Selection of Student Loans and College Performance

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Abstract

The rising cost of college attendance, and corresponding increase in the amount of student loan debt outstanding, has garnered significant media and policy attention over the past several years. At the same time, little is known about the short-term academic consequences of borrowing to finance college attendance. We use detailed student-level administrative data from the Montana University System to examine the relationship between the use of student loans to pay for college and students' academic performance, choice of major, and retention rates. Our results from individual fixed effects regressions suggest that having access to student loans can improve college performance: Students who borrow for college have higher GPAs and take more credits in the semesters when they take out loans than in semesters when they do not. However, as the amount of debt accumulated relative to tuition increases, student GPAs, and the number of credits taken per semester, decline. We further find that in semesters when students receive additional non-loan financial aid they have higher GPAs and take additional credit hours. These insights into the relationship between student loan debt, financial aid, and academic performance can help inform policy discussions regarding the consequences of rising student debt.

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Introduction

Over the past decade, the rising cost of post-secondary education in the United States has largely been borne by students through increases in both the incidence and amount of student loan debt at graduation. In 2013, 69 percent of graduating seniors had some amount of student loan debt, with an average balance of $28,400, compared with a 59 percent incidence and $19,000 average balance in 2006 (TICA, 2014). Student loan debt has also increased in the broader population: From 2004 to 2014, the number of individuals of all ages with student loan debt increased by 89 percent and the average amount of debt increased by 77 percent to $26,000 (Haughwout et al., 2015). As a result of this growth, the total amount of student loan debt outstanding reached $1.16 trillion in the fourth quarter of 2014 (Federal Reserve Bank of New York, 2015; Federal Reserve Board, 2015).

Despite the substantial rise in student loan debt, until recently the economics literature has primarily focused on the credit constraints associated with student loan borrowing (Cameron and Taber, 2004;, Carneiro and Heckman, 2002; Keane and Wolpin, 2001). However, as the ever-growing student loan debt balances have attracted the attention of policymakers, a nascent literature on the long-term economic and social consequences of student loan debt on borrowers has begun to emerge (Brown et al., 2013; Dettling and Hsu, 2014).

One area of research that has yet to receive any attention is the effect of student loan borrowing on academic outcomes. This lack of attention is due to the limited availability of high-quality data on the amount and type of student borrowing, as well as any linkage of that data to information on college major, grade point average (GPA), and college completion. The majority of previous work on the effect of student loan debt on academic outcomes employs aggregate data rather than individual data, and a 2014 report by the New America Foundation

highlights the lack of student-level data at the federal level and the need for such data to facilitate research. One exception to the use of aggregate data is Rothstein and Rouse (2011), who use individual-level data for one university to show that students who earn scholarships are more likely to choose careers in the public sector upon graduation than comparable students with loans and no scholarships. However, little comparable work exists for other academic outcomes. Recent work using similar university institutional data has examined how STEM (science, technology, engineering, and mathematics) field choices (especially for minority students) are affected by academic preparation (Arcidiacono, Aucejo, and Hotz, 2015), but currently no research examines whether financial constraints may be an equally important contributor to STEM field choice.

This study uses a unique administrative dataset on students of the Montana University System that contains detailed information on these students from secondary school through college. With these data, we examine whether the use of student loans, and the amount of student loan debt accumulated, affects academic performance, choice of major, and retention rates among borrowers.

We find strong and consistent relationships between borrowing decisions, non-loan aid, and various measures of academic performance. After controlling for academic ability measured by ACT scores, and for background characteristics including Pell Grant status and detailed student Zip-code-level demographic characteristics, students who take out loans have lower GPAs and are less likely to choose STEM majors than students who do not take out loans or who receive greater non-loan aid. However, when individual-level fixed effects are included in the model to address unobserved time-invariant heterogeneity, students who transition from having

no student loan debt to having student loan debt during college increase their GPA and take additional course credits.

Among students who borrow to finance their education, those with greater debt balances have significantly lower GPAs, take fewer credits per semester, are less likely to choose STEM fields, and are less likely to return to college the following year. This is the case for the pooled cross-sectional comparisons that control for individual academic ability and background characteristics. Even after controlling for time-invariant unobserved heterogeneity using individual fixed effects, among those with student loan debt we find that as loan balances increase, their GPAs and the number of credit hours they take significantly decline. Furthermore, we find that these effects begin early in a student's freshman year and compound over his academic career. These findings suggest that having access to student loan debt can allow a student to take on additional credits and focus on doing well in his courses up to a point; however, as the amount of debt increases, we begin to see detrimental effects on academic performance.

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 post-secondary campus attended, and the degree pursued. The MUS data are novel for the detailed individual-level college funding information. These data identify the source of funds (federal, institutional, state, etc.), 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 private loans. These data also include semester-by-semester enrollment,

credits, major, GPA, and courses taken. To our knowledge, we are the first researchers to use individual student loan data to examine the effect of student debt on post-secondary educational outcomes.

For this analysis, we restrict our attention to the two largest four-year institutions in Montana, where data quality is highest. Montana State University and the University of Montana are roughly comparable to many public institutions throughout the United States. Student enrollment levels are similar across the two campuses, with enrollment of about 13,000 undergraduate students at Montana State University and about 15,000 undergraduates at the University of Montana. These enrollment numbers are roughly comparable to the average enrollment at public four-year universities in the United States of about 11,000 students. About 60 percent of students at both universities come from Montana. Although tuition rates at these universities are below the national average, they are comparable as a fraction of state median household income. Financial decisions are also similar at the two schools and approximate national averages. At Montana State, 65 percent of students graduate with debt, while at the University of Montana, 62 percent have student loans; nationally, an average of 69 percent of college students graduate 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).

The data span 2002 through 2014, or 36 semesters, and follow 57,334 students with loans for at least some portion of their time in college. Our final sample includes 229,669 student-semester observations with full coverage across all variables. We limit our analysis to in-state students to abstract from tuition and loan differences due to the choice of an out-of-state institution. However, we are able to examine both the effects of loans and the amount of tuition

covered by loans as tuition charges at the University of Montana and Montana State typically vary from year to year, with a current difference between campuses of about 15 percent.

Table 1 reports summary statistics on the loan, demographic, and academic characteristics of the students we study. Of these students, 50 percent take out a federal loan, with an average loan amount of $4,200 that covers about 94 percent of tuition charges. On average, students receive approximately $1,280 in non-loan aid, such as merit or athletic scholarships, work-study payments, and other school-specific scholarships or grants. Approximately one in every three students is a Pell Grant recipient, compared with about 38 percent of students nationally at four-year degree-granting institutions.[1]

On average, students take 12.2 credits per semester. The average number of semesters completed is 7.8, suggesting the average standing is a first semester senior. However, the average number of cumulative credits, 58.5, is significantly lower than one would expect from a first semester senior. This suggests that there is a skewed distribution in the number of credits per semester completed, where it is more likely that students complete only 8 credits per semester. Approximately 45 percent of students declare a STEM major at these two universities. This number may seem high at first glance, but given that Montana State is a land grant university with many agriculture-based majors and a large school of engineering, the high percentage of STEM majors is not surprising.

Predictions

Disentangling the causal relationship between academic outcomes and an individual's decision to borrow to finance their education, their receipt of non-loan financial aid, or the total amount of debt they accumulate is difficult given concerns about unobserved heterogeneity that may be

[1] Based on author calculations from 2011-12 National Postsecondary Student Aid Study (NPSAS:12).

driving any relationships found. For example, students who do not need to borrow to finance their education, or who borrow less than other students, likely come from families with greater financial resources and whose parental characteristics promote academic success and retention.

Independent of this unobserved heterogeneity, student loans might affect student performance in college through several potential channels. Students with more aggressive loan packages might focus more time and energy on school in hopes of higher lifetime earnings with which to repay their debt. In this case, we would expect greater student loan amounts to be associated with higher GPAs and an increase in semester credits taken. Students with greater loan amounts might also be more likely to pursue STEM majors, anticipating higher future income. Greater loan amounts might also increase retention rates if students perceive that they need the higher future salaries resulting from college completion to repay these debts.

Greater amounts of student loan debt may also impose an emotional burden on students as they contemplate their ability to repay their loans. This emotional burden may result in stress or feeling an obligation to work while in college (outside of work study) that may be detrimental to academic performance, lowering GPAs and reducing credits per semester. These adverse effects of debt might be especially substantial if the student's self-assessed probability of completing college is low. Students might also be more likely to pursue higher-earning majors after taking on high loan amounts as a strategy to repay the loans in the future. This could yield a poor match of student ability to major and thus poor academic performance. Since these effects are ambiguous, we look at the effect of student loan debt on academic performance in the data described previously.

Methods and Results

How are borrowing behaviors related to academic choices and outcomes? We use the MUS individual-level panel data to understand how loan composition affects a student's performance in college, measured by the student's GPA, semester credits, choice of major (STEM vs. non-STEM), and retention. All of these models control for ACT scores as a proxy for students' academic abilities.[2] We convert the scores of students who took the SAT to ACT units for ease of comparison.

Family income is likely to influence both borrowing behavior and academic choices. The best measure we have for income is the student's Pell Grant status, with Pell Grants received by about a third of our sample.[3] Students eligible for Pell Grants tend to come from lower-income families or to be economically independent. To further control for socioeconomic status, the specifications include demographic characteristics of a student's Zip code of origin from the American Community Survey and the 2010 U.S. Census. We include Zip code median income, percent non-white, the distribution of educational attainment (percent of adults without a high school diploma, percent with only a high school degree, percent with some college, percent with a Bachelor's degree or higher), population density, and an indicator for whether the population is above 25,000 individuals. We also control for student level attributes: race, gender, the number of credits accumulated prior to that semester, the number of semesters the student has completed (i.e., his standing in school), a campus dummy,[4] and dummies for semester (fall, spring, or summer). Specifications also include year fixed effects. Equation 1 summarizes the basic form

[2] We also run specifications with and without ACT score, since this variable is missing for a significant portion of the sample. The results remain largely unchanged.

[3] While we have information on the Pell amount students receive, we find that most of the within-student variation comes from receiving and not receiving a Pell grant and not on the amount. Those who always receive Pell grants tend to receive close to the same amount throughout all semesters. Thus, we prefer to use the Pell receipt as a dummy variable. If students receive their largest Pell grants at times when their family is undergoing the highest level of financial distress, this would likely make the student more stressed out and bias us against finding a positive effect of student aid on academic outcomes.

[4] Specifically, we include a dummy for whether or not the campus was Montana State University, where the University of Montana is the excluded group.

of the specifications:

$$Y_{\{i,t\}} = \alpha_0 + \alpha_1 X_{\{i,t\}} + \alpha_2 White_i + \alpha_3 Male_i + \alpha_4 Pell_{\{i,t\}} + \alpha_5 Credits_{\{i,t\}} + \alpha_6 Semesters_{\{i,t\}} + \alpha_7 ACT_i + \alpha_8 ZipChars_i + \delta_{\{year\}} + \beta_{\{semeter\}} + \gamma_{\{campus\}} + \epsilon_{\{i,t\}}$$

The specifications examine several independent variables of interest (depicted by $X_{\{i,t\}}$). The first set of analysis uses a dummy for whether or not the student received a loan in the given semester to look at differences among borrowers and non-borrowers. The second set of regressions examines the impact of the total amount of non-loan aid the student received, including merit-based scholarships, athletic scholarships, grants, work-study aid, and other non-loan aid. Several studies have found that greater amounts of non-loan aid are associated with higher rates of college attendance, retention, graduation, and career choice (Waddell and Singell, 2011; Dynarski, 2003; DesJardins and McCall, 2007; Castleman and Long, 2013; Minicozzi, 2005). Finally, we restrict the sample to students who borrow to finance their education and use the ratio of loans to tuition charges to examine the effects of the intensive margin. Outcome variables ($Y_{\{i,t\}}$) are alternately semester or cumulative GPA, the number of credits taken in a given semester, choice of a STEM major, and retention in the following semester or the following year. All standard errors are clustered at the individual-student level. We estimate these regressions for the full sample of students, as well as for first-year freshmen, women, non-white students, and Pell Grant recipients.

Even with this rich set of individual controls, students who take out loans, or those with greater loan amounts, may differ in unobserved ways from students who do not borrow or who borrow less. These unobserved characteristics may be correlated with academic choices. To allow for this possibility, we also estimate individual fixed effect regressions that control for any

time invariant characteristics of the student that may be correlated with academic outcomes. However, because retention is a one-time decision and major choices do not vary much from semester to semester, only semester GPA and semester credit hours can be analyzed in this individual fixed effect regression framework.

The results for semester GPAs are reported in Table 2. On average, students with loans have approximately 0.05 point lower GPAs than students without loans. This effect is slightly smaller than the effect of a one-point decrease in a student's ACT score (scores range from 0 to 36 points). There are also significant effects along the intensive margin: a 10 percentage point increase in the ratio of loans to tuition reduces GPA by about .08 points (Column (3)).[5] Results are roughly consistent for subcategories of subsidized and unsubsidized loans. However, the effect of other kinds of financial aid—such as merit aid, scholarships, athletic support, work-study, and grants—are starkly different. For example, increasing the amount of non-loan aid by $1,000 *increases* the student's GPA by 0.06 points (Column (2)). We also find similar results when examining the effect of student loans and financial aid on cumulative institutional GPA.

Columns (4) through (6) report the results including individual fixed effects. The total number of observations here is greater than in the previous specification, as ACT scores are missing for many students, but are excluded in the individual fixed effect regressions as they are time invariant.[6] These fixed effect specifications are identified by variation over a student's time in college, where in some semesters the student takes out loans and in other semesters the student does not borrow, or where the amount of loan or non-loan aid varies across semesters. These results are particularly compelling because unobserved individual background and ability are uncorrelated with the effects of loans estimated in these specifications. Column (4) shows that in

[5] Dividing by tuition allows us to control for changes in tuition across campuses over time.
[6] The inclusion of ACT scores does not change the basic results in Columns (1) through (3).

semesters when a student chooses to borrow, GPAs are 0.1 point higher than in semesters when the student forgoes loans. However, Column (6) shows that for students who borrow, a 10 percent increase in loans relative to tuition reduces GPA by about 0.04 points. In contrast, Column (5) shows that greater non-loan aid increases GPA. The results for Pell Grants are consistent with this finding. While Columns (1) through (3) show that students who receive Pell Grants tend to have lower GPAs than students who do not, for students who receive Pell Grants in some semesters but not in others, their GPAs are 0.05 points higher in the Pell aid semesters.

Student achievement appears to be related to the level of student loans, but it may be the case that students with a higher fraction of loans choose to take a different number of credits per semester or choose different types of majors. The number of credits could be lower if these students are simultaneously working an outside job (although work-study payments are included as part of a student's aid package). The number of credits could also be higher if students choose higher levels of financial aid in order to devote additional time and energy to school. Table 3 reports the relationship between loans and semester credit hours. In these results, students with loans take an average of 0.23 more credits than those without loans (Column (1)). Furthermore, Column (4) shows that for students who do not borrow every semester, in the semesters when they take out loans, they also take on 1.2 more credits. This is also the case for additional non-loan aid: a $1,000 increase in the amount of non-loan aid increases average credits by 0.2 to 0.3 units (Columns (2) and (5)). As in Table 2, while Pell Grant recipients tend to take fewer credits than non-recipients, among Pell Grant recipients the semesters in which they received the grants are associated with about 0.5 more semester credits. In contrast, larger levels of borrowing have a negative effect on credit accumulation. Conditional on getting a loan, a 10 percent increase in the amount of tuition covered by loans decreases semester credits by nearly half a credit

(Column (3) and (6)). This is true in both the pooled cross sections and when comparing performance across semesters when loan amounts vary for a given student.

Taking the results of Tables 2 and 3 together implies that having access to loan aid may modestly increase the number of semester credits, but relatively larger loans decrease both performance and credit accumulation. On the other hand, non-loan aid (both federal Pell Grants and other non-loan aid) increases both credits and grades.

More demanding majors may result in lower grades and students may enroll in fewer credits to be successful. Lower credit accumulation and lower grades may not be indicative of less successful college careers if a student takes out more loans to pursue a more difficult major that may lead to a higher-paying career. To examine this possibility, we look at how financial aid affects the choice of a STEM major. One caution in interpreting these results is that the STEM major choice is highly persistent, which makes individual fixed effect regressions unsuitable. Thus, the results in Table 4 may be partly related to unobserved individual variation.

The results in Table 4 indicate that students who take out loans are 3.2 percentage points less likely to choose a STEM major (Column (1)). This difference in STEM majors between borrowers and non-borrowers is larger than the gap in the choice to become a STEM major between white and non-white students, and it is roughly comparable to a 3-point decrease in ACT scores. For students with loans, increasing the percentage of tuition covered by loans by 10 percent decreases the probability of becoming a STEM major by 0.6 percent (Column (3)). On the other hand, $1,000 more in non-loan aid increases the probability of being a STEM major by 0.7 percent. Recent work (Arcidiacono, Aucejo, and Hotz, 2015) finds that academic preparation and mismatches with university quality have significant implications for minority students' choices of STEM fields; our results suggest that financial constraints may be an equally

important contributor to fewer rates of STEM majors.

Our results suggest that larger loans are negatively related to student outcomes across a variety of measures. However, if students who receive loans are more likely to complete college or to complete it in a timely manner, the overall academic effect of student loans may still be positive. Table 5 reports the effects of loan amounts on enrollment in school a year later. Do students with loans or with relatively large loans persist to a greater degree in their academic programs? As with number of credits, the results here indicate that receiving a loan is positively associated with academic progress, though the effect is small: receiving a loan increases the probability of retention by 0.7 percent. However, and again paralleling the results for debt accumulation, a higher ratio of loans to tuition decreases retention: a 10 percent increase in this ratio reduces the probability of remaining enrolled in the following year by 2 percentage points.

These results indicate significant academic disparities between students who use loans to finance their education, even controlling for race, Pell Grant status, and academic ability (ACT scores). To see how these gaps evolve over a student's academic career and vary across specific subgroups of students, Table 6 compares the baseline results in Tables 3 through 5 with results restricted to incoming freshmen. Table 5 indicates that loans tend to have more adverse effects on incoming freshmen, for whom the negative effects on GPA, credits, and retention are greater in magnitude.[7] Freshman students who take out a loan have a GPA that is 0.05 point lower than those without loans, and a 10 percent increase in loans relative to tuition decreases GPA by about 0.1 point. In unreported regressions examining cumulative GPA, we find that these effects of loans on GPA compound as students move through their academic career. In contrast to the slightly positive effect for more advanced students, freshmen with loans are 2 percent less likely to return the following school year. Larger loans also reduce retention: among students with

[7] STEM results are not reproduced for freshmen as many have not yet declared a major.

loans, those whose ratio of loans to tuition is 10 percentage points greater are 3 percent less likely to return.

Conclusions

By taking advantage of unique administrative panel datasets with a wealth of details on student loan debt, academic outcomes, and post-graduation earnings, we provide novel insights into the effect of student loan debt and financial aid on student outcomes. Overall, our results from both the pooled cross-section regressions and individual fixed effects regressions suggest that greater amounts of student loan debt are correlated with poor academic performance and reduced credit accumulation. The adverse effects of student debt appear to be particularly concentrated among freshmen, with student debt reducing GPA, number of credits, and re-enrollment. The receipt of non-loan aid is correlated with improved academic outcomes even after controlling for time invariant characteristics using individual fixed effects. Having access to student loans does appears to be beneficial, as the specifications with individual fixed effects show that semesters in which students take on additional loans they earn additional credits and increase their GPA. This improvement in academic outcomes may be a result of the student loans allowing them to focus on their studies.

Our findings provide some suggestive evidence that the ever-increasing amount of student debt undergraduates are accumulating has the potential to adversely affect their academic performance. The possibility that students who take on loans and accumulate more debt are more likely to drop out of school is particularly concerning, as these students will need to meet their loan obligations without earning the higher salaries that result from a college degree. These results suggest that reducing the need for students to borrow, as well as the amount of debt they

accumulate, could yield considerable social benefit. However, we must emphasize that our results do not necessarily imply a causal relationship between student loan debt and academic outcomes given the possibility that unobserved time varying heterogeneity, such as individual or family shocks, may influence both borrowing and academic performance. At a minimum, our findings do suggest that it may be effective if academic advising took into consideration the individual student's debt load given the potential relationship between debt and academic performance.

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Table 1: Summary Statistics

	Observations	Mean	Std. Dev.
Academic Characteristics			
Institutional GPA	498,645	2.89	0.75
Semester GPA	505,983	2.82	1.06
Institutional Credits	498,645	58.49	39.57
Semester Credits	505,983	12.22	4.66
STEM Major	508,166	0.45	0.50
Number of Semesters	508,166	7.85	3.58
Loan Characteristics			
Have Loan	508,166	0.50	0.50
Amount of Non-Loan Aid ($000s)	508,166	1.28	2.04
Loan Amount for Borrowers ($000s)	255,785	4.20	2.75
Loan/Tuition Ratio for Borrowers	255,785	0.94	0.15
Student Characteristics			
White	508,166	0.87	0.33
Male	508,166	0.51	0.50
Pell	508,166	0.30	0.46
ACT Score	283,855	23.38	4.04
Zip Code Characteristics			
% No High School Education	504,943	5.93	3.48
% High School Only	504,943	22.74	7.76
% Some College	504,943	30.57	3.89
% Non White	504,943	7.70	7.78
Urban Area	448,983	0.82	0.38
Population Density	504,943	1372.33	2286.74
Credit Approval Rate			
Number of Banks			
Observations (unique students)	92,271		
Observations (student-semester)	454,366		

Table 2: Student Loans and Student Average GPAs

	Dependent Variable = Student Semester GPA					
	Pooled Cross Sections			Individual Student Fixed Effects		
	(1)	(2)	(3)	(4)	(5)	(6)
Loan Dummy	-0.045***	--	--	0.105***	--	--
	(0.006)			(0.006)		
Amount Non-Loan Aid	--	0.061***	--	--	0.015***	--
		(0.001)			(0.001)	
Loan/Tuition (if have loans)	--	--	-0.792***	--	--	-0.372***
			(0.017)			(0.015)
Pell Dummy	-0.021**	-0.167***	-0.072***	0.052***	0.049***	0.008
	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)	(0.007)
ACT Score	0.063***	0.058***	0.052***	--	--	--
	(0.001)	(0.001)	(0.001)			
White	0.128***	0.159***	0.139***	--	--	--
	(0.011)	(0.011)	(0.014)			
Male	-0.284***	-0.274***	-0.253***	--	--	--
	(0.006)	(0.006)	(0.008)			
Cumulative Credits	0.005***	0.005***	0.006***	0.001***	0.001***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of Semesters	0.018***	0.018***	0.022***	--	--	--
	(0.001)	(0.001)	(0.001)			
Census Controls	Yes	Yes	Yes	Yes	Yes	Yes
Campus FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Term FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Student Fixed Effects	No	No	No	Yes	Yes	Yes
Observations	248,412	248,412	125,841	438,753	438,753	229,685
Adjusted R-squared	0.156	0.165	0.168	0.008	0.007	0.010

Notes: Standard errors are clustered at the individual student level and are reported in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10. All models control for Zip code level characteristics from the American Community Survey including percent no high school education, percent of 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 an MSA with over 25,000 residents, a proxy for urbanicity.

Table 3: Student Loans and Semester Credits

	Dependent Variable = Number of Semester Credits					
	Pooled Cross Sections			Individual Student Fixed Effects		
	(1)	(2)	(3)	(4)	(5)	(6)
Loan Dummy	0.234***	--	--	1.238***	--	--
	(0.025)			(0.029)		
Amount Non-Loan Aid	--	0.330***	--	--	0.209***	--
		(0.007)			(0.006)	
Loan/Tuition (if have loans)	--	--	-4.726***	--	--	-3.620***
			(0.071)			(0.071)
Pell Dummy	-0.329***	-0.925***	-0.647***	0.576***	0.483***	0.272***
	(0.027)	(0.030)	(0.030)	(0.028)	(0.031)	(0.033)
ACT Score	0.227***	0.197***	0.173***	--	--	--
	(0.003)	(0.004)	(0.004)			
White	0.533***	0.718***	0.562***	--	--	--
	(0.048)	(0.049)	(0.056)			
Male	-0.766***	-0.723***	-0.569***	--	--	--
	(0.027)	(0.027)	(0.032)			
Cumulative Credits	0.021***	0.022***	0.026***	0.024***	0.024***	0.030***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Number of Semesters	0.050***	0.051***	0.063***	--	--	--
	(0.006)	(0.006)	(0.006)			
Census Controls	Yes	Yes	Yes	Yes	Yes	Yes
Campus FE	Yes	Yes	Yes			
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Term FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Student Fixed Effects	No	No	No	Yes	Yes	Yes
Observations	248,412	248,412	125,841	438,753	438,753	229,685
Adjusted R-squared	0.111	0.125	0.155	0.028	0.023	.033

Notes: Standard errors are clustered at the individual student level and are reported in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10. All models control for Zip code level characteristics from the American Community Survey including percent no high school education, percent of 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 an MSA with over 25,000 residents, a proxy for urbanicity.

Table 4: Student Loans and Choice of STEM Major

	Dependent Variable = 1 if STEM Major		
	(1)	(2)	(3)
Loan Dummy	-0.032***	--	--
	(0.004)		
Amount Non-Loan Aid	--	0.007***	--
		(0.001)	
Loan/Tuition (if have loans)	--	--	-0.064***
			(0.013)
ACT Score	0.012***	0.011***	0.027**
	(0.001)	(0.001)	(0.009)
White	0.024***	0.027***	0.198***
	(0.007)	(0.007)	(0.006)
Male	0.198***	0.200***	-0.023***
	(0.004)	(0.004)	(0.005)
Pell Dummy	-0.019***	-0.047***	0.000***
	(0.004)	(0.005)	(0.000)
Cumulative Credits	0.001***	0.001***	-0.000
	(0.000)	(0.000)	(0.001)
Number of Semesters	-0.001	-0.001	0.027**
	(0.001)	(0.001)	(0.009)
Census Controls	Yes	Yes	Yes
Campus FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Term FE	Yes	Yes	Yes
Observations	248,412	248,412	125,841
Adjusted R-squared	0.111	0.125	0.155

Notes: Standard errors are clustered at the individual student level and are reported in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10. All models control for Zip code level characteristics from the American Community Survey including percent no high school education, percent of 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 an MSA with over 25,000 residents, a proxy for urbanicity.

Table 5: Student Loans and Retention Rates (Freshmen through Juniors)

	Dependent Variable = 1 if Enrolled in Subsequent Year		
	Freshmen through Juniors		
	(1)	(2)	(3)
Loan Dummy	0.007*	--	--
	(0.003)		
Amount Aid not Loans	--	0.020***	--
		(0.001)	
Loan/Tuition (if have loans)	--	--	-0.204***
			(0.009)
ACT Score	0.013***	0.011***	0.010***
	(0.000)	(0.000)	(0.000)
White	0.033***	0.044***	0.034***
	(0.005)	(0.005)	(0.006)
Male	-0.035***	-0.032***	-0.027***
	(0.003)	(0.003)	(0.004)
Pell Dummy	-0.011***	-0.049***	-0.025***
	(0.003)	(0.003)	(0.003)
Cumulative Credits	0.000	0.000*	-0.000**
	(0.000)	(0.000)	(0.000)
Number of Semesters	0.070***	0.069***	0.073***
	(0.001)	(0.001)	(0.001)
Census Controls	Yes	Yes	Yes
Campus FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Term FE	Yes	Yes	Yes
Observations	132,270	132,270	66,286
Adjusted R-squared	0.444	0.449	0.456

Notes: Standard errors are clustered at the individual student level and are reported in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10. All models control for Zip code level characteristics from the American Community Survey including percent no high school education, percent of 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 an MSA with over 25,000 residents, a proxy for urbanicity.

Table 6: Summary of Regression Results for Student Loans and Outcomes among First Semester Freshmen

Each cell represents results from a separate regression

	(1) Semester GPA	(2) Semester Credits	(3) Enrolled Next Year
Loan Dummy	-0.076***	-0.022	-0.023***
	(0.010)	(0.045)	(0.005)
	[n=38,987]	[n=38,987]	[n=38,681]
Loan/Tuition (if have loans)	-1.008***	-5.203***	-0.285***
	(0.032)	(0.132)	(0.017)
	[n=19,337]	[n=19,337]	[n=19,207]

Notes: Standard errors are clustered at the individual student level and are reported in parentheses. *** p<0.001, ** p<0.01, * p<0.05, + p<0.10. All models control for Zip code level characteristics from the American Community Survey including percent no high school education, percent of 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 an MSA with over 25,000 residents, a proxy for urbanicity.