloans.gov? This step is required to disburse your loans & credit to your CCBC bill.

## Appendix C: Online Survey

CCBC Student Loan Decisions

Q1 The Community College of Baltimore County is exploring new ways to help students with their student loan decisions. We would very much appreciate your answers to the following short survey about the loan borrowing decisions you made this fall. We anticipate that this survey will take no more than 10 minutes of your time. Students who complete the survey will be entered into a drawing for one of twenty $100 Amazon gift cards. CCBC will contact you directly if you are one of our winners. Your answers will be kept confidential and only accessible by CCBC employees. We will share fully anonymous responses to the survey with Dr. Ben Castleman from the University of Virginia, who will help us analyze the survey results. Your participation is fully voluntary and you can stop the survey at any point.Thank you in advance for your helpful input!

Q2 Please rank how important each of the following was in your decision to apply for a loan at CCBC:

| | Not important (1) | Less important (6) | Somewhat important (2) | Important (3) | Very Important (4) |
|---|---|---|---|---|---|
| Paying tuition and fees (1) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Paying for other classroom materials, such as books or lab fees (2) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Paying living or transportation expenses (3) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Paying for child care or to support other family members (4) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Allowing me to work less while I was in college (5) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Other - please specify (6) | ❍ | ❍ | ❍ | ❍ | ❍ |

Q3 Please indicate your agreement or disagreement with the following statements:

| | Strongly disagree (1) | Disagree (2) | Neutral (3) | Agree (4) | Strongly agree (5) |
|---|---|---|---|---|---|
| I am satisfied with my present financial condition (1) | ❍ | ❍ | ❍ | ❍ | ❍ |
| I do not worry about meeting my monthly expenses (2) | ❍ | ❍ | ❍ | ❍ | ❍ |
| I am confident I could come up with $2,000 if an unexpected need arose within the next month (3) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Concerns about finances affect how well I do in my classes (4) | ❍ | ❍ | ❍ | ❍ | ❍ |
| I do not have too much debt right now (5) | ❍ | ❍ | ❍ | ❍ | ❍ |
| I do not worry about how I will pay off my student loans (6) | ❍ | ❍ | ❍ | ❍ | ❍ |
| My family depends on me to provide for them financially (7) | ❍ | ❍ | ❍ | ❍ | ❍ |

Q4 As of the end of the Fall 2015 term, what is your best estimate of how much you have borrowed in student loans at CCBC?

❍ Total: (1) _____

❍ I have not taken loans (2)

Answer If During the time you attended CCBC, what is your best estimate of how much you have borrowed to date, both Federal and private loans? Total: Is Greater Than or Equal to 0

Q5 For loans you have taken while at CCBC, what is your best estimate of what your minimum monthly payment would be if you followed the standard 10-year repayment plan?

Answer If During the time you attended CCBC, what is your best estimate of how much you have borrowed to date, both Federal and private loans? Total: Is Greater Than or Equal to 0

Q6 How confident are you that you will be able to pay your monthly loan payments in full after you finish at CCBC

_____ Confidence (1)

Q7 Were you employed while attending CCBC in Fall 2015?

❍ Yes (1)

❍ No (2)

Answer If Were you employed while attending CCBC in Fall 2015? Yes Is Selected

Q8 How many hours a week did you work?

Q9 After you graduate from CCBC and secure a job, how much do you estimate you will earn each month?

Q10 Which of the following statements are TRUE or FALSE:

| | TRUE (1) | FALSE (2) |
|---|---|---|
| If student loan borrowers encounter financial difficulties paying back their loans, they can choose to pay a fraction of their income each month to pay back the loan (1) | ❍ | ❍ |
| If student loan borrowers encounter financial difficulties paying back their loans, they can declare bankruptcy to avoid paying back the loan (2) | ❍ | ❍ |

Q38 During the fall term, do you recall receiving text messages from the CCBC financial aid office about your loan application?

- ❍ Yes (1)
- ❍ No (2)

If No Is Selected, Then Skip To We want to better understand how stud...

Q11 During the fall term we sent you text messages about applying for student loans at CCBC. Please indicate how helpful these messages were in:

_____ Providing you with information you didn't have before about student loans (1)
_____ Connecting you to a CCBC financial aid counselor who provided helpful answers to questions you had about student loans (2)
_____ Getting you to think more clearly about whether and how much to borrow for the fall term (3)
_____ Influencing whether or how much you borrowed in loans this fall (4)

Answer If During the fall term we sent you text messages about applying for student loans at CCBC. Please i... Influencing whether or how much you borrowed in loans this fall Is Greater Than 1

Q12 Please write 1-2 sentences about how the texts influenced your borrowing decision:

Q13 How, if at all, did receiving the text messages about student loans influence other decisions you made during the fall 2015 term?

_____ How many hours you worked (1)
_____ How much time you put into my classes (2)
_____ Your overall level of financial stress (3)
_____ Whether you used other support resources available at CCBC (4)
_____ How much you borrowed in private loans (5)

Q14 We want to better understand how students' overall financial understanding and preferences relate to their financial aid decisions, so that we can better target assistance for future loan applicants. The following questions are designed to measure financial understanding and preferences. Please answer as best as you can. For each question, there are also options to indicate "I don't know" or to skip the question.

Q15 If the chance of winning a prize is 10 percent, how many people out of 1,000 would be expected to win a prize?

- Answer: (1) _____
- I don't know (2)

Q16 If 5 people all have the winning numbers in the lottery and the prize is $2 million, how much will each of them get?

- Answer: (1) _____
- I don't know (2)

Q17 Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than, exactly the same as, or less than today with the money in the account?

- More than today (1)
- Exactly the same as today (2)
- Less than today (3)

Q18 What minimum amount of money would you prefer to receive for certain, instead of flipping a coin and receiving $300 if the coin is heads or $0 if the coin is tails:

- $0 (1)
- $10 (2)
- $30 (3)
- $50 (4)
- $70 (5)
- $90 (6)
- $110 (7)
- $130 (8)
- $150 (9)
- $170 (10)
- $190 (11)

Q19 On each row, please indicate which of the following two options you would prefer:

| | 1 (1) | 2 (2) |
|---|---|---|
| $1000 today:$1025 in 12 months (1) | ❍ | ❍ |
| $1000 today:$1076 in 12 months (2) | ❍ | ❍ |
| $1000 today:$1129 in 12 months (3) | ❍ | ❍ |
| $1000 today:$1183 in 12 months (4) | ❍ | ❍ |
| $1000 today:$1238 in 12 months (5) | ❍ | ❍ |
| $1000 today:$1294 in 12 months (6) | ❍ | ❍ |
| $1000 today:$1351 in 12 months (7) | ❍ | ❍ |
| $1000 today:$1410 in 12 months (8) | ❍ | ❍ |
| $1000 today:$1470 in 12 months (9) | ❍ | ❍ |
| $1000 today:$1531 in 12 months (10) | ❍ | ❍ |