Student Loan Information Provision and Academic Choices *

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As the cost of pursuing post-secondary education in the United States has continued to rise, students have taken on increasing amounts of debt to finance their studies. In 2013, 69 percent of graduating seniors had some amount of student loan debt, a ten percentage point increase in incidence from 2006. Moreover, average balances at graduation have increased 50 percent in the same period,rising from $19,000 for the 2006 cohort to $28,400 for the 2013 cohort (TICA, 2014). Concerns about these debt levels are based in part on increasing default rates: the current three-year cohort default rate is 14 percent (National Center for Education Statistics, 2015). As a result, there has been significant coverage in the press about graduates in low-earning fields with disproportionately high levels of debt (Siegel, 2015).

Economic theory suggests that students with high future incomes ought to borrow greater amounts than students with low future incomes: finance majors face different lifetime income constraints than art history majors. However, students make the decision to borrow with considerable uncertainty about their ultimate major, career trajectory, and future earnings. Little is known about whether students at the start of college have the financial literacy and accurate expectations for the future that would allow them to make correct decisions about both borrowing and career choices (Lochner and Monge-Naranjo, 2015). This raises a critical question: would providing students with salient information about potential default early-on in college lead them to make different choices of majors?

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We address this question by examining a unique intervention providing targeted high-debt students with additional information about their debt levels. Very little research has examined the connection between academic choices and borrowing behavior, and the administrative dataset we use allows us to address whether these warning letters influenced students' choice of major. In related research using these data, Schmeiser, Stoddard and Urban (2015*a*) find that students with greater loan amounts are less likely to major in STEM fields. Rothstein and Rouse (2011) find that greater non-loan aid leads students to choose less lucrative careers and careers in public service. However, little is known about how information about student loans early-on in a student's academic life influences college major chioces and other career decisions.

I. Description of Intervention and Data

Beginning in the fall semester of 2012, the Allen Yarnell Center for Student Success At Montana State University sent warning letters to students with high loans amounts based on their standing in school: first-semester freshmen with more than $6,250 in loans, sophomores with more than $12,000 in debt, juniors with more than $18,750 in debt, and any student with more than $25,000 in debt received a letter. These amounts represent about double the amount of in-state tuition, and they lie above the federal limits for Stafford subsidized loans amounts. (For example, freshmen can take up to $3,500 in federal subsidized Stafford loans.) The letters advised, "If you continue to accept loans at this rate you will accrue a debt level that may become difficult to repay, which may place you at risk for defaulting on your loan." Letters further offered career and financial counseling. Approximately 2,300 letters were sent

in the first year, comprising about 15 percent of the student body at Montana State University.

We use administrative data from the Montana University System (MUS) to analyze the effects of this intervention. These data include demographic characteristics with semester-by-semester academic and borrowing behaviors. The MUS data are novel for the detailed individual-level college funding information provided. These data identify the source of funds (such as federal, institutional, state, or other), the type and amount of award (need-based, merit-based, athletic payments, work study, loans, etc.), and the fraction of tuition covered by the loans. Our data do not include any information on private loans; however, private student loans constitute only a small fraction of student debt at the undergraduate level (Lochner and Monge-Naranjo, 2015; Consumer Financial Protection Bureau, 2012). Academic outcomes include enrollment, credits, major, and GPA. To our knowledge, we are among the first researchers to use administrative individual student loan data to examine the effects of borrowing on postsecondary education outcomes.

These data follow 57,334 in-state undergraduates from Montana State University and the University of Montana during 2002 through 2014. Montana does not have a single state flagship campus: the two institutions are peers. Enrollments are similar, with about 15,000 undergraduate students, compared to 11,000 at the average public four-year universities in the United States. Admission standards are also the same. In-state tuition at the University of Montana in the 2014-15 school year was $6,330, about 15 percent lower than at Montana State ($6,800); out-of-state tuition is about 5 percent higher at the University of Montana. These rates are also comparable to average tuition for public institutions in the U.S. as a fraction of state median household income. At Montana State, 65 percent of students graduate with student loan debt; at the University of Montana, 62 percent graduate with student loans. Nationally, 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). About half of students at both institutions receive Pell grants, more than the US average of about 40 percent.The main difference between the two is that Montana State University is the land grant institution, with larger colleges of agriculture and engineering, while the University of Montana has a larger liberal arts program.[1]

We restrict the sample to in-state students who have some federal loans. The first restriction allows us to abstract away from differences between in-state and out of state students whose academic and borrowing decisions may be very different.[2] The second allows us to compare only the pool of students who require aid to finance their college educations. The average loan amount for borrowers is $4,200, which is approximately average annual tuition during this period. About 42 percent of students at these two universities declare a STEM major. The fraction of STEM majors may seem high at first glance, but given that Montana State is a land grant university with many agriculture-based majors, this number is not surprising. 72 percent of students change majors during their tenure in the data, and this rate is similar for freshmen students. Average GPA is 2.8.

II. Empirical Methodology and Results

We use a difference-in-difference-in-differences (DDD) framework to identify the causal effects of this targeted information on the probability of switching majors. The comparison with the University of Montana allows for a natural experiment framework, as the University of Montana had no parallel effort to identify and target high debt students. We examine students' probabilities of switching majors after

[1] For more descriptive statistics on these data, please see Schmeiser, Stoddard and Urban (2015*b*).

[2] About 60 percent of undergraduate students at both universities come from Montana.

receiving the letters by comparing them to similar high borrowers in the periods before the letters were in effect. We further compare the rates of switching with the rates for other students at Montana State University whose loan amounts were low enough that they would not have received a warning letter. Finally, we examine differences in switching rates among students with comparable loan levels at the University of Montana where no such policy was in place.

To generate the DDD estimates, we create an indicator variable *Letter* equal to 1 for a student at either campus in any year whose debt levels would have qualified them for the "Know Your Debt" letter. This varies by time because students may be eligible for a letter one semester and not the next. We interact this variable with an indicator for Montana State University (*MSU*), where the policy was in place. Finally, we interact the *Letter* and *MSU* variables with an indicator for the years 2012 and later (*2012*). We estimate the following equation for the outcome switching major, where the β_4 coefficient on this variable is the DDD estimate of the effect of the warning letters:

$$\begin{aligned} Y_{i,t} &= \alpha_0 + \beta_1 \text{Letter}_{i,t} + \beta_2 \text{MSU}_{i,t} \\ &+ \beta_3 \text{Letter} \times \text{MSU}_{i,t} \\ &+ \beta_4 \text{Letter} \times \text{MSU} \times 2012_{i,t} \\ &+ \alpha_1 \text{Demographic}_i + \alpha_2 \text{Academic}_{i,t} \\ &+ \gamma_{\text{semester}} + \delta_{\text{year}} + \epsilon_{i,t} \end{aligned}$$

We control for students' race and ethnicity, gender, Pell Grant status, and Census characteristics for their home town ZIP code (percent non-white, median income, educational attainment, and urbanicity). We further control for the cumulative number of credits up to that semester and for school standing (number of semesters enrolled). We also include the amount of loan aid as a fraction of tuition and non-loan aid (grants and scholarships). Fixed effects control for the year, the type of semester (fall or spring), and the campus.

Our Y variables include variables that reflect the student's college major more generally. First, we create a variable that equals one if the student changed majors between the fall and spring semesters. We do this by categorizing majors into groups: Business, Education, Health, Liberal Arts, and Science. This categorization allows us to distinguish between students who make significant changes (e.g., Liberal Arts to Science) and those who make smaller changes (e.g., Chemistry to Biology). Second, we use these group categorizations to see where the transitions occurred, specifically which major categories students move into in the spring semester. Those undeclared in the fall semester start uncategorized and remain uncategorized if they do not declare a major in the subsequent semester.

Table 2 reports the coefficient estimates for the DDD estimator. The first column shows the difference in probability for switching any major; the subsequent columns show the probability of switching into a specific group of majors. Each cell is from a separate regression, with the rows showing results for all students, for students with GPAs above and below 3.0, and for freshmen.

The results indicate that overall, students who receive warning letters are two percentage points more likely to switch majors in the semester after receiving the letter. They are particularly likely to make this change into business-related fields and out of health related fields. Note that most of these health fields are related to nursing; students who major in pre-medicine are classified as STEM majors. The subsequent panels indicate that the rate of switching majors is highest for freshmen students, which is not surprising given their low switching costs. Among letter recipients, there is a 3.6 percentage point increase in the share of freshmen declaring a business major and a 4 percentage point increase in the share declaring a STEM major. The increase in business and STEM majors comes primarily at the expense of arts majors, with their share declining by 3.8 percentage points.

What is most striking is the extent to which the students' GPA affects their ma-

jor choice after receiving a letter. Freshmen with a low GPA in their first semester of enrollment who receive the letter are twice as likely to switch to a business major in the subsequent semester relative to higher GPA freshmen letter recipients. In contrast, there is an almost 10 percentage point increase in the share of freshmen with GPAs above 3.0 who switch into a STEM field after they receive the targeted warning about debt, while there is no effect on STEM majoring for low GPA freshmen. This responsiveness is particularly remarkable, as the comparison is with other academically strong students with lower levels of debt. These high GPA students are perhaps the most likely to have understood the borrowing process, their future incomes, and the consequences of debt. If they did possess clear information at the start of the process, they would be less likely to make changes in their majors. However, the fact that high GPA students are the most responsive may be indicative of their greater ability to assimilate the information from a relatively simple warning letter.

Table 1 presents data from the National Center for Education Statistics' Baccalaureate and Beyond Survey on economic outcomes by major for the 2008 graduating class from four year public colleges. Based on these data, it appears that after receipt of the letter the students are making an informed decision to switch to majors that have lower subsequent unemployment, higher incomes, and lower student loan default rates. For example, Table 1 shows that humanities majors have an unemployment rate of 8.6 percent, an average annual income of $36,197, and a student loan default rate of 6.7 precent four years after graduation. In contrast, business majors have an unemployment rate of 6.8 percent, an average annual income of $53,126, and a student loan default rate of 5.0 percent four years after graduation.

III. Conclusions

The effectiveness of the simple "Know Your Debt" letter intervention at affecting choice of major suggests a possible low-cost strategy for colleges to change student behavior. Since freshmen in particular are malleable, it is possible to refocus their energy on higher paying majors that are likely to still suit their abilities. Given that students change majors frequently, this suggests they potentially have a wide range of interests and are able to determine which major fits best by the end of their tenure in college.

REFERENCES

Consumer Financial Protection Bureau. 2012. "Private Student Loans."

Lochner, Lance, and Alexander Monge-Naranjo. 2015. "Student Loans and Repayment: Theory, Evidence and Policy." *National Bureau of Economic Research Working Paper Series*, No. 20849.

National Center for Education Statistics. 2015. "The Conditions of Education 2015." U.S. Department of Education Report.

Rothstein, Jesse, and Cecilia Elena Rouse. 2011. "Constrained after college: Student loans and early-career occupational choices." *Journal of Public Economics*, 95(1–2): 149–163.

Schmeiser, Maximilian D., Christiana Stoddard, and Carly J. Urban. 2015*a*. "Selection of Student Loans and College Performance." *Working Paper.*

Schmeiser, Maximilian D., Christiana Stoddard, and Carly Urban. 2015*b*. "Does Salient Financial Information Affect Academic Performance and Borrowing Behavior among College Students?" *Federal Reserve Board Finance and Economics Discussion Series*, 2015-075.

Siegel, Lee. 2015. "Why I Defaulted on My Student Loans." *New York Times*, SR4.

TICA. 2014. "Student Debt and the Class of 2013." The Institute for College Access & Success Report.

Table 1—: Economic Outcomes by College Majors

Field	Unemp Rate	Average Salary	Default Rate
Computer Sci	7.3	$66,103	1.2
Engineering	3.3	$72,014	1.5
Science, Math, Ag	5.9	$44,294	5.1
Social Sci	8.7	$41,316	4.8
Humanities	8.6	$36,197	6.7
Health Care	2.0	$52,899	5.8
Business	6.8	$53,126	5.0
Education	6.3	$39,910	6.1

Note: Authors' calculations using the National Center for Education Statistics' Baccalaureate and Beyond Longitudinal Study, 2008 cohort. Sample is restricted to graduates of four year public institutions. Unemployment rate is the share of all graduates who were unemployed and not enrolled in college in 2012, regardless of labor force participation status. Average annual salary excludes zero earners. Defaults are any default on federal or private student loan debt.

Table 2—: Effect of Letters on Student Majors

	Change Major	Business	Education	Health	Liberal Arts	Science
All Students						
β_4	0.020***	0.011*	-0.005	-0.016**	0.004	0.009
	(0.007)	(0.006)	(0.005)	(0.006)	(0.009)	(0.009)
N	236,855	236,855	236,855	236,855	236,855	236,855
Low GPA (< 3.0) Students						
β_4	0.022**	0.010	-0.010*	-0.021***	0.015	0.011
	(0.010)	(0.009)	(0.006)	(0.008)	(0.011)	(0.013)
N	110,505	110,505	110,505	110,505	110,505	110,505
High GPA (> 3.0) Students						
β_4	0.013	0.010	-0.001	-0.016*	-0.013	0.016
	(0.009)	(0.008)	(0.007)	(0.009)	(0.012)	(0.012)
N	125,695	125,695	125,695	125,695	125,695	125,695
All Freshmen						
β_4	0.032*	0.036***	-0.007	-0.000	-0.038**	0.040*
	(0.017)	(0.013)	(0.008)	(0.013)	(0.019)	(0.022)
N	49,163	49,163	49,163	49,163	49,163	49,163
Low GPA (< 3.0) Freshmen						
β_4	0.021	0.044**	-0.015*	0.006	-0.041	0.011
	(0.025)	(0.019)	(0.009)	(0.018)	(0.025)	(0.029)
N	24,913	24,913	24,913	24,913	24,913	24,913
High GPA (> 3.0) Freshmen						
β_4	0.043*	0.022	0.001	-0.009	-0.042	0.095***
	(0.023)	(0.019)	(0.015)	(0.020)	(0.028)	(0.032)
N	24,248	24,248	24,248	24,248	24,248	24,248

Note: Standard errors are clustered at the individual student level and are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Dependent variables are all for the subsequent semester. All models control for year fixed effects, urban MSAs, ZIP code-level characteristics such as percent no high school education, percent high school education, percent some college, percent non-white, population density, and median household income.