



Working Paper:

Can Simplifying Financial Aid Information Impact College Enrollment and Borrowing? Experimental and Quasi-Experimental Evidence

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Recent policy and research efforts have focused simplifying the college-going process and helping students make informed college decisions. In 2012, the Obama administration released a model financial aid award letter, called the “shopping sheet,” that is intended to simplify information students receive from colleges about financial aid, college costs, financing options, and college outcomes. This paper examines the impact of this policy intervention, adopted by 200 four-year colleges during its first year, on enrollment and borrowing using: 1) administrative data from a field experiment among admitted and enrolled students at a public university, and 2) college-level data from a quasi-experiment among four-year colleges that initially adopted the format. Findings from both indicate little impact at colleges with relatively average outcomes while quasi-experimental results indicate enrollment rates decreased at colleges with lower graduation rates and borrowing decreased at colleges with higher loan default rates. This study demonstrates that reference points comparing a college’s outcomes to the average college may be particularly salient as students evaluate college decisions and could lead shifts enrollment and borrowing at colleges that perform worse (or better) relative to others.

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CAN SIMPLIFYING FINANCIAL AID INFORMATION IMPACT COLLEGE ENROLLMENT AND BORROWING? EXPERIMENTAL AND QUASI-EXPERIMENTAL EVIDENCE

Kelly Rosinger

During the college-going process, students face a number of complex procedures and decisions regarding whether to enroll, where to enroll, and how to pay for college. Small missteps and mistakes along the way – missing admission or financial aid deadlines, failing to complete a form, or not understanding college costs and borrowing options – can limit a student’s college choices. For instance, as many as 20-30 percent of college-intending high school graduates do not matriculate in college in part due to tasks they must complete after high school (Castleman and Page 2014). Each year, more than 2 million college students who might be eligible for federal student aid never submit the relatively complex Free Application for Federal Student Aid (FAFSA) (The White House 2015). Once in college, many students underestimate how much they have borrowed or are unaware that they have borrowed (Akers and Chingos 2014; Matherson 2016). Such complexity may prevent students from going to college or from attending a college at which they are likely to succeed.

In recent years, efforts within the federal government have focused on simplifying the college and financial aid process and providing simplified information to help students evaluate college options. In 2012, the Obama administration announced the release of the “shopping sheet,” a simplified financial aid award notification developed by the U.S. Department of Education (ED) and the Consumer Financial Protection Bureau. Financial aid award notifications are how colleges communicate information to students and their families about financial aid, specific costs, and borrowing options. Notifications vary across colleges and often lack information about net cost, specific terms and conditions of loans, and may use different language to describe awards (Kantrowitz 2010, The Institute for College Access and Success [TICAS] 2013, Whitsett and O’Sullivan 2012). As a result, they have proven difficult to interpret and, for students who receive awards from more than one college, to compare costs and borrowing options across colleges.

An initial group of nearly 700 postsecondary institutions volunteered to use the shopping sheet during the 2012-2013 academic year (ED 2012). By 2016, more than 3,000 postsecondary institutions had adopted the shopping sheet for some or all students in awarding financial aid.¹ In

¹ Executive Order No. 13,607 (2012) requires postsecondary institutions that agree to comply with the VA Principles of Excellence to use a standardized award format for students eligible for federal military and veterans educational benefits.

2016, nearly three-quarters of undergraduate students attend a college that uses the shopping sheet (ED 2016). The shopping sheet is intended to help students make informed college decisions by simplifying information about costs and borrowing options and make it easier to compare awards across colleges. The shopping sheet also provides specific reference points comparing a college's outcomes relative to the average college on two institutional metrics: graduation rate (ranked as low, medium, or high relative to other colleges) and loan default rate (relative to the national average). Reference points give context to information and prove particularly salient when a point lies above (or below) the reference (e.g., Kahneman and Tversky 1979; Tversky and Simonson 1993). By providing explicit reference points to help students assess college outcomes, the shopping sheet may make colleges that perform better (or worse) on these metrics more (or less) attractive relative to other colleges. In doing so, students may be more likely to enroll at colleges that perform better relative to others. Similarly, students may adjust borrowing decisions based on how a college's outcomes compare to other colleges.

In this study, I draw on experimental and quasi-experimental methods to evaluate how this new policy effort affects enrollment and borrowing decisions. In particular, I investigate the impact of the shopping sheet when colleges are close to the reference points – colleges that might be perceived as “average” – and when colleges rank better (or worse) than an average college. The first data source comes from a field experiment conducted among admitted and enrolled students at a public university. The university is a relatively average college with a graduation rate in the medium range and a loan default rate near the national average. Because the university does not deviate from the reference points, information about college outcomes may be less salient to students, providing an appropriate context in which to examine the impact of the shopping sheet at an average college. I then draw on college-level data from a quasi-experiment to examine the overall impact among the broader range of four-year colleges that adopted the shopping sheet in its first year as well as the potentially differential impact at colleges with better (or worse) outcomes relative to other colleges. Findings from the field and quasi-experiment indicate little impact on enrollment and borrowing at the average college. Reference points indicating how a college's outcomes compared to others, however, mattered:² a smaller share of admitted students enrolled at colleges with high default rates

Of the initial 700 postsecondary institutions that adopted the shopping sheet, almost 600 provided it to all students and around 120 provided it only to students eligible for military and veterans educational benefits.

² The shopping sheet categorized a college's graduation rate as low (below 37.3 percent), medium (between 37.3 and 56.7 percent), and high (higher than 56.7 percent). Loan default rate was provided in comparison to the national average (13.4 percent).

while students at colleges with low graduation rates borrowed around \$500 less than those at colleges with higher default rates.

In the following section, I draw on insights from behavioral economics to understand why students encounter difficulty understanding financial aid, college costs, and financing options and how efforts to simplify information and provide reference points relating to college outcomes might influence enrollment and borrowing. I then describe the 1) field experiment examining the shopping sheet's impact at a relatively average public college, and 2) quasi-experiment examining the shopping sheet's influence at a broader range of four-year colleges. I conclude with a discussion of experimental and quasi-experimental results and implications for policy and practice.

Conceptual Framework

Scholars have traditionally approached the study of students' decisions about whether and where to enroll as well as how much to borrow from a cost-benefit perspective (Becker 1962; Schultz 1961). In this perspective, students tend to make college decisions in ways that are expected to maximize the net present value of their educational investment. However, relatively low graduation rates and rising loan defaults rates might indicate that students do not always make optimal enrollment and borrowing decisions from a cost-benefit perspective: just over half of students who started college in 2009 had completed a degree six years later (National Student Clearinghouse 2015) while the share of students defaulting on their student loans has risen to around 14 percent (College Board 2016). This evidence seems to suggest that some students might enroll at colleges with relatively poor outcomes where they are less likely to succeed or might borrow too much or fail to complete a degree, leading to risk of defaulting on loan payments.

Insights from behavioral economics indicate that cognitive limitations as well as the context in which people evaluate options can lead to suboptimal decisions from a cost-benefit perspective, particularly when decisions involve processing complex or relatively unfamiliar information (Bertrand et al. 2005; Kahneman and Tversky 1979). In such cases, people rely on heuristics, or mental shortcuts, to make sense of complex information. With limited time and attention to devote to complex tasks, people may focus on the wrong information, may ignore important pieces of information or heavily weight relatively unimportant information, or may focus only on readily available information (Kahneman 2011).

Financial aid award notifications might be particularly complex for students and their parents to interpret and compare across colleges for a number of reasons. First, award notifications contain

multiple pieces of information about costs, grant and scholarship aid, and loan options. The amount of information students receive may make it difficult to know what information is most important to consider. Unless information stands out or seems particularly salient, students are likely to ignore it (Loewenstein, Sunstein, and Golman 2014). Complex or unclear (and sometimes missing) information also may make it difficult to assess the outcomes of college decisions. Typically, award notifications do not contain information about outcomes, for example, the share of students who graduate and who make payments on loan balances. Because individuals have limited attention and are biased toward readily available information (Kahneman 2011), students may not seek out this information despite its importance in determining the outcomes students might expect when they leave college. Students may be biased toward the present, for example, by borrowing the maximum amount to have more funds in the present rather than focusing on the potential long-term impact of high debt levels (Barr, Bird, and Castleman 2016).

Finally, students may receive award notifications from multiple colleges, making the process of interpreting and comparing awards more complicated because colleges differ in what information is included and the language used to describe awards. Colleges also differ on multiple dimensions, e.g., cost, quality, and location, attributes that are non-alignable in that they often involve tradeoffs of some kind (e.g., a student may travel further to attend a college that is perceived as higher quality than another college). Decisions that involve such tradeoffs require a great deal of cognitive effort, and people often put off making a decision or regret their decision when faced with such choices (Gourville and Soman 2005). Processing information about tradeoffs may be especially difficult when the information students have differs for each college.

The complexity associated with college enrollment and borrowing decisions is compounded by students' limited experience making college decisions. Most students make enrollment and borrowing choices just a few times in their lives. As a result, they have little familiarity or practice evaluating college decisions and few opportunities to get these decisions correct. Feedback on decisions is delayed, and students may not know until after they leave college whether they borrowed an amount that they can repay. As a result, students are not able to learn from and correct previous mistakes when they decide where to enroll and how much to borrow each year.

For low-income students, complex college decisions may be especially difficult and the outcomes particularly costly. Research into the psychology of scarcity indicates that the constant tradeoffs that low-income households make with every financial decision, even regular and relatively small purchases, can be distracting, fatiguing, and lead to limited attention (Mullainathan and Shafir

2013). Constantly evaluating tradeoffs associated with even regular purchases requires mental bandwidth that reduces the amount of attention people would otherwise have for planning ahead or problem solving. This can increase the likelihood of errors, and limited financial resources mean the consequences of these decisions are particularly costly.

Recent research provides strong evidence that simplifying and reducing informational barriers can improve college outcomes at a number of stages of the college-going process, particularly for low-income and other underrepresented student populations. For instance, sending students information about costs, admissions procedures, and application fee waivers can lead high-achieving, low-income students to apply and enroll at more selective institutions (Hoxby and Turner 2013). For college-intending, low-income students, college counseling and reminders about pre-matriculation tasks during the summer after high school can increase the likelihood of college enrollment (Castleman, Arnold, and Wartman 2012; Castleman and Page 2015; Castleman, Page, and Schooley 2014). When it comes to applying for financial aid, providing assistance with FAFSA (Bettinger et al. 2012) and sending text messages reminding college students to re-file FAFSA (Castleman and Page 2016) can improve college enrollment and persistence.

While many studies focus on the college and financial aid application process, financial aid award notifications – a later stage of the college-going process during which students evaluate costs and loan options – are less often considered. A few recent studies demonstrate that interventions delivered to students as they evaluate awards can influence borrowing decisions. These studies indicate that providing information about cumulative debt and future monthly payments (Lorin 2014; Stoddard, Urban, and Schmeiser 2016), changing default borrowing options (Marx and Turner 2016), and sending text messages with information about loans and counseling assistance (Barr et al. 2016) can decrease the amount students borrow. In other cases, however, sending information to students about previous borrowing has had a relatively modest impact on subsequent borrowing decisions (Darolia 2016).

Shopping sheet

In this study, I investigate a recent federal policy effort designed to help students evaluate financial aid awards. The shopping sheet is intended to provide simple, timely, and salient information to students as they evaluate their specific college costs and borrowing options. Colleges that have adopted the shopping sheet typically include the one-page document as a supplement to the information they already provide to students. The shopping sheet has several features distinguishing it from many award notifications (Appendix A provides the shopping sheet). First, the

shopping sheet clearly outlines net cost, the cost of attendance adjusted for grant aid that students do not have to repay, and then lists loans and other options for paying net cost. In this study, I evaluate the overall impact of this effort to simplify information, asking:

1. How does information about college costs and financial aid in the shopping sheet impact enrollment and borrowing decisions?

Rather than influencing decisions in one particular direction, the shopping sheet is intended to help students make informed decisions by providing simplified and standardized information about costs, aid, and financing options. By listing net cost and clearly distinguishing loan offers from grant aid, however, I hypothesize that the shopping sheet may draw students' attention to loans and make loans particularly salient to college decisions. As a result, the shopping sheet may influence students' decisions about whether to borrow and how much to borrow and, for students who receive awards from more than one college, could influence enrollment decisions.

Second, the shopping sheet differs from traditional award notifications by providing reference points that compare a college's graduation and default rates to the average college. Graduation rate is ranked as low, medium, or high relative to other four-year colleges, and loan default rate is provided in comparison to the national average.³ Reference points have proven influential in motivating behavior in other contexts: for instance, giving consumers three credit card tip options can lead to higher tips for taxi drivers by nudging people toward the middle option (Grynbbaum 2009). In another study, giving information about households' energy consumption relative to neighbors lowered energy use in high-consumption households (Allcott 2011). Reference points in the shopping sheet provide a location from which students can view a college's outcomes as better or worse than outcomes at the average college. The information is located at the top of the shopping sheet (See Appendix), a place on a letter where the eye is typically drawn to first and generally indicates the relative importance of the information (ideas42 2016a). The information is formatted as an image, which may also distinguishes it from the other pieces of information in the letter. This leads to the second research question:

2. How does comparative information about a college's outcomes in reference to other colleges impact enrollment and borrowing decisions?

By providing reference points relating to a college's outcomes in a prominent location and a visually attractive image format, the shopping sheet may make colleges that score better (or worse)

³ The shopping sheet does not provide comparison information on median borrowing.

on these metrics more (or less) attractive. I hypothesize that students will be more likely to enroll at colleges that score better on these metrics, i.e., those with higher graduation rates or lower default rates relative to other colleges. Likewise, students' borrowing decisions may differ depending on these same metrics because students are more easily able to assess the expected financial outcomes for students at a particular college. Specifically, I hypothesize that students will be less likely to borrow and those who do borrow will borrow less at colleges that perform worse on these metrics, i.e., colleges with low graduation rates or high default rates. Colleges that fall in the middle range for these metrics – relatively average colleges – may see little change in enrollment and borrowing, particularly relative to colleges that perform better or worse than the average college.

Experimental Evidence

I collaborated with administrators at a public university during the spring of 2013, the first year colleges adopted the shopping sheet, to evaluate the impact of this intervention on enrollment and borrowing decisions. The university is a broad access college, admitting more than 80 percent of applicants, and enrolling primarily students from the state and region in which it is located. The average annual net cost was around \$15,000, just below the national average of \$16,500 for primarily bachelor's degree granting colleges (College Scorecard 2016). Students at the participating university graduate at about the same rate as their peers at similar colleges: the six-year graduation rate was in the medium range (~45 percent) relative to other colleges that primarily award bachelor's degrees. The loan default rate (~14 percent) was near the national average of 13.4 percent, and median borrowing was around \$14,500, which is below the average of \$17,800 for students at four-year colleges. The relative similarity of the participating university to the average four-year college provides an appropriate context in which to evaluate the impact of this intervention at the average college, one that reference points in the shopping sheet indicate does not have particularly better or worse outcomes than other colleges.

Sample and Data

The field experiment focused on two groups of students: 1) students who had been admitted to the participating university, and 2) students who were currently enrolled in their first year at the university. The sample of admitted students allowed me to examine college enrollment and borrowing among a group of students making college decisions for the first time; the sample of already enrolled students allowed me to examine borrowing decisions students make while in

college.

I draw on administrative data from admissions, financial aid, and enrollment records at the participating university. Outcomes include: 1) a dichotomous variable indicating whether a student enrolled at the participating university (for admitted students), 2) a dichotomous variable indicating whether a student borrowed federal loans, and 3) a continuous variable indicating the amount borrowed. Borrowing outcomes include subsidized and unsubsidized Stafford and Perkins loans.⁴ Data on borrowing was not available for students who did not enroll at the participating university, so I estimate models for borrowing outcomes among students who enrolled.⁵

The independent variable of interest is a dichotomous variable indicating whether a student was assigned to receive the shopping sheet. Administrative records also include data on students' academic (high school GPA, ACT/SAT score, whether a student had taken more than 30 credit hours), socioeconomic and financial (amount of grant aid received, whether a student was eligible for the Pell grant, parent income, whether a student had at least one parent with a college degree, amount previously borrowed for already enrolled students, whether a student was an in-state resident), and demographic (ethnicity, gender) characteristics.

Intervention Design

Students received aid awards during Spring/Summer 2013, and I observed enrollment and borrowing during the 2013-2014 academic year. Students assigned to treatment received the shopping sheet in addition to the notification traditionally used by the participating university; students assigned to the control group received the traditional notification.⁶

Students received notifications at the participating university through their online financial aid account. The university's traditional notification includes several screens of information that students click through to find information about and accept their financial aid. Appendix B provides the screen that lists a student's award. Because notifications vary across colleges, results from the field experiment may be more generalizable to institutions with similar notifications to the university in this study. However, the shopping sheet (provided in Appendix A) differs from many traditional award notifications, including the one at the participating university, by providing: 1) cost and aid

⁴ Less than one percent of students at the participating university borrowed non-federal loans.

⁵ Results from models that do not condition on enrollment are similar in significance to those presented. In these models, borrowing was coded as 0 for students who did not enroll and a dichotomous indicator for missingness was included.

⁶ Colleges can use the shopping sheet as a supplement to or replacement for the notification they provide students. Colleges that have adopted the shopping sheet, including the participating university, generally use it as a supplement.

information together on one page, 2) loan offers separate from grant aid and listed after net cost (cost of attendance adjusted for grant aid), and 3) information about a college's graduation and default rates relative to other colleges.

Students in the treatment group could view the shopping sheet in their online account and received a paper copy in the mail. When students accessed their account, they could click on multiple tabs, including one for the shopping sheet, to view their complete award. Technological limitations prevented tracking what tabs students viewed or how long they accessed each page. As a result, estimates for all models reflect the intent to treat, or the effect of being assigned to treatment, on enrollment and borrowing rather than the actual treatment effect.

Sample Size and Baseline Equivalence

I selected sample sizes that accounted for the possibility that the shopping sheet had a relatively small influence on behavior.⁷ The sample size of 2,655 admitted students ($N = 1,100$ in treatment group) provided statistical power to detect an effect size of .11 on enrollment, or about one-tenth of a standard deviation difference in treatment and control group means, at 80% power, .05 significance, and 10% variance explained. The sample size of 855 enrolled students ($N = 437$ in treatment group) provided statistical power to detect a .19 effect size using the same criteria.⁸

Table 1 provides treatment and control group means for baseline covariates and differences in means between groups for the admitted student sample (columns 2-4). I find no significant differences between treatment and control group means on baseline covariates among admitted students. I also conducted an F -test by regressing treatment status on pre-treatment covariates to determine whether covariates jointly predicted assignment to treatment. The test failed to reject the null hypothesis that coefficients were equal to zero ($p = 0.68$), indicating observable covariates did not jointly predict assignment to treatment.

In the already enrolled student sample (columns 6-8), students in the treatment group were statistically more likely to have had a parent with a college degree than those in the control group:

⁷ Research provides mixed evidence for whether and how information affects college decisions (e.g., Hoxby and Turner 2013; Oreopoulos and Dunn 2013). For example, the effect size was .16 standard deviations in college expectations for an intervention that provided information about costs, earnings, and aid to high school students (Oreopoulos and Dunn 2013; What Works Clearinghouse 2013) and .12 standard deviations on enrollment in a study that provided information to high-achieving, low-income students (Hoxby and Turner 2013; What Works Clearinghouse 2014).

⁸ Power analyses were conducted using *PowerUp*, a tool developed to determine minimum detectable effect sizes and sample sizes in education research (Maynard and Dong 2013), and randomization was done separately for admitted and enrolled students using Stata's random number generator with a uniform distribution to ensure each student had an equal probability of selection into treatment (Buis 2007).

75% of students in the treatment group had at least one parent with a college degree or higher compared to 68% in the control group. There were no statistically significant differences in other baseline covariates by treatment status, and observable covariates did not jointly predict assignment to treatment ($p = 0.18$).

Analytic Strategy

I used linear probability models to estimate the effect of being assigned to treatment on whether a student enrolled and whether a student borrowed, along with linear models for amount borrowed.⁹ I first estimated a simplified model using treatment status to predict enrollment and borrowing outcomes and then estimated a model with the inclusion of baseline academic, socioeconomic, financial, and demographic covariates. The full model can be expressed:

$$y_i = \alpha + \beta_1 \text{shoppingsheet}_i + \beta_2 X_i + \varepsilon_i \quad (1)$$

where y_i is the outcome variable; shoppingsheet_i indicates whether a student was selected to receive the shopping sheet; β_1 is the intent-to-treat effect; X_i is a vector of baseline student-level covariates, which reduce unexplained variance and lead to more efficient estimates and increased statistical power (Murnane and Willett 2011); and ε_i is the error term. I estimated all models using robust standard errors.

Receipt of the shopping sheet may have had a stronger effect on enrollment and borrowing decisions of low-income students than those of their higher-income peers. Lower-income students face higher informational barriers surrounding costs and aid and are more likely to overestimate college costs than higher-income groups (Avery and Kane 2004; Grodsky and Jones 2007; Horn, Chen, and Chapman 2003) and may be making decisions in situations of financial scarcity. As a result, these students may be more responsive to information in the shopping sheet relative to their higher-income peers. I analyzed data for heterogeneous intent-to-treat effects for this subpopulation of students by interacting Pell grant eligibility status with treatment status.^{10,11}

⁹ Estimates from logistic and tobit models were similar in signs and significance to those presented and are available upon request.

¹⁰ Focusing on this subgroup resulted in a loss of statistical power. The 1,217 admitted students who were eligible for the Pell grant provided power to detect an effect size of .15 on enrollment. For 339 Pell eligible students who were enrolled at the participating university, statistical power allowed for a minimum detectable effect size of .29 on borrowing decisions.

¹¹ I tested the robustness of heterogeneous intent-to-treat effects to an alternate measure of financial need: a dichotomous variable indicating whether a student's expected family contribution was zero, which indicates a limited ability to contribute to educational expenses. Results from these models were similar to those presented and are available upon request.

Results

Table 2 presents results from the intent-to-treat analysis for admitted (columns 1-6) and already enrolled (columns 7-10) students. For each outcome, the first column presents results from a simplified model using only treatment to predict outcomes; results in the second column for each outcome come from the full model with baseline covariates. Results indicate that assignment to receive the shopping sheet did not have a statistically significant effect on whether a student enrolled, whether a student borrowed federal loans, or how much a student borrowed at the participating college.

Table 3 presents results from models examining whether the shopping sheet had different impacts on enrollment and borrowing decisions for Pell eligible students relative to their higher-income peers. Columns 1-6 provide results for admitted students, and columns 7-10 provide results for enrolled students. I found no evidence in these models of a differential effect for low-income students at the participating college.

Quasi-Experimental Evidence

When the U.S. Department of Education first introduced the shopping sheet, around 200 four-year colleges adopted it for all students who received a financial aid award (author calculation using data from The College Solution website 2013). In the second part of this study, I use a quasi-experimental research design to evaluate the impact of the shopping sheet across the initial group of four-year adopters, the group for which data is most recently available. I first consider the overall impact of the shopping sheet and then examine how reference points relating to a college's graduation and loan default rates influenced enrollment and borrowing at colleges that performed better (or worse) on these metrics relative to other colleges.

Data and Methods

Data for the quasi-experimental analysis come from the National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS) and the ED's College Scorecard (<https://collegescorecard.ed.gov/data/>). The sample consists of 1,710 primarily bachelor's degree granting ("four-year") colleges, and I observed these colleges annually from the 2007-2008 to the 2013-2014 academic year. Colleges first used the shopping sheet in

Spring/Summer 2013 to award financial aid for the 2013-2014 academic year, providing six years of pre- and one year of post-policy observations.¹²

Outcome variables are the percent of admitted students who enrolled (admissions yield rate), the percent of full-time, first-time undergraduates who borrowed federal loans (subsidized and unsubsidized Stafford and Perkins loans), and the average dollar amount full-time, first-time undergraduates borrowed in federal loans (among those who borrowed). These outcomes are measured at the college-level but correspond to the student-level outcomes examined in the field experiment.

The independent variable of interest is a dummy variable indicating whether a college used the shopping sheet in 2014.¹³ Around 12 percent of four-year colleges ($N = 203$) adopted the shopping sheet. I control for several college-level covariates that are likely to influence whether a college adopted the shopping sheet as well as enrollment and borrowing. These include tuition and fees, average amount of grant aid per student, percent Pell grant recipient enrollment, median borrowing at time of departure from the college,¹⁴ default rate, acceptance rate, six-year graduation rate, and total undergraduate enrollment. Financial figures are adjusted for inflation using the Consumer Price Index and scaled by 1,000 to ease interpretation. See Appendix C for a full list of variables, definitions, and sources used in the analysis.

To investigate the impact of the shopping sheet, I used a difference-in-differences (DD) estimation strategy with propensity score matching to identify an appropriate comparison group. The DD design uses differences in outcomes before and after adoption at shopping sheet colleges and differences in outcomes at adopting and non-adopting colleges to construct the counterfactual and estimate the impact of an intervention. The DD model with covariates and fixed effects can be expressed:

$$Y_{it} = \beta_0 + \beta_1 \text{shoppingsheet}_{it} + \beta_2 X_{it} + \gamma_i + \delta_t + \varepsilon_{it} \quad (2)$$

where Y_{it} is the outcome variable; $\text{shoppingsheet}_{it}$ is a dummy variable equal to 1 for shopping sheet colleges in post-policy years (2014); X_{it} is a vector of college-level covariates; γ_i are matched

¹² The 2013-2014 academic year represents the most recently available data from the IPEDS Student Financial Aid survey component.

¹³ The list of colleges that adopted the shopping sheet comes from The College Solution, a college advising website (www.thecollegesolution.com). Data from the first year of adoption was not publicly available through the ED because the list of colleges is updated periodically to reflect the most recent colleges that have adopted. I define shopping sheet colleges as those that provided the shopping sheet to all students who received a financial aid award.

¹⁴ Median borrowing from the College Scorecard data represents a two-year average.

college pair fixed effects; δ_t are year fixed effects; and ε_{it} is the error term. The inclusion of matched college pair fixed effects accounts for time-invariant unobservable differences between matched shopping sheet and comparison colleges. Year fixed effects capture common shocks in enrollment and borrowing trends that shopping sheet and comparison colleges may have experienced. Robust standard errors were clustered at the college level (Bertrand, Duflo, and Mullainathan 2004).

Equation 2 provides an overall estimate of how efforts to simplify financial aid awards impact enrollment and borrowing, particularly at a relatively average college. However, the shopping sheet's prominently featured information about college outcomes and reference points relating to graduation and loan default outcomes may have shaped the enrollment and borrowing in different ways at colleges with better (or worse) outcomes than others.

I created a categorical variable defining graduation rate as low (below 37.3 percent), medium (between 37.3 and 56.7 percent), and high (higher than 56.7 percent) using the ED's cutoff points on the shopping sheet. In the matched sample, 17 percent of shopping sheet colleges fell in the low graduation rate category, 37 percent in medium, and 46 percent in high. I interacted the graduation rate categorical variable with the treatment indicator to examine whether the shopping sheet had a different impact on enrollment and borrowing at colleges with high and low graduation rates (relative to colleges with medium graduation rates). Unlike graduation rate, the shopping sheet did not place a college into a specific category for default rate. Rather, it listed a college's default rate relative to the national average. To examine how information about loan default influenced students' decisions, I interacted a college's continuous default rate with whether a college adopted the shopping sheet in 2014. The average default rate at matched shopping sheet colleges was 6.6 percent and ranged from 0.7 to 18 percent. The resulting equation can be expressed:

$$Y_{it} = \beta_0 + \beta_1 sheet_{it} + \beta_2 sheet_{it} * gradcat_{it} + \beta_3 sheet_{it} * default_{it} + \beta_4 X_{it} + \gamma_i + \delta_t + \varepsilon_{it} \quad (3)$$

where $sheet_{it}$ is a dummy variable equal to 1 for shopping sheet colleges in post-policy years (2014); $sheet_{it} * gradcat_{it}$ is an interaction between whether a college adopted the shopping sheet and a categorical variable for graduation rate; and $sheet_{it} * default_{it}$ is an interaction between whether a college adopted the shopping sheet and continuous default rate.

Causal inference in DD analysis rests on the assumption that treatment and comparison colleges experienced similar trends in outcomes in years prior to policy adoption. If this assumption is violated, the DD estimates capture not only the impact of the shopping sheet but any other

differences in enrollment or borrowing trends that existed prior to the intervention. For instance, if colleges adopted the shopping sheet in response to relatively high or rapidly rising borrowing rates, a model that does not account for this would yield biased estimates of the treatment effect. I employ several strategies to account for potential differences in enrollment and borrowing trends that could confound the observed impact.

First, and primarily, I use propensity score matching to construct treatment and comparison groups that resemble each other in observable ways. I estimate a college's propensity score, or the conditional probability of a college adopting the shopping sheet based on a range of baseline covariates measured in 2013, the year prior to adoption, using logistic regression. The observable baseline covariates used to predict whether a college adopted the shopping sheet include enrollment and borrowing rates, tuition and fees, grant aid, percent Pell recipient enrollment, median debt, default rate, acceptance rate, graduation rate, whether a college is public, and a dummy variable indicating the state in which a college is located.

I matched shopping sheet and comparison colleges to their nearest neighbor based on each college's propensity score.¹⁵ Shopping sheet colleges were matched to a non-adopting college that, based on observable characteristics, had a similar propensity to adopt the shopping sheet. I restricted the sample to colleges with propensity scores that fell within the region of common support, i.e., the distribution of propensity scores for shopping sheet and comparison colleges overlapped. This restriction ensured each shopping sheet college in the analysis was matched to a comparison college that was similar in observable ways. The resulting sample consisted of 168 shopping sheet and 168 comparison colleges.

In Table 4, I provide a comparison of means for baseline covariates at shopping sheet and comparison colleges for all four-year colleges (columns 1-3) and the matched sample (columns 4-6) in 2013,¹⁶ the year colleges decided whether to adopt the shopping sheet. Before matching, colleges that adopted the shopping sheet differed in many ways from other four-year colleges. Shopping sheet colleges, on average, tended to be lower cost, lower aid institutions, charging around \$5,000 less in tuition and offering nearly \$3,000 less in grant aid than four-year colleges that did not adopt the shopping sheet. They also had slightly higher graduation rates, were nearly twice the size of non-adopting colleges, and were much more likely to be public colleges (67 percent of adopting colleges were public). Nearest neighbor propensity score matching achieved balance in observable

¹⁵ I also used Mahalanobis distance matching to create a comparison group. Results, similar to those presented, are available upon request.

¹⁶Year is defined as end of academic year (e.g., 2013 indicates data came from the 2012-2013 academic year).

characteristics between treatment and comparison groups, with no statistically significant differences in selection covariates between groups.

Figure 2 plots trends in outcomes for matched shopping sheet and comparison colleges from 2008-2014. The admissions yield rate at shopping sheet colleges was higher throughout the period and followed a similar downward trend with a slight leveling off at shopping sheet colleges around the time of the informational intervention. The percent of students who borrowed followed a similar trend at matched shopping sheet and comparison colleges after 2009 with no clear change in the trend after the introduction of the shopping sheet. Trends in the amount borrowed among borrowers were similar in both groups.

To further account for potential differences in enrollment and borrowing trends, I estimated a model with college-specific linear trends to account for differences in enrollment and borrowing trends at each college in the sample. Results from these models were similar in signs and significance to models that did not include college-specific trends and are presented in the tables alongside other estimates. Finally, I conducted placebo tests using pre-policy years (2008-2013) in which I assigned treatment to each year prior to actual policy adoption (2009-2013) to determine whether there were significant differences in enrollment and borrowing between shopping sheet and comparison colleges prior to actual adoption. These tests yielded a significant decrease in the amount borrowed in years prior to actual adoption; however, significant effects were in earlier years (2009 and 2010) and findings in the years immediately prior to adoption of the shopping sheet were not significant.

Results

Table 5 presents DD estimates of the shopping sheet's overall impact on admissions yield rate (columns 1-3), the share of students borrowing federal loans, (columns 4-6), and the average amount borrowed among students who borrowed (columns 7-9) for the matched sample. The first column for each outcome provides estimates from models that include the treatment indicator and college and year fixed effects, the second adds college-level covariates, and the third adds college-specific trends.

Shopping sheet colleges experienced a small decrease in the share of admitted students who enrolled after the introduction of the shopping sheet, a small decrease in the share of students borrowing, and a \$100 decrease in the average amount borrowed. The direction of these effects was consistent across models when covariates and college-specific trends were included, but they were not statistically significant. These findings are consistent with those from the field experiment,

conducted at a relatively average four-year college, providing further evidence that the shopping sheet had little overall impact on enrollment and borrowing at the average college.

I next examined how reference points relating to college outcomes, specifically graduation and loan default rates, impacted enrollment and borrowing decisions to determine the impact of the shopping sheet at colleges that ranked better (or worse) than others. Table 6 provides results from this analysis. Columns 1-3 present DD estimates for this information's impact on admissions yield rate; columns 4-6 on the percent of students who borrowed; and columns 7-9 on the average amount borrowed among borrowers. The first column for each outcome provides estimates from models that include college covariates and matched college pair and year fixed effects, and the second provides estimates with college-specific trends.

Results demonstrate that reference points relating to college outcomes in the shopping sheet influenced enrollment and borrowing patterns. The shopping sheet was associated with an increase in admissions yield rate that was attenuated as a college's loan default rate increased. This finding that yield rates were lowest at colleges with high default rates is individually and jointly (with treatment) significant across models. Findings also indicate information about a college's graduation rate – in particular its categorization as low, medium, or high – influenced the amount borrowed. At shopping sheet colleges with low graduation rates, students borrowed \$400-500 less than students at shopping sheet colleges in the medium range. This finding is individually significant across models and jointly significant in the first and third model.

Importantly, interpreting the effects on borrowing is somewhat difficult because enrollment patterns shifted in response to information about colleges' loan default rates. The significant effects on borrowing amounts at low graduation rate colleges may be driven at least in part by any selective enrollment that occurred as a result of the shopping sheet. As a result, it is difficult to conclude with certainty whether the shopping sheet reduced the amount students borrowed by changing the composition of students at these colleges or whether it induced students to borrow less. The shopping sheet and information about college outcomes in the shopping sheet, however, did not influence the share of students who borrowed, suggesting the change in amount borrowed was not driven by a change in the share of students borrowing but rather by a change in the amount borrowed among a similar share of borrowers. Overall, findings indicate that enrollment rates and borrowing decreased somewhat at colleges with worse outcomes (i.e., low graduation rates, high loan default rates) relative to colleges with average outcomes.

Discussion

This study uses two rigorous identification strategies to investigate the impact of a recent federal policy effort aimed at helping students make informed college decisions by simplifying information in financial aid award notifications. Experimental and quasi-experimental results indicate the shopping sheet had little impact on enrollment and borrowing decisions at the average four-year college. However, information in the shopping sheet that placed a college's graduation and loan default rates in context relative to other colleges did influence college decisions. In particular, admitted students were less likely to enroll at colleges with high loan default rates relative to colleges with lower default rates, and students who enrolled at colleges with low graduation rates borrowed nearly \$500 less than students at colleges with graduation rates in the middle of the range.

Several limitations must be considered prior to noting the potential broader implications of this work. Importantly, the treatment in the quasi-experiment is challenging to define because colleges typically adopted the shopping sheet as a cover page or supplement to the information they already provided. Colleges vary in information they provide (Kantrowitz 2010, TICAS 2013, Whitsett and O'Sullivan 2012), which means treatment was somewhat different at each college. As a result, predicting what might happen to enrollment and borrowing at a college that is considering adopting the shopping sheet in part depends on how different the college's current award notification is from the shopping sheet. At some colleges, the differences may be greater, and the shopping sheet may offer more new information or may do more to clarify costs and borrowing options. The shopping sheet, however, differs from most colleges' traditional notifications by providing information comparing a college's graduation and loan default rates to outcomes at other colleges. Results from the quasi-experimental analysis, however, demonstrate the average treatment effect of the policy as implemented, which proves useful for informing future policy efforts.

One question raised by this research is whether the shopping sheet, which is currently used by more than 3,000 postsecondary institutions (ED 2016), could lead to fewer students or a smaller share of students defaulting on loans. Over the past decade, outstanding education debt in the United States grew more than two and half times (College Board 2016). During the same period, the default rate on federal student loans more than doubled, rising to 14 percent (College Board 2016). Students who leave college with debt, even small amounts of debt, but do not complete a degree are at particular risk of defaulting on loans (Dynarski 2015). This study provides evidence that the shopping sheet shifts enrollment and borrowing patterns at colleges with worse outcomes (i.e., low graduation rates, high loan default rates). In doing so, the shopping sheet may represent one

potential strategy that could serve to lower loan default rates in the long run by shifting enrollment and borrowing patterns in ways that may make students more likely to enroll at colleges with better outcomes or borrow smaller amounts at colleges where students are less likely to complete a degree. At the same time, however, student loans also contribute to persistence, providing a means for students to stay in college who might otherwise leave without earning a degree (Wiederspan 2016). If students at colleges with relatively poor outcomes decrease their borrowing, it could also reduce persistence and degree completion. Because the shopping sheet is a relatively new policy, adopted within the past four years, it is too early to know whether the shifts in enrollment and borrowing observed in this study will lead to improved outcomes for students. Nonetheless, this study provides a compelling look at what happens to overall enrollment and borrowing rates at colleges that perform relatively better (or worse) than others when students are given information about college outcomes.

This study contributes to a growing policy and research interest in simplifying and reducing informational barriers in the college-going process (e.g., Advisory Committee for Student Financial Assistance 2005; Bettinger et al. 2012; Castleman and Page 2015, 2016; College Affordability and Transparency Center 2015; Dynarski and Scott-Clayton 2006; ideas42 2016b; Long 2010; Scott-Clayton 2013; The White House 2016; Whitsett and O’Sullivan 2012). This effort has resulted in the development of a number of consumer information tools designed to help students and their families make informed college decisions (College Affordability and Transparency Center 2016; The White House 2016). In this study, I provide an evaluation of one of these consumer information tools, and findings entail implications for how other related efforts might influence students’ college decisions at different stages of the college-going process. While the shopping sheet shifted student enrollment and borrowing in ways that decreased likelihood of enrollment and levels of debt at colleges with worse outcomes, the intervention had relatively little impact on overall student enrollment and borrowing. One potential explanation for the limited overall impact is that the shopping sheet was delivered to students too late in the college-going process to alter college decisions in meaningful ways.

The College Scorecard, a consumer information website for students that the Obama administration announced in 2015, allows students to compare colleges on many of the same metrics used in the shopping sheet, including graduation and loan default rates (College Scorecard 2016). The Scorecard is intended to inform students’ college search process, the point at which students decide where to apply to college. In giving students similar information about college outcomes as

the shopping sheet but during an earlier stage in the college-going process, the Scorecard or other similar informational interventions might prove effective at expanding students' college choice sets to include colleges with better outcomes. Already, early research indicates that as the average earnings of students who attended a college increases, the growth in the number of students sending scores to a college also increases. This shift in score-sending behavior, often considered a precursor to college application decisions, is concentrated among relatively advantaged students (Hurwitz and Smith 2016).

More broadly, many recent policy efforts within the federal government (and in the private sector) have focused on providing salient and timely information to help consumers evaluate a number of complex choices. Consistent with previous behavioral interventions in other fields (e.g., Allcott 2011; Grynbaum 2009; Kahneman and Tversky 1979; Sunstein 2014; Tversky and Simonson 1993; White House Social and Behavioral Sciences Team 2015), this study indicates that the context in which information plays a role in decision-making. In particular, giving students reference points by which they can compare a college's outcomes relative to the average college may prove particularly salient as students evaluate enrollment and borrowing options.

Table 1. Comparison of Baseline Means for Treatment and Control Groups, Field Experiment

	Admitted Students				Enrolled Students			
	<i>N</i> (1)	Treatment Group (2)	Control Group (3)	Difference in Means (4)	<i>N</i> (5)	Treatment Group (6)	Control Group (7)	Difference in Means (8)
High school GPA	2,637	3.42	3.40	0.02	855	3.56	3.58	-0.02
ACT score	2,655	22.0	21.9	0.1	855	23.6	23.3	0.2
Previously taken >30 credit hours					854	25.0%	22.1%	2.9%
Amount previously borrowed					855	\$2,279	\$2,037	\$242
In-state resident	2,655	92.5%	91.9%	0.6%	855	94.5%	95.5%	-0.9%
Pell eligible	2,655	46.3%	45.5%	0.7%	855	39.6%	43.0%	-3.4%
Parent income	2,536	\$74,511	\$78,504	-\$3,993	833	\$80,967	\$78,672	\$2,296
Parent with college degree or higher	2,617	65.6%	63.7%	1.9%	849	75.2%	67.8%	7.4%**
Grant aid	2,655	\$3,396	\$3,513	-\$117	855	\$6,497	\$6,955	-\$457
Female	2,654	58.6%	60.8%	2.2%	855	61.7%	66.8%	-5.1%
Black	2,288	9.1%	10.4%	-1.3%	775	5.3%	5.1%	0.2%
Latino	2,288	2.2%	2.5%	-0.2%	775	2.6%	1.4%	1.2%
White	2,288	86.6%	85.4%	1.2%	775	90.0%	92.1%	-2.2%
Other race/ethnicity	2,288	2.1%	1.8%	0.3%	775	2.1%	1.4%	0.7%
Race/ethnicity missing or unreported	2,655	14.0%	13.7%	0.3%	855	8.3%	10.6%	-2.2%

* p<0.10 ** p<0.05 *** p<0.01

Table 2. Impact of Shopping Sheet on Enrollment and Borrowing at the Participating University, Field Experiment

	Admitted Students						Enrolled Students			
	Whether a Student Enrolled		Whether a Student Borrowed		Amount Borrowed		Whether a Student Borrowed		Amount Borrowed	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Shopping sheet	-0.02 (0.02)	-0.02 (0.02)	0.03 (0.02)	0.03 (0.03)	94.17 (172.48)	137.10 (163.79)	0.03 (0.03)	0.00 (0.02)	299.96 (215.21)	162.71 (140.26)
Constant	0.48*** (0.01)	-0.11 (0.15)	0.45*** (0.02)	1.51*** (0.26)	2369.28*** (112.01)	7651.35*** (1393.50)	0.42*** (0.03)	0.48** (0.21)	2285.44*** (150.05)	1704.97 (1605.74)
Observations	2,655	2,471	1,243	1,162	1,243	1,162	821	791	821	791
R ²	0.00	0.03	0.00	0.13	0.00	0.14	0.00	0.56	0.00	0.61
Covariates?	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

* p<0.10 ** p<0.05 *** p<0.01

Notes: Robust standard errors in parentheses. Estimates of intent-to-treat effect on whether a student enrolled and whether a student borrowed come from linear probability models. Estimates of intent-to-treat effect on amount borrowed come from linear models. Whether a student borrowed and amount borrowed include subsidized and unsubsidized Stafford loans and Perkins loans. Baseline covariates include indicators for gender, ethnicity, in-state residency, Pell eligibility, at least one parent with college degree or higher, previously taken >30 college credit hours (for enrolled students), and continuous measures of high school GPA, ACT score, natural log of parent income, grant aid, and amount previously borrowed (for enrolled students).

Table 3. Heterogeneous Impact of Shopping Sheet on Enrollment and Borrowing at the Participating University, Field Experiment

	Admitted Students						Enrolled Students			
	Whether a Student Enrolled		Whether a Student Borrowed		Amount Borrowed		Whether a Student Borrowed		Amount Borrowed	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Shopping sheet	-0.01 (0.03)	-0.01 (0.03)	0.01 (0.04)	0.01 (0.04)	-10.02 (216.04)	37.72 (208.47)	0.02 (0.04)	-0.01 (0.03)	196.40 (268.20)	-9.32 (161.75)
Shopping sheet x Pell	-0.03 (0.04)	-0.03 (0.04)	0.06 (0.06)	0.05 (0.06)	239.32 (345.14)	229.42 (337.20)	0.03 (0.07)	0.04 (0.05)	306.72 (440.97)	435.77 (299.62)
Constant	0.46*** (0.02)	-0.11 (0.15)	0.39*** (0.03)	1.52*** (0.26)	1994.86*** (141.23)	7681.59*** (1402.94)	0.36*** (0.03)	0.50** (0.21)	1976.38*** (194.65)	1873.82 (89.08)
Observations	2,655	2,471	1,243	1,162	1,243	1,162	821	791	821	791
R^2	0.00	0.03	0.03	0.13	0.02	0.14	0.03	0.56	0.02	0.61
<i>p-value (F-test for joint significance)</i>	0.47	0.38	0.33	0.34	0.70	0.59	0.60	0.77	0.27	0.24
Baseline covariates	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

* p<0.10 ** p<0.05 *** p<0.01

Notes: Robust standard errors in parentheses. Estimates of intent-to-treat effect on whether a student enrolled and whether a student borrowed come from linear probability models. Estimates of intent-to-treat effect on amount borrowed come from linear models. Whether a student borrowed and amount borrowed include subsidized and unsubsidized Stafford loans and Perkins loans. Baseline covariates include indicators for gender, ethnicity, in-state residency, Pell eligibility, at least one parent with college degree or higher, previously taken >30 college credit hours (for enrolled students), and continuous measures of high school GPA, ACT score, natural log of parent income, grant aid, and amount previously borrowed (for enrolled students).

Table 4. Comparison of Baseline Means for Shopping Sheet and Comparison Colleges in 2013 (Full and Matched Samples)

	Full Sample			Matched Sample		
	Shopping Sheet Colleges (1)	Comparison Colleges (2)	Difference in Means (3)	Shopping Sheet Colleges (4)	Comparison Colleges (5)	Difference in Means (6)
Admissions yield rate	36.8%	37%	-0.2%	36.3%	37.7%	-1.4%
Percent of students borrowing	60.1%	62.4%	-2.3%	60.8%	62.7%	-1.9%
Average amount borrowed	\$5,931	\$6,029	-\$97	\$5,934	\$5,952	-\$18
Tuition and fees	\$15,309	\$20,733	-\$5,424***	\$16,125	\$16,348	-\$223
Grant aid	\$11,037	\$13,786	-\$2,749***	\$11,502	\$11,655	-\$153
Percent Pell enrollment	37.1%	41.3%	-4.2%***	36.7%	37.9%	-1.2%
Median borrowing	\$17,283	\$17,194	\$88	\$17,655	\$17,601	\$53
Loan default rate	7.2%	7.6%	-0.4%	7.2%	7.4%	-0.4%
Acceptance rate	64.4%	64.4%	0.1%	64.9%	64.6%	0.2%
Graduation rate	55.4%	52.5%	2.9%*	56.1%	55.5%	0.6%
Undergraduate enrollment	10,428	4,901	5,528***	10,021	9,737	283
Percent public colleges	67%	27.3%	39.7%***	65.5%	61.3%	4.2%
<i>N</i> (colleges)	203	1,538		168	168	

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

Notes: Matches were generated using propensity score nearest neighbor matching.

Table 5. Difference-in-Differences Estimates of the Impact of Shopping Sheet (Matched Sample)

	Admissions Yield Rate			% of Students Borrowing			Average Amount Borrowed		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Shopping sheet	-1.12 (1.22)	-1.20 (1.17)	-0.89 (1.15)	-1.94 (1.70)	-1.38 (1.18)	-1.61 (1.16)	-95.50 (91.16)	-80.77 (80.69)	-84.13 (77.32)
Tuition and fees		-0.72*** (0.16)	-0.71*** (0.16)		0.80*** (0.15)	0.80*** (0.15)		39.20*** (11.23)	40.40*** (10.95)
Grant aid		0.84*** (0.23)	0.86*** (0.23)		-1.62*** (0.20)	-1.66*** (0.19)		-63.73*** (16.42)	-66.31*** (16.14)
% Pell		-0.09 (0.05)	-0.07 (0.05)		0.45*** (0.06)	0.44*** (0.06)		9.93** (4.30)	9.48** (4.33)
Median borrowing		-0.62*** (0.22)	-0.57** (0.22)		2.31*** (0.22)	2.25*** (0.22)		94.01*** (11.88)	92.34*** (12.27)
Default rate		-0.33 (0.20)	-0.29 (0.20)		0.38* (0.22)	0.36* (0.22)		48.12*** (14.79)	48.77*** (14.71)
Acceptance rate		0.01 (0.04)	0.02 (0.04)		0.16*** (0.03)	0.15*** (0.03)		-3.00 (2.03)	-2.65 (2.03)
Graduation rate		0.01 (0.06)	0.01 (0.06)		-0.01 (0.05)	-0.01 (0.05)		4.71** (4.31)	4.83** (4.36)
Enrollment		-0.26*** (0.08)	-0.27*** (0.08)		-0.49*** (0.08)	-0.48*** (0.08)		3.16 (4.77)	4.53 (4.64)
Constant	42.06*** (0.76)	67.08*** (6.43)	59.88*** (6.07)	56.96*** (0.90)	5.62 (5.64)	10.22* (5.90)	4755.78*** (59.76)	3141.49*** (440.89)	3155.89*** (470.66)
Observations	2,272	1,943	1,937	2,349	2,259	2,253	2,349	2,259	2,253
R ²	0.43	0.53	0.57	0.42	0.73	0.74	0.37	0.48	0.50
College trend	No	No	Yes	No	No	Yes	No	No	Yes
Placebo effect	No	No	No	No	No	No	Yes	Yes	Yes

* p<0.10 ** p<0.05 *** p<0.01

Notes: Robust standard errors clustered at the college level reported in parentheses. Matches were generated using nearest neighbor propensity score matching with scores estimated from a logit regression with an outcome indicating whether a college adopted the shopping sheet and selection variables: yield rate, percent of students borrowing, amount borrowed, tuition and fees, grant aid, percent Pell, median borrowing, default rate, graduation rate, enrollment, dummy for public college, and dummy for state. Percent Pell, median borrowing, graduation rate, and default rate are lagged for enrollment outcome. Models include year and pair fixed effects.

Table 6. Difference-in-Differences Estimates of the Impact of Comparative Information in the Shopping Sheet (Matched Sample)

	Admissions Yield Rate			% of Students Borrowing			Average Amount Borrowed		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Shopping sheet	3.91 (2.56)	3.10 (2.35)	3.33 (2.35)	3.73 (3.48)	1.96 (3.08)	1.34 (3.04)	5.40 (210.90)	-49.34 (206.66)	-78.67 (205.89)
Shopping sheet x low grad rate	3.46 (3.06)	2.90 (2.78)	3.86 (2.71)	-8.58*** (3.15)	-2.70 (2.36)	-2.94 (2.33)	-521.36** (205.88)	-381.75** (185.16)	-441.22** (180.24)
Shopping sheet x high grad rate	-2.99* (1.69)	-2.47 (1.65)	-2.26 (1.62)	-5.99*** (2.26)	-3.50* (2.07)	-3.11 (2.04)	-136.35 (140.40)	-89.28 (135.59)	-95.99 (133.32)
<i>F-test</i> ^a				***			*		*
Shopping sheet x default rate	-0.64** (0.32)	-0.55** (0.28)	-0.58** (0.28)	-0.17 (0.38)	-0.19 (0.31)	-0.15 (0.31)	9.96 (24.96)	11.09 (23.22)	17.16 (23.48)
<i>F-test</i> ^b	**	**	**						
Constant	53.19*** (3.23)	66.96*** (6.46)	59.67*** (6.08)	72.96*** (4.14)	5.67 (5.64)	10.30* (5.92)	4599.41*** (223.41)	3173.75*** (438.20)	3194.93*** (467.61)
Observations	2,264	1,943	1,937	2,342	2,259	2,253	2,342	2,259	2,253
<i>R</i> ²	0.46	0.53	0.57	0.49	0.73	0.74	0.39	0.49	0.50
Covariates	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
College trend	No	No	Yes	No	No	Yes	No	No	Yes

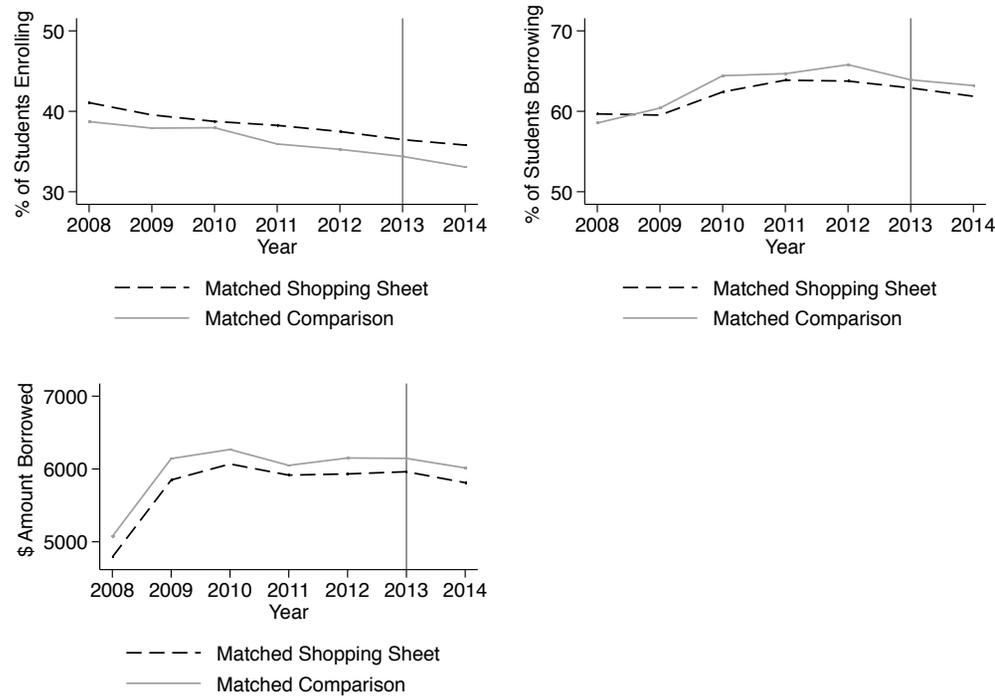
* p<0.10 ** p<0.05 *** p<0.01

Notes: Robust standard errors clustered at the college level reported in parentheses. Matches were generated using nearest neighbor propensity score matching with scores estimated from a logit regression with an outcome indicating whether a college adopted the shopping sheet and selection variables: yield rate, percent of students borrowing, amount borrowed, tuition and fees, grant aid, percent Pell, median borrowing, default rate, graduation rate, enrollment, dummy for public college, and dummy for state. Percent Pell, median borrowing, graduation rate, and default rate are lagged for enrollment outcome. Models include year and pair fixed effects.

^a*F*-test of joint significance for shopping sheet, shopping sheet x low grad rate, and shopping sheet x high grad rate.

^b*F*-test of joint significance for shopping sheet and shopping sheet x default rate.

Figure 1. Enrollment and Borrowing Averages for Matched Sample of Shopping Sheet and Comparison Colleges (2008-2014)



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Appendix A

U.S. Department of Education and Consumer Financial Protection Bureau Shopping Sheet

<div style="border: 1px solid #004a7c; padding: 5px; margin-bottom: 5px;"> <p>Costs in the 2013-14 year</p> <p>Estimated Cost of Attendance for full-time enrollment \$ XX,XXX / yr</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Tuition and fees</td> <td style="width: 10%; text-align: right;">\$ XX,XXX</td> <td style="width: 10%;"></td> </tr> <tr> <td>Housing and meals (on-campus resident)</td> <td style="text-align: right;">X,XXX</td> <td></td> </tr> <tr> <td>Books and supplies</td> <td style="text-align: right;">X,XXX</td> <td></td> </tr> <tr> <td>Transportation</td> <td style="text-align: right;">X,XXX</td> <td></td> </tr> <tr> <td>Other educational costs</td> <td style="text-align: right;">X,XXX</td> <td></td> </tr> </table> </div> <div style="border: 1px solid #004a7c; padding: 5px; margin-bottom: 5px;"> <p>Grants and scholarships to pay for college</p> <p>Total Grants and Scholarships ("Gift" Aid; no repayment needed) \$ XX,XXX / yr</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Grants from your school</td> <td style="width: 10%; text-align: right;">\$ X,XXX</td> <td style="width: 10%;"></td> </tr> <tr> <td>Federal Pell Grant</td> <td style="text-align: right;">X,XXX</td> <td></td> </tr> <tr> <td>Grants from your state</td> <td style="text-align: right;">X,XXX</td> <td></td> </tr> <tr> <td>Other scholarships you can use</td> <td style="text-align: right;">X,XXX</td> <td></td> </tr> </table> </div> <div style="border: 1px solid #004a7c; padding: 5px; margin-bottom: 5px;"> <p>What you will pay for the 2013-14 year</p> <p>Net Costs \$ XX,XXX / yr <small>(Cost of attendance minus total grants and scholarships)</small></p> </div> <div style="border: 1px solid #004a7c; padding: 5px; margin-bottom: 5px;"> <p>Options to pay net costs</p> <p>Work options</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Work-Study (Federal, state, or institutional)</td> <td style="width: 10%; text-align: right;">\$ X,XXX / yr</td> <td style="width: 10%;"></td> </tr> </table> </div> <div style="border: 1px solid #004a7c; padding: 5px; margin-bottom: 5px;"> <p>Loan options*</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Federal Perkins Loans</td> <td style="width: 10%; text-align: right;">\$ X,XXX / yr</td> <td style="width: 10%;"></td> </tr> <tr> <td>Federal Direct Subsidized Loan</td> <td style="text-align: right;">X,XXX / yr</td> <td></td> </tr> <tr> <td>Federal Direct Unsubsidized Loan</td> <td style="text-align: right;">X,XXX / yr</td> <td></td> </tr> </table> <p><small>*Recommended amounts shown here. You may be eligible for a different amount. Contact your financial aid office.</small></p> </div> <div style="border: 1px solid #004a7c; padding: 5px; margin-bottom: 5px;"> <p>Other options</p> <p>Family Contribution \$ XX,XXX / yr <small>(As calculated by the institution using information reported on the FAFSA or to your institution.)</small></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> • Payment plan offered by the institution • Parent PLUS Loan </td> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> • Military and/or National Service benefits • Non-Federal private education loan </td> </tr> </table> </div> <div style="border: 1px solid #004a7c; padding: 5px; margin-bottom: 5px;"> <p>Customized information from UUS</p> </div>	Tuition and fees	\$ XX,XXX		Housing and meals (on-campus resident)	X,XXX		Books and supplies	X,XXX		Transportation	X,XXX		Other educational costs	X,XXX		Grants from your school	\$ X,XXX		Federal Pell Grant	X,XXX		Grants from your state	X,XXX		Other scholarships you can use	X,XXX		Work-Study (Federal, state, or institutional)	\$ X,XXX / yr		Federal Perkins Loans	\$ X,XXX / yr		Federal Direct Subsidized Loan	X,XXX / yr		Federal Direct Unsubsidized Loan	X,XXX / yr		<ul style="list-style-type: none"> • Payment plan offered by the institution • Parent PLUS Loan 	<ul style="list-style-type: none"> • Military and/or National Service benefits • Non-Federal private education loan 	<div style="border: 1px solid white; padding: 5px; margin-bottom: 5px;"> <p>Graduation Rate <small>Percentage of full-time students who graduate within 6 years</small></p> <div style="text-align: center;"> </div> <div style="text-align: center; font-weight: bold; font-size: 1.2em;">71%</div> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="width: 30%; text-align: center; border: 1px solid white; padding: 2px;">LOW</div> <div style="width: 30%; text-align: center; border: 1px solid white; padding: 2px;">MEDIUM</div> <div style="width: 30%; text-align: center; border: 1px solid white; padding: 2px;">HIGH</div> </div> </div> <div style="border: 1px solid white; padding: 5px; margin-bottom: 5px;"> <p>Loan Default Rate <small>Percentage of borrowers entering repayment and defaulting on their loan</small></p> <div style="text-align: center;"> </div> </div> <div style="border: 1px solid white; padding: 5px;"> <p>Median Borrowing <small>Students at UUS typically borrow \$XX,XXX in Federal loans over X years. The Federal loan payment over 10 years for this amount is approximately \$X,XXX per month. Your borrowing may be different.</small></p> <div style="text-align: center; font-size: 2em; font-weight: bold;">\$</div> </div>
Tuition and fees	\$ XX,XXX																																									
Housing and meals (on-campus resident)	X,XXX																																									
Books and supplies	X,XXX																																									
Transportation	X,XXX																																									
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<p>Repaying your loans</p> <p>To learn about loan repayment choices and work out your Federal Loan monthly payment, go to: https://www.direct.ed.gov/palc.html</p>																																										
<p>For more information and next steps:</p> <p>University of the United States (UUS) Financial Aid Office 123 Main Street Anytown, ST 12345 Telephone: (123) 456-7890 E-mail: financialaid@uus.edu</p>																																										

Notes: The information on this form is not specific to a particular university to maintain the confidentiality of the university where the field experiment was conducted. Graduation rate at the participating university was in the medium range relative to other primarily bachelor's degree granting institutions. The loan default rate was close to the national average of 13.4%, and median borrowing was around \$14,000.

Appendix B

Participating University's Traditional Financial Aid Award Notification

[General Information](#) | [Award Overview](#) | [Resources/Additional Information](#) | [Accept Award Offer](#)

[Print](#)

Options for Accept Award Offers include:

- Accept the full award amount by selecting **Accept Full Amount of All Awards**.
- Choose **Decline** or **Accept** for each fund.
- Accept a partial amount by selecting **Accept** and entering the amount in the **Accept Partial Amount** field.
- **NOTE to students entering or returning for the fall semester:** Accepted award amounts will typically be split between the fall and spring semesters.

Important Dates for Fall 2012 Know Your Limits If you have student requirements that are received and complete and/or pending review and you have not been awarded financial aid, contact our office to see if you are eligible to sign a **Financial Aid Agreement Promissory Note** to extend your payment due or inquire about **University Short-Term and Emergency Loans** as funds permit. These options do not necessarily provide you a refund to assist with books or miscellaneous expenses. Please plan accordingly. Loans and grants that begin with the word **"Transfer"** are **NOT** awards for which you are eligible at [REDACTED]; therefore, NO "Transfer" grants or loans will pay toward your [REDACTED] Student Account.

Award Decision

Fund	Status	Fall 2012	Spring 2013	Total	Accept Award	Accept Partial	Amount	Lender
Subsidized Direct Loan	Accepted Aid	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Unsubsidized Direct Loan	Accepted Aid	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Federal Work Study	Accepted Aid	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	Accepted Aid	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED] Grant 1213	Accepted Aid	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Pell Grant	Accepted Aid	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Total		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

[[Award Messages](#) | [Overall Financial Aid Status](#) | [Account Summary By Term](#) | [Award Payment Schedule](#) | [Award History](#) | [Loan Application History](#)]

Appendix C

Variable	Variable Definition	Variable Source
<i>Experimental Data</i>		
High school GPA	High school GPA	Administrative data
ACT score	ACT score	Administrative data
Previously taken >30 credit hours	Whether student previously took >30 credit hours	Administrative data
Amount previously borrowed	Amount of Stafford and Perkins loans borrowed before 2013-2014	Administrative data
In-state resident	Whether student was classified as an in-state resident in 2013-2014	Administrative data
Pell eligible	Whether a student was eligible for Pell grant in 2013-2014	Administrative data
Parent income	Parent income from FAFSA	Administrative data
Parent with college degree or higher	Whether at least one parent had a college degree or higher	Administrative data
Grant aid	Amount of grant aid received in 2013-2014	Administrative data
Gender	Whether student was female	Administrative data
Race/ethnicity	Categorical variable for race/ethnicity	Administrative data
Indicator for whether a student enrolled	Whether student enrolled at the participating university in 2013-2014	Administrative data
Indicator for whether a student borrowed	Whether student borrowed Stafford and Perkins loans in 2013-2014	Administrative data
Amount borrowed	Amount student borrowed in Stafford and Perkins loans in 2013-2014	Administrative data
<i>Quasi-Experimental Data</i>		
Shopping sheet	Indicator for whether college adopted shopping sheet	The College Solution (thecollegesolution.com)
Tuition and fees	In-state tuition and fees	IPEDS
Grant aid	Average amount of grant aid received by first-year, first-time students	IPEDS
Percent Pell	Percent of unduplicated undergraduates who received Pell grant	U.S. Department of Education and IPEDS
Median borrowing	2-year average of median debt when students leave a college	College Scorecard (collegescorecard.ed.gov)
Default rate	2-year cohort default rate for 2007-2013 (3-year default rate for 2014)	College Scorecard (collegescorecard.ed.gov)
Acceptance rate	Share of applicants accepted	IPEDS
Enrollment	Unduplicated undergraduate enrollment	IPEDS
Public college	Whether a college is public	IPEDS
te	Indicator variables for state	IPEDS
Yield rate	Share of admitted students who enroll	IPEDS
Percent of students borrowing	Percent of first-time, first-year students who borrow Stafford and Perkins loans	IPEDS
Average amount borrowed	Average amount of Stafford and Perkins loans among first-time, first-year students	IPEDS