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*What Do Stafford  
Loans Actually Buy  
You? The Effect of  
Stafford Loan Access  
on Community College  
Students*

ERIN DUNLOP

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# What Do Stafford Loans Actually Buy You? - The Effect of Stafford Loan Access on Community College Students

Erin Dunlop  
*American Institutes for Research*

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# **What Do Stafford Loans Actually Buy You? - The Effect of Stafford Loan Access on Community College Students**

Erin Dunlop

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## **Abstract**

Students who do not have access to credit may not be able to complete their optimal level of post-secondary education. More than one out of every ten community college students nationwide attends a community college that does not allow access to federal college loans. This paper takes advantage of plausibly exogenous variation in whether a student's community college offers student loans to evaluate the effect of access to Stafford loans on student outcomes, including educational attainment, employment, and finances. Using the Beginning Postsecondary Student Study of 2004, I show that access to federal Stafford loans does not affect the decision to attend community college. However, I find that Stafford loan access increases overall borrowing among community college students by \$262 a year and increases the likelihood of transferring to a four-year school by 5.6 percentage points. Additionally, for high-need and female students, loan access increases their total months of enrollment and dependent students' bachelor's degree attainment as well. These sizable effects of loan access on student behavior indicate that federal loans relax credit constraints for some community college students.

# 1 Introduction

Every year, the U.S. Department of Education provides more than \$150 billion in grants, loans, and work-study assistance for students to fund post-secondary education.<sup>1</sup> While the federal government provides means-tested loans to all eligible students, a rising number of community colleges deny their students the opportunity to take out federal loans. In 1992, less than 3% of American community college students did not have access to federal loans.<sup>2</sup> Two decades later, 12% of community college students attend a college that does not offer federal loans.<sup>3</sup>

Without access to loans, many students may not have the financial resources necessary to complete their optimal level of postsecondary education, as considerable evidence in the literature supports the existence of credit constraints.<sup>4</sup> Limited resources to finance college attendance may reflect the economic circumstances of the student's parents, or, if the student is paying for college himself, the amount of time necessary to work to afford college may preclude spending enough time on school work. When students lack adequate savings and cannot borrow against their future earnings, they may complete less schooling than they would in the absence of credit constraints.

Variation among community colleges in providing access to federal Stafford loans gives a unique opportunity to assess the effects of federal loans on students' college outcomes. In this paper, I identify the casual impact of the availability of federal Stafford loans on community college students' outcomes, including overall borrowing, total educational attainment, and hours worked during college. Identifying the effect of any federal aid program is difficult, given that the students who qualify and take up aid are very different from the students who do not. Even with a rich set of

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<sup>1</sup> U.S. Department of Education <http://studentaid.ed.gov/PORTALSWebApp/students/english/funding.jsp>

<sup>2</sup> Calculated from the National Education Longitudinal Study of 1988 (NELS:88)

<sup>3</sup> Calculated from 2008-09 college level default rates

<http://www2.ed.gov/offices/OSFAP/defaultmanagement/cdr.html>. For more information on calculating the number of community colleges that do not offer loans, see footnote 15 on page 6.

<sup>4</sup> While earlier papers found little evidence of credit constraints in higher education, more recent papers (Belley and Lochner 2007, Lovenheim 2011) have found evidence that students are credit constrained in college. Even the work that found that students have little to no credit constrained under the current system financial aid (Cameron and Tabler 2004, Keane and Wolpin 2001), were evaluating the current financial aid system at a time when nearly all eligible students had access to federal loans. These older papers leave open the question as to whether students would be credit constrained with no access to federal loans. The previous literature on credit constraints in higher education is discussed in more detail in Section 3.

covariates, there may be unobserved differences between students who use or do not use federal aid that could be correlated to their college outcomes. To address this selection problem, I take advantage of both the local nature of community college markets and variation in loan access at the community college level.

I assume that a student's access to federal Stafford loans is random. There are two ways this assumption could be violated: if students make their community college decisions based on loan availability or if colleges make their loan availability decisions based on student characteristics. I carry out several empirical tests using multiple large data sets and I cannot reject the hypotheses that loan access is uncorrelated to any student or community college characteristics.

I find significant effects of Stafford loan access for several outcomes, and these effects are larger for various population subgroups. Access to Stafford loans significantly increases a student's overall borrowing by \$262 in the first year, indicating that Stafford loans are not just crowding out other types of loans. Stafford loan access also significantly increases the probability of transfer to a four-year college by 5.6 percentage points and decreases employment later in college. The effects of access to loans on these outcomes are larger for high-need, black, and female students, and loan access also increases the total months of enrollment by 3- 6 months for these segments of the population. Finally, loan access has a significant effect on bachelor's degree attainment for dependent female and high-need students, increasing the likelihood of receiving a bachelor's degree by roughly 9 percentage points. I find no effect on associate's degree attainment or credits, employment, and credit card debt in the first year of college for either the entire population or the various subgroups examined.

The outline of the paper is as follows. Section 2 describes Stafford loans in more detail, including how to qualify for a Stafford loan and why community colleges would choose not to offer loans. Section 3 outlines prior research evaluating the Stafford loan program and assessing the extent to which students are credit constrained in college-going. The motivating theoretical model is outlined in Section 4. Section 5 explains the empirical strategy, including why access to loans appears to be

exogenous to student characteristics. The data are described in Section 6. In Section 7, I present the results and the paper concludes in Section 8.

## 2 Stafford Loans

### 2.1 Who Qualifies for a Stafford Loan

Many students do not have enough savings to fund their college educations and must borrow against the future earnings gains that their college educations are expected to yield. Perhaps because there is no way for a bank to confiscate a person's education in the case of default, unlike the case of default of a car or home loan, private interest rates for education are high and funds are limited. The interest rate a student receives, and the availability of private loans all together, vary greatly based on the credit rating of the student and his or her co-signer. When national interest rates are low, and with the highest credit rating possible, these private loan rates can sometimes be as low as 5% or 6%, but they are generally 10% or higher.<sup>5</sup>

Motivated by the large cost of a college education and the high interest rates of private loans, the federal government has been providing low interest student loans since the Higher Education Act of 1965. These low-interest loans give students the opportunity to borrow money cheaply to fund their college educations. The vast majority of student federal loan dollars are dispersed through the Stafford loan program.<sup>6</sup> Stafford loans comprise a significant portion of the total financial aid community college students receive. For students who received a Stafford loan, Stafford loan dollars comprise 63% of their total aid package.<sup>7</sup>

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<sup>5</sup> A student's private loan interest rate is either pegged to the PRIME (Prime lending rate) or LIBOR (London Interbank Offered Rate). The private interest rate a student receives will either be PRIME + X.X% or LIBOR + Y.Y%, depending on which rate the particular bank chooses to peg its student loans to. The X.X% (or Y.Y%) is a function of the student's credit rating and the rating of the student's co-signer.

<sup>6</sup> The other federal student loan program is the Perkins loan program, which also distributes college loans to high-need students, but the program is considerably smaller. In 2010, the loan volume distributed under the Perkins loan program was 1% of the loan volume of the Stafford loan program (Source: President's 2011 Budget Request Appendix; New America Foundation - <http://febp.newamerica.net/background-analysis/federal-student-loan-programs-overview>)

<sup>7</sup> Calculated from the BPS:04/09.



There are two types of Stafford loans; subsidized and unsubsidized. For both types of loans, the student completes a Free Application for Federal Student Aid (FAFSA) and is awarded a loan amount each year he or she is in college. A subsidized Stafford loan does not start accruing interest until the student leaves college, while an unsubsidized loan starts accruing interest from the time the loan is disbursed. The subsidy that students receive by not paying interest on their loans in college is large; Cadena and Keys (2010) estimate that over four years this in-school interest subsidy is worth over \$1,500. A federal maximum caps the size of the Stafford loan a student can receive, even if the student has extensive financial need. Subsidized and unsubsidized loans have different maximums, as do dependent and independent students, and the maximums increase based on the student's year in school.<sup>8</sup>

A student can be awarded a subsidized Stafford loan equal to the size of the student's unmet need, up to the maximum allowed. The formula to calculate the amount of Stafford loans per year a student is eligible to receive is the following:

$$\textit{Subsidized Stafford Loan} = \min(\textit{COA} - \textit{EFC} - \textit{grants}, \textit{maximum subsidized})$$

The cost of attendance (COA) includes tuition and fees, room and board, books, supplies, transportation, and if applicable, dependent care.<sup>9</sup> A student's expected family contribution (EFC) is a function of the family's income, assets, benefits, as well as family size, and the number of family members currently enrolled in college.<sup>10</sup> A student's financial need, the difference between cost of attendance and expected family contribution, is considered unmet if it exceeds the student's grant aid. Even though the formula looks straightforward, predicting the amount of loans a student is eligible to receive can be complicated. For example, if a family of four has an income before taxes of \$50,000 and has \$50,000 in net assets, they will have an EFC of approximately \$3,030. Combined with

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<sup>8</sup> Students are considered independent if they are over 24 years old, married, parents, or veterans of the military. The maximum Stafford loan for first year dependent students is \$2,625, rising to \$3,500 in the second year and \$5,500 in the third through fifth years. For independent students, the maximum for first year is \$6,625, second year is \$7,500, and third through fifth years is \$8,000.

<sup>9</sup> Department of Education's Student Aid website  
<http://studentaid.ed.gov/PORTALSWebApp/students/english/Glossary.jsp>

<sup>10</sup> Department of Education's FAFSA website - <http://www.fafsa.ed.gov/help/fftoc01g.htm>

a COA of \$10,000 and a grant award of \$1,500, the student has an unmet need of approximately \$5,470. If the student is a dependent in his first year of college, the maximum Stafford loan is only \$2,625, so this is the largest subsidized Stafford loan the student could receive, even though it is far below the student's unmet need. If the student is an independent, or a dependent in his third year or higher, the student is eligible to receive his total unmet need, \$5,470, in subsidized Stafford loans because the maximum for these students is much higher.<sup>11</sup>

Unsubsidized Stafford loans are not disbursed based on financial need. The formula to calculate the amount of unsubsidized Stafford loans a student could receive is similar to above, except that the EFC is not considered.

$$\text{Unsubsidized Stafford Loan} = \min(\text{COA} - \text{grants}, \text{maximumun subsidized})$$

Interest for unsubsidized Stafford loans starts accruing from the time the loan is disbursed, and the interest rate is higher, although still significantly cheaper than private loans.<sup>12</sup> For the 2011-12 school year, the interest rate on subsidized loans is 3.4% and for unsubsidized loans it is 6.8%. Because the average cost of attendance for a community college in the U.S. is over \$10,000, the average Pell grant award is only around \$2,400, and minimal institutional grant aid is available at community colleges, the vast majority of community college students qualify for unsubsidized Stafford loans, and many qualify for subsidized loans as well. For both subsidized and unsubsidized Stafford loans, repayment is not required during college but begins six months after the student leaves college.

Conditional on eligibility for a Stafford loan, take-up of these loans is far from universal. In a study of four-year college students, Cadena and Keys (2010) find that one in six students turn down a subsidized Stafford loan after submitting a FAFSA form and qualifying for the loan. Cadena and Keys suggest several possible explanations for low take-up rates, such as not understanding how the interest subsidy works, the hassle of borrowing and thus having to keep track of paperwork and forms, or an aversion to carrying debt. The explanation that Cadena and Keys determine is most likely

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<sup>11</sup> Students are considered independent if they are over 24 years old, married, parents, or veterans of the military.

<sup>12</sup> Starting in 2012-13, both types of loans will have the same interest rate.

is that students turn down subsidized loans as an enforcement mechanism to limit over spending in college. Additionally, many students do not even apply for federal loans, even if they would have been awarded a loan had they applied. In this study, I find that 13% of community college students never apply for federal loans, but would have received a subsidized Stafford loan had they applied.<sup>13</sup>

Students might not apply for federal aid because of information barriers, such as a lack of knowledge about deadlines and the correct forms necessary to apply (Dynarski and Scott-Clayton 2008 offer a thorough description of the information difficulties students face while borrowing) or debt aversion (Rothstein and Rouse 2011). The low take-up of Stafford loans makes estimating the causal effect of Stafford loan use problematic; students who take-up Stafford loans are likely different than students who do not. Thus, this paper estimates an intent-to-treat model, measuring the effect of access to Stafford loans on community college students' outcomes.

## *2.2 Why Community Colleges Do Not Offer Loans*

Community colleges, or public two-year colleges, differ from traditional four-year colleges in several ways. The highest degree students can earn at a community college is an associate's degree, which takes two years of full time course work to earn. There is generally no on-campus housing, so students live at home or in off-campus apartments. Community colleges also have a much higher percentage of older and independent students. About a third of community college students are independents, compared to about 6% of four-year college students.<sup>14</sup>

In 2009, 111 of the 905 community colleges nationwide did not offer Stafford loans, and more than one out of every ten U.S. community college students did not have access to federal loans.<sup>15</sup> This

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<sup>13</sup> This is an estimated number calculated from the BPS:04/06.

<sup>14</sup> Calculated from the BPS: 04/09.

<sup>15</sup> There is no federally available list of colleges that do not offer Stafford loans, although there are multiple ways this statistic can be calculated from federally available data. First, after examining college cohort default rates, colleges that have no students entering repayment or default in 2009 can be counted as not offering loans, although this is likely a lower bound on the number of colleges not offering loans because a college that does not offer loans could still have students entering repayment from loans that the college offered several years ago. A second method to assess the number of community colleges that do not offer loans would be to count all community colleges that are not found in the list of Stafford loan volumes by college, although this is likely an upper bound because schools could not be found on this list because of typos in their OPE ID or missing data. To be conservative, the statistics in the rest of this section assume the first, lower bound estimate of the schools that

phenomenon occurs for one of two reasons - either the government is denying the college access or the community college is voluntarily deciding not to offer students loans. The government can deny a college access to Stafford loans if a high proportion of the community college's students default on their Stafford loans within the first two years of leaving the school. The federal government has mandated that a default rate is too high if it is over 25% for three consecutive years (in which case the college also loses its Pell grants) or if the community college has a default rate of 40% in a single year (in this case, the college can keep its Pell grants).

The Project on Student Debt reports that these maximum default rate prohibitions are applied in very few, if any, cases and concludes that, "no community college has been sanctioned in recent years, and hardly any community colleges will be at risk of sanctions under the current ... rules." <sup>16</sup> So, it seems that very few, if any, community colleges are forced by the government to forgo offering Stafford loans.

Thus it appears that all or nearly all community colleges that do not offer Stafford loans do so by choice. One hypothesis is that community colleges may not offer loans because they are worried about crossing the 25% default rate barrier and losing their Pell grants as well. The Project on Student Debt report finds such a concern to be unfounded because, "the vast majority of community colleges have CDRs (cohort default rates) well below sanction thresholds."

Examination of college-level loan default rate data, published by the U.S. Department of Education, confirms the Project on Student Debt's conclusion. In 2003-04, the year that I focus on in my empirical analysis, the mean community college default rate in the country was only 6.7% with a standard deviation of 4.8. Only 3.6% of community colleges had default rates above 15%, and less than 1% of schools had a default rate over 18%.<sup>17</sup> This makes it very unlikely that the community

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do not offer Stafford loans be conservative, the statistics in the rest of this section assume the first, lower bound estimate of the schools that do not offer Stafford loans.

<sup>16</sup> Project on Student Debt report titled "Still Denied: How Community Colleges Shortchange Students by Not Offering Federal Loans" - [http://projectonstudentdebt.org/files/pub/still\\_denied.pdf](http://projectonstudentdebt.org/files/pub/still_denied.pdf)

<sup>17</sup> Statistic is from FY2004 and was calculated from college-level cohort default rates published by the Department of Education - <http://www.ifap.ed.gov/DefaultManagement/press/>

colleges that are not offering loans would be close to losing federal aid, especially since the college would have to have a rate over 25% for three consecutive years.

Additionally, it does not appear that community colleges that discontinue offering loans have higher default rates on average than community colleges that continue to offer loans. In 2002, the average default rate of community colleges that discontinued offering loans the following year was 2.3%, with a maximum of 18.6%. The average default rate of all other community colleges in that year was 5.8%. In 2003, the average default rate of community colleges that discontinued offering loans the following year was 4.1%, compared to all other community colleges that had an average default rate of 4.9%. Of the 55 community colleges that stopped offering loans in 2004, only 3 had default rates above 25% in the two previous years. These schools most likely stopped offering loans because they were concerned about the possibility of losing their Pell grants in the following year, but it is more difficult to explain the behavior of the other 52 community colleges.

Figure 1 shows the average default rates over the past two decades for colleges that always offer loans and those that do not. If colleges cease to offer loans because they are approaching the 25% default rate penalty threshold, then one would expect the colleges that stop offering loans to have higher average default rates on average.<sup>18</sup> This pattern does not appear in the data. Community colleges that always offer loans, and those that stop, have very similar default rates over the twenty year period examined. This is again evidence that community colleges that stop offering loans do not appear systematically different than those that always offer loans.

Another explanation for why community colleges choose not to offer loans is that administrators believe that, given the low cost of community college, it is not necessary to borrow to fund a community college education, and these administrators are saving their students from unnecessary borrowing. The data also do not support this rationale. The national average community college cost of attendance (COA) in 2009 was \$10,390 a year.<sup>19</sup> Additionally, community college

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<sup>18</sup> If a college did not offer loans in a given year, their default rate of zero was not included in the mean.

<sup>19</sup> The Institute for College Access and Success report titled "Quick Facts About Financial Aid and Community Colleges, 2007-08" - [http://www.ticas.org/files/pub/cc\\_fact\\_sheet.pdf](http://www.ticas.org/files/pub/cc_fact_sheet.pdf)

students are just as likely as traditional four-year students to have demonstrated need; 83% of community college students have a documented need for financial aid, compared to 81% of students at public four-year colleges.<sup>20</sup>

To further support the hypothesis that a community college's decision to offer loans is exogenously related to the students who attend, all community colleges in Virginia that do not offer Stafford loans were interviewed to determine if there were any additional reasons why a community college would limit access to loans. No administrator cited a reason for not offering loans aside from the two explanations mentioned above. Every administrator referenced either fear of crossing the 25% default rate sanction threshold or the belief that two year colleges should provide a “debt-free” education.

An additional consideration when explaining community colleges' decisions to offer loans is the geographic location of the colleges that are denying their students access. It is possible that a regional contagion arises where it becomes popular in a particular area of the country for community colleges to limit their students' access to loans. States that do not offer their students loans appear to be distributed somewhat randomly throughout the country. Figure 2 shows the percent of community colleges not offering loans at the state level. In half the states in the U.S., all community college students have access to Stafford loans. For the other states, the percentage of community colleges not offering loans ranges from 3% (Minnesota) to 60% (Georgia). Because it appears that there is state-level variation in loan access, state fixed effects are included in all regression specifications estimated in this paper.

Administrator idiosyncrasy appears to best explain why some community colleges do not offer loans. Administrators may have a somewhat exaggerated fear of losing all federal aid and deny their students access to loans well before their schools have crossed the 25% default rate threshold twice. Other administrators may have a feeling of paternalism that causes them to deny their students access to loans to limit their debt post-college. In either case, the community college is choosing not

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<sup>20</sup> The Institute for College Access and Success report titled “Quick Facts About Financial Aid and Community Colleges, 2007-08” - [http://www.ticas.org/files/pub/cc\\_fact\\_sheet.pdf](http://www.ticas.org/files/pub/cc_fact_sheet.pdf)

to offer loans, not because of the actual types of students attending the school, or their needs, but because of a college administrator's random preference.<sup>21</sup>

### 3 Related Literature and Contribution

The majority of research on student college loans has evaluated whether students are credit constrained while applying for and attending college. This literature takes the widely cited fact that family income and college attendance rates in the U.S. are positively correlated as possible evidence of short-run credit constraints in college and tries to separate the effect of these possible credit constraints from the effect of student ability. The evidence on the existence of credit constraints is fairly mixed, with several earlier papers (Cameron & Heckman 1998, Shea 2000, Keane and Wolpin 2001, Carneiro and Heckman 2002, Carmen and Taber 2004) finding little to no evidence of credit constraints, while several newer studies using more recent data (Belley and Lochner 2007, Lovenheim 2011) find evidence of credit constraints in students' post-secondary schooling decisions.

Few papers evaluate the effect of the Stafford loan program specifically on college outcomes. Reyes (1995) finds that Stafford loans increase attendance using a change in the relative loan availability across income groups that occurred due to the Middle Income Assistance Act of 1978. Dynarski (2003) uses variation in eligibility for federal loans caused by the Higher Education Amendments of 1992, and finds that federal loans have a weak effect on enrollment and college choice. Both of these papers use a difference-in-difference strategy around an administrative policy change in the Stafford loan program to evaluate its effects. Consequently, the effect of Stafford loans is identified off students who are affected by the policy change. Students who change their Stafford loan borrowing because of a small change in eligibility, for example, might not be representative of

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<sup>21</sup> Several researchers have suggested that a third possible reason why some schools do not offer loans is that it is costly to hire an additional financial aid officer to administer loans. While during my interviews of community colleges in Virginia, no schools mentioned this as a possible cause, it could be a factor. This would lead researchers to worry that schools in particularly tight budget crises would be less likely to offer Stafford loans, although administrators might worry that not offering loans could affect enrollment, and hurt the budget even more. Regardless, in the Estimation Section I show that a college's financial characteristics are not correlated to loan access.

students who use Stafford loans as a whole. For example, Dynarski (2003) identifies the effect of Stafford loans on students who qualified for subsidized Stafford loans because of a change that removed home equity from the group of assets “taxed” in the financial aid formula. Students on the margin of qualifying for a federal loan are most likely not representative of the average loan user.

Given the limited research on the effects of access to federal Stafford loans on student outcomes, no research specifically examines community college students. The majority of research on community colleges is focused on the labor market returns to two-year colleges (Grubb 1993 and 1997, Kane and Rouse 1995 and 1997, Leigh and Gill 1997) and whether community colleges have an overall negative or positive effect on educational attainment (Rouse 1995 and 1998, Leigh and Gill 2003). This literature has found positive labor market returns to attending a community college and that the negative “diversion” effect of community colleges (some students who enroll in community college would have enrolled at four-year colleges) is outweighed by the larger “democratization” effect (many students who would not have enrolled in any higher education can enroll in community colleges). Finally, Dunlop (2011) explores factors that determine community college student's degree attainment by examining the effects of four-year college choice and quality. I find that while quality is not a primary factor in the four-year college choice of community college transfer students, college quality has a large effect on attainment.

This paper adds to current research on student loans and community colleges in several ways. First, this paper evaluates the effect of Stafford loans, not using differences in behavior around a policy change in the structure of the Stafford loan program, but using exogenous variation in overall loan availability. The estimation strategy in this paper allows for analysis of the overall effect of the Stafford loan program on all Stafford loan users, not just on marginal students affected by the policy change. Second, the previous research on Stafford loans and federal aid in general, has focused on the effect of these programs on a student's college enrollment decision. Since college persistence is arguably a better indicator of the overall social value of these programs, I examine college attainment, as well as several other college outcomes. Finally, little, if any work has examined the effect of federal



financial aid programs or credit constraints on community college students specifically. This research combines those two areas of research to evaluate the effects of a multi-billion dollar federal program on a population that comprises a third of all U.S. college students.

## 4 Theoretical Model

Using a two-period model, I illustrate how changing loan access impacts a student's intertemporal consumption, labor supply in college, and educational attainment. In the first period of the model, the student attends college, and in the second period, the student is employed post-college.<sup>22</sup> In both periods, the student values consumption and leisure. The student chooses how many credits to take in college, which can be thought of as choosing the level of higher education to obtain, how many hours to work while enrolled, and the amount of loans to take to maximize his lifetime utility. The student is maximizing the following utility function:

$$U_i = u_1(\text{consumption}_{1i}, \text{leisure}_{1i}) + \beta u_2(\text{consumption}_{2i}, \text{leisure}_{2i}) \quad (1)$$

The student's consumption in the first period, while enrolled in college, is:

$$\text{consumption}_{1i} = \text{Transfers}_i + \text{Loans}_i + \text{wage} \cdot \text{hours Worked}_i - \text{tuition} \cdot \text{credits}_i \quad (2)$$

where  $\text{Transfers}_i$  are the transfers the student receives from his parents,  $\text{Loans}_i$  is the amount of loans the student takes,  $\text{wage}$  is the wage a student earns while working during college,

$\text{hours Worked}_i$  is the number of hours the student works while enrolled in college,  $\text{tuition}$  is the

tuition price per credit, and  $\text{credits}_i$  is the number of credits the student chooses to take in college.<sup>23</sup>

The student's consumption in the second period, post-college, is:

$$\text{consumption}_{2i} = \text{Income}(\text{credits}_i) - \text{interestRate} \cdot \text{Loans}_i \quad (3)$$

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<sup>22</sup> This model has no college choice decision. Dunlop (2011) finds that distance from home is the most significant factor in a student's community college choice and that 90% of students attend their local community college. These facts indicate that there is little variation in a community college student's college choice margin. Additionally, in this paper, I show that whether a college offers Stafford loans does not affect a student's choice between nearby community colleges. Because there is little variation in community college students' college choice decisions, and loan access does not appear to affect what little variation there is, this choice is removed from the model for simplicity.

<sup>23</sup> Savings does not play a role in this model because it is likely that the student will be wealthier post-college than during college. If savings were to be included in this model, saving money during college could be thought of as taking negative loans.

where  $Income(\cdot)$  is the student's income (*abbreviated by*  $I(\cdot)$ ), which is a function of the number of credits the student took in college, and  $interestRate$  is equal to one plus the interest rate on the student's loans (*abbreviated by*  $R$ ).  $\frac{\partial I}{\partial d} > 0$ , thus the more college the student completes, the higher the student's post-college income.

The student is subject to one additional constraint, and that is a time constraint during college:

$$1 = leisure_{1i} + hoursWorked_i + schoolTime \cdot credits_i \quad (4)$$

where  $schoolTime$  is the school time required per credit taken (*abbreviated by*  $s$ ).<sup>24</sup> This is the time required to attend class, plus whatever study time is necessary. The student's total time allotment is normalized to 1.

In this simple version of the model, no constraints define the student's leisure in the post-college period. It can be assumed that this variable is given. An extended version of the model could have a student's college choices affect post-college leisure, but this relationship is not included in this basic specification.<sup>25</sup>

The student chooses:  $c_{1i}$  (consumption in college),  $l_{1i}$  (leisure in college),  $c_{2i}$  (consumption post-college),  $h_i$  (hours worked in college),  $d_i$  (credits taken), and  $L_i$  (amount of loans). It is assumed that  $T_i$  (parental transfers),  $w$  (wage earned in college),  $p$  (tuition price per credit),  $I(\cdot)$  (post-college income function) and  $R$  (interest rate) are given.<sup>26</sup> When the student chooses  $h_i$ ,  $d_i$ , and  $L_i$ ,  $c_{1i}$  is defined by the budget constraint in the first period,  $c_{2i}$  is defined by the budget constraint in the second period, and  $l_{1i}$  is defined by the time constraint, so the problem can be simplified into three choice variables: hours worked in college, credits earned, and loans.

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<sup>24</sup> I assume that the amount of school time each credit takes,  $schoolTime$ , is exogenous and unrelated to attainment or future income. A more complicated model could include these relationships.

<sup>25</sup> One way to have student choices in college affect leisure in the post-college period is to include an hours worked decision in the post-college period, and individuals with more college debt can choose to work more in that period.

<sup>26</sup> In reality, parental transfers could be crowded out by loans. This model could be extended to have parental transfers as a function of loans, but this is not included here for simplicity.

The student trades off working hours during college with the number of credits he takes.<sup>27</sup>

If the student works more, he can consume more in the first period, when he is relatively poor. If the student takes more credits, he will have less time for working during college, but over his lifetime, he will have more wealth. Loans allow students to borrow against their future earnings to take additional credits in college and smooth consumption between periods.

The trade-offs the student faces can easily be seen in the model's first order conditions. After substituting the three constraints into the student's utility function, the first order conditions are the following:

$$\frac{\partial U}{\partial h} = \frac{\partial u_1}{\partial c_1} w - \frac{\partial u_1}{\partial l_1} = 0 \quad (5)$$

$$\frac{\partial U}{\partial d} = -p \frac{\partial u_1}{\partial c_1} - s \frac{\partial u_1}{\partial l_1} + \beta \frac{\partial u_2}{\partial c_2} \frac{\partial I}{\partial d} = 0 \quad (6)$$

$$\frac{\partial U}{\partial L} = \frac{\partial u_1}{\partial c_1} - \beta \frac{\partial u_2}{\partial c_2} R = 0 \quad (7)$$

The model implies, from (5), that:

$$\frac{\partial u_1}{\partial l_1} / \frac{\partial u_1}{\partial c_1} = w \quad (8)$$

indicating that the marginal rate of substitution between leisure and consumption in the first period is equal to the inverse of the ratio of their marginal costs. The during-college wage,  $w$ , is the additional amount of consumption a student gets when he works one more hour, and has one less hour of leisure.

The model also implies, from (7), that:

$$\frac{\partial u_1}{\partial c_1} / \beta \frac{\partial u_2}{\partial c_2} = R \quad (9)$$

indicating that the marginal rate of substitution between consumption in the first period and consumption in the second period is equal to the inverse ratio of their marginal costs. Every extra

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<sup>27</sup> Since the student's total time allotment in college is normalized to 1, it is assumed that all students spend the same number of years in college. So for a given time, the student can choose between working and credits earned. In actuality, the student can work many hours and take many credits, but just stay in college for a long time. This extra margin of student choice is not considered in this model, but this model could be extended to incorporate it.

dollar the student consumes in the first period must be paid back in the second period at the interest rate,  $R$ .

Finally, all three first order conditions can be combined to show that<sup>28</sup>:

$$w = \frac{\frac{1}{R} \frac{\partial I}{\partial d} - p}{s} \quad (10)$$

When the student chooses between hours worked in college and the number of credits to take, the marginal value of working one unit of time in college,  $w$ , is equal to the marginal value of taking one additional unit of time's worth of credits<sup>29</sup>. The interpretation of this equation depends on the functional form of  $I(\cdot)$ .<sup>30</sup> Because many students both work in college and take credits, the degenerate case of the model where  $I(\cdot)$  is linear is not very pertinent, and the remainder of this analysis with focus on the case where  $\frac{\partial I}{\partial d} > 0$  and  $\frac{\partial^2 I}{\partial d^2} < 0$  (income is increasing in college credits, but at a decreasing rate). Under this assumption, the return to an additional credit decreases with credits, so the student chooses the number of hours to work and the number of credits to take by setting the marginal benefit of an additional hour working,  $w$ , to the marginal benefit of taking an additional hour of credits,  $\frac{\frac{1}{R} \frac{\partial I}{\partial d} - p}{s}$ .

Students consider these trade-offs and maximize their utility by choosing their optimal hours worked ( $h_i^*$ ), credits earned ( $d_i^*$ ), and loans borrowed ( $L_i^*$ ).

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<sup>28</sup> This equation was derived by dividing (6) by  $\frac{\partial u_1}{\partial c_1}$ , the marginal utility of consumption in the first period, and substituting in (5) and (7).

<sup>29</sup> In one unit of time, the student can take  $\frac{1}{s}$  credits, and the benefit of these credits is the discounted increase in income,  $\frac{1}{R} \frac{\partial I}{\partial d}$ , minus the cost,  $p$ .

<sup>30</sup> When  $I(\cdot)$  is linear the model becomes degenerate because it is unlikely that equation (10) will hold in equality, given that  $\frac{\partial I}{\partial d}$  (derivative of  $I(\cdot)$  with respect to credits),  $w$  (during-college wage),  $R$  (interest rate plus one),  $p$  (tuition price per credit), and  $s$  (school time required per credit) are all given. In that case, the student will be at a corner solution, spending all his time not in leisure on either working or taking credits, but not both. If  $w > \frac{\frac{1}{R} \frac{\partial I}{\partial d} - p}{s}$ , the student will spend all his time working, never taking any credits, and never actually becoming a student. Given the vast literature on the returns to college, it is a reasonable assumption that the returns to entering college are greater than the returns to working immediately out of high school. If  $I(\cdot)$  is assumed to be linear, it should also be assumed that  $w < \frac{\frac{1}{R} \frac{\partial I}{\partial d} - p}{s}$ , implying that students will choose to take as many credits as time allows, and never work during college.

Now assume that students face an increased interest rate. This would occur if students did not have access to federal Stafford loans and needed to borrow at the private loan interest rate, which is considerably higher than the government rate. For students with  $L^* = 0$ , an increase in the interest rate will have no effect, as they will not choose to start borrowing. These students choose the same  $h_i^*$ ,  $d_i^*$ , and  $L_i^*$ . Students may choose to take no loans, and therefore be unaffected by changing interest rates, if the students has large parental transfers,  $T_i$ .

For the remainder of the students, for whom  $L_i^* > 0$ , the students must adjust their hours worked, credits taken, and loans to compensate for rising interest rates, assuming that the students are not already at a corner solution. To derive the effect of an increased interest rate on credits, hours worked, and loans, I start with equation (10). Since the only term in (10) that is variable is  $\frac{\partial I}{\partial d}$ , when there is an increase in  $R$ ,  $\frac{\partial I}{\partial d}$  must also increase.  $I(\cdot)$  is concave, so an increase in  $I'$  indicates a decrease in credits taken. To summarize, for students who would choose a positive amount of loans given the original interest rate, for example the federal Stafford loan interest rate, they would choose to take less credits (complete less education) when the interest rate rises to, for example, the private loan interest rate level, which would happen if Stafford loans were no longer available.

Next, to derive the effect of an increased interest rate on hours worked, I multiply (8) by (9):

$$\frac{\partial u_1}{\partial l_1} / \beta \frac{\partial u_2}{\partial c_2} = wR \quad (11)$$

Given equation (11) and the fact that credits are decreasing, it must be the case that the number of hours worked during college is increasing as well.<sup>31</sup> So for students who would choose a

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<sup>31</sup> If the interest rate,  $R$ , increases, the term on the left must increase because  $w$  is fixed. We know from the second period budget constraint, (3), that if the interest rate increases,  $c_2$  must decrease, so  $\frac{\partial u_1}{\partial c_1}$  must be increasing. I assume that utility of consumption and leisure are increasing at a decreasing rate so  $\frac{\partial u_1}{\partial c_1} > 0$ ,  $\frac{\partial u_1}{\partial l_1} > 0$ ,  $\frac{\partial u_2}{\partial c_2} > 0$ ,  $\frac{\partial^2 u_2}{\partial c_1^2} < 0$ ,  $\frac{\partial^2 u_1}{\partial l_1^2} < 0$  and  $\frac{\partial^2 u_2}{\partial c_2^2} < 0$ . If, when the interest rate,  $R$ , increases, the left term must increase as well, and  $\frac{\partial u_1}{\partial l_1}$  is also increasing, it must be that  $\frac{\partial u_2}{\partial c_2}$  is increasing. If  $\frac{\partial u_1}{\partial l_1}$  is increasing, that indicates that  $l_1$  is decreasing. Since I already showed that credits are decreasing, the only way for leisure to be decreasing as well, is if hours worked,  $h$ , increases.

positive amount of loans given the original Stafford loan interest rate, they would choose to work more hours during college if the interest rates increased to the private loan interest rate.

Finally, because  $\frac{\partial u_1}{\partial c_1}$  and  $\frac{\partial u_1}{\partial l_1}$  must be kept in a constant ratio, as indicated by (8), it must be the case that for students who would choose a positive amount of loans given the original interest rate, they would choose to take less loans when the interest rate is increased.<sup>32</sup>

For students who borrow loans under the original interest rate, for example the Stafford loan interest rate, they will chose to complete less college (take fewer credits), work more hours while enrolled, and take fewer loans if the interest rate rises to the private loan interest rate. Another interpretation of these results is that for students who are credit constrained, which is equivalent to having the interest rate approach infinity and be prohibitively expensive, students will complete less college, work more hours during school, and take fewer loans. For those students who were originally taking no loans, for whom  $L^*=0$ , then  $\frac{\partial h}{\partial R} = 0$ ,  $\frac{\partial d}{\partial R} = 0$ , and  $\frac{\partial L}{\partial R} = 0$ . These students will continue to take no loans, work the same number of hours, take the same number of credits, and be unaffected by higher interest rates.

This paper investigates the effect of Stafford loan access on students' college outcomes. Without access to Stafford loans, all students who wish to take a positive amount of loans, are credit constrained, and will have to take fewer loans than optimal. The model predicts that when a student faces an increased interest rate, the student will work more hours during school and take fewer credits and loans. While the sign of these effects is clear from the model, the magnitudes are not. The Estimation Section outlines a strategy to measure the magnitude of the effect of Stafford loan access, which lowers the interest rate students face, on students' college outcomes, including total loans, hours worked, and credits earned. Additionally, there are other persistence measures investigated

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<sup>32</sup> Since I showed above that  $\frac{\partial u_1}{\partial l_1}$  must increase when the interest rate,  $R$ , increases, it must also be the case that  $\frac{\partial u_1}{\partial c_1}$  increases when the interest rate increases. If  $\frac{\partial u_1}{\partial c_1}$  increases, that indicates that consumption in the first period is decreasing. Since we already showed that credits are decreasing and hours worked are increasing, the only way for consumption to decrease is if loans decrease.

that are closely related to credits earned, such as associate's and bachelor's degree attainment, transfer to a four-year college, and total months enrolled.

## 5 Estimation Strategy

I measure the impact of Stafford loans on numerous outcomes of community college students by comparing outcomes for those who are eligible and attend a community college that offered loans to those who are eligible but attend a community college that did not offer loans. Thus, I do not consider the endogenous decision of whether to take a Stafford loan. Yet, I still make the critical assumption that access to loans is random.

### 5.1 Estimating Equations

Since I focus on the effect of the Stafford loan program, I only include students who appear to qualify to receive a Stafford loan in the regression analysis.<sup>33</sup> All students who have a cost of attendance that exceeds their total grant award will qualify for unsubsidized Stafford loans. The average cost of attendance of a community college in the U.S. is over \$10,000 and the average Pell grant award is only \$2,400, so the majority of students qualify for unsubsidized Stafford loans. Since all students who qualify for a subsidized Stafford loan also qualify for an unsubsidized Stafford loan, the population of interest for this analysis is all students who qualify for an unsubsidized Stafford loan. In 2004, 91% of community college students qualified for an unsubsidized Stafford loan.<sup>34</sup>

I estimate the following OLS regression:<sup>35</sup>

$$Y_i = \beta_0 + LoanAccess_i\beta_1 + independent_i\beta_2 + age_i\beta_3 + female_i\beta_4 + race_i\beta_5 + parentEd_i\beta_6 + SAT_i\beta_7 + hsGPA_i\beta_9 + income_i\beta_9 + State_i\beta_{10} + \varepsilon_i \quad (12)$$

<sup>33</sup> I include all students who qualified for a Stafford loan, regardless of whether they applied for federal aid by completing a FAFSA, even though this is a crucial step in the take-up decision. Different types of students could submit FAFSAs depending on whether their community college offers Stafford loans, and I do not want this endogeneity to bias my results.

<sup>34</sup> Calculated from the BPS:04/09.

<sup>35</sup> For the college outcomes that are binary, this specification was also estimated as a logit model. The point estimates of the change in probability of the outcome when a college offers loans are very similar in magnitude between the OLS and logit models.

where  $Y_i$  is the college outcome of interest and  $LoanAccess_i$  is an indicator for whether the student's community college offers loans, which is the key independent variable. I also control for  $independent_i$ , an indicator for the student being an independent student;  $age_i$ , the age of the student when he begins college;  $female_i$ , an indicator for being female;  $race_i$ , a set of race dummy variables;  $ParentEd_i$ , a set of indicators that capture the education level of the student's mother and father;  $SAT_i$ , the student's math SAT score, verbal SAT score, and an indicator for not taking the SAT;  $hsGPA_i$ , the student's high school GPA;  $income_i$ , the student's parent's income, unless the student is an independent, in which case  $income_i$  is the student's (and his spouse's) income; and  $State_i$ , state fixed effects. The random error  $\varepsilon_i$  is clustered at the community college level.

I include these covariates because they could potentially affect college outcomes, and, to the extent that loan access may not be completely exogenous to student characteristics, including these controls will mitigate any endogeneity bias. I include state fixed effects because state-wide higher education policies may be correlated to loan access. For instance, states with large state grant programs could have community colleges that are less likely to offer loans. With state fixed effects, the effect of loans is identified by comparing students in a given state who have access to loans with students in the same state who do not.

Another approach to this question would be to investigate the effect of Stafford loan dollars received, not just access to Stafford loans, on community college students' outcomes. I do not take this approach because not all students who have access to Stafford loans use them, and I have no instrument to explain why some students use available Stafford loan dollars, while others do not. Because use of Stafford loans, conditional on being awarded them, could be correlated with something about the student, such as private information the student has about his future income, the estimated effect of Stafford loan dollars would be biased. To avoid the issue of endogenous take-up, this paper estimates the intent-to-treat of access to Stafford loans on student outcomes.<sup>36</sup>

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<sup>36</sup> I could choose to estimate a treatment effect on the treated specification, even with these endogeneity issues, but given the large number of regression results already included in this analysis, I do not focus on this specification.



Additionally, I estimate an instrumental variables model where I measure the effect of total loans in the first year on college outcomes, instrumenting for total loans with access to Stafford loans.

The first stage is:

$$TotalLoans_i = LoanAccess_i \alpha_1 + X_i \alpha_2 + \mu_i \quad (13)$$

And the second stage is:

$$Y_i = \widehat{TotalLoans}_i \beta_1 + X_i \beta_2 + \varepsilon_i \quad (14)$$

where  $X_i$  are the covariates described in the base regression.

There are several reasons why a student's total loan amount is possibly endogenous to college outcomes. Perhaps the most motivated and organized students are able to submit their FAFSA forms on time and are more likely to receive federal loans. Maybe only the most privileged students are aware of the private loan market and are able to take loans in the case of attending a community college that does not offer Stafford loans. In both cases, the estimated effect of total loans would be biased upward because these student attributes are positively correlated to both total loans and college outcomes.

I use access to Stafford loans as an instrument for total loans because loan access has a large and statistically significant effect on total loans. This strong effect occurs because community college students have very few other loan options; only 3% of community college students take private loans. As argued in the next section, while Stafford loan access does effect total loans, there is no evidence that it has a direct effect on college attainment outcomes.

## *5.2 Exogeneity of Access to Loans*

This empirical test relies on the assumption that access to loans is uncorrelated with factors that affect students' college achievement. If, for instance, more highly motivated or determined students attend schools that are more likely to offer loans, the estimated effect of loan access would be biased. Two possible selection problems could threaten the validity of this assumption; one involving endogenous selection by students, the second involving endogenous loan offering by colleges.

The second possible selection problem is that a community college's decision to offer loans might be correlated with other characteristics of the college that affect students' outcomes. For example, if community colleges that offer the highest quality educations are also most likely to offer loans, the effect of loans in the specification above would be biased. A similar issue would arise if community colleges that serve the most disadvantaged students are least likely to offer loans. This might occur if schools with the highest potential default rates are least likely to offer loans.

I use several large nationally representative longitudinal data sets and a census of all community college students in Virginia to estimate the magnitude of these potential selection issues. Neither source of selection bias appears in any of the data sets.

To investigate the correlation between students' community college decisions and the availability of 17 Stafford loans, I examine two large nationally representative data sets, the Educational Longitudinal Study of 2002 (ELS:02) and the National Educational Longitudinal Study of 1988 (NELS:88). ELS:02 includes students who are tenth graders in 2002 and NELS:88 includes students who are eighth graders in 1988. In both studies, I estimate a multinomial logit model predicting whether a high school student works, enters a community college, or enters a four-year college after graduating high school, controlling for whether the student's closest community college offers loans, along with other control variables similar to the main specification show earlier. Whether a student's closest community college offers loans may be a pertinent margin for students because 90% of community college students attend the closest community college to their home (Dunlop 2011). In neither study does the presence of loans at a student's local community college affect the student's post-high school plans. The results from the multinomial logit estimated with the ELS:02 data are included in the appendix, Table A1.<sup>37</sup> The estimated marginal effect of the closest community

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<sup>37</sup> For this regression, I used a measure of loan offering derived from cohort default rate data. This is the measure that is a lower bound on the number of schools that offer loans. For more information on this measure, see footnote 15 on page 6. Additionally, I have replicated these regressions using data from the loan volumes data, which is likely an upper bound on the number of school that offer loans. The regression results are similarly small in magnitude and insignificant, regardless of the measure. For more information on the measure of loan access using the loan volumes data, see the end of the Data Section, page 22-23.

college offering loans on a student's decision to enter community college is small (1.3 percentage points) and highly insignificant, with a p-value of 0.561.

Additionally, in a case study of loan access in Virginia, Dunlop (2011) finds that a student's decision to attend his local community college, versus another community college in the state, is not affected by the presence of Stafford loans at his local community college. While estimating a linear probability model that predicts whether a community college student attends his local community college, controlling for a rich set of student and county demographics, the point estimate of the effect of the local community college offering loans is small at only -0.65 percentage points and highly insignificant (p value is .935).

To evaluate the exogeneity of a community college's decision to offer loans, I examined the loan availability decision of U.S. community colleges in 2003-04, the year the students in the Beginning Postsecondary Student Study of 2004 (BPS:04/09) attended college, and found that a community college's characteristics were not related to the community college's decision to offer loans. Using data on all community colleges in the U.S. in that year, I regressed whether a community college offered loans on the number of degrees awarded, tuition, instructional expenditures other than salaries, faculty and staff salaries and wages, total expenditures at the college, total enrollment, and the number of black, Hispanic, Asian, and other race students. There was only one significant effect, and it is economically trivial due to its small magnitude.<sup>38</sup> If a community college has tuition that is \$500 higher (this is a large change given the mean is only \$1,700), the college is 3.3 percentage points more likely to offer loans.<sup>39</sup> Table 1 shows the results of the regression of community college characteristics on loan availability. I also replicated this analysis on U.S. community colleges in 1992-93, the year students in NELS:88 enter college. For this data, there were no significant effects of college characteristics on the colleges' decisions to offer loans.

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<sup>38</sup> See the previous footnote, 38, for a description of the loan access variable used.

<sup>39</sup> Another way to gauge the magnitude of this effect is to control for the log of tuition. In this case, a 10% increase in tuition makes colleges 1.2 percentage points more likely to offer loans.

Finally, in the same case study in Virginia, Dunlop (2011) finds that population characteristics of the county a community college is located in or serves, such as the percent of college graduates, median home value, median family income, and persons per square mile, are not correlated with the decision to offer loans.<sup>40</sup> Additionally, demographics of a community college's incoming class, such as race and family income, are not related to whether that community college offers loans.<sup>41</sup>

There is no hypothesis as to why community colleges would choose not to offer loans that both indicates an endogeneity problem and is supported by the data. Following the discussion in Section 2.2 that outlines possible hypotheses as to why community colleges would choose not to offer loans, the only conclusion to be reached is that loan access is caused by some idiosyncratic administrator preference. Moreover, using multiple nationally representative data sets and one state level administrative data set, I have shown that a student's decision to enter community college in general, or to choose a specific community college, is unrelated to whether the student's local community college offers loans. Further, these data sets show that a community college's decision to offer loans is unrelated to local county demographics, the characteristics of the student body, and the characteristics of the school itself.

## 6 Data

I use data from the Beginning Postsecondary Student Study of 2004 (BPS:04/09), which is collected by the National Center for Education Statistics at the U.S. Department of Education. The students in the BPS:04 are the first-time college students in the 2004 National Postsecondary Student

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<sup>40</sup> In a regression predicting loan access at Virginia community colleges in 2000-01, controlling for a number of characteristics of the counties served by each community college (percent Black, percent Hispanic, percent who speak another language at home, percent high school graduates, percent college graduates, percent home owners, median home value, median family income, percent below the poverty line and persons per square mile; all from the 2000 Census), there were no statistically significant effects.

<sup>41</sup> In a regression predicting average family income of the incoming class of community college students, while controlling for a time trend and whether the community college offered loans in that year, Dunlop (2011) found the effect of loans to be negative, but small in magnitude, -\$240, and statistically insignificant with a p-value of .572. In a regression predicting the percent of black students in the incoming class of community college students, while controlling for a time trend and whether the community college offered loans in that year, Dunlop (2011) found that the effect of loans was negative, but small, -3.1 percentage points, and statistically insignificant, with a p-value of .173

Aid Study (NPSAS:04). NPSAS is a comprehensive cross-sectional study of financial aid use among postsecondary education students in the U.S. conducted approximately every three years. In some years, the first-time students interviewed for the NPSAS are interviewed in subsequent years so that questions regarding the effect of financial aid on persistence and degree completion can be answered. The longitudinal study of first time students in the NPSAS constitutes the BPS.

The BPS:04 interviewed over 16,000 first-time college students in spring 2004 and again in spring 2006 and spring 2009. Additional information from federal financial aid records and from college institutions was collected as well.

This analysis focuses on the effect of Stafford loans on community college students, so I only include students whose first institution was a “public two-year college” from the BPS data. Since the work I did with both the Educational Longitudinal Survey of 2002 (ELS:02) and the National Educational Longitudinal Survey of 1988 (NELS:88), outlined in Section 5.2, shows that the availability of loans does not affect selection into community college, this sample structure should not generate bias in the results. There are a total of 5,549 public two-year or community college students in the BPS:04/09. To understand how community college students differ from traditional four-year students, appendix Table A2 shows descriptive statistics for four different populations in the BPS:04/09: all four-year college students, all community college students, dependent community college students, and independent community college students. I consider dependent and independent students separately because they often have very different monetary constraints while attending college, and are eligible for different amounts of Stafford loans. For a description of how community college students and four-year students vary, see the appendix.

Table 2 shows descriptive statistics for six different types of borrowers within the community college sample; those who qualify and use, subsidized Stafford loans, unsubsidized Stafford loans, and the maximum subsidized Stafford loan.<sup>42</sup> The demographics across the groups of Stafford loan borrowers are fairly similar, with a few notable exceptions. Hispanic and Asian students are far less

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<sup>42</sup> In this table, “qualify” means the student could have received a loan conditional on applying, but I am not specifying that the student actually applied.

likely to use subsidized, unsubsidized, and the maximum Stafford loans, conditional on qualifying for them. The sample of students who qualify for subsidized Stafford loans is 15% Hispanic and 4% Asian, while the sample who uses Stafford loans is only 6% Hispanic and 2% Asian. A similar pattern holds for unsubsidized Stafford loans and maximum Stafford loans.

Additionally, of the students who qualify for subsidized, unsubsidized, and the maximum Stafford loans, the students who use the loans have higher family incomes. Students who qualify for subsidized Stafford loans have an average income of \$25,700, but students who use subsidized Stafford loans have an average income of \$31,000. Again, a similar pattern exists for unsubsidized Stafford and the maximum Stafford loans. Because of this selection into who takes up Stafford loans, the variable of interest in this analysis is access to Stafford loans, not Stafford loan use.

Figures 3A-3F are histograms showing the unmet need, cost of attendance, and expected family contribution for dependent and independent community college students in the BPS. Remember that cost of attendance is the institution's estimate of the total cost of attending that school for a year, expected family contribution is what the government expects a family can contribute towards their child's education, and unmet need is the difference between the cost of attendance and the sum of expected family contribution and grant aid. The distributions are shown separately for dependent and independent students because the previous tables showed major differences in their finances and maximum loan eligibility.

Figure 3A shows the density of positive unmet need for all dependent community college students in the BPS:04/09. Most of the distribution mass is right around the maximum, with a long right tail. The distribution is asymmetrical because unmet need is bounded at zero, while some students have very high unmet need if their cost of attendance is high (perhaps they are out of state students), their expected family contribution is zero, or they receive no grant aid. A student is awarded a subsidized Stafford loan equal to his unmet need, up until the maximum Stafford loan allowed. The maximum varies by year in school and dependency status. The maximum Stafford loan

for first year dependent students is \$2,625, which is shown. The maximum for dependent second year students increases to \$3,500 and for the third through fifth years, the limit is \$5,500.

Figure 3B shows the positive unmet need for all independent community college students. For independent students, the maximum for first year is \$6,625 (which is shown), second year is \$7,500, and third through fifth years is \$8,000. The distribution of unmet need for independent students is less concentrated, and a smaller percent of students qualify to take the maximum, compared to dependent students.

Figures 3C and 3D show the expected family contribution (EFC) for dependent and independent students respectively. Many dependent community college students have an EFC of \$0, and the majority of families have an EFC less than \$20,000. For independent students, the distribution of EFC is shifted to the left, so even more students have an EFC of \$0 and the vast majority of students have an EFC less than \$20,000.

Figures 3E and 3F show the cost of attendance (COA) for dependent and independent community college students respectively. Dependent students attend community colleges with relatively higher COAs. Most of the density mass of COA for dependent students is around \$8,000 while most of the density mass of COA for independent students is around \$6,000.

Table 3 shows descriptive statistics of the outcome and control variables used in this analysis. The BPS:04/09 has very little data that is missing because of non-response, although some questions are not asked of all students. Credit hours in the first year are missing for about 30% of the students because students who attended more than one college in their first year, or who attended colleges that do not have 21 standard terms or that are on a clock-hour system were not asked this question.

Similarly, the BPS only asks questions about high school, such as SAT scores and high school GPA, if the student is under 24 years old. Therefore, these variables are missing for students who are 24 years or older at the end of their first year in college when they were surveyed.<sup>43</sup> Also, since not all community college students take the SAT, this variable is not available for those students. To keep the

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<sup>43</sup> Because the BPS is a random survey of all college students, the students in the sample range in age from 15 to 72 years old.

sample representative, indicator variables are created for not taking the SAT, having missing SAT information (indicating that the student is under 24), and having missing HS GPA information (indicating that the student is under 24 or did not receive a diploma in high school). The math SAT, verbal SAT, and HS GPA variables that are missing are coded as 0, so that these students can still be used in the analysis. The only variables with actual missing data are mother's and father's education. Two additional variables, mother's education missing and father's education missing are constructed so no students are removed from the analysis.

Additionally, weekly hours worked in the third year and working all weeks in the third year were all summarized only for those students still enrolled in college, so their sample sizes are smaller. The regressions using these outcomes will also only be estimated on students who are still enrolled.

Finally, I utilized an additional source of data to create a measure of loan access at the community college level for the 2003-04 school year. Since no publicly available list of community colleges that offer federal loans is available, this measure must be constructed from other sources. I use information from published college-level federal Stafford loan volumes, which are publicly available by the U.S. Department of Education. The data are from the 2003-04 school year, which is the same year that the students in the BPS:04/09 began college. The difficulty in using the loan volume data is that only schools that offer loans are on the list, so to the extent that community colleges that students in the BPS attend do not match with this data, it is unclear whether this is due to mistakes coding the college ID numbers, missing data, or because the colleges actually do not offer loans. Because of this fact, I combined information from the college loan volume data with the only other data available on which schools offered loans in 2003-04, data from the BPS:04/09 itself. A school is coded as not offering loans for the bulk of this analysis if it is not listed in the federal loan volume data and no students in the BPS:04/09 take a positive amount of Stafford loans at the school.

<sup>44</sup> The combined measure of loan access is the preferred measure because it combines all available

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<sup>44</sup> There are 39 schools in the BPS:04/09 that are not found in the loan volume data. Of these schools, 7 have a positive amount of students that took Stafford loans. These 7 schools are recoded as offering loans in the loan access measure that combines information from both data sources.



data and also matches the population averages found in other studies.<sup>45</sup> As a robustness check, the analysis in this paper is re-estimated using a definition of loans derived solely from the loan volume data (schools missing from the loans file are all coded as not offering loans). The results are fairly robust to this second definition, although the point estimates are smaller in magnitude.

## 7 Results

My empirical approach is to investigate the effects of Stafford loan availability on student outcomes including total loans, educational attainment, employment, and finances. I investigate total loans borrowed to see if Stafford loan dollars represent an additional source of aid or simply crowd-out other loans that the student would have received anyway. I use several measures of educational attainment, including credits taken in the first year (to examine whether loans affect the speed students move through community college), associate's degree attainment, transfer to a four-year college, bachelor's degree attainment, and total months enrolled in college. I investigate the effect of the availability of loans on work in the first and third years of college because credit constrained students may take on extra work and consequently spend less time studying.<sup>46</sup> Finally, I examine the effect of loan access on credit card debt in the first year of college to investigate whether limited access to loans leads students to reduce consumption or borrow by other means.

I disaggregate the sample into dependent and independent students, as there are several reasons why the return to Stafford loans might differ between these groups. First, a student qualifies

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<sup>45</sup> Using the combined measure, 9% of community colleges are coded as not offering loans, which is consistent with analysis conducted by the Project on Student Debt ([http://projectonstudentdebt.org/files/pub/still\\_denied.pdf](http://projectonstudentdebt.org/files/pub/still_denied.pdf)). Earlier in the analysis, a more conservative measure of loan access, derived from college default rates was used. This measure is likely a lower bound on the number of schools that do not offer Stafford loans (see footnote 15, page 6 for more information). The measure of loan access that only uses information from the loan volume files is likely an upper bound, because it may count some colleges as not offering loans because of data mistakes. The measure that combines information from the loan volume file and the BPS is the best measure because it falls between the two bounds, and as mentioned earlier, is similar to other measures calculated. This best measure of loan access is not used to calculate the summary statistics about schools that do not offer loans in Section 2.2 because it can only be used in the context of the BPS (given that I only have additional information about schools that appear in the BPS), so it cannot be used in an analysis of all community colleges nationwide.

<sup>46</sup> The employment variables are only measured in the first and third years of college because these are the years that the students was interviewed as part of the BPS:04/09 study.

as an independent if he is over 24 years old, married, a parent, or a veteran of the military, so by definition, independent students are often dissimilar from dependent students and may have different educational objectives.<sup>47</sup> Second, because independent students often do not receive money from their parents for college, they face different financial constraints when trying to fund their college educations. Third, the details of the Stafford loan program are different for dependent and independent students. For example, independent students have higher loan maximums than dependent students. Lastly, I estimate the effect of Stafford loan access on groups that may face particular disadvantages or credit constraints, including students with high unmet need, females, and black students.

### *7.1 Base Specification*

In Tables 4, 5, 6, and 7, I show the estimated effect of Stafford loan access on, respectively, total loans and completed credits, associate's degree attainment and transfers to a four-year college, total months of enrollment and bachelor's degree attainment, and employment while enrolled. In each case, the right-hand side variables are the same, with loan access as the key variable and other covariates reflecting demographics and family background. I find that loan access has a statistically significant effect on total borrowing, transfer to a four year college, and employment in the third year of college, although I caution that the employment effect could be driven by selection into which students are still enrolled in their third year.

Table 4 shows the results for the effect of loan access on total loans and credits taken in the first year of college. Access to loans increases students' total loan amount by \$262 in the first year. This is a large effect given that the average community college student borrows \$501 in total Stafford loans in their first year of college.<sup>48</sup> The effect is significant for both dependent and independent students, although quite a bit larger in magnitude for independent students alone, at \$403. Independent students have higher Stafford maximums and thus take more Stafford loans on average,

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<sup>47</sup> 70% of dependent community college students have a degree goal of earning a bachelor's degree in their first year of college, compared to only 44% of independent students.

<sup>48</sup> This was calculated from the BPS:04/09 for all community college students who attend a college that offers Stafford loans. Conditional on taking a Stafford loan, the average student takes \$2,655 in Stafford loans.

so it follows that Stafford loan access should have a larger effect on their total borrowing. These results indicate that Stafford loan dollars do not just replace other sources of borrowing, such as private loans. Stafford loans represent additional loan dollars that the student would not have otherwise taken.

I find no effect of access to loans on the number of credits taken in the first year, also shown in Table 4. This may be because many community colleges have waiting lists to take introductory classes, so the limiting factor in first year credit taking may not be affordability, but availability. Another issue could be sample selection; this question was only asked to about two thirds of the sample (see Data Section for more information).

As is true for all of the following results, the other covariates in the regressions have the expected sign. Older students take fewer loans, as do male, Hispanic, Asian, and high GPA students. Older students take fewer credits in their first year, as do independent, black, and low math SAT students.

While I find no effect of loan access on the number of first-year credits, loan access may affect other educational attainment measures. The next two tables describe the effects of loan access on associate's degree attainment, transfer to a four-year college, total months of enrollment, and bachelor's degree attainment. I find no effect of loan access on two-year degree attainment, as seen in Table 5. However, a student who has access to Stafford loans is 5.6 percentage points more likely to transfer to a four-year college. This effect is significant and driven by dependent students. Loan access does not have a statistically significant effect on total months enrolled or bachelor's degree attainment, as shown in Table 6, but the point estimates are nearly all positive.<sup>49</sup> The point estimates for the effect of loan access on total enrollment vary from 1.9 to 3.3 months and the effect on bachelor's degree attainment varies from 2.8 to 5.5 percentage points.

It is clear that, while loans may not have a large effect on other measures of college attainment, access to loans does increase the likelihood of transfer to a four-year college. This

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<sup>49</sup> There is a negative effect on bachelor's degree attainment for independent students, although the effect is very small in magnitude at 0.4 percentage points.

indicates that community college students with access to Stafford loans are not completing more education, but they are spending more time earning credits at four-year colleges, compared to two-year colleges.

Next, I investigate the effect of loans on students' employment during college. Table 7 shows the effects of access to Stafford loans on two different measures of working while enrolled in the third year of college: weekly hours worked and an indicator for working all weeks of the school year. I limit the sample to students still enrolled in their third year. Loans have no effect on weekly hours worked but do affect the proportion of students who work year-round. Loan access decreases the number of students working all weeks of the school year by 6.8 percentage points. Similar to the effect on four-year college transfer, this effect appears to be driven by dependent students, who are 14.8 percentage points less likely to work all weeks of the school year in their third year with access to Stafford loans.

This employment result should be interpreted with caution however, given that it is possible that it is driven by sample selection. The sample was limited to only students still enrolled in the third year, as to not confound the effects of loan access on employment during college and post-college, but that introduces the possibility that these results are driven, not by students changing their work decisions, but by different types of students still attending college in the third year. Assuming that the marginal student who persists into the third year due to loan access is of higher need than the average student in the third year, and that high need students work more in college, selection into the third year should bias the effect of loan access on employment upward. To the extent that I found statistically significant negative effects, these effects are likely not overstated due to the upward bias, but should still be interpreted with caution.

The employment effect of Stafford loans appears to be limited to the third year of college. Stafford loans have no effect on students' employment decisions in the first year, which fits with the earlier finding of no effect on credits taken in the first year. Because students may become increasingly financially constrained the longer they are in college, loan access may have larger effects

on employment later in college. Additionally, loan access does not affect student credit card debt in the first of college. Presumably when most students do not have access to federal loans, they prefer to adjust other margins, such as consumption, before accumulating credit card debt. The regression results for employment and credit card debt in the first year are included in appendix Table A3.

Overall, Stafford loan access increases community college students' total loans and the probability of transferring to a four-year college and possibly decreases their hours worked in their third year of college. The effects on transferring to a four-year college and on employment are driven primarily by dependent students, while the total loan effect is four times as large for independent students. Because the effects vary between independent and dependent students, it is likely that other subgroups may have different effects of loan access as well.

## *7.2 Results for Disadvantaged Subgroups*

I find larger effects on the outcomes that were significant for the entire sample and significant effects on additional outcomes when I focus on subgroups of interest - females, black students, and high-need students, as shown in Table 8.<sup>50</sup> The effect of access to Stafford loans on a student's total loans in the first year is even larger for these three subgroups, with effects of \$291 for females, \$300 for black students, and \$355 for high-need students. I do not estimate this separately for independent students, and dependent black students, due to limited sample sizes.

For both female and high-need students, the effect of loan access on four-year college transfers is larger than for the overall population as well. Loan access increases the likelihood of transfer for female and high-need students by 8.8 and 7.6 percentage points respectively. I do not find a significant effect on transfers to a four-year college for black students. For both dependent female and high-need students, there is a significant effect of loan access on bachelor's degree attainment, with point estimates of 8.7 and 9.7 percentage points.<sup>51</sup> There are likely only significant effects on bachelor's degree attainment for dependent students because dependent students are

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<sup>50</sup> Students are considered high-need if they qualify for over \$4,000 in Stafford loans.

<sup>51</sup> These results are very similar if the sample is limited to students who have a first year goal of bachelor's degree attainment.

significantly more likely to have a bachelor's degree goal at the start of community college.<sup>52</sup> For these subgroups, loan access also has significant effects on total months of enrollment; 3.5 months for female students, 5.7 months for black students, and 2.8 months for high-need students. The third year employment effects for these subgroups are smaller in magnitude than with the whole sample, and no longer statistically significant.

Overall, access to Stafford loans increases total loans in the first year and the probability of transferring to a four-year college, and decreases employment in the third year. For female and high-need students, the effects of loan access on total loans and four-year college transfers are even larger, and for female, black, and high-need students, there are significant effects on total months enrolled. Finally, for dependent female and high-need students, there is a significant effect of loan access on bachelor's degree attainment.

### *7.3 Instrumental Variables Specification*

In this specification, I estimate the effects of total loans in the first year on students' college outcomes, with loan access acting as an instrument for total loans. The effect of Stafford loan access on total loans, the first stage, can be seen in Tables 4 and 8. Loan access has an economically large and highly statistically significant effect on total loans borrowed in the first year, with point estimates ranging from \$159 (all dependent students) to \$355 (all high-need students), depending on the sample.

The IV estimates of the effect of total loans in the first year of college, as seen in Table 9, are similar to the reduced-form estimates of the effects of Stafford loan access because students are unlikely to take loans other than Stafford loans.<sup>53</sup> I find that an extra \$100 in total loans increases the probability of transfer to a four-year college for the full sample, females, and high-need students by 2.1, 3.0 and 2.2 percentage points respectively. The only statistically significant effect of total loans on bachelor's degree attainment is for dependent female students, and it is very small in magnitude;

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<sup>52</sup> 70% of dependent community college students cite bachelor's degree attainment as their degree objective in their first year, compared to only 44% of independent students.

<sup>53</sup> As estimated in the BPS: 04/09, only 3% of community college students take private loans.

increasing total loans by \$1000 increases the likelihood of transfer by 0.48 percentage points. I also find that total months of enrollment increases by 0.8 - 1.2 months for the subgroup samples (female, black and high-need students) with a \$100 increase in total loans. Finally, the probability of working all weeks of the year in the third year decreases by 10.3 percentage points with a \$100 increase in total loans for dependent students, although similar caution should be used in interpreting this result, as was in the base specification. The sizable changes in student behavior when students take additional loans indicates that many students are credit constrained without the availability of Stafford loans.

#### *7.4 Additional Robustness and Specification Checks*

The first robustness check is to estimate a model similar to above, but control for community college characteristics as well. If there is still concern that loan access is correlated to characteristics of the school, then controlling for these school attributes would mitigate the effect of loan access. The community college characteristics that I include are enrollment, tuition, instructional expenditures other than faculty and staff salaries and wages, faculty and staff salaries and wages, and total expenditures at the college. The first two college characteristics come from the Integrated Postsecondary Data System (IPEDS) at the U.S. Department of Education. The second three expenditure variables are from the Delta Cost Project. All data are from the 2003-04 school year to match the BPS: 04/09 data. It should be noted that both of these sources of college characteristics have missing data, and there are mistakes in the BPS college ID variable, so the regressions including college characteristics have a sizable amount of missing data. The regressions that include college characteristics can only be estimated on 72% of the original sample.

That said, the results are similar across this specification and the base specification, as can be seen in appendix Table A4. Access to loans increases students' total loan amount by \$203, and similarly to the base specification, the effect is considerably larger for independent students compared to dependent students (\$318 versus \$128). Consistent with the base specification, there is no effect of loan access on credits taken in the first year, associate's or bachelor's degree attainment, or total months of enrollment. Again, similar to the base specification, loan access decreases the

probability of working all weeks in the third year by 8.1 percentage points, and this effect is driven by dependent students. The only notable difference when college characteristics are included is that the effect on transfers to a four-year college is smaller in magnitude, 2.8 percentage points, and no longer statistically significant. Lastly, in this specification, there is a significant effect of loan access on working all weeks of the year in the first year for all and independent students.

As a second robustness check, I verify the validity of the results to a second measure of loan access. As explained previously, because there was no one reliable source of information on which community colleges offered loans, I created a measure of which colleges offered loans combining all available information for the 2003-04 school year; the loan volume file which lists the number of loans that originated in 2003-04 by college and the BPS:04/09 survey. As a robustness check, I re-estimated all of the above results using a definition of loans derived only from the loan volume data file. A school was coded as not offering loans if it did not appear in the loan volume file, regardless of whether students in the BPS:04/09 took a positive amount of Stafford loans at that school. The point estimates in these additional regressions are similar in magnitude to the specifications using the combined measure of loan access, although often the point estimates are smaller in magnitude

For an additional check, I tested whether my results were driven by the assumption to limit my sample to only students who would have qualified for a Stafford loan, had they applied. I re-estimated the above results on the following additional samples: students who qualified for a Stafford loan and applied for federal financial aid, students who qualified for a subsidized Stafford loan, and students who qualified for a subsidized Stafford loan and applied for federal financial aid. The results vary little depending on which sample of Stafford loan qualifiers is included.

I also re-estimated all of the above regressions without state fixed effects. The estimates are similar in magnitude, although sometimes smaller when state fixed effects are not included. Finally, I re-estimated the regressions for transferring to a four-year college and bachelor's degree outcomes on only students who have a bachelor's degree goal when beginning community colleges. This



eliminates any potential bias from students who attend colleges that do and do not offer loans possibly having different degree goals. Again, the point estimates are similar in magnitude.

Overall, loan access has a large and statistically significant effect on students' total loans, educational attainment, and possibly employment later in college. The total loan effects are driven by independent students and the educational attainment and working effects are mostly driven by dependent students. Female, black and high-need students have even larger educational attainment gains from loan access and have additional gains in their total months of enrollment. Dependent female and high-need students also have significant effects of loan access on bachelor's degree attainment. Additionally, total loans borrowed has a large and statistically significant effect on transfers to a four-year college for all students, on total months enrolled for female, black and high-need students, and on bachelor's degree attainment for female dependent students. All of the above effects are robust to controlling for community college characteristics, using a different measure of loan access, including different samples of Stafford loan eligible students, and excluding state fixed effects.

## **8 Conclusion and Policy Recommendations**

With more than one out of every ten community college students being denied access to Stafford loans, understanding the effects of credit constraints on students' college outcomes is paramount. Without the ability to fully borrow against their future earnings, students may be forced to complete less college, work more hours while enrolled, and accumulate other forms of debt compared to the efficient outcome. This paper analyzes how the arguably random access to federal Stafford loans that community college students face affects their total borrowing, educational attainment, employment in college, and finances. I find that access to Stafford loans increases a student's overall borrowing by \$262 a year, increases the probability of transfer to a four-year college by 5.6 percentage points, and may decrease the probability of working year-round later in college by

7 percentage points. Additionally, access to Stafford loans increases bachelor's degree attainment by 3 percentage points, although the result is not statistically significant.

I find even larger effects on educational attainment for female, black and high-need students and loan access increases enrollment by 3-6 months for these sub-populations as well. Loan access also increases bachelor's degree attainment by 9 percentage points for dependent female and high-need students. The sizable changes in student behavior when students have access to federal Stafford loans indicates that some students are credit constrained in community college.

In order to use these estimated effects to make policy recommendations, it is important to compare the effect sizes in this work to those from other policy interventions. Dynarski, Hyman, and Schanzenbach (2011) compare the relative cost of several replicable interventions, calculating relative cost by dividing the cost of the intervention per student by the percentage point increase in college attendance caused by the intervention. The costs per student induced into college vary widely: helping students complete their FAFSA (Free Application for Federal Student Aid) costs \$1,257 per additional student induced to attend college by the intervention; Upward Bound, which provides at-risk high school students additional instruction, costs \$93,667 per student induced into college; Head Start, a pre-school program, costs \$133,333 per additional student induced to attend college; and reducing class size by one third in kindergarten through third grade (as seen in the Tennessee STAR experiment) costs \$400,000 per student induced into college.

Many of these experiments have lower costs per student induced into college if the intervention can be targeted at the students who benefit most. For example, if the Tennessee STAR class size reduction experiment were only done for students with the lowest ex ante probability of attending college, the cost per student induced to attend college would drop to \$109,000. It should also be considered that for some of these interventions, the only benefit of the intervention is increased college attendance, like with the experiment helping students complete their FAFSAs, while with other interventions, like Upward Bound and Head Start, there are likely additional positive effects besides increased college attendance.

Compared to these other college attendance-increasing interventions, access to Stafford loans appears very cost effective. The average community college student in my sample takes \$417 in Stafford loans per year, and access to Stafford loans increases transfers to a four-year college by 5.6 percentage points. The cost calculations are slightly complicated because while the amount of loans dispersed per student is apparent, the total cost of the program per student is not as clear, because the loans are eventually paid back. To calculate the cost of lending money under the Stafford loan program, one needs to consider that the government does not charge interest on subsidized Stafford loans while the student is enrolled in college and that some students default on their loans. If we conservatively assume that half of the money loaned under the Stafford loan program is a loss and that students stay in community college for three years before transferring, the cost per additional student induced to attend a four-year college is \$11,170 ( $\$417 * 3\text{yrs} * 0.5 / 0.056$ ), making Stafford loan access one of the least expensive replicable interventions in the literature.<sup>54</sup> While helping students complete their FAFSAs is still considerably cheaper, Stafford loan access has additional benefits besides increased college attendance, such as increased total months of college enrollment and increased bachelor's degree attainment, and these additional effects have not been documented in the FAFSA experiment (yet).

Instead of comparing the cost of increasing college attendance across interventions, one may be more interested in comparing the cost of increasing college degree attainment. Using the same conservative estimates from above, access to Stafford loans for community college students costs \$20,850 per extra bachelor's degree earned ( $\$417 * 3\text{yrs} * 0.5 / 0.03$ ). Since much of the previous literature looks at the college attendance rather than completion margin, there is not much evidence to compare this figure to, but the cost per additional degree earned for the Tennessee STAR class reduction experiment is considerably higher at \$750,000. Given the estimates in the literature that the wage premium on a college degree is 10-20 percentage points (Hungerford and Solon 1987,

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<sup>54</sup> Some community college students would have transferred to a four-year college regardless of the availability of Stafford loans. These calculations estimate the cost per additional student enticed to transfer just because of Stafford loan access.

Belman and Heywood 1991, Kane and Rouse 1995, Jaeger and Page 1996, Card 2001), it appears that access to Stafford loans is a cost effective intervention both in terms of increased entrance into college and bachelor's degree attainment.

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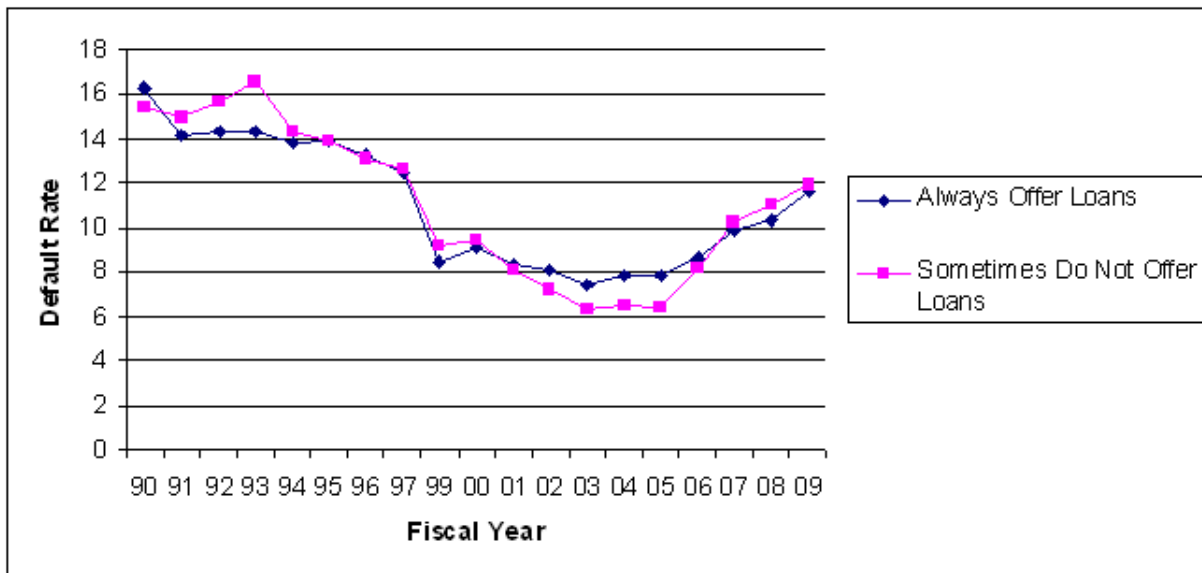
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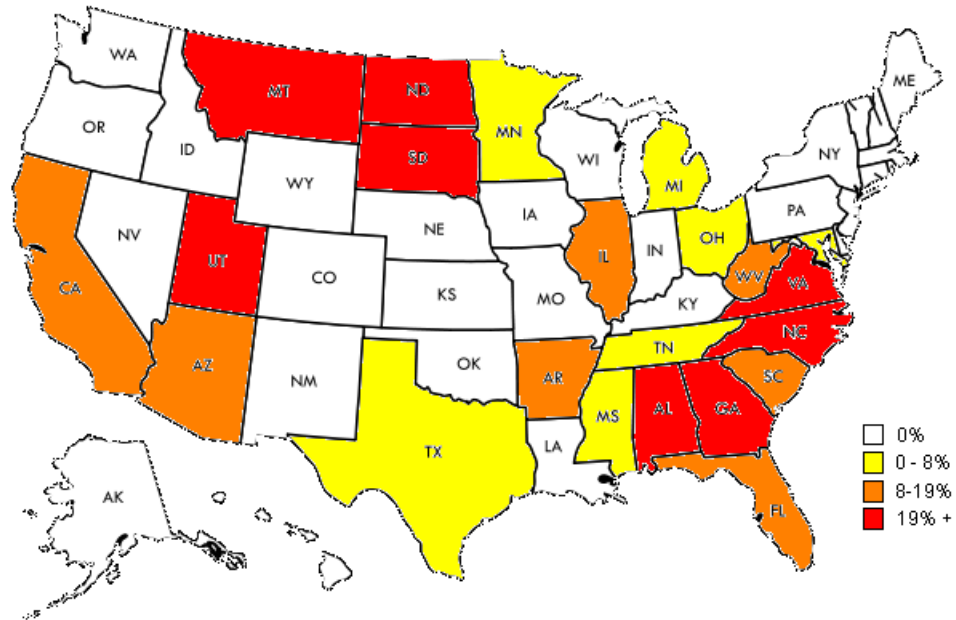
## Figures

Figure 1: Average Default Rates from 1989-90 to 2008-09 for Community Colleges That Always Offer Loans Over this Period and Those That Do Not



Source: Calculated from average cohort default rates published by the US Dept. of Ed

Figure 2: Percent of Community Colleges Not Offering Loans by State in 2008-09

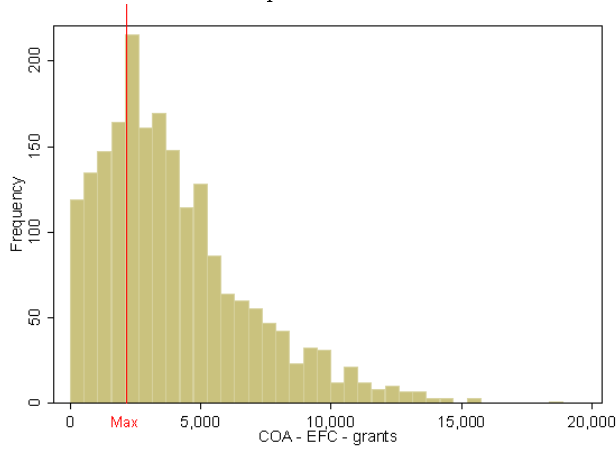


Source: Calculated from average cohort default rates published by the US Dept. of Ed

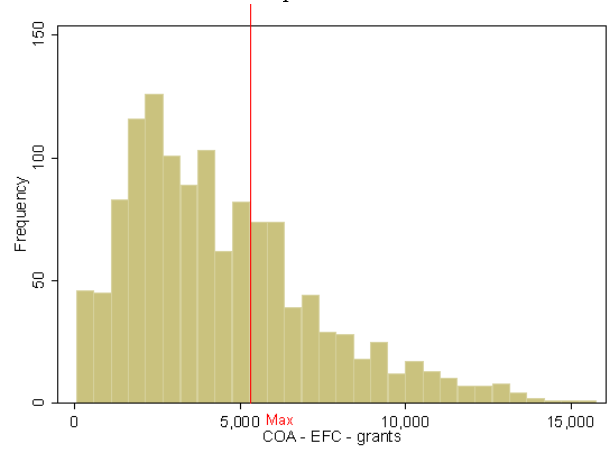


Figure 3: Histograms of Student Attributes that Determine Financial Aid

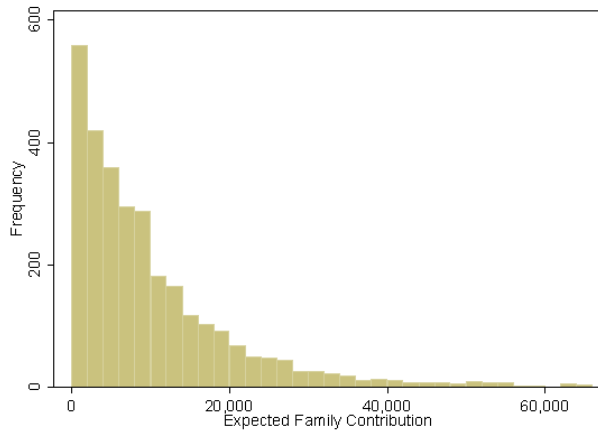
3A: Positive Need of Dependent Students



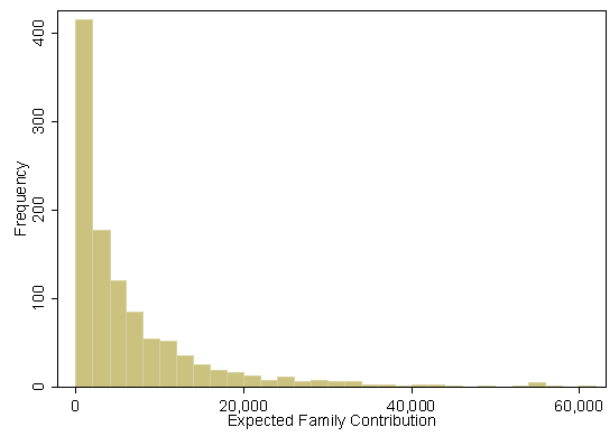
3B: Positive Need of Independent Students



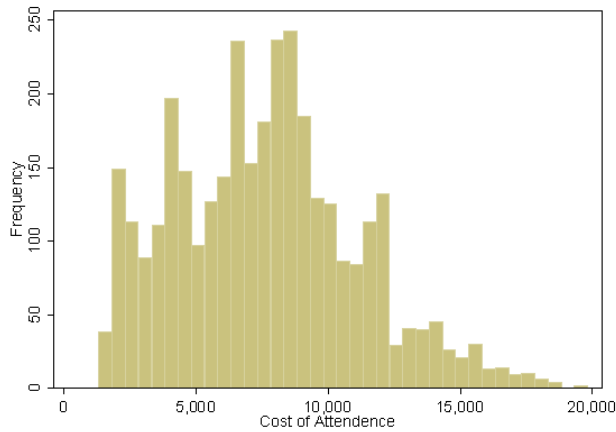
3C: EFC of Dependent Students



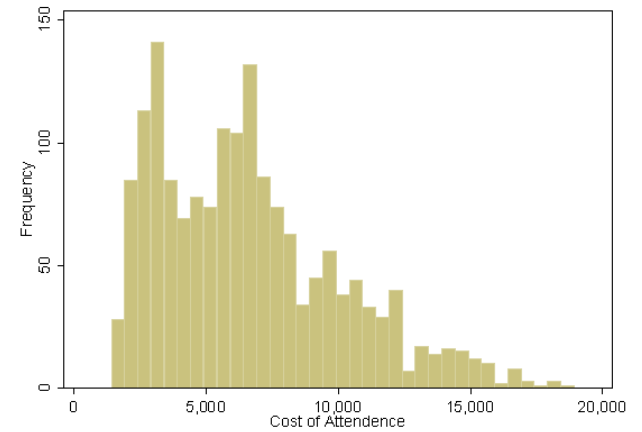
3D: EFC of Independent Students



3E: COA of Dependent Students



3F: COA of Independent Students



Notes: EFC = Expected Family Contribution. COA = Cost of Attendance. Data are from all public two-year college students in the BPS:04/09, although some graphs were truncated on the left to more clearly show the bulk of the distribution.

## Tables

Table 1: The Effect of Community College Characteristics on Loan Availability

	$\beta$ (Std. Dev.)
Degrees Awarded (1,000)	-0.0003 (0.0003)
Tuition (\$1,000)	0.0672*** (0.0150)
Instructional Expenditures (\$1,000)	-0.0228 (0.0218)
Salaries and Wages (\$1,000)	-0.0143 (0.0160)
Total Expenditures (\$1,000)	4.13E-10 (-3.86E-10)
Enrollment (100)	-0.0043 (0.0045)
Black Students (100)	0.0020 (0.0049)
Hispanic Students (100)	0.0051 (0.0047)
Asian Students (100)	0.0063 (0.0050)
Other Race Students (100)	0.0058 (0.0055)
constant	0.7829*** (0.0467)

Source: Loan data are publicly available from the U.S. Dept. of Education. Degrees awarded, enrollment, and tuition data are publicly available from the Integrated Postsecondary Data System (IPEDS) at the National Center for Education Statistics (NCES). The expenditure data are publicly available from the Delta Project on Postsecondary Education Cost, Productivity, and Accountability.  $N=670$ ,  $R^2=0.10$

Table 2: Descriptive Statistics for Different Types of Stafford Borrowers

	Qualify Subsidized	Use Subsidized	Qualify Unsubsidized	Use Unsubsidized	Qualify Maximum	Use Maximum
Age	22.7	22.5	22.7	22.6	22.8	22.6
Independent	0.382	0.373	0.329	0.376	0.404	0.396
Female	0.614	0.627	0.576	0.592	0.622	0.636
Black	0.197	0.208	0.157	0.169	0.214	0.206
Hispanic	0.149	0.061	0.134	0.052	0.131	0.061
Asian	0.039	0.022	0.035	0.011	0.044	0.019
Other Race	0.055	0.048	0.053	0.030	0.056	0.040
Father HS Degree	0.461	0.484	0.434	0.425	0.467	0.464
Father Some College	0.190	0.232	0.207	0.245	0.190	0.235
Father Bachelor's	0.107	0.093	0.126	0.148	0.098	0.093
Father Grad Degree	0.060	0.062	0.080	0.073	0.063	0.070
Mother HS Degree	0.420	0.421	0.411	0.402	0.416	0.423
Mother Some College	0.271	0.290	0.271	0.322	0.273	0.288
Mother Bachelor's	0.102	0.106	0.120	0.111	0.103	0.107
Mother Grad Degree	0.043	0.050	0.063	0.066	0.043	0.047
Didn't Take SAT	0.304	0.254	0.298	0.266	0.294	0.219
Math SAT	429	431	438	427	429	432
Verbal SAT	434	435	445	436	433	443
Family Income	25,743	31,024	43,117	51,311	23,040	28,992

Source: Compiled from all public two-year college students in the BPS:04/09

Table 3: Descriptive Statistics for Community College Students in the BPS

Variable	Obs	Mean	Std. Dev.	Min	Max
<b>Outcome Variables:</b>					
Total Loans	5549	595.90	1569.08	0	24220
Associate's Degree	5549	0.21	0.41	0	1
Transfer 4 yr. College	5549	0.34	0.47	0	1
Credit Hours 1st yr	3857	20.62	10.93	1	60
Weekly Hours Worked 1st yr	5549	21.75	16.22	0	70
Worked All Weeks 1st yr	5549	0.41	0.49	0	1
Credit Card Balance 1st yr	5549	98.72	547.80	0	14651
Weekly Hours Worked 3rd yr	3600	21.55	15.94	0	60
Worked All Weeks 3rd yr	3600	.26	.44	0	1
Total Months Enrolled 09	5549	32.16	17.31	1	72
<b>Control Variables:</b>					
Age	5549	22.51	8.12	15	72
Independent	5549	0.32	0.46	0	1
Female	5549	0.58	0.49	0	1
Black	5549	0.16	0.36	0	1
Hispanic	5549	0.13	0.34	0	1
Asian	5549	0.04	0.19	0	1
Other Race	5549	0.05	0.22	0	1
Dad HS Degree	5058	0.43	0.49	0	1
Dad Some College	5058	0.21	0.41	0	1
Dad Bachelors Degree	5058	0.13	0.34	0	1
Dad Graduate Degree	5058	0.08	0.28	0	1
Mom HS Degree	5316	0.40	0.49	0	1
Mom Some College	5316	0.28	0.45	0	1
Mom Bachelors Degree	5316	0.12	0.33	0	1
Mom Graduate Degree	5316	0.06	0.25	0	1
HS GPA	3876	5.37	1.21	1	7
Math SAT	3062	441	94	200	780
Verbal SAT	3062	448	102	200	800
Didn't Take SAT	5549	.22	.42	0	1
Family Income	5549	43806.27	41746.02	0	497686

Source: Statistics are compiled from all public two-year college students in the BPS:04/09.

Notes: HS GPA is coded the following way: 7=3.5-4.0, 6=3.0-3.4, 5=2.5-2.9, 4=2.0-2.4, 3=1.5-1.9, 2=1.0-1.4, 1=0.5-0.9. Even though for the analysis, students with missing SAT and HS GPA information are coded to 0, for this description of the variables, they are not. Weekly hours worked in the third year and working all weeks in the third year were all summarize only for those students still enrolled in college.

Table 4: The Effect of Loan Access on Total Loans and Credits Taken First Year

	<u>Total Loans 1st Yr.</u>			<u>Credits Taken 1st Yr.</u>		
	All	Depend.	Independ.	All	Depend.	Independ.
Loans Access	262.2*** (66.870)	158.9*** (48.020)	402.7*** (130.400)	-0.447 (0.821)	0.576 (1.005)	-1.416 (1.195)
Age	-12.96*** (3.086)	17.290 (11.730)	-12.61*** (3.138)	-0.151*** (0.040)	-0.658*** (0.203)	-0.106*** (0.039)
Independent	47.540 (63.410)			-4.017*** (0.796)		
Female	70.19** (32.520)	31.830 (33.860)	162.8** (67.050)	-0.497 (0.395)	-0.438 (0.432)	-0.467 (0.613)
Black	50.020 (59.350)	4.809 (47.180)	64.250 (91.640)	-1.296** (0.605)	-1.667** (0.753)	-0.918 (0.854)
Hispanic	-125.0*** (38.470)	-125.5*** (38.810)	-143.8* (83.860)	-1.785*** (0.656)	-1.444 (0.949)	-1.287 (0.868)
Asian	-184.2*** (46.610)	-140.8*** (53.870)	-356.3*** (94.110)	-1.368 (1.348)	-0.593 (1.281)	-2.767 (2.313)
Other Race	-26.460 (123.400)	-27.140 (160.400)	2.081 (115.800)	-1.441* (0.814)	-0.911 (1.154)	-2.112 (1.384)
Dad HS Degree	20.880 (52.200)	-15.250 (60.970)	71.500 (89.810)	0.155 (0.738)	0.775 (0.937)	-0.317 (0.801)
Dad Some College	18.420 (62.900)	-24.960 (66.820)	55.450 (128.500)	0.456 (0.802)	2.007** (1.014)	-2.264** (1.130)
Dad Bachelors	38.700 (68.930)	10.430 (74.170)	109.500 (176.000)	-0.056 (1.077)	0.882 (1.233)	-1.055 (1.617)
Dad Grad Degree	-76.690 (66.260)	-74.740 (69.910)	-50.380 (121.100)	0.035 (1.185)	0.108 (1.504)	1.653 (1.656)
Mom HS Degree	-60.380 (59.780)	-22.540 (65.430)	-101.500 (87.830)	0.065 (0.717)	0.483 (1.186)	-0.174 (0.799)
Mom Some College	-82.990 (61.150)	-108.7* (57.440)	-18.100 (107.100)	1.152 (0.781)	0.795 (1.275)	2.118* (1.080)
Mom Bachelors	-54.690 (85.730)	-93.500 (68.620)	70.490 (227.400)	0.449 (0.939)	0.611 (1.284)	0.198 (1.419)
Mom Grad Degree	-120.9* (68.030)	-135.9** (68.920)	-150.900 (128.300)	1.226 (1.193)	1.644 (1.565)	0.969 (1.900)
Math SAT	-0.492* (0.297)	-0.398 (0.313)	-0.915 (1.016)	0.00944*** (0.004)	0.00762** (0.004)	0.009 (0.011)
Verbal SAT	0.080 (0.303)	0.019 (0.335)	-0.066 (0.682)	-0.001 (0.003)	-0.001 (0.003)	-0.002 (0.007)
No Take SAT	-217.5** (109.000)	-194.000 (121.900)	-567.100 (418.700)	0.990 (1.817)	0.366 (1.998)	0.925 (3.685)
HS GPA	-47.98*** (15.780)	-37.17** (14.930)	-112.600 (76.590)	0.349 (0.249)	0.250 (0.258)	0.679 (0.506)
Income	-0.493* (0.283)	-0.293 (0.274)	-1.228 (1.246)	-0.006 (0.005)	-0.003 (0.005)	-0.0276** (0.011)
N	4590	3118	1472	3473	2413	1060
R <sup>2</sup>	0.07	0.08	0.11	0.24	0.17	0.23

Notes: “Depend.” is dependent students and “Independ.” is independent students. Missing Dad Ed, Missing Mom Ed, Missing SAT, Missing HS GPA and a constant were all included in the regression, but their coefficients are not shown to save space. State FE were also include and the errors are clustered at the community college level. BPS:04/09 sample weights were included. All specifications were estimated with an OLS linear probability model.

Table 5: The Effect of Loan Access on Associate's Degree Attainment and Transfer to a Four-Year College

	<u>Associate's Degree Attainment</u>			<u>Transfer to a 4-Yr. College</u>		
	All	Depend.	Independ.	All	Depend.	Independ.
Loans Access	-0.006 (0.025)	-0.020 (0.039)	-0.007 (0.039)	0.0559* (0.032)	0.0754* (0.046)	0.012 (0.035)
Age	-0.003 (0.002)	-0.0182** (0.008)	-0.002 (0.002)	-0.00321** (0.001)	-0.0409*** (0.010)	-0.002 (0.001)
Independent	-0.0590** (0.024)			-0.106*** (0.028)		
Female	0.0548*** (0.015)	0.0776*** (0.019)	0.000 (0.022)	0.021 (0.019)	0.032 (0.024)	-0.020 (0.024)
Black	-0.0526** (0.021)	-0.0583** (0.025)	-0.046 (0.030)	0.017 (0.027)	0.008 (0.041)	0.008 (0.029)
Hispanic	-0.011 (0.021)	-0.009 (0.027)	-0.014 (0.035)	-0.042 (0.028)	-0.028 (0.040)	-0.046 (0.033)
Asian	0.045 (0.039)	0.008 (0.041)	0.108 (0.096)	0.151*** (0.050)	0.113* (0.065)	0.238*** (0.088)
Other Race	-0.007 (0.030)	-0.027 (0.038)	0.012 (0.049)	0.006 (0.048)	-0.001 (0.056)	0.030 (0.063)
Dad HS Degree	0.026 (0.021)	0.029 (0.028)	0.041 (0.032)	-0.002 (0.024)	0.016 (0.043)	0.000 (0.032)
Dad Some College	0.0467* (0.028)	0.0830** (0.035)	-0.018 (0.034)	0.004 (0.030)	0.029 (0.048)	-0.005 (0.048)
Dad Bachelors	0.020 (0.029)	0.044 (0.039)	-0.004 (0.052)	0.040 (0.036)	0.081 (0.053)	0.003 (0.050)
Dad Grad Degree	-0.032 (0.032)	0.014 (0.038)	-0.131** (0.058)	0.0903** (0.039)	0.137** (0.054)	-0.002 (0.068)
Mom HS Degree	0.012 (0.022)	-0.019 (0.039)	0.007 (0.028)	0.024 (0.025)	0.036 (0.050)	0.015 (0.028)
Mom Some College	0.006 (0.023)	-0.031 (0.036)	0.024 (0.035)	0.0507* (0.029)	0.062 (0.054)	0.044 (0.035)
Mom Bachelors	0.036 (0.033)	-0.037 (0.043)	0.164** (0.066)	0.126*** (0.035)	0.125** (0.061)	0.111** (0.056)
Mom Grad Degree	0.010 (0.045)	-0.051 (0.057)	0.107 (0.075)	0.053 (0.047)	0.065 (0.074)	0.065 (0.074)
Math SAT	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000416** (0.000)	0.000471** (0.000)	0.000 (0.001)
Verbal SAT	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
No Take SAT	0.009 (0.059)	-0.009 (0.064)	0.134 (0.106)	0.084 (0.078)	0.087 (0.085)	-0.009 (0.225)
HS GPA	0.0232*** (0.008)	0.0251*** (0.009)	0.006 (0.021)	0.0303*** (0.010)	0.0264** (0.011)	0.028 (0.024)
Income	0.000394* (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
N	4590	3318	1472	4590	3318	1472
R <sup>2</sup>	0.06	0.07	0.09	0.15	0.12	0.12

Notes: "Depend." is dependent students and "Independ." is independent students. Missing Dad Ed, Missing Mom Ed, Missing SAT, Missing HS GPA and a constant were all included in the regression, but their coefficients are not shown to save space. State FE were also include and the errors are clustered at the community college level. BPS:04/09 sample weights were included. All specifications were estimated with an OLS linear probability model.

Table 6: The Effect of Loan Access on Total Months Enrolled Through Six Years and Bachelor's Degree Attainment

	<u>Total Months Enrolled</u>			<u>Bachelor's Degree Attainment</u>		
	All	Depend.	Independ.	All	Depend.	Independ.
Loans Access	1.941 (1.476)	0.122 (1.295)	3.324 (2.690)	0.028 (0.022)	0.055 (0.033)	-0.004 (0.016)
Age	-0.340*** (0.085)	-1.931*** (0.365)	-0.288*** (0.086)	-0.00168** (0.001)	-0.0173*** (0.006)	-0.001 (0.001)
Independent	-6.856*** (1.061)			-0.0833*** (0.015)		
Female	3.716*** (0.739)	4.283*** (0.872)	2.288* (1.195)	0.0319*** (0.011)	0.0457*** (0.015)	-0.007 (0.011)
Black	0.054 (1.066)	-0.198 (1.359)	-0.061 (1.544)	-0.0248* (0.014)	-0.0549** (0.022)	0.001 (0.017)
Hispanic	-0.874 (1.269)	0.307 (1.447)	-1.445 (1.973)	-0.0285* (0.016)	-0.036 (0.023)	-0.005 (0.014)
Asian	6.613*** (2.108)	6.073** (2.455)	6.030* (3.124)	0.034 (0.033)	0.024 (0.041)	0.038 (0.038)
Other Race	0.037 (1.661)	0.935 (1.739)	-1.652 (2.909)	-0.023 (0.023)	-0.035 (0.029)	0.008 (0.031)
Dad HS Degree	0.544 (1.048)	3.039* (1.619)	-0.605 (1.573)	0.012 (0.015)	0.022 (0.024)	0.023 (0.017)
Dad Some College	-0.213 (1.220)	3.605** (1.628)	-4.868*** (1.837)	0.007 (0.018)	0.017 (0.029)	0.009 (0.015)
Dad Bachelors	1.619 (1.160)	5.798*** (1.637)	-4.698** (2.358)	0.0537** (0.024)	0.0773** (0.036)	0.031 (0.027)
Dad Grad Degree	1.784 (1.660)	5.057*** (1.900)	-1.867 (3.148)	0.0504* (0.029)	0.0748* (0.040)	0.019 (0.030)
Mom HS Degree	0.503 (1.278)	0.027 (2.164)	0.826 (1.835)	-0.007 (0.014)	-0.015 (0.030)	-0.009 (0.011)
Mom Some College	2.923** (1.215)	2.012 (2.057)	4.167** (1.701)	0.005 (0.019)	-0.009 (0.035)	0.015 (0.016)
Mom Bachelors	3.559** (1.381)	2.238 (2.364)	5.477** (2.338)	0.0480* (0.026)	0.024 (0.039)	0.0721* (0.037)
Mom Grad Degree	0.347 (2.121)	0.322 (2.278)	1.737 (4.257)	-0.003 (0.031)	-0.007 (0.046)	-0.014 (0.026)
Math SAT	0.004 (0.006)	0.007 (0.007)	-0.0281* (0.016)	0.00036*** (0.000)	0.00038*** (0.000)	0.000 (0.000)
Verbal SAT	-0.001 (0.005)	-0.007 (0.005)	0.0312** (0.014)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
No Take SAT	-3.780 (2.788)	-5.154 (3.254)	0.555 (6.160)	0.0971* (0.049)	0.0932* (0.056)	-0.028 (0.065)
HS GPA	0.808** (0.366)	0.702* (0.406)	0.944 (0.956)	0.0253*** (0.007)	0.0260*** (0.008)	0.006 (0.008)
Income	0.008 (0.009)	0.008 (0.009)	-0.009 (0.028)	0.000 (0.000)	0.000 (0.000)	0.0006** (0.000)
N	4590	3118	1472	4590	3118	1472
R <sup>2</sup>	0.14	0.12	0.10	0.11	0.10	0.08

Notes: "Depend." is dependent students and "Independ." is independent students. Missing Dad Ed, Missing Mom Ed, Missing SAT, Missing HS GPA and a constant were all included in the regression, but their coefficients are not shown to save space. State FE were also include and the errors are clustered at the community college level .BPS:04/09 sample weights were included. All specifications were estimated with an OLS linear probability model.

Table 7: The Effect of Loan Access on Weekly Hours Worked and Working All Weeks in the Third Year

	<u>Wkly. Hrs. Worked 3rd Yr.</u>			<u>Work All Weeks 3rd Yr.</u>		
	All	Depend.	Independ.	All	Depend.	Independ.
Loans Access	0.310 (1.952)	-1.846 (2.155)	4.388 (4.086)	-0.0684* (0.039)	-0.148*** (0.054)	0.082 (0.053)
Age	0.063 (0.095)	0.554 (0.403)	-0.043 (0.099)	-0.0106*** (0.002)	-0.017 (0.012)	-0.00964*** (0.002)
Independent	6.126*** (1.698)			0.018 (0.044)		
Female	-0.374 (0.925)	1.843** (0.920)	-5.646*** (1.790)	0.009 (0.022)	0.001 (0.028)	0.020 (0.040)
Black	-0.865 (1.625)	-0.947 (1.429)	1.640 (2.103)	-0.060 (0.036)	-0.040 (0.046)	-0.073 (0.046)
Hispanic	1.481 (1.320)	2.203 (1.536)	1.019 (2.210)	-0.0819** (0.038)	-0.065 (0.041)	-0.102 (0.064)
Asian	-3.388* (1.974)	-3.169 (2.283)	-3.217 (3.883)	-0.189*** (0.052)	-0.242*** (0.051)	-0.073 (0.129)
Other Race	0.762 (2.274)	-1.570 (2.456)	4.768** (2.403)	-0.0887* (0.049)	-0.154*** (0.044)	0.083 (0.130)
Dad HS Degree	1.688 (1.490)	-0.286 (1.528)	4.402* (2.603)	-0.005 (0.036)	0.000 (0.056)	0.002 (0.046)
Dad Some College	2.267 (1.935)	0.862 (1.838)	3.689 (3.055)	-0.027 (0.041)	-0.029 (0.057)	-0.069 (0.068)
Dad Bachelors	3.032 (2.113)	1.473 (2.257)	3.303 (3.361)	-0.0760* (0.040)	-0.136** (0.055)	0.173 (0.111)
Dad Grad Degree	1.681 (2.057)	0.032 (2.089)	8.160* (4.903)	-0.014 (0.057)	-0.052 (0.074)	0.169 (0.116)
Mom HS Degree	0.008 (1.733)	-0.064 (2.134)	-1.424 (2.411)	0.031 (0.035)	0.047 (0.051)	-0.009 (0.052)
Mom Some College	-0.178 (1.852)	0.429 (2.124)	-2.361 (2.747)	0.0590* (0.035)	0.073 (0.049)	0.045 (0.063)
Mom Bachelors	-1.811 (1.916)	-0.916 (2.135)	-4.537 (3.935)	0.017 (0.046)	0.052 (0.061)	-0.028 (0.082)
Mom Grad Degree	-0.602 (2.380)	-0.081 (2.406)	-1.358 (5.175)	0.110** (0.055)	0.125 (0.076)	0.010 (0.126)
Math SAT	0.006 (0.007)	0.004 (0.007)	0.018 (0.023)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)
Verbal SAT	-0.0139** (0.006)	-0.0139*** (0.005)	0.002 (0.026)	0.000 (0.000)	0.000 (0.000)	-0.00100** (0.000)
No Take SAT	-2.321 (2.835)	-4.056 (2.913)	13.870 (11.300)	-0.068 (0.077)	-0.034 (0.073)	-0.194 (0.293)
HS GPA	0.079 (0.367)	-0.206 (0.386)	1.764 (1.114)	0.020 (0.013)	0.015 (0.014)	0.055 (0.037)
Income	-0.006 (0.012)	-0.010 (0.012)	0.0762*** (0.029)	0.000 (0.000)	0.000 (0.000)	0.000 (0.001)
N	2976	2175	801	2976	2175	801
R <sup>2</sup>	0.06	0.06	0.23	0.06	0.08	0.18

Notes: “Depend.” is dependent students and “Independ.” is independent students. Missing Dad Ed, Missing Mom Ed, Missing SAT, Missing HS GPA and a constant were all included in the regression, but their coefficients are not shown to save space. State FE were also include and the errors are clustered at the community college level. BPS:04/09 sample weights were included. All specifications were estimated with an OLS linear probability model.



Table 8: The Effect of Loan Access on Outcomes for Various Subgroups

	<b>Female</b>		<b>Black</b>	<b>High-Need</b>	
	All	Depend.	All	All	Depend.
Total Loans	290.5*** (81.400)	182.5*** (57.550)	299.9** (123.400)	354.9*** (95.820)	210.1*** (76.120)
Credits 1st Year	-1.733 (1.050)	-0.596 (1.444)	0.903 (1.447)	-0.033 (1.361)	1.408 (1.480)
Associate's	0.007 (0.037)	-0.0115 (0.055)	0.029 (0.047)	0.012 (0.042)	-0.0005 (0.066)
Transfer 4-Year	0.0882** (0.041)	0.174*** (0.058)	-0.065 (0.056)	0.0764** (0.038)	0.0867 (0.060)
Bachelor's	0.0398 (0.027)	0.0866** (0.040)	0.0027 (0.023)	0.0565 (0.037)	0.0967* (0.051)
Total Months Enrolled	3.403* (1.986)	0.908 (1.694)	5.704*** (1.777)	2.844* (1.585)	0.103 (1.798)
Hours Work 3rd Year	-0.283 (1.652)	0.27 (2.062)	0.378 (2.282)	0.475 (1.788)	-0.157 (1.585)
Work All Weeks 3rd Year	-0.032 (0.041)	-0.00327 (0.048)	-0.074 (0.065)	-0.047 (0.055)	-0.049 (0.064)

Notes: "Depend." is dependent students. Each variable in the left column is an outcome for a separate regression. All the covariates included in other regressions were also included here, but their values are not shown for brevity. The numbers shown are the coefficients (and standard errors) of the loan access variable in the given regressions. The sample was limited to the various subgroups before the analysis was performed. Independent female, dependent and independent black, and independent high-need student regressions were not estimated because of small sample size concerns. All specifications were estimated with an OLS linear probability model. N for All Females = 1795-2667, N for Dependent Females = 1227-1662, N for All Black students = 457-744, N for All High Need students = 2037-2981, N for Dependent High Need students = 1561-2145.

Table 9: The Effect of Total Loans on Outcomes Using the IV Specification

	<u>Full Sample</u>		<u>Female</u>		<u>Black</u>	<u>High-Need</u>
	All	Depend.	All	Depend.	All	All
Credits 1st Year	-0.160 (0.283)	0.365 (0.667)	-0.667* (0.393)	-0.406 (0.901)	0.285 (0.486)	-0.008 (0.309)
Associate's	-0.002 (0.009)	-0.013 (0.023)	0.002 (0.012)	-0.006 (0.030)	0.010 (0.015)	0.003 (0.012)
Transfer 4-Year	0.0213** (0.011)	0.048 (0.029)	0.0304** (0.015)	0.0955** (0.043)	-0.022 (0.024)	0.0215** (0.011)
Bachelor's	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000475* (0.000)	0.000 (0.000)	0.000 (0.000)
Total Months Enrolled	0.740 (0.517)	0.077 (0.804)	1.171* (0.598)	0.498 (0.923)	1.902*** (0.723)	0.801** (0.402)
Hours Work 3rd Year	0.113 (0.704)	-1.281 (1.587)	0.415 (0.818)	-0.667 (1.267)	0.348 (0.944)	0.104 (0.583)
Work All Weeks 3rd Year	-0.025 (0.015)	-0.103** (0.049)	0.001 (0.012)	-0.036 (0.031)	-0.015 (0.020)	-0.006 (0.013)

Notes: "Depend." is dependent students. Each variable in the left most column is an outcome for a separate regression. All the covariates included in other regressions were also included here, but their values are not shown for brevity. The values in the table are the coefficient (and standard error) on total loans. Total loans is instrumented for with Stafford loan access. Full sample independent students and high need independent students were not shown because there were no significant effects. Independent female, dependent and independent black, and independent high need student regressions were not estimated because of small sample size concerns.

# Appendix

## Effect of Loans on Selection into Community College

Table A1: Marginal Effects from a Multinomial Logit Regression Predicting Post-High School Activity

	P(work)		P(2 yr)		P(4 yr)		P(other)	
	dy/dx	P>z	dy/dx	P>z	dy/dx	P>z	dy/dx	P>z
Loans	0.021	0.184	0.013	0.561	-0.038	0.132	0.004	0.526
Distance to Closest CC	0.001	0.000	-0.002	0.000	0.000	0.247	0.000	0.077
Reading Score	-0.004	0.000	-0.004	0.000	0.008	0.000	0.000	0.673
Math Score	-0.009	0.000	-0.003	0.000	0.014	0.000	-0.002	0.000
HS GPA	-0.001	0.003	0.000	0.261	0.000	0.097	0.000	0.733
Mom College	-0.065	0.000	0.006	0.552	0.058	0.000	0.001	0.829
Mom Post-college	-0.078	0.001	-0.055	0.009	0.131	0.000	0.002	0.812
Dad College	-0.040	0.000	0.000	0.992	0.047	0.000	-0.007	0.145
Dad Post-college	-0.088	0.000	-0.006	0.778	0.117	0.000	-0.023	0.052
Asian	-0.121	0.000	-0.047	0.029	0.174	0.000	-0.005	0.608
Black	-0.078	0.000	-0.091	0.000	0.168	0.000	0.002	0.752
Hispanic	-0.039	0.015	-0.033	0.108	0.053	0.023	0.018	0.011
American Indian	0.025	0.584	-0.078	0.163	0.040	0.472	0.013	0.564
Multi-racial	0.036	0.057	-0.095	0.000	0.059	0.023	0.000	0.979
Female	-0.081	0.000	0.004	0.637	0.080	0.000	-0.003	0.547
Family Income <25k	-0.010	0.548	0.025	0.296	-0.008	0.744	-0.008	0.414
Family Income >25k, <35k	-0.022	0.202	0.014	0.545	0.013	0.606	-0.004	0.643
Family Income >35k, <50k	-0.031	0.050	0.013	0.568	0.014	0.546	0.004	0.596
Family Income >50k, <75k	-0.069	0.000	0.021	0.353	0.052	0.019	-0.004	0.622
Family Income >75k, <100k	-0.095	0.000	0.006	0.807	0.101	0.000	-0.012	0.265
Family Income 100k+	-0.160	0.000	-0.008	0.766	0.180	0.000	-0.012	0.280

Notes: P(work) is the probability that post high school activity = working; P(2 yr) is the probability that post high school activity = public two-year college; P(4 yr) is the probability that post high school activity = four-year college; P(other) is the probability that post high school activity = other college type (such as for profit or less than two year colleges). Sample weights were included, the errors were clustered at the community college level, state FE were included, only high school graduates were included, and Alaskans were not included (because their community colleges are not separate institutions, they are just branches of the public four-year colleges, and therefore do not have their own default rates published). These findings are robust to different specifications and samples. N=11,646,  $R^2=0.18$

## Additional Data Description

The first panel of Table A2a compares the different populations of students in terms of their borrowing behavior. For both subsidized and unsubsidized loans, the percentage of students who qualify to use them is similar at both four-year and community colleges (63% compared to 60% for subsidized loans, 92% compared to 91% for unsubsidized loans).<sup>55</sup> For both types of loans, the take-up rate is about twice as high for four-

<sup>55</sup>In order to calculate which students qualified for loans, information on cost of attendance (COA) and estimated family contribution (EFC) is necessary. In the BPS, both COA and EFC information is available for all students, regardless of whether they submitted a FAFSA form. COA information is obtained from the school and EFC information is imputed from the CPS if the student did not submit a FAFSA. This said, COA and EFC information in the BPS is most accurate for students who did submit FAFSAs.

year students as it is among community college students, and the take-up rate of subsidized Stafford loans is over twice as high as the take-up of unsubsidized Stafford loans. Conditional on borrowing, community college students take subsidized Stafford loans that are 13% smaller, and unsubsidized loans that are 16% smaller, than all students. Community college students are far less likely to use the maximum Stafford loan, conditional on qualifying for it. Four-year students are three times more likely to take private loans than community colleges students. All these facts are likely to be explained, at least in part, by the higher cost of four-year college, both per credit hour and to complete a degree.

It is clear that many students who have access to low cost loans do not use them. 13% of community college students are eligible for a subsidized loan, yet do not submit a FAFSA to qualify to receive one.<sup>56</sup> Even among students who submit FAFSAs and apply for federal aid, the take-up rates of Stafford loans among community college students are low, at 32%.<sup>57</sup> Possible reasons for the low take-up rate and use of Stafford loans are discussed in Section 2.1

The second panel of Table A2a summarizes the college outcomes studied in this analysis. Compared to four-year college students, community college students take fewer loans, are more likely to earn an associate's degree, take fewer credit hours in the first year, have more credit card debt in their first year, work more hours in the first and third years, and complete 25 percent fewer total months of schooling.

Table A2b compares the control variables that I use in my regressions across the different types of students. Compared to four-year students, community college students are older, five times more likely to be independents and two thirds less likely to have a father or mother with a graduate degree. Community college students also have SAT scores that are about 20% lower and incomes that are about 40% lower, compared four-year college students. Community college students are also 50% more likely to be black or Hispanic.

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<sup>56</sup>This is an estimate calculated from the BPS:04/09.

<sup>57</sup>This is an estimate calculated from the BPS:04/09.

Table A2a: Characteristics of Different Types of Students in the BPS:04 - Loan and Academic Outcome Variables

	4-Year Students	All CC Students	Dependent CC	Independent CC
<b>Loan Variables:</b>				
Apply for Federal Aid	.79	.68	.67	.69
Qualify Subsidized Stafford	0.63	0.60	0.54	0.72
Qual. Subsidized Staff. & Apply	0.52	.47	.42	.56
Use Subsidized Stafford	0.37	0.14	0.13	0.16
Take-up Rate of Sub. (loans=1)	0.71	.32	.31	.33
Take-up Rate of Sub (loans=0)	-	.01	.01	.01
Subsidized Stafford loans*	2373.43	2076.41	2033.49	2148.44
Qualify Unsubsidized Stafford	0.92	0.91	0.89	0.95
Qual. Unsubsidized Staff. & Apply	.73	.60	.59	.64
Use Unsubsidized Stafford	0.21	0.08	0.07	0.09
Take-up Rate of Unsub. (loans=1)	0.29	.14	.13	.16
Take-up Rate of Unsub. (loans=0)	-	.00	.01	.00
Unsubsidized Stafford loans*	2684.75	2265.31	2045.56	2630.24
Qualify for Maximum Stafford	0.52	0.27	0.34	.13
Use Maximum Stafford	0.26	0.04	0.06	0.00
Receive Pell	0.26	0.36	0.32	0.46
Take Private Loans	0.10	0.03	0.03	0.02
Private loans 1st Yr.*	6282.12	3129.60	3219.91	2756.30
<b>Outcome Variables:</b>				
Total Loans 1st year	2424.76	595.90	568.89	654.53
Associate's Degree	0.05	0.21	0.24	0.16
Credit Hours 1st year	28.69	19.95	21.75	15.86
Credit Card Balance 1st year	28.69	98.72	141.99	4.80
Transfer 4 yr. College	-	0.34	0.42	0.18
Bachelor's Degree	0.66	0.13	0.17	0.04
Weekly Hours Worked 1st year	11.41	21.75	20.90	23.61
Worked All Weeks 1st year	0.17	0.41	0.40	0.44
Total Months Enrolled 09	41.11	32.16	34.70	26.63
Weekly Hours Worked 3rd year	17.24	21.55	21.09	22.84
Worked All Weeks 3rd year	0.22	0.26	0.27	0.23

Source: All students in the BPS:04/09

Notes: "CC" stands for community college. Both full time and part time community college students are included. A student is considered an independent if the student is over 24 years old, married, a parent, or served in the military. "Take-up Rate of Sub. (loans=1)" is the percent of students who qualified for a subsidized Stafford loan, submitted a FAFSA, and attended a college that offered loans who actually took a Stafford loan. \* = average loan amount was calculated only for those students who took loans. The outcomes in the 3rd year (weekly hours, worked, worked all weeks) are calculated only for students still enrolled in their third year.

Table A2b: Characteristics of Different Types of Students in the BPS:04 - Control Variables

	4-Year Students	All CC Students	Dependent CC	Independent CC
<b>Control Variables:</b>				
Age	19.01	22.51	18.73	30.74
Independent	0.06	0.32	0.00	1.00
Female	0.57	0.58	0.53	0.68
Black	0.09	0.16	0.14	0.20
Hispanic	0.09	0.13	0.13	0.13
Asian	0.06	0.04	0.05	0.02
Other Race	0.05	0.05	0.05	0.05
Dad HS Degree	0.24	0.43	0.42	0.44
Dad Some College	0.20	0.21	0.23	0.17
Dad Bachelors Degree	0.24	0.13	0.15	0.08
Dad Graduate Degree	0.23	0.08	0.09	0.06
Mom HS Degree	0.25	0.40	0.39	0.43
Mom Some College	0.25	0.28	0.31	0.22
Mom Bachelors Degree	0.27	0.12	0.15	0.08
Mom Graduate Degree	0.17	0.06	0.08	0.04
HS GPA	5.86	5.37	5.37	5.37
Didn't Take SAT	0.03	0.22	0.27	0.11
Math SAT	538.80	441.58	443.52	423.91
Verbal SAT	538.88	447.61	449.18	433.31
Family Income	70410.09	43806.27	52141.65	25711.35
Access to Loans	1.00	0.92	0.94	0.88

Source: All students in the BPS:04/09

Notes: "CC" stands for community college. Both full time and part time community college students are included. A student is considered an independent if the student is over 24 years old, married, a parent, or served in the military.

## Additional Results

Table A3: The Effect of Loan Access on Additional Outcomes

	All	Depend.	Independ.
Wkly Hrs. 1st Yr.	-0.798 (1.510)	-0.333 (1.788)	-1.199 (2.662)
Worked All Weeks 1st Yr.	-0.038 (0.032)	-0.019 (0.038)	-0.052 (0.056)
Credit Card Debt 1st Yr.	23.490 (34.420)	29.270 (58.180)	36.530 (34.330)
N	4590	3118	1472

Notes: "Depend." is dependent students and "Independ." is independent students. Each variable in the left column is an outcome for a separate regression. All the covariates included in other regressions were also included here, but their values are not shown for brevity. The numbers shown are the coefficient (standard error) of the loan access variable in the given regressions. All specifications were estimated with an OLS linear probability model.

Table A4: The Effects of the Loans Variable When Community College Characteristics are Included

	All	Dependent	Independent
Total Loans	203.4*** (63.130)	128.0** (56.780)	317.8*** (102.200)
Credits 1st Year	0.309 (1.012)	1.725 (1.103)	-1.476 (1.389)
Associate's	0.0117 (0.025)	-0.00688 (0.043)	0.0242 (0.048)
Transfer 4-Year	0.0276 (0.027)	0.0275 (0.039)	0.027 (0.047)
Total Months Enrolled	0.98 (1.256)	-0.691 (1.325)	2.599 (2.947)
Bachelor's	0.0172 (0.018)	0.0452 (0.030)	-0.0118 (0.015)
Hours Work 3rd Year	-1.086 (2.663)	-2.124 (2.499)	1.881 (4.626)
Work All Weeks 3rd Year	-0.0813** (0.041)	-0.171*** (0.052)	0.104 (0.072)
Hours Work 1st Year	-2.046 (2.166)	-0.369 (2.139)	-4.719 (3.076)
Work All Weeks 1st Year	-0.0661* (0.034)	-0.021 (0.043)	-0.132*** (0.049)
Credit Card Debt 1st Year	-5.196 (25.000)	-19.05 (34.040)	48.76 (44.260)

Notes: "Depend." is dependent students and "Independ." is independent students. Each variable in the left column is an outcome for a separate regression. All the covariates included in other regressions were also included here, but their values are not shown for brevity. The numbers shown are the coefficient (and standard error) of the loans variable in the given regressions. All specifications were estimated with an OLS linear probability model. N All students = 2408-3727, N Dependent students = 1762-2523, N Independent students = 646-1204.