FEDERAL FINANCIAL AID ELIGIBILITY AND STUDENT DEBT

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This paper presents estimates of the impact of student eligibility for federal financial aid on total student debt using a natural experiment created by the 1992 Amendment to the Higher Education Act of 1965. The amendment removed assets from the calculation of federal aid eligibility for families with earned income of less than $50,000 and excluded housing assets from eligibility calculation for all students. My results suggest each dollar of eligibility increases student debt by about 40 cents.

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I. INTRODUCTION

There has been a tremendous amount of recent interest in access to college. A college degree has been long thought to have high returns in the labor market, and, as a result, the proportion of college-goers has grown steadily. However, many college graduates have seen the return to their education stagnate, as wages for the middle class fail to keep pace with rising college costs. Increasingly, graduates are left with large amounts of student debt relative to their earnings, which has led to an increase in student loan defaults. These trends have precipitated much public policy interest in the cost and financing of higher education.[1]

This paper provides evidence on the influence of federal financial aid policies on student debt. In particular, I estimate the effect of federal aid eligibility on student debt accumulation. There are four fundamental empirical challenges in estimating this relationship. First, there are likely unobserved characteristics, like taste for debt, that are correlated with both eligibility and debt. Factors such as these would induce omitted variable bias. Second, eligibility and debt are likely to be endogenous, because eligibility is a function of the price of school chosen by the student. Third, eligibility may also be endogenous to debt because families can, to some extent, alter their financial characteristics that determine eligibility. Finally, there is a dearth of data that measures debt accumulation and eligibility for a national sample of students.

In this paper, I outline a quasi-experimental approach that circumvents these concerns. I use rich longitudinal data from the Beginning Postsecondary Students Longitudinal Study (BPS) to exploit a change in aid eligibility caused by the 1992 Amendment to the Higher Education Act of 1965. The Amendment allowed dependent students from families with less than $50,000 of

[1] See the Bureau of Labor Statistics (2013) for evidence on wage growth over the past two decades. See National Center for Education Statistics (2012) for college and university tuition costs since 1980. See Federal Reserve Bank of New York (2013) for documentation of student and credit card debt delinquency. For evidence on increasing concern about rising debt-to-earnings ratios, see Davies and Harrison (2012) and Chopra (2012).

earned income who filed their federal taxes using form 1040A to exclude all assets from the calculation of need-based federal aid eligibility. Both those with family income below and above $50,000 who filed the 1040 long-form were not affected by this change. In addition, the law change excluded housing assets from the calculation of federal aid eligibility for all students. Students treated by the law change experienced increased eligibility relative to those who were untreated. The manner of the law change was such that different groups of individuals were affected differently. I use this group-level variation over time to construct a predicted treatment variable, which is by construction uncorrelated with omitted variables and exogenous to debt. I then examine the impact of treatment on subsequent student debt accumulation.

I have a number of findings. I find that each dollar of federal aid eligibility raises student debt by 30 to 60 cents, depending upon the data source and specification used; the typical estimate is about 40 cents. A $1,000 increase in eligibility is predicted to increase the ratio of debt to total price of attendance by 4 percentage points. I also examine differences in responses to aid eligibility across different subgroups of the population of college-goers. The effect of federal aid eligibility on debt is significantly higher for those with the most exposure to postsecondary education, namely whites and students with a parent who attended college. Overall, my estimates suggest that an expansion in federal student aid eligibility has large, significant effects on total undergraduate debt accumulation. Based on my central estimates, the increase in aid eligibility caused by the 1992 Amendment is responsible for about one-third of the increase in total student debt from 1989-90 to 1993-94.

The remainder of the paper is organized as follows. Section II contains background information. My methodology and a description of my data are found in Section III. Section IV

contains my results, and Section V presents several robustness checks. I include a brief conclusion, which discusses the external validity of my results and areas for further research.

II. BACKGROUND

This paper is most closely related to four strands of the empirical postsecondary education finance literature: the impact of financial aid on attendance (see, for example, Buss, Parker, and Rivenburg, 2004; Cameron and Heckman, 2001; Cornwell, Mustard, and Sridhar, 2006; Deming and Dynarski, 2009; Dynarski, 2000, 2002; Kane, 1995; Lovenheim and Owens, 2013; and Seftor and Turner, 2002; the impact of financial aid on progress in college (Bailey and Dynarski, 2011; Bettinger, 2004; Dynarksi, 2003; Scott-Clayton, 2011); the impact of financial aid on post-college outcomes (Field, 2009; Rothstein and Rouse, 2011; Scott-Clayton, 2012a); and the relationship between student debt and default rates (Gross et al., 2009; Lochner, Stinebrickner, and Suleymanoglu, 2012). What has garnered relatively little empirical attention, on the other hand, is the effect of federal aid policies on how students finance their education. The existing literature has suggested that an important factor in the run-up of student debt has been changes in federal aid eligibility, although this work has been primarily theoretical.

Theoretical work has argued that favorable loan terms, such as below-market interest rates and flexible repayment terms, increase the amount students are willing to borrow for education (Ionescu, 2008a, 2008b, 2009; Johnson, 2013), student enrollment (Levine and Rubinstein, 2013), and persistence (Cameron and Taber, 2004; Caucutt and Kumar, 2003). Federal loans are usually more appealing than private student loans because they offer more favorable interest rates, grace periods, and flexible repayment options (Dynarski, 2002). Thus, the literature predicts that access to attractive federal loans should be associated with higher debt levels than access to other types

of loans. So, expansions in eligibility for federal loans, such as those caused by the 1992 Amendment, are expected to increase student debt.

Aggregate trends in federal aid suggest that the predictions of the theoretical literature ring true; these policies appear to have had a large effect on the take-up of student debt. Figure 1 shows aggregate federal loan volumes over time, and Figure 2 shows average federal loans per student over time. Aggregate and per student loan volumes have been increasing steadily for the past twenty years, but the figures show two major points of inflection: the early 1990's and the late 2000's. Both of these points correspond to the timing of amendments to the Higher Education Act of 1965. These amendments affected the characteristics of federal financial aid programs. Past amendments have created new federal aid programs, altered individual and institutional eligibility rules, and changed annual and aggregate maxima for aid, among other things. (Figures 1 and 2 here)

Aggregate federal loan volumes in the years surrounding the 1992 Amendment, the focus of this paper, are shown in Figure 3. Figure 4 shows federal loan volumes per student during the years surrounding the law change. The graphs show sharp increases in federal loans in academic year 1993-94, the year the Amendment came into effect. Students also appear to have financed a greater proportion of total college costs with debt as a result of the law changes. Figure 5 shows an increase in the percentage of total college funding that took the form of student loans following the 1992 Amendment. Loans made up 33 percent of college funding in academic year 1992-93 and 39 percent of college funding in 1993-94. (Figures 3, 4, and 5 here)

Despite these suggestive aggregate trends, the empirical literature has yet to establish a causal link between federal aid policies and student debt. The existing literature in this area has suffered from a lack of external validity and a lack of attention to causality. The lack of external

validity stems from the fact that there have been few sources of national data that include detailed information about students' family characteristics and college financing decisions. As a result, much of the work that has studied the effects of loan eligibility on other education outcomes has focused on narrow policies that only affect a single state or institution. In general, the estimated effects of state and institutional loan eligibility have been highly dependent upon the way these loans are packaged and a student's socio-demographic group.[2] The one exception is a national study by Monks (2012). He used the College Board's 2011 Annual Survey of Colleges and the 2011 Integrated Postsecondary Education Data System and variation in aid policies at the institutional level to examine the impact of college aid policies on student debt. Monks found that need-blind admissions increased average student debt, and meeting full demonstrated need decreased average student debt.

III. METHODOLOGY AND DATA DESCRIPTION

The demand for student loans, L^D, is a function of the interest rate, r, and individual characteristics, $\boldsymbol{\theta}$, $L^D = h(r, \boldsymbol{\theta})$, while the supply of student loans, L^S, is determined by r and dollars of need-based federal aid eligibility, E, $L^S = g(r, E)$. In practice, observed student debt is the equilibrium outcome of the interaction between demand and supply, $L = f(E, \boldsymbol{\theta})$. Federal aid eligibility is determined by the price of college attendance (tuition and other educational expenses associated with school choice), P, and the Expected Family Contribution, EFC, subject to annual and aggregate federal aid maxima.[3] The formula for yearly eligibility for student i is

$$(1) \qquad E_i = \min(M, \max(0, P_i - EFC_i)),$$

[2] Dowd (2008) extensively reviews this literature.

[3] Valid costs are defined in Section 472 of the Higher Education Act of 1965. For traditional, dependent students, costs include tuition and fees, an allowance determined by the institution for books, supplies, transportation, and miscellaneous personal expenses, and an allowance determined by the institution for room and board.

where *M* is the annual maximum, determined by statute. Information provided by students on the Free Application for Federal Student Aid (FAFSA), a form required for federal financial aid, is used to calculate *EFC*. This information is based upon the preceding tax year, so high school students are not be able to file a FAFSA until at least January of their senior year, or after taxes are filed. The *EFC* is determined by

$$(2) \qquad EFC_i = \rho(I_i^F + \pi(\phi(A_i^H) + \zeta(A_i^{NH})), I_i^S, A_i^S),$$

where the function ρ takes as its arguments the functions ϕ and ζ, as well as I^F, which measures total earned and unearned family income, I^S, total earned and unearned student income, and A^S, total student assets less debt. The function ϕ takes A_{it}^H, family home equity, as its argument. A measure of family non-housing assets less debt, A_{it}^{NH}, is the argument for the function ζ.[4] I substitute (2) into (1) to create

$$(3) \qquad E_i = \min(M, 0, \max(P_i - \rho(I_i^F + \pi(\phi(A_i^H) + \zeta(A_i^{NH})), I_i^S, A_i^S))),$$

eligibility in terms of individual financial characteristics and school price.

A. Econometric Specification

I adopt a flexible empirical specification which models student loans as a linear function of *E* such that

$$(4) \qquad L_{it} = \omega + \beta E_{it} + \boldsymbol{\Psi X_i} + \boldsymbol{\Psi X_i} \cdot t + \kappa_t + u_{it},$$

where ω is a constant term, and *t* indexes time. My model allows for level effects of socioeconomic characteristics, $\boldsymbol{X}$, on loans, as well as trends in the effect of socioeconomic characteristics over time. These time trends allow optimally chosen debt paths of loans across time, which may differ because of liquidity constraints or tastes, to vary by individual characteristics. In addition, I allow

[4] The specifics of (2) are discussed in the Technical Appendix.

for a linear time trend, κ, and u, an idiosyncratic error term. Then, β measures the impact of federal financial aid eligibility on loans, controlling for these factors.

There are four main problems with directly estimating the parameters in (4). First, an unobserved individual fixed effect, such as taste for debt, could be correlated with eligibility. The existence of such a factor would induce omitted variable bias. Second, it is clear from (1) that eligibility is a function of the student's individual price of attendance. Thus, the relationship between federal aid eligibility and student debt suffers from classic endogeneity, because students likely choose the price of college attendance jointly with debt. Third, (3) shows that eligibility is also a function of family financial characteristics, another potential source of endogeneity. There is evidence to suggest that, to some extent, families alter their financial characteristics to affect eligibility at the same time as they choose debt.[5] For these three reasons, the correlation between federal aid eligibility and aggregate student debt cannot be interpreted as a causal effect. Finally, there is a dearth of data in which student loans and eligibility are observed beyond the first year of college for a national sample of students. To solve the first problem, I take the first difference of (4) to get

(5) $\Delta L_{i.} = \alpha + \beta \Delta E_{i.} + \boldsymbol{\Psi X_i} + v_{i.}$,

where $v_{i.} \equiv \Delta u_{i.}$and $\alpha \equiv \Delta \kappa.$, which is purged of unobserved time-invariant characteristics, such as fixed effects.

B. Law Change

To solve the endogeneity problems, I exploit a change in the early 1990's that alters the eligibility calculation differentially for dependent students with parental incomes above and below $50,000. This change, caused by the 1992 Amendment to the Higher Education Act of 1965,

[5] Evidence on the degree to which families respond to financial aid rules is mixed. See, for example, Babiarz and Yilmazer (2009), Feldstein (1995), Long (2004), and Monks (2004).

allows parents with annual incomes under $50,000, who file the 1040A short federal tax form, to exclude all of their assets from the *EFC* calculation.[6] In other words, the Amendment changes the function ζ in (3) for families with less than $50,000 of income who file the 1040A, but not for families with higher incomes. The 1040A is generally filed by individuals and families with uncomplicated tax situations. To file the 1040A, taxpayers must meet a number of requirements. They must have taxable income of less than $50,000 and claim the standard deduction instead of itemizing. As a rule, only taxpayers with itemized deductions less than the standard deduction choose to file the 1040A. Because the 1040A does not allow for property tax and mortgage interest deductions, a majority of homeowners choose to file the 1040 long-form (Poterba, 1992). The Amendment also changes the function ϕ for all students, because home equity is no longer considered in the eligibility calculation, and increases the annual federal aid maximum.[7, 8]

I illustrate the change in student eligibility from baseline, before the Amendment came into effect, to follow-up, after the Amendment came into effect, in Table 1. The change in eligibility from (5), $\Delta E_{i.}$, corresponds to the last column of Table 1. In order to emphasize the sharp differences in eligibility the Amendment creates between similar families, I calculate eligibility for pairs of model students. In each pair, there is one student with family income of $45,000 and another with family income of $55,000; the students differ only in their family income.[9] In both academic years, the families are composed of two working parents and two college students. In each family, the older parent is 45 years old. The focal students have no income or assets, and the

[6] The Amendment also changed the *EFC* calculation for those who file the federal tax form 1040EZ. However, those with dependent children cannot file this form, so this change is only relevant for independent students, who are outside of this study population.

[7] Dynarski (2002) studies the effect eligibility on college enrollment and completion by exploiting the change in ϕ caused by the 1992 Amendment.

[8] Annual loan limits for sophomores increased from $2,625 in 1989-90 to $3,500 in 1994-95. Annual loan limits for juniors and seniors increased from $4,000 in 1989-90 to $5,500 in 1994-95.

[9] Eligibility and all student and family characteristics in Table 2 are reported in 1992 dollars.

price of college attendance is $10,000. All family income is earned income. These family characteristics approximate those typical of families near the $50,000 income cut-off. (Table 1 here)

I compare three pairs of these model students in order to demonstrate the implications of the change in ϕ for all students in (3) as well. In panel A of Table 1, each family has $60,000 of non-housing assets and no housing assets. In this case, the student with $45,000 of family income is eligible for an additional $844 of financial aid after 1992, relative to no increase in eligibility for the student with $55,000 of family income. In panel B, when the families hold $45,000 of non-housing assets and $15,000 of housing assets, the results are identical to panel A. In panel C, in contrast, a student from a family with $55,000 of income, $15,000 of non-housing assets, and $45,000 of housing assets experiences a $395 increase in eligibility. For higher-income families, the exclusion of housing assets from the eligibility calculation and the increase in the annual federal aid maximum for all students are the mechanisms that can drive a change in eligibility. This effect, of course, is proportional to the size of home equity. The student with family income of $45,000 in this scenario still experiences an $844 change.

C. Construction of Predicted Eligibility

To solve the endogeneity problems, I want to construct a measure of $\Delta E_{i\cdot}$, from (5), that is exogenous to observable characteristics that could be jointly correlated with debt. To do so, I decompose $\Delta E_{i\cdot}$ into

(6) $$\Delta E_{i\cdot} = \Delta E_g^* + \varepsilon,$$

where ΔE_g^* is the exogenous part of change in eligibility that is due to the law change, and ε is endogenous part of the change in eligibility. I exploit the details of the 1992 Amendment, which

changes eligibility differentially by student group, to make the group-mean predicted change in eligibility, ΔE_g^*. By construction, ΔE_g^* is orthogonal to ε.

I am able to construct ΔE_g^* and estimate the effect of eligibility on debt with the 1990-94 BPS, a restricted-access dataset from the U.S. Department of Education, which is drawn from the 1990 National Postsecondary Student Aid Study (NPSAS). The 1990 NPSAS was designed by the National Center for Education Statistics to provide information on how postsecondary student financial aid is targeted, received, and used.[10] The survey collected information on a nationally representative sample of students in all types of postsecondary schools and at all academic levels (undergraduate, graduate, and first-professional). The BPS followed a nationally representative cohort of students that was randomly drawn from the NPSAS students who were enrolled in college for the first time. The BPS is composed of student-level records on financial aid provided by the federal government, states, colleges, employers, and private agencies, along with student demographic and enrollment data.

The BPS has two main limiting factors. First, it only measured aggregate loans in 1993-94, so I cannot distinguish between the effect of federal aid eligibility on federal and non-federal loan debt. Second, the students in my sample enroll in college in 1989-90, several years before the law changes took effect, so their matriculation decisions are independent of the Amendment.[11] Much of the previous literature in this area has focused on enrollment, however, and one of the

[10] It included students who did and did not receive student financial aid, allowing comparisons of the costs and financing of education between these groups.

[11] Based on evidence that students know little about financial aid before entering college (Dynarksi and Scott-Clayton, 2013) and the uncertainty of the content of the 1992 Amendment (Hannah, 1996), it is unlikely that the initial matriculation decision in 1989-90 is affected by the potential law changes.

advantages to the BPS data is that it allows me to measure responses to eligibility that go beyond initial enrollment.[12]

My analysis sample consists of 2,850 dependent students who are freshman in 1989-90, 57 percent of which have family income below $50,000.[13] Summary statistics for this sample are shown in column 1 of Table 2. As a whole, members of this sample begin college at 18 years of age, pay approximately $9,000 to attend school as freshman, and have average family income of about $60,000. About half of the students attend a private college, 8 percent attend a two-year college, and less than 10 percent attend a for-profit college. Over three-quarters are full-time students and almost that many have a parent who attended college. (Table 2 here)

Columns 2 and 3 of Table 2 report mean characteristics of students by income group, above and below $50,000. The differences between these group means are reported in column 4. Compared to students from families with higher incomes, those students with family incomes under $50,000 are more likely to be non-white and more likely to attend a two-year or for-profit school. They are less likely to have parents who are married, parents who went to college, or a sibling in college. Students with lower family incomes also have college costs and home equity that are an average of $1,931 and $66,568 lower than students with higher family incomes, respectively.[14]

Members of my sample are initially surveyed at the end of their first academic year (1989-90), the baseline, and then participated in a follow-up survey five years later (1993-94), the follow-up. The BPS is the only national dataset available that spans an exogenous change in federal aid

[12] See Dynarski and Scott-Clayton (2013) for an overview of this literature.
[13] Family income reported here is measured in 1988 and converted to 1992 dollars using the Consumer Price Index. So, families who earn more than about $42,000 in 1988 dollars are considered above the $50,000 limit.
[14] On the whole, the magnitudes of these differences are economically as well as statistically significant. As a result, I include a separate analysis using a subgroup with family income between $40,000 and $60,000 as a robustness check. Summary statistics for this subgroup are discussed in Section V.B.

eligibility, includes detailed financial aid eligibility information, and measures students' usage of financial aid beyond the first year of college. Although I do not observe true eligibility in 1993-94, by replacing $\Delta E_{i.}$ with ΔE_g^* I solve the final problem, the shortage of national data that measure both eligibility and debt. For this reason, the BPS is the best dataset available with which to identify the causal effect of federal aid eligibility on student debt for a national sample.

To create ΔE_g^* with the BPS, I use group-mean income and assets, measured in 1989-90, and a fixed price of attendance, $\bar{P}$, in lieu of individual characteristics to calculate eligibility in 1989-90 and 1993-94 using (3).[15] Treatment by the Amendment varies by income and tax-filing status. Filing status is not observed in the BPS, but I do observe two attributes that are closely related to the characteristics that play the most important part in predicting itemization and therefore tax-filing status: mortgage interest and state and local taxes (Poterba, 1992). Accordingly, I group students by whether family income is above or below $50,000, whether the family owns a home, and the state in which the family resides, because the Amendment differentially affects students along these lines. There are 103 of these groups in the sample. As in Table 1, the eligibility change is calculated with demographic and financial characteristics that do not vary over time; only the Amendment causes eligibility changes.

I make the treatment variable as a weighted average, where τ is the probability that the family files an itemized tax return, a 1040, and $(1-\tau)$ is the probability that the family does not file an itemized tax return, a 1040A, such that

$$\Delta E_g^* \equiv \tau\left(\Delta E_g^* \middle| File\ a\ 1040\right) + (1-\tau)\left(\Delta E_g^* \middle| File\ a\ 1040A\right). \quad (7)$$

The first term is equal to the predicted change in eligibility for those who file the 1040 long-form, multiplied by the proportion of the group that itemizes. These families are only affected by the

[15] The details of this calculation are discussed in the Technical Appendix.

exclusion of home equity from the eligibility calculation and the increase in aid maxima. The second term is equal to the proportion of the group that does not itemize, multiplied by the predicted change in eligibility for those who are affected by the exclusion of all assets from the eligibility calculation, 1040A filers, as well as the exclusion of home equity from the eligibility calculation and the increase in aid maxima.

Since tax-filing status is not measured in the BPS, I use the 1992 Health and Retirement Study (HRS) to create τ. The HRS is a longitudinal panel study that surveys a representative sample of over 26,000 Americans over the age of 50 every two years. The HRS collects information about income, work, assets, family relationships, and, unlike the BPS, tax-filing status. My HRS sample includes only those respondents who have a child in college. Although the HRS respondents in my sample are slightly older, on average, than the parents in the BPS, the HRS survey is the closest match in timing to my BPS sample. I group the HRS sample by the same characteristics as the predicted treatment variable, whether family income is above or below $50,000, whether the family owns a home, and the state in which the family resides, and determine the proportion of individuals in each group who itemize. ΔE_g^* is by construction uncorrelated with unobserved heterogeneity as it is not based on individual-level characteristics.[16]

I substitute (6) into (5) to arrive at the following reduced-form econometric model:

(8) $$\Delta L_{ig\cdot} = \alpha + \beta \Delta E_g^* + \boldsymbol{\Psi X_i} + \epsilon_{ig\cdot},$$

where g indexes groups. The focal parameter, β, measures the impact of eligibility on loans, conditional on individual baseline socioeconomic characteristics. The identifying variation results from group-level differences in eligibility changes due to the 1992 Amendment. I cluster the standard errors at the group level.

[16] ΔE_g^* is also uncorrelated with measurement error in self-reported family characteristics.

D. Identifying Assumptions

There are three reasons to believe my fundamental assumption, that variation in ΔE_g^* is exogenous to individual characteristics. First, there is no evidence ex ante to suggest that families with similar incomes, but on opposite sides of $50,000, should have significantly different preferences or education financing behavior.[17] Second, there are no ex post findings that suggest that schools differentially changed their financial aid policies for those students from families below and above $50,000 of income (McPherson and Schapiro, 1998). Third, Hannah (1996) described the political economy surrounding the Amendment and found no systematic relationship between targeted eligibility increases and family income levels in ways that would violate my identifying assumption.

IV. RESULTS

Table 3 displays OLS estimates of the parameters from (8) using a variety of different specifications. In the first column, I define the vector of individual baseline socioeconomic controls, $\boldsymbol{X}$, to include the self-reported race of the student, the student's age, the total number of family members in the household, parent's income, parent's marital status, the age of the older parent, and whether a parent attended college. These general family characteristics are a standard set of socioeconomic controls and, importantly, are measured in 1989-90 (i.e., baseline), prior to the law change. The focal parameter, β, is estimated to be .38, and is significantly different from zero at the 1 percent level. This estimate is shown in the first row of column 1. So, each dollar of eligibility is predicted to increase debt by 38 cents. I also find that debt increases more for non-whites and younger students. The change in student debt from 1989-1990 to 1993-1994 decreases by $3.55 for every $1,000 of parental income. Students with married parents, older parents, or a

[17] Figure 4, discussed in Section V.A, provides evidence to this effect.

parent who attended college have, on average, less change in debt. In column 2, I add family assets, namely parent's net worth and home equity, to the standard socioeconomics characteristics that make up $\boldsymbol{X}$. The parameter estimate for β is .37, similar to the parameter estimate in column 1. For every $1,000 of home equity and for every $1,000 of parental net worth, the change in debt decreases by $3.36 and $2.24, respectively. (Table 3 here)

Column 3 contains parameter estimates for my richest specification. In this specification I condition on all of the control variables found in the specification shown in column 2, as well as family education characteristics measured at baseline, the focal student's school price, whether the student attends a two- or four-year school, whether the student attends a private college, and whether the student attends a for-profit school whether the focal student attends school full-time and whether he has siblings in college, and state fixed effects. For each dollar of eligibility, the average student increases total loans by 44 cents, which is significantly different from zero at the 1 percent level. For a $1 increase in the school price, debt is predicted to increase by 23 cents. In addition, students who attend private colleges have higher changes in debt than students who attend public colleges, and students who attend two-year or for-profit schools have lower changes in debt than students who attend four-year or not-for-profit schools. Each of the parameter estimates of β in columns 1, 2, and 3 is economically similar to the others and statistically indistinguishable.

In column 4, I include all of the control variables found in the specification in column 3, and estimate (8) with a group random-effects model. As in column 3, the group random-effects model estimates that that each dollar of federal aid eligibility increases student debt by 44 cents.[18] My final specification recalculates ΔE_g^* with the group-median values of family characteristics rather than the group-mean characteristics. This recalculation tests whether the results in the

[18] The eligibility parameter estimates in columns 3 and 4 of Table 3 differ only at the third decimal place.

previous columns are driven by the outliers in each group. I find that the estimated effect of eligibility when ΔE_g^* is calculated with median values is .61 and actually *higher* than the effects calculated with means. Overall, the results in Table 3 suggest that an increase of $1 in federal aid eligibility translates into an increase in student debt of roughly 40 cents.

A. Types of Response to Increased Eligibility

In Table 4, I estimate variations on (8) in an attempt to learn about the mechanisms behind the loan increases seen in Table 3. Both of the models shown in this table are estimated with my richest vector of control variables. Column 1 displays the parameter estimate of the effect of eligibility on the total cost of school. School cost information is not reliably included in the BPS for all enrolled students for all years, so I calculate the real net present value of cost,

(9) $$Total\ Cost = \sum_{t=8990}^{9394} \%\ of\ Year\ Enrolled_t \times Cost_t^{8990} \times (1+r)^{8990-t},$$

where $Cost^{8990}$ is the cost of attendance at the student's chosen institution in 1989-90, indexed for inflation using the Consumer Price Index, and r is .075, the five-year Treasury constant maturity rate on August 1, 1989. This dependent variable is best expressed in levels, so I construct

(10) $$Total\ Cost_{ig} = \alpha + \varphi \Delta E_g^* + \boldsymbol{\Psi X_i} + \nu_{ig}..$$

I find that the estimated effect of a $1,000 change in eligibility on $Total\ Cost$ is about -$89; this effect is economically small and not significantly different than zero. Eligibility does not appear to have an effect on $Total\ Cost$. I also estimate

(11) $$L/Total\ Cost_{ig} = \alpha + \varphi \Delta E_g^* + \boldsymbol{\Psi X_i} + \nu_{ig}.,$$

where the dependent variable is the proportion of the net present value of costs that are debt financed. A change in eligibility of $1,000 increases the ratio of $L/Total\ Cost$ by 4 percentage points, significantly different from zero at the 1 percent level. This parameter estimate is shown in column 2. Because $Total\ Cost$ does not change as a result of eligibility, this result suggests that

students finance a greater proportion of $Total\ Cost$ with debt. An increase of 4 percentage points is a relatively large effect, as about one-eighth of the price of college attendance is financed with loans in 1989-90.[19] (Table 4 here)

B. Heterogeneity in Response to Increased Eligibility

I test for heterogeneous responses to the increase in eligibility for student aid in Table 5, which contains estimates of (8), using my richest specification, for various subsets of the sample. I conduct Wald tests of the null hypothesis that the effect of eligibility on debt is equal in each of the pairs of subsets. The p-values for these tests are shown in the last column of Table 5. I am particularly interested in the effect of eligibility on marginal college students. Marginal college students, which are frequently defined as students who have parents who did not attend college, are the target group for most expansions of federal financial aid policies (Lewin, 2013) and are shown to be responsive to federal financial aid in terms of college matriculation and, to a lesser extent, completion (Hoxby, 2004). In general, I find that the effects of eligibility are larger for students with *more* exposure to postsecondary education.[20] Panel A of Table 5 shows that white students have a larger response to an increase in eligibility for federal aid, .53, relative to non-white students, -.11. The p-value of the Wald test for whites and non-whites is .0003, so the effect of eligibility on debt is significantly different for these two groups. There is a smaller, but

[19] The calculation of $Total\ Cost$ is determined by the student's initial school choice. Although I do not measure price changes that result from later enrollment and transfer behavior, I do find that there is no differential transfer or enrollment behavior by ΔE_g^* in 1993-94. This evidence suggests that an expansion in federal student aid eligibility induces students to pay for a greater proportion of school costs with student loans rather than to respond on some other behavioral margin.

[20] While the previous literature found that marginal college students are much more response to financial aid than other college students, my results suggest the opposite pattern. There are multiple interpretations of this result. The dissimilarity may be because marginal college students have less exposure to the rules of the federal aid system (Horn, Chen, and Chapman, 2003; Ikenberry and Hartle, 1998; Scott-Clayton, 2012b) relative to other students, and much of the previous work focused on more salient aid policies (the Georgia HOPE Program, for example). On the other hand, the effects could be lower for this group because they are constrained by federal aid maxima, *M* from (3), and thus are not able to enjoy further expansions in eligibility as a results of the 1992 Amendment. Unfortunately, the data do not allow me to test this second possibility.

statistically significant, difference in the responses of students with a parent who attended college, .53, relative to students with parents who never attended college, .18, shown in Panel B. The Wald test's p-value for this pair of subsets is .0838. The average student response does not statistically differ by parental marital status or by whether the student sought financial aid advice while in high school. (Table 5 here)

In panels E, F, and G of Table 5, I estimate the effect of a change in eligibility separately for students at various types of colleges in 1989-90. Students who matriculate at 4-year schools experience a significantly larger effect of eligibility, .51, relative to the effect of eligibility for students who matriculate at two-year schools, .05; the p-value of the Wald test is .0024. This result is shown in panel E. In addition, students who attend private schools experience a greater effect, .62, than students who attend public schools, .20, shown in panel F. The p-value of the Wald test for these subsets is .0117, indicating that the difference between effects is also significant. Finally, in panel G, there is a significant difference in effect size between students who attend for-profit schools, -.04, and students who attend not-for-profit schools, .47. The p-value of the Wald test for this pair is .0171.

V. Robustness Checks

A. Subsample Estimation

As a robustness check, I estimate (8) for the 850 students from families with incomes from $40,000 to $60,000, near the policy change cut-off. I use this subsample to address the concern that family income might be correlated with other characteristics that affect student debt accumulation and that families with vastly different incomes might be affected differentially by other time-variant shocks. Families with more similar incomes, on the other hand, are not likely to

be as dissimilar in their unobserved characteristics that affect the demand for loans, especially given the arbitrary nature of the $50,000 cut-off (Hannah, 1996).[21]

Table 6 shows results of these estimations for several different specifications of (8) that correspond to those shown in Table 3. In general, the parameter estimates of the effect of eligibility on debt are economically very similar across the different specifications. And, each of these parameter estimates is statistically indistinguishable from the others. The third column contains the parameter estimate from my richest specification, which corresponds to the estimates from the model shown in column 3 of Table 3. In column 3 of Table 6, each dollar of eligibility is predicted to increase debt by 40 cents for students with family income from $40,000 to $60,000. The standard error on the parameter estimate for the subsample is naturally larger than that for the whole sample, as the subsample is much smaller than the whole sample and contains fewer groups, but the estimated effect for the subsample is statistically different from zero at the 10 percent level. The p-value of a Wald test with the null hypothesis that the eligibility effects in column 3 of Tables 3 and 6 are equal is .85, indicating the estimated effects are statistically indistinguishable. This result suggests that differences in debt accumulation between families with over and under $50,000 of income are driven by the change in federal aid eligibility and not by other income-specific time trends for this sample. (Table 6 here)

B. Other Loans

Overall, my results suggest that federal aid eligibility increases total debt, but do not separately identify effects on need-based federal loans and other student loans. The calculation of

[21] Table 1 shows differences in demographic characteristics for families below and above $50,000 in income for those families with incomes from $40,000 to $60,000. Compared to students from families with incomes above $50,000, students from families with lower incomes have a $917 lower average school price and $22,941 less family home equity. In addition, these students are less likely to parents who are married. However, these students do not significantly differ in their age, race, propensity to be full-time students, to attend a 2-year, private, or for-profit college, to have a sibling in college, or to have a parent who attended college.

need-based eligibility that has been discussed thus far in this paper determines students' ability to take out subsidized Stafford loans. However, in addition to subsidized Stafford loans, the measure of total loans includes private, institutional, state loans, and non-need-based federal loans. In particular, after 1992, the market for other loans is dominated by federal unsubsidized Stafford loans, which were created by the 1992 Amendment and are not need-based. In this section, I present two pieces of evidence that suggest need-based federal aid eligibility increases need-based federal loan usage and does not increase other loan usage. The first piece of evidence is based on separate estimates of the effect of eligibility by usage of subsidized Stafford loans at baseline, and the second is based on a complementary analysis using the NPSAS.

In order to ensure that my estimated effects are driven by increases in subsidized Stafford loan usage, rather than other loan usage, I estimate (8) for subsamples of students with different amounts of subsidized Stafford loans at baseline. I expect to see the majority of the effect of eligibility on loans concentrated among those who are not constrained by the annual subsidized Stafford loan maximum, as these students are able to increase their subsidized Stafford loan usage. If individuals who are constrained by the loan limit exhibit large responses to eligibility, they must be increasing take-up of other loans.

In the first column of Table 7, I estimate the eligibility effect for students with zero subsidized Stafford loans, who are thus unconstrained by the annual loan limit, at baseline. As expected, I find that these students experience a 56 cent increase in debt for every dollar of eligibility, significantly different from zero at the 1 percent level. On the other hand, in column 2, students who had a subsidized Stafford loan under the maximum amount experience a 10 cent decrease in debt for every dollar of eligibility, although this effect is not significantly different than zero. And, as predicted, students who take up the maximum subsidized Stafford loan at

baseline experience a statistically insignificant .08 decrease in debt for every dollar of eligibility, shown in column 3. The results in columns 2 and 3 provide evidence to suggest that those who are likely to be constrained by the annual loan maximum in the follow-up period, and consequently unable to increase their use of need-based federal loans, are not driving my results with an increased use of other loans. In addition, the effect of eligibility on debt appears to be driven by new subsidized Stafford loan users, rather than existing users. (Table 7 here)

While the advantage of using the BPS data is that is allows me to compare the behavior of the same individuals before and after the law change, the disadvantages are that it does not measure true eligibility or separately measure different types of loans after the law change. In order to examine the effects of need-based federal aid eligibility separately for need-based subsidized Stafford loans and other loans, I draw upon the 1990 NPSAS and the 1996 NPSAS. These datasets each provide a snapshot of financial aid usage in a single year for a sample of students at all levels of postsecondary education. The 1990 NPSAS is comprised of information from the 1989-90 school year, before the 1992 Amendment came into effect. Students in the 1996 NPSAS sample, which contains data from the 1995-96 academic year, experience at least one year of potentially expanded eligibility due to the law change. I merge these samples to create an analysis sample of 16,860 dependent undergraduate students in all years of study.[22] The NPSAS data include measures of true eligibility in both years, so I am able to estimate the effect of eligibility on debt, β, in (4), reprinted here for convenience,

(12) $$L_{it} = \omega + \beta E_{it} + \boldsymbol{\Psi X_i} + \boldsymbol{\Psi X_i} \cdot t + \kappa_t + u_{it},$$

using E_g^* as an instrument for E. The construction of E_g^* for the NPSAS sample is identical to the construction of E_g^* for the BPS sample, described in Section IV. Each model includes a vector of

[22] Socioeconomic summary statistics for this sample are displayed in Appendix Table A5.

control variables that consists of the student's age, whether the student is non-white, the parents' marital status, the number of individuals in the household, whether a parent attended college, the older parent's age, and state fixed effects. All standard errors are clustered at the group level.

There is one serious limitation to the NPSAS results. The previous literature has provided evidence that student enrollment behavior is responsive to eligibility changes (Dynarski, 2002; Lovenheim and Owens, 2013), so the parameter estimate of β is a mixture of the true effect of eligibility on loans and compositional shifts as a result of the enrollment effects of the law change. There is the possibility of bias resulting from sample selection in 1995-96 if students who enter college or remain enrolled in response to the law change exhibit significantly different behavior than other students.[23]

Table 8 contains IV estimates of (13) with various types of loans as dependent variables. Column 1 shows that each dollar of need-based federal aid eligibility is predicted to increase total loans by 20 cents. This estimates is significantly different from zero at the 1 percent significance level. All dependent variables measure the usage of a particular type of aid for that particular year. That is, for example, total loans are the total loans a student takes during the 1989-90 or 1995-96 school year. In column 2, $1 of eligibility is shown to increase subsidized Stafford loan usage by 38 cents, significant at the 1 percent level. The result in column 2 are consistent with the expectation that need-based federal aid eligibility should increase the take-up of the need-based subsidized Stafford loan. Column 3 displays results with total other loans, which include federal unsubsidized Stafford, state, institutional, and private student loans, as the dependent variable. Each dollar of eligibility decreases other loans by 18 cents, significant at the 1 percent level.

[23] Dynarski (2002) suggests that $1,000 of financial aid eligibility, which is roughly equal to the estimated average increase in predicted eligibility in my BPS sample, only increases enrollment by 1.7 percentage points. Consequently, I believe that any potential bias due to sample selection is likely to be small relative to the magnitude of my estimated effects.

Together, the results in Table 8 suggest that need-based federal aid eligibility primarily affects need-based federal aid, and that these effects are large. (Table 8 here)

C. Differences in Debt Accumulation Patterns

If students from families with less than $50,000 of income tend to rely increasingly on debt as they progress in college relative to students from families with more income even in the absence of the law change, the results I find could reflect this trend rather than the effect of an increase in aid eligibility. As a final robustness check, I draw on the 1990 NPSAS, to determine if student loan trends before the change in eligibility differ over years of educational attainment across income groups.[24] The NPSAS, unlike the BPS, includes students at all education levels in 1989, which allows me to construct Figure 6. In the figure, I define years in school as the number of academic years since a student first entered college. The figure plots average yearly debt levels by years in school for the samples of dependent students above and below the income threshold in 1989-90. Yearly student loans increase with years in school. Students from families with below $50,000 of income borrow more in all but the third year of college than students from families with higher incomes, but they increase borrowing in the later years of college relatively less than students from families with higher incomes. In fact, students with family income above $50,000 experience significantly higher increases in debt than students from families with lower income. The figure provides no evidence to suggest that counterfactual trends in debt accumulation by income level are responsible for the results in Table 3. (Figure 6 here)

VI. CONCLUSION

In my analysis I use multiple data sources and specifications to determine the effect of need-based federal aid eligibility on student loans. I find that each dollar of federal aid eligibility

[24] The 1990-94 BPS was drawn from the larger 1990 NPSAS sample.

raises student debt by 30 to 60 cents, depending upon the data source and specification used; the typical estimate is about 40 cents. A $1,000 increase in eligibility is predicted to increase the ratio of debt to total price of attendance by 4 percentage points. In addition, need-based federal aid eligibility increases primarily affect take-up of need-based federal aid. I also examine differences in responses to the law change across different subgroups of the sample. I find that the effect of federal aid eligibility on debt is significantly higher for those with the most exposure to postsecondary education, namely whites and students with a parent who attend college. Students who matriculate at four-year, private, or not-for-profit colleges at baseline experience a stronger effect than those who matriculate at two-year, public, or for-profit colleges, respectively.

There is one important caveat to the applicability of my results to other student populations and federal aid expansions. This analysis only measures a short-run effect as the BPS data capture one year of a potential expansion in eligibility in 1993-94, the follow-up interview year.[25] I expect that the effect of an increase in federal student aid eligibility would be larger for students who were eligible for a greater number of years, because they have more time to adjust their behavior, or for students who experience the change earlier in their educational careers. In addition, part of the responsiveness to the law change that I measure in my results could be a consequence of the simplification of the FAFSA form as a result of the exclusion of the asset section for students from families with less than $50,000 of income who file a 1040A. [26] An increase in FAFSA applications due to the simplification to the form implies a smaller true effect of eligibility on debt than is measured here. On the other hand, if my reliance on predicted changes in eligibility introduces

[25] Approximately 30% of students in my sample had completed a bachelor's degree before 1993-1994. Most students who complete a bachelor's degree, with the exception of students in certain teacher certification and licensure programs, are no longer eligible for need-based Pell grants. However, these students are eligible for subsidized Stafford loans, up to aggregate maxima, if they pursue additional undergraduate courses and degree programs.

[26] Bettinger et al. (2009) suggests the complexity of the FAFSA form is one of the reasons that some students who are eligible for need-based federal financial aid do not take up this aid.

measurement error and, consequently, possible attenuation bias, the true effect of eligibility on debt could be larger than the measured effect.

Overall, my estimates suggest that increases in federal student aid eligibility have large, significant effects on total undergraduate debt accumulation. Based on my typical estimate of a 40 cent increase in debt for every dollar of eligibility, and an average change in predicted eligibility of $1,124, I calculate that the average change in debt due to the 1992 Amendment is .40×$1,124 ≈ $450. 1,272 students in my sample, or 45 percent, are enrolled in college classes in 1993-94, so the average change in debt for students who experience increased eligibility due to the law change is $450/.45 ≈ $999. On average, debt increases by $3,421 for dependent students from 1989-90 to 1993-94, so I calculate that the increase in aid eligibility caused by the 1992 Amendment is responsible for roughly $999/$3,421 ≈ 29 percent of the increase in total student debt from 1989-90 to 1993-94.

My results provide evidence that the expansion in federal aid eligibility caused by the 1992 Amendment was partially responsible for the sharp increase in student loans for that period. Although I cannot disentangle the different effects of eligibility on federal and non-federal aid due to data limitations, these results suggest that the sharp increase in federal loans in 1993-94, shown in Figures 1 and 2, is due, in part, to the eligibility increase. In my future research, I will examine the effects of eligibility around the second major point of inflection in the figures, the late 2000's, which corresponds to the 2008 Amendment to the Higher Education Act of 1965. New BPS and NPSAS data that span this policy change was recently released. Comparing the effects from the different Amendments will allow me to gain insight into the changing landscape of postsecondary education.

REFERENCES

Bailey, Martha J., and Susan M. Dynarski, 2011. "Inequality in Postsecondary Attainment." In Duncan, Greg J. and Richard J. Murnane (eds.), *Whither Opportunity: Rising Inequality, Schools, and Children's Life Chances.* Russell Sage Foundation: New York, NY.

Bettinger, Eric P., Bridget T. Long, Philip Oreopoulos, and Lisa Sanbonmatsu, 2009. "The role of simplification and information in college decisions: Results from the H&R Block FAFSA experiment." NBER Working Paper No. 15361. National Bureau of Economic Research, Cambridge, MA.

Bettinger, Eric P., 2004. "How Financial Aid Affects Persistence." In Dynarski, Susan M. and Caroline Hoxby (eds.), *How the Great Recession Affected Higher Education*. University of Chicago Press, Chicago, IL.

Babiarz, Patryk, and Tansel Yilmazer, 2009. "The Impact of College Financial Aid Rules on Household Portfolio Choice." *National Tax Journal* 62 (4), 635-655.

Bureau of Labor Statistics, 2013. *National Compensation Survey – Employment Cost Index Historical Listing – Volume 5*. Bureau of Labor Statistics, Washington, DC.

Buss, Christian, Jeffrey Parker, and John Rivenburg, 2004. "Cost, Quality and Enrollment Demand at Liberal Arts Colleges." *Economics of Education Review* 23 (1), 57-65.

Cameron, Stephen V. and James J. Heckman, 2001. "The Dynamics of Education Attainment for Black, Hispanic, and White Males." *Journal of Political Economy* 109 (3), 455-499.

Cameron, Stephen V. and Christopher Taber, 2004. "Estimation of Educational Borrowing Constraints Using Returns to Schooling." *Journal of Political Economy* 112 (1), 132-182.

Caucutt, Elizabeth M. and Krishna B. Kumar, 2003. "Higher Education Subsidies and Heterogeneity: A Dynamic Analysis." *Journal of Economic Dynamics and Control* 27 (8), 1459-1502.

Chopra, Rohit, 2012. *Too Big to Fail: Student Debt Hits a Trillion*. Consumer Financial Protection Bureau, Washington, DC.

Cornwell, Christopher, David B. Mustard, and Deepa J. Sridhar, 2006. "The Enrollment Effects of Merit-Based Financial Aid: Evidence from Georgia's HOPE Program." *Journal of Labor Economics* 24 (4), 761-786.

Davies, Antony and James R. Harrison, 2012. "Why the Education Bubble Will Be Worse than the Housing Bubble." U.S. News and World Report, June 12, http://www.usnews.com/opinion/blogs/economic-intelligence/2012/06/12/the-government-shouldnt-subsidize-higher-education.

Deming, David and Susan M. Dynarski, 2009. "Into College, Out of Poverty? Policies to Increase the Postsecondary Attainment of the Poor." NBER Working Paper No. 15387. National Bureau of Economic Research, Cambridge, MA.

Dowd, Alicia C., 2008. "Dynamic Interactions and Intersubjectivity: Challenges to Causal Modeling in Studies of College Student Debt." *Review of Educational Research* 78 (2), 232-259.

Dynarski, Susan M., 2000. "Hope for Whom? Financial Aid for the Middle Class and Its Impact on College Attendance." NBER Working Paper No. 7756. National Bureau of Economic Research, Cambridge, MA.

Dynarski, Susan M., 2002. "Loans, Liquidity, and Schooling Decisions." Kennedy School of Government Working Paper, Cambridge, MA.

Dynarski, Susan M., 2003. "Does Aid Matter? Measuring the Effect of Student Aid on College Attendance and Completion." *American Economic Review* 93 (1), 279-288.

Dynarski, Susan M., and Judith Scott-Clayton, 2013. "Financial Aid Policy: Lessons from Research." NBER Working Paper No. 18710. National Bureau of Economic Research, Cambridge, MA.

Research and Statistics Group, Microeconomic Studies, Federal Reserve Bank of New York, 2013. *Quarterly Report on Household Debt and Credit*. Federal Reserve Bank of New York, August, New York, NY.

Feldstein, Martin, 1995. "College Scholarship Rules and Private Saving." *American Economic Review* 85 (3), 552-566.

Field, Erica, 2009. "Educational Debt Burden and Career Choice: Evidence from a Financial Aid Experiment in NYU Law School." *American Economic Journal: Applied Economics* 1 (1), 1-21.

Gross, Jacob P., Osman Cekic, Don Hossler, and Nick Hillman, 2009. "What Matters in Student Loan Default: A Review of the Research Literature." *Journal of Student Financial Aid* 39 (1), 19-29.

Hannah, Susan B., 1996. "The Higher Education Act of 1992: Skills, Constraints, and the Politics of Higher Education." *The Journal of Higher Education* 67 (5), 498-527.

Horn, Laura J., Xianglei Chen, and Chris Chapman, 2003. *Getting Ready to Pay for College: What Students and Their Parents Know about the Cost of College Tuition and What They Are Doing to Find Out*. NCES Report 2003-030. National Center for Education Statistics, United States Department of Education, Washington, D.C.

Hoxby, Caroline M., 2004). *College Choices: The Economics of Where to Go, When to Go, and How to Pay for It*. The University of Chicago Press, Chicago, IL.

Ikenberry, Stanley O., and Terry W. Hartle, 1998. *Too Little Knowledge Is a Dangerous Thing: What the Public Thinks about Paying for College.* American Council on Education: Washington, D.C.

Ionescu, Felicia A., 2008a. "Consolidation of Student Loan Repayments and Default Incentives." *The B.E. Journal of Macroeconomics* 8 (1), 1935-1690.

Ionescu, Felicia A., 2008b. "The Federal Student Loan Program: Quantitative Implications for College Enrollment and Default Rates." *Review of Economic Dynamics* 12 (1), 205-231.

Ionescu, Felicia A., 2009. "Risky College Investment under Alternative Bankruptcy Regimes for Student Loans". Colgate University Working Paper, Hamilton, NY.

Johnson, Matthew T., 2013. "Borrowing Constraints, College Enrollment, and Delayed Entry." *Journal of Labor Economics* 31 (4), 669-725.

Kane, Thomas J., 1995. "Rising Public College Tuition and College Entry: How Well Do Public Subsidies Promote Access to College?" NBER Working Paper No. 5164. National Bureau of Economic Research, Cambridge, MA.

Levine, Ross, and Yona Rubinstein, 2013. "Liberty for More: Finance and Educational Opportunities." NBER Working Paper No. 19380. National Bureau of Economic Research, Cambridge, MA.

Lewin, Tamar, 2013. "Obama's Plan Aims to Lower Cost of College." *The New York Times*, August 22, http://www.nytimes.com/2013/08/22/education/obamas-plan-aims-to-lower-cost-of-college.html?_r=0.

Lochner, Lance, Todd Stinebrickner, and Utku Suleymanoglu, 2012. "Understanding Student Loan Repayment Problems: Evidence from the Canada Student Loans Program." University of Western Ontario Working Paper, London, ON.

Long, Mark, 2004. "The Impact of Asset-Tested College Financial Aid on Household Savings." *Journal of Public Economics* 88 (1), 63-88.

Lovenheim, Michael F., and Emily G. Owens, 2013. "Does Federal Financial Aid Affect College Enrollment? Evidence from Drug Offenders and the Higher Education Act of 1998." NBER Working Paper No. 18749. National Bureau of Economic Research, Cambridge, MA.

McPherson, Michael S., and Morton O. Schapiro, 1998. *The Student Aid Game: Meeting Need and Rewarding Talent in American Higher Education*. Princeton University Press, Princeton, NJ.

Monks, James, 2003. "An Empirical Examination of the Impact of College Financial Aid on Family Savings." *National Tax Journal* 57 (2), 189-207.

Monks, James, 2012. "The Role of Tuition, Financial Aid Policies, and Student Outcomes on Average Student Debt." Cornell Higher Education Research Institute Working Paper No. 150. Cornell Higher Education Research Institute, Ithaca, NY.

National Center for Education Statistics, 2012. *Digest of Education Statistics, 2011 – Tuition Costs of Colleges and Universities*. National Center for Education Statistics, U.S. Department of Education.

Poterba, James M., 1992. "Taxation and Housing Markets." In Shoven, John B., and John Whalley (eds.), *Canada-U.S. Tax Comparisons*. University of Chicago Press, Chicago, IL.

Rothstein, Jesse, and Cecilia E. Rouse, 2011. "Constrained after College: Student Loans and Early-Career Occupational Choices." *Journal of Public Economics* 95 (1), 149-163.

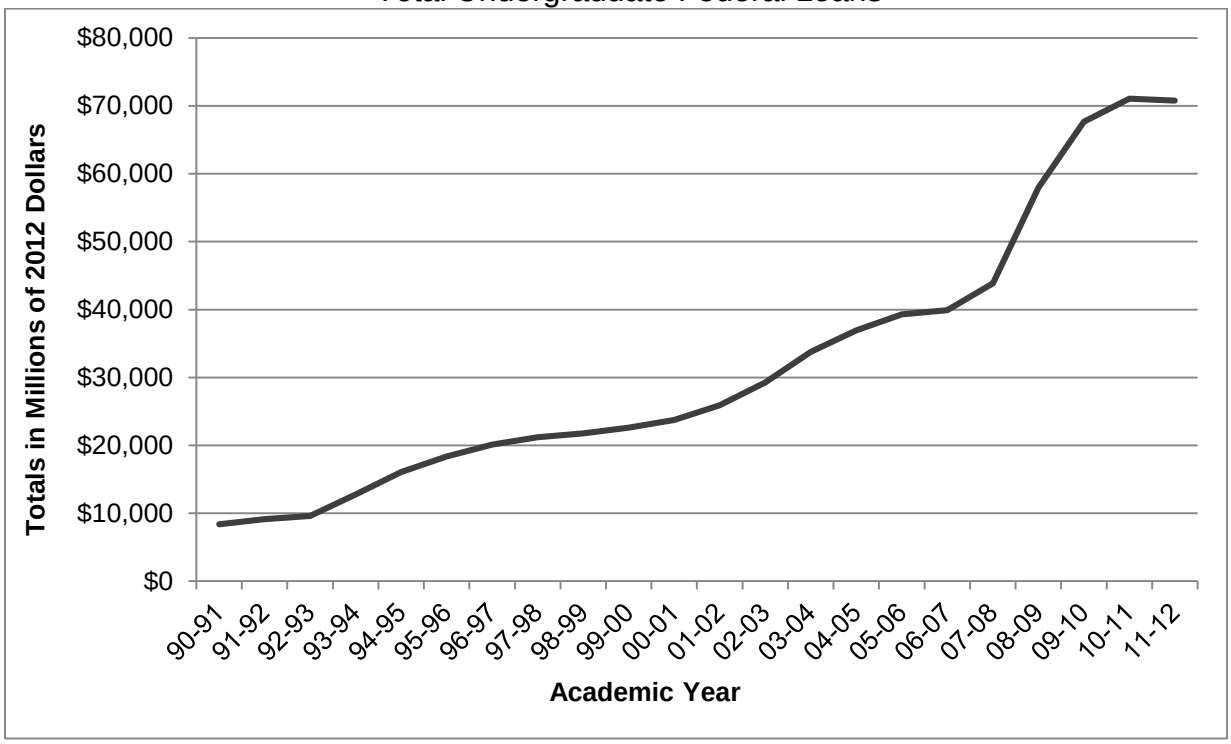
Scott-Clayton, Judith, 2011. "On Money and Motivation: A Quasi-Experimental Analysis of Financial Incentives for College Achievement." *Journal of Human Resources* 46 (3), 614-646.

Scott-Clayton, Judith, 2012a. "What Explains Trends in Labor Supply Among U.S. Undergraduates?" *National Tax Journal* 65 (1), 181-210.

Scott-Clayton, Judith, 2012b. "Information Constraints and Financial Aid Policy." NBER Working Paper No. 17811. National Bureau of Economic Research, Cambridge, MA.

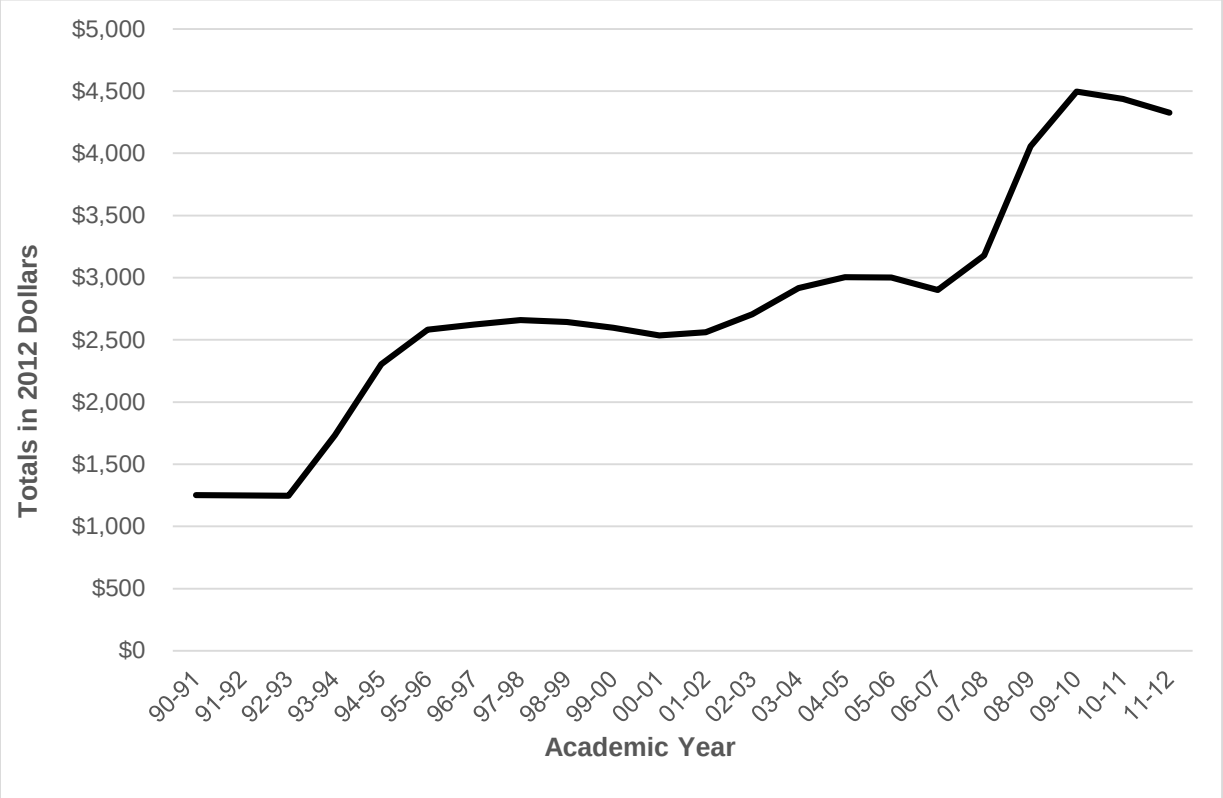
Seftor, Neil S., and Sarah E. Turner, 2002. "Back to School: Federal Student Aid Policy and Adult College Enrollment." *Journal of Human Resources* 37 (2), 336-352.

Figure 1
Total Undergraduate Federal Loans



Source: Trends in Student Aid, 2012. College Board 2012. Administrative Data are provided by the U.S. Department of Education, Office of Postsecondary Education, National Student Loan Data System (NSLDS).

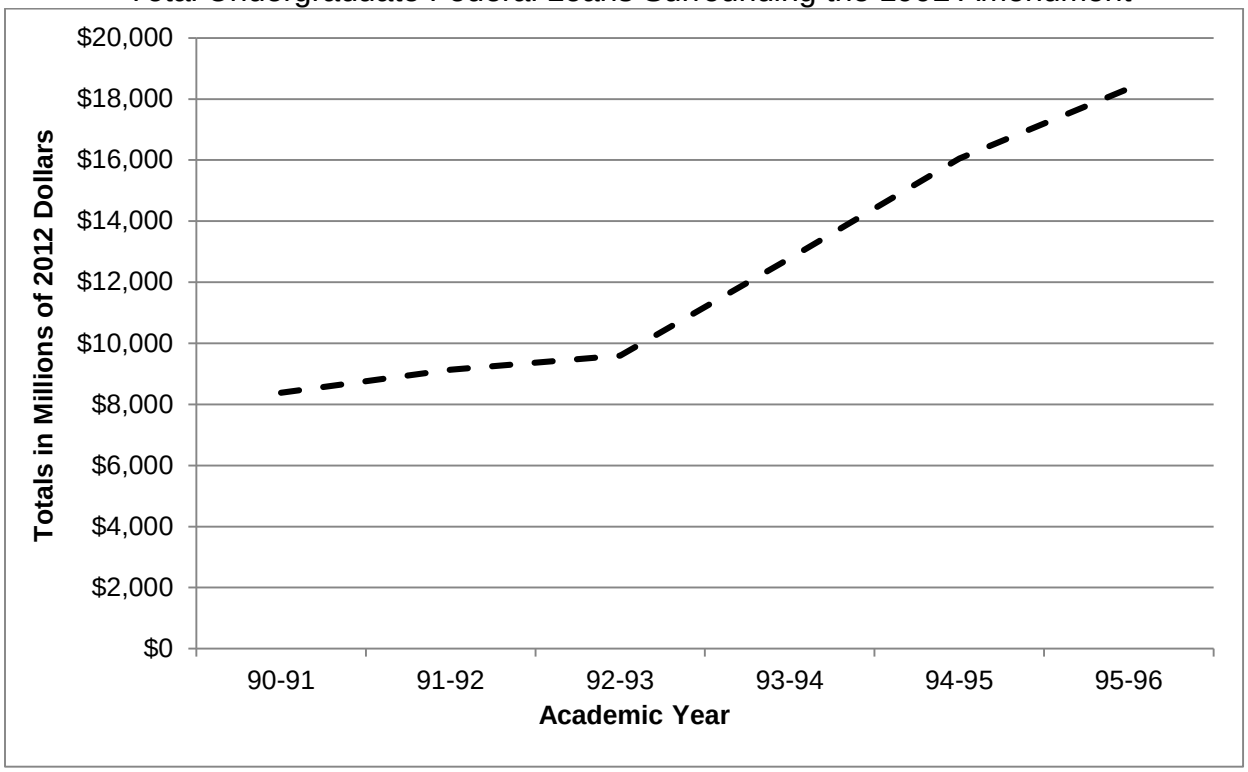
Figure 2
Undergraduate Federal Loans per Student



Source: Trends in Student Aid, 2012. College Board 2012. Administrative Data are provided by the U.S. Department of Education, Office of Postsecondary Education, National Student Loan Data System (NSLDS) and Integrated Postsecondary Education Data System (IPEDS).

Figure 3

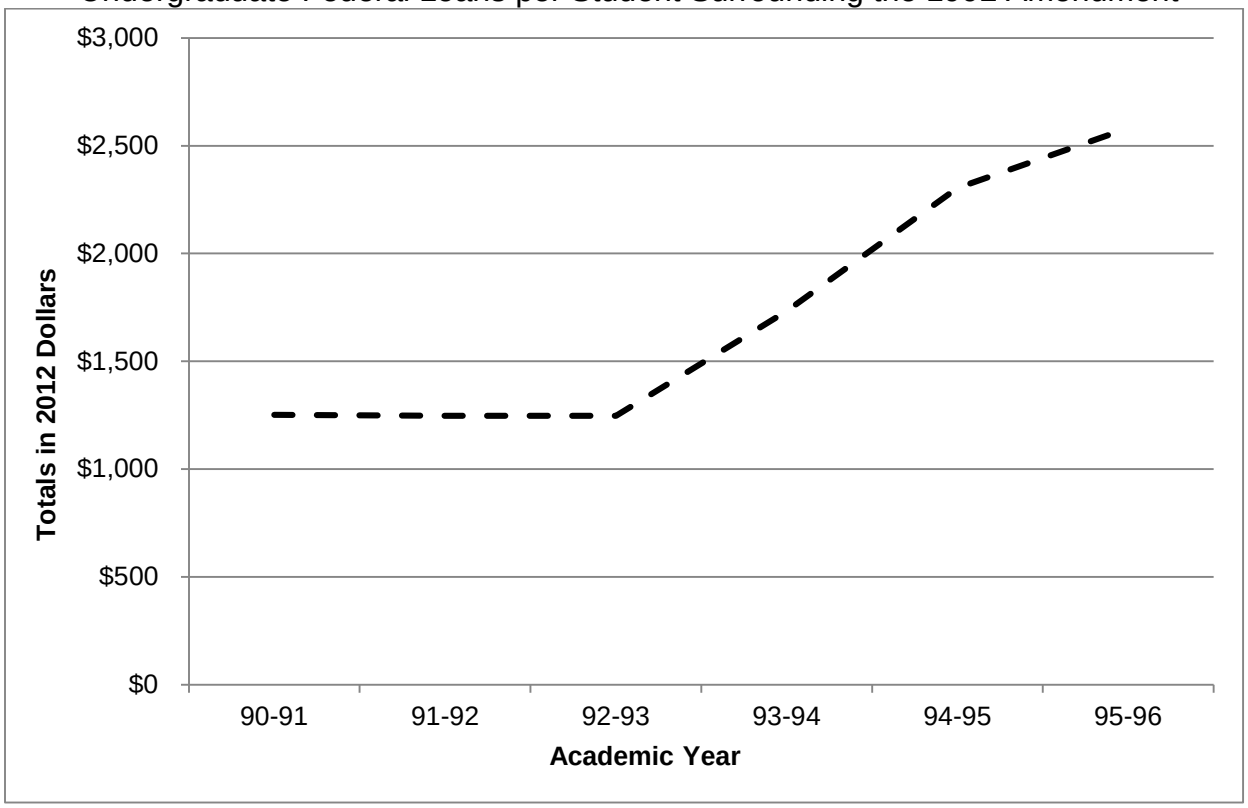
Total Undergraduate Federal Loans Surrounding the 1992 Amendment



Source: Trends in Student Aid, 2012. College Board 2012. Administrative Data are provided by the U.S. Department of Education, Office of Postsecondary Education, National Student Loan Data System (NSLDS).

Figure 4

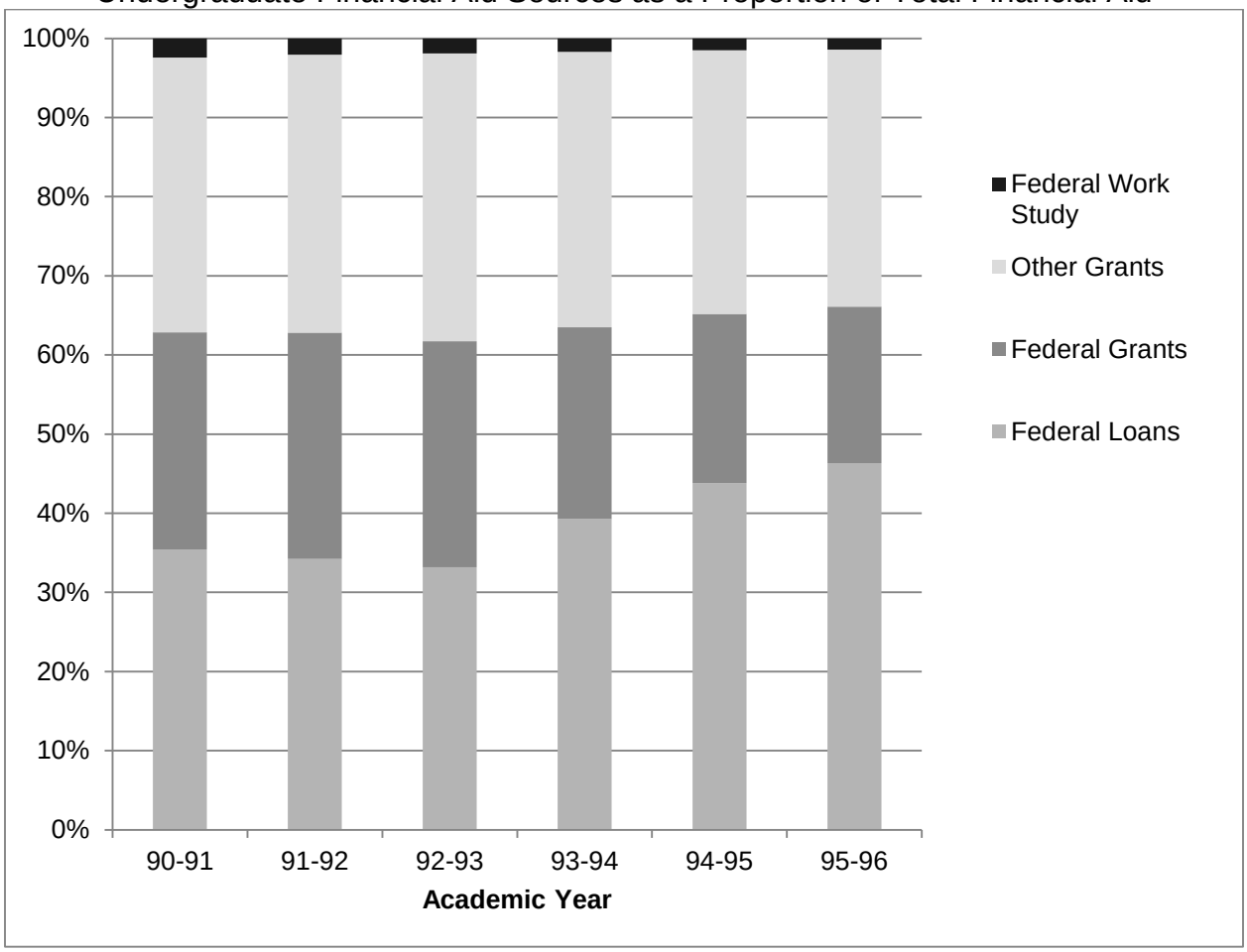
Undergraduate Federal Loans per Student Surrounding the 1992 Amendment



Source: Trends in Student Aid, 2012. College Board 2012. Administrative Data are provided by the U.S. Department of Education, Office of Postsecondary Education, National Student Loan Data System (NSLDS) and Integrated Postsecondary Education Data System (IPEDS).

Figure 5

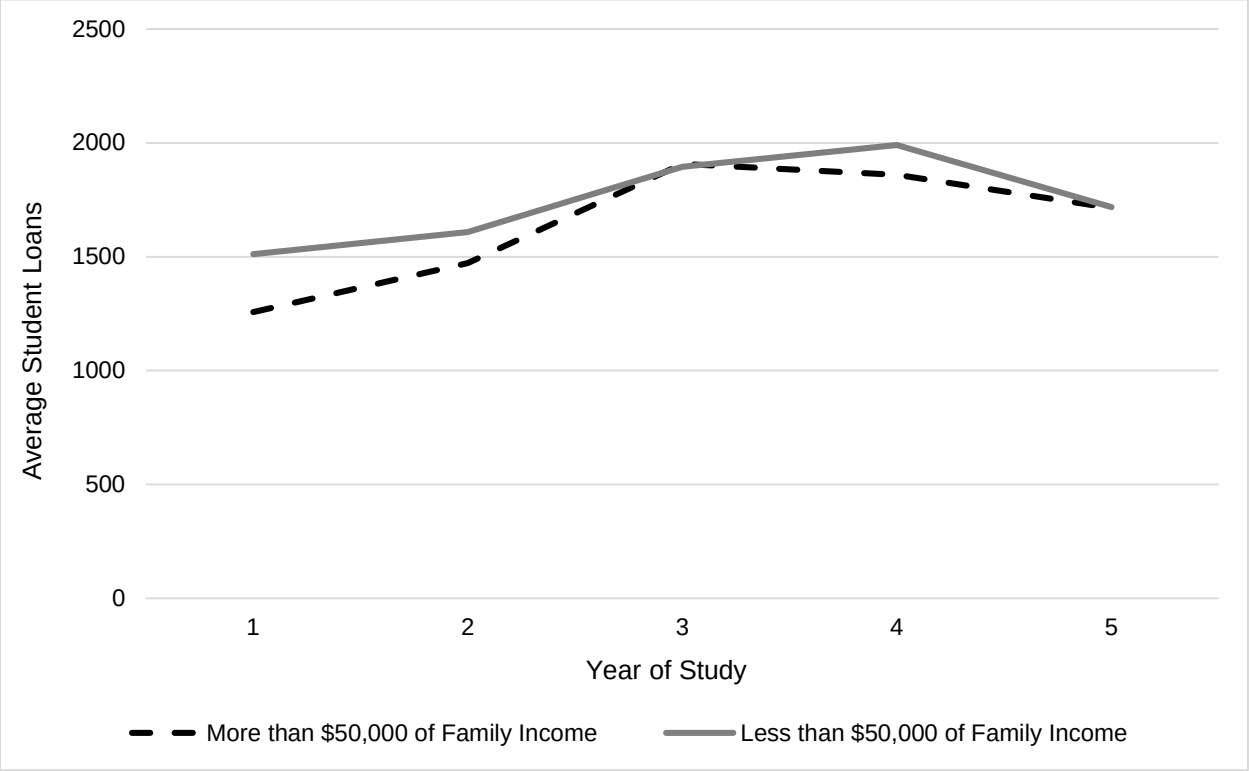
Undergraduate Financial Aid Sources as a Proportion of Total Financial Aid



Source: Trends in Student Aid, 2012. College Board 2012. Administrative Data are provided by the U.S. Department of Education, Office of Postsecondary Education, National Student Loan Data System (NSLDS).

Figure 6

Student Loans by Year of Study for Dependent Students in 1989-90



Source: 1989-90 NPSAS

Table 1

Changes in Federal Student Aid Eligibility for a Model Family

Family Characteristics	1992-93	1993-94	Difference
A. A^{NH} = \$60,000, A^{H} = \$0			
I = \$45,000	\$1,901	\$2,745	\$844
I = \$55,000	\$0	\$0	\$0
B. A^{NH} = \$45,000, A^{H} = \$15,000			
I = \$45,000	\$1,901	\$2,745	\$844
I = \$55,000	\$0	\$0	\$0
C. A^{NH} = \$15,000, A^{H} = \$45,000			
I = \$45,000	\$1,901	\$2,745	\$844
I = \$55,000	\$0	\$395	\$395

Notes: Income, I, non-housing assets, A^{NH}, and housing assets, A^{H}, are measured in 1992 dollars. Model families each have two working parents and two children in college. The older parent is 45 years old. Neither child has income or assets. The price of college attendance is \$10,000 for the focal student. Eligibility is reported in 1992 dollars.

Table 2

1989-90 Mean Demographic Characteristics by Income Group for Dependent Students

	Full Sample				Families with $40,000 to $60,000 of Income		
	Full Sample	Family Income ≥$50,000	Family Income <$50,000	Difference	Family Income ≥$50,000	Family Income <$50,000	Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Age	18.20	18.14	18.24	.10	18.22	18.20	-.02
	(.02)	(.02)	(.02)	(.03)	(.02)	(.03)	(.05)
Non-White	0.18	.13	.21	.08	.14	.13	-.01
	(.01)	(.01)	(.01)	(.01)	(.02)	(.01)	(.02)
Parents' Income ($)	60,132	98,590	31,120	-67,470	56,710	44,216	-12,494
	(1,715)	(3,587)	(303)	(3,112)	(171)	(103)	(190)
Home Equity ($)	69,770	107,714	41,146	-66,568	78,232	55,291	-22,941
	(2,100)	(3,606)	(1,229)	(3,455)	(6,067)	(2,455)	(5,512)
Parents Married	072	.86	.61	-.25	.86	.78	-.08
	(.01)	(.01)	(.01)	(.02)	(.02)	(.02)	(.03)
Parent Attended College	(.70)	.83	.61	-.22	.72	.68	-.04
	(.01)	(.01)	(.01)	(.02)	(.03)	(.02)	(.03)
Siblings in College	(.40)	.47	.35	-.12	.41	.39	-.02
	(.01)	(.02)	(.02)	(.02)	(.04)	(.03)	(.05)
Full-Time Student	.82	.82	.82	.00	.82	.82	.00
	(.01)	(.01)	(.01)	(.01)	(.02)	(.02)	(.03)
School Price ($)	9,746	10,858	8,907	-1,931	10,014	9,097	-917
	(159)	(182)	(137)	(223)	(332)	(241)	(414)
Two-Year College	.07	.11	.05	.05	.11	.15	.04
	(.01)	(.01)	(.01)	(.01)	(.02)	(.01)	(.03)
Private College	.50	.55	.47	-.08	.55	.51	-.05
	(.01)	(.01)	(.01)	(.02)	(.03)	(.02)	(.04)
For-Profit College	.07	.04	.10	.06	.05	.06	.01
	(.00)	(.01)	(.01)	(.01)	(.01)	(.01)	(.02)
N	2,850	1,220	1,630	2,850	350	500	850

Notes: Longitudinal data are from the BPS. Standard errors are shown in parentheses. Groups are based on characteristics in academic year 1989-90. Family income in 1989 is measured in 1992 dollars

Table 3

The Effect of Federal Aid Eligibility on Loans for Dependent Students

Explanatory Variable	(1)	(2)	(3)	(4)	(5)
ΔE_g^*	.38	.37	.44	.44	.61
	(.14)	(.14)	(.09)	(.09)	(16)
Parents Married	-722.31	-638.51	-558.96	-560.12	-458.14
	(283.56)	(282.93)	(352.86)	(352.86)	(357.90)
Age of Older Parent	-36.68	-27.84	-33.30	-32.18	-28.12
	(14.81)	(15.54)	(16.57)	(16.57)	(16.65)
Parent Attended College	-89.64	.77	-641.05	-629.84	-658.10
	(292.16)	(294.94)	(278.94)	(278.94)	(272.26)
Non-White	133.77	93.13	18.78	18.78	-211.40
	(179.42)	(274.97)	(263.51)	(263.51)	(160.43)
Age	-531.98	-540.11	-188.78	-188.80	-211.40
	(179.42)	(180.22)	(159.07)	(159.07)	(160.43)
Total Family Members	-14.97	-8.24	127.63	129.63	102.89
	(128.67)	(129.3)	(218.42)	(218.42)	(209.92)
Parents' Income ($1000's)	-3.55	-2.09	-3.25	-2.25	-3.41
	(2.55)	(2.27)	(3.05)	(3.05)	(3.12)
Parents' Net Worth ($1000's)		-3.36	-.41	-.44	-.41
		(.07)	(.09)	(.09)	(.09)
Home Equity ($1000's)		-2.24	-5.99	-5.92	-5.86
		(.99)	(1.27)	(1.27)	(1.28)
School Price ($)			.23	.23	.23
			(.04)	(.04)	(.04)
Two-Year College			-2,088.9	-2,100.1	-2,068.2
			(230.0)	(230.0)	(233.1)
Private College			554.64	553.99	536.81
			(280.82)	(280.82)	(286.03)
For-Profit College			-3,099.3	-3,100.1	-3,124.4
			(347.9)	(347.9)	(338.1)
Siblings in College			-5.86	-5.76	-62.25
			(265.35)	(265.35)	(265.95)
Full-Time Student			226.1	220.0	-3,124.4
			(269.4)	(269.4)	(338.1)
State Fixed Effects	No	No	Yes	Yes	Yes
Group Random-Effects	No	No	No	Yes	No
ΔE_g^* *Constructed with Group Median Values*	No	No	No	No	Yes
N	2,850	2,850	2,850	2,850	2,850
Groups	103	103	103	103	103

Notes: Longitudinal data are from the BPS. Predicted change in eligibility, ΔE_g^*, is constructed using group means for income and assets, and weighted by the likelihood of filing a 1040A tax form. Students are grouped by whether family income is above or below $50,000, whether the family owns a home, and state of residence. Groups are based on characteristics in academic year 1989-90. Standard errors clustered at the group level are shown in parentheses.

Table 4

Effects of Federal Aid Eligibility (in Thousands of Dollars) for Dependent Students

Explanatory Variable	*Total Cost* (in dollars) (1)	*L/Total Cost* (2)
ΔE_g^*	-89.02	.04
	(175.50)	(.01)
General Family Characteristics	Yes	Yes
Family Assets	Yes	Yes
Education Characteristics	Yes	Yes
State Fixed Effects	Yes	Yes
N	2,850	2,850
Groups	103	103

Notes: Longitudinal data are from the BPS. Predicted change in eligibility, ΔE_g^*, is constructed using group means for income and assets, and weighted by the likelihood of filing a 1040A tax form. Students are grouped by whether family income is above or below $50,000, whether the family owns a home, and state of residence. Groups are based on characteristics in academic year 1989-90. Standard errors clustered at the group level are shown in parentheses. A vector of 1989-90 control variables, which corresponds to the richest specification of the model, shown in column 3 of Table 3, is included in each specification here.

Table 5

The Effect of Federal Aid Eligibility on Loans for Selected Samples of Dependent Students

Group	ΔE_g^*	*p-value for Wald Test of Difference*
A. Sample Split by Race		
White	.53	
	(.12)	
Non-White	-.11	
	(.17)	*.0003*
B. Sample Split by Parent College Attendance		
Parent Attended College	.53	
	(.14)	
Neither Parent Attended College	.18	
	(.19)	*.0838*
C. *Sample Split by Parent Marital Status*		
Parents are Married	.50	
	(.12)	
Parents are Not Married	.20	
	(.19)	*.1037*
D. Sample Split by Search for Aid Information		
Searched for Aid Information	.44	
	(.14)	
Did Not Search for Aid Information	.30	
	(.15)	*.4624*
E. Sample Split by Two- or Four-Year College		
Two-Year College	.05	
	(.12)	
Four-Year College	.51	
	(.13)	*.0024*
F. Sample Split by Private or Public College		
Private College	.62	
	(.15)	
Public College	.20	
	(.12)	*.0117*
G. Sample Split by For-Profit College		
For-Profit College	.-.04	
	(.18)	
Not-For-Profit College	.47	
	(.12)	*.0171*

Notes: Longitudinal data are from the BPS. Predicted change in eligibility, ΔE_g^*, is constructed using group means for income and assets, and weighted by the likelihood of filing a 1040A tax form. Students are grouped by whether family income is above or below $50,000, whether the family owns a home, and state of residence. Groups are based on characteristics in academic year 1989-90. Standard errors clustered at the group level are shown in parentheses. A vector of 1989-90 control variables, which corresponds to the richest specification of the model, shown in column 3 of Table 3, is included in each specification here.

Table 6

The Effect of Federal Aid Eligibility on Loans for Dependent Students from Families with $40,000 to $60,000 of Income

Explanatory Variable	(1)	(2)	(3)	(4)	(5)
ΔE_g^*	.48	.52	.40	.40	.31
	(.25)	(.25)	(.22)	(.22)	(.30)
General Family Characteristics	Yes	Yes	Yes	Yes	Yes
Family Assets	No	Yes	Yes	Yes	Yes
Education Characteristics	No	No	Yes	Yes	Yes
State Fixed Effects	No	No	Yes	Yes	Yes
Group Random-Effects	No	No	No	Yes	No
ΔE_g^* *Constructed with Group Median Values*	No	No	No	No	Yes
N	850	850	850	850	850
Groups	94	94	94	94	94

Notes: Longitudinal data are from the BPS. Predicted change in eligibility, ΔE_g^*, is constructed using group means for income and assets, and weighted by the likelihood of filing a 1040A tax form. Students are grouped by whether family income is above or below $50,000, whether the family owns a home, and state of residence. Groups are based on characteristics in academic year 1989-90. Standard errors clustered at the group level are shown in parentheses.

Table 7

The Effect of Federal Aid Eligibility on Loans for Subsamples of Dependent Students

	Total Subsidized Stafford Loans in 1989-90		
	$0	$1 to $2,624	$2,625
Explanatory Variable	(1)	(3)	(5)
ΔE_g^*	.55	-.10	-.08
	(.16)	(.45)	(.57)
General Family Characteristics	Yes	Yes	Yes
Family Assets	Yes	Yes	Yes
Education Characteristics	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes
N	1,980	490	370
Groups	103	80	75

Notes: Longitudinal data are from the BPS. Subsidized Stafford loan usage is measured in 1989-90 dollars, where $2,850 was the annual maximum for freshman in that year. Predicted change in eligibility, ΔE_g^*, is constructed using group means for income and assets, and weighted by the likelihood of filing a 1040A tax form. Students are grouped by whether family income is above or below $50,000, whether the family owns a home, and state of residence. Groups are based on characteristics in academic year 1989-90. Standard errors clustered at the group level are shown in parentheses. A vector of 1989-90 control variables, which corresponds to the richest specification of the model, shown in column 3 of Table 3, is included in each specification here.

Table 8

IV Estimates of the Effect of Federal Aid Eligibility on Aid for Dependent Students

Explanatory Variable	Total Loans (1)	Subsidized Stafford Loans (2)	Other Loans (3)
Eligibility	.20	.38	-.18
	(.02)	(.01)	(.02)
N	16,860	16,860	16,860
Groups	148	148	148

Notes: Data are from the 1990 and 1996 NPSAS. Predicted change in eligibility, ΔE_g^*, serves as an instrument for true aid need-based federal aid eligibility. Predicted change in eligibility, ΔE_g^* is constructed using group means for income and assets, and weighted by the likelihood of filing a 1040A tax form. Students are grouped by whether family income is above or below $50,000, whether the family owns a home, and state of residence. In the 1996 NPSAS, groups are based on predicted income. The estimation is weighted by the likelihood of being in the 1990 NPSAS sample. Standard errors clustered at the group level are shown in parentheses. Each model is estimated with a vector of control variables that includes the student's age, whether the student is non-white, the parents' marital status, the number of individuals in the household, whether a parent attended college, the older parent's age, predicted income, and state fixed effects.

TECHNICAL APPENDIX

I calculate the change in federal aid eligibility, ΔE_g^*, for students grouped by whether family income was over or under $50,000, whether the family owned a home, and state of residence. I fix the price of attendance at the median price at baseline, $9,800 (in 1992 dollars). Groups are denoted by g, and group-mean financial information is used to calculate eligibility. The Federal Needs Analysis Methodology, specified in Part F of the Title IV of the Higher Education Act of 1965, defines the functions ρ, π, ϕ, and ζ in (3). The equation is reprinted here for the reader's convenience:

$$E_i = \min(M, 0, \max(P_i - \rho(I_i^F + \pi(\phi(A_i^H) + \zeta(A_i^{NH})), I_i^S, A_i^S))). \quad (3)$$

The functions ϕ and ζ were redefined under the 1992 Amendment. Housing assets are not included in the calculation eligibility after the Amendment; for the baseline period, $\zeta(A_g^H) = A_g^H$, and for the follow-up period, $\zeta(A_g^H) = 0$. A_g^H is defined as group-mean family home equity. Group-mean family non-housing assets, A_g^{NH}, include cash, savings, real estate and other investments less debt, and the adjusted value of the family business or farm (calculated using Table A1). For all individuals in the baseline period, $\phi(A_g^{NH}) = A_g^{NH}$. As a result of the Amendment, in the follow-up period, $\phi(A_g^{NH}) = 0$ for students from families with less than $50,000 of earned income, and $\phi(A_g^{NH}) = A_g^{NH}$ for students from families with more income.

The asset assessment function is

$$\pi(\cdot) = \max(0, .12(\zeta(A_g^H) + \phi(A_g^{NH}) - ESAP_g)), \quad (A1)$$

where $ESAP$ is the Education Savings and Asset Protection Allowance that varies by age of the older parent and parents' marital status, as shown in Table A2.[27] Finally, the *EFC* is calculated using

$$\text{(A2)} \quad \rho(\cdot) = \max\left(0, \gamma\left(I_g^F + \pi(\cdot) - IPA_g - \min\left(2{,}400, .35 \times EI_g^M, .35 \times EI_g^F\right)\right) \div S_g\right) + \max(0, .5(I_g^S - 2{,}100)) + \max(0, .35 \times A_g^S),$$

where I_g^F is the group-mean of the sum of pre-tax earned and unearned family income (including Earned Income Credit, Social Security benefits, AFDC/ADC, and child support). The Income Protection Allowance, *IPA*, is determined by family size and the number of college students in the household according to the schedule in Table A3. The Employment Expense Allowance (EEA) is the final term in the argument of γ, $\min(2{,}400, .35 \times EI^M, .35 \times EI^F)$, where EI_g^M is the group-mean earned income of the mother and EI_g^F is the group-mean earned income of the father.

The EEA is determined by the lesser of the parents' earned incomes. If one parent does not work, or there is only one parent in the household, the lesser earned income is zero. The EEA accounts for the marginal costs for a two-earner compared to a one-earner family.[28] Parents' contribution is determined by the step-function γ, found in Table A4. This contribution is divided by the number of college students supported by the family, S_g. If this contribution is negative, it is set to zero. The maximum of zero and half of the mean of students' earned and unearned income in the group, I_g^S, less an income protection allowance, is added to the parents' contribution in (A2).

[27] Section 478 of Part F of the Title IV of the Higher Education Act of 1965 requires the Secretary of Education to adjust the Income Protection Allowance, the Education Savings and Asset Protection Allowance, and the Assessment Schedules and Rates every year. These adjustments take into account inflation for the 12 months, based on the Consumer Price Index (CPI), between December 31 of the previous year and December 31 of the current year. As a result of these adjustments, the real values (measured here in 1992 dollars) do not change from year to year.

[28] The EEA is adjusted, as mandated by Section 477(b)(5) of Part F of the Title IV of the Higher Education Act of 1965, by the Secretary of Education using the Bureau of Labor Statistic's estimates of marginal costs of employment: meals away from home, apparel and upkeep, transportation, and housekeeping services.

The final term added in (A2) is a fraction of the mean of students' total assets for the group, A_g^S, which include cash, savings, real estate and other investments less debts, and the unadjusted value of the student-owned business or farm, which is set to zero if it is negative.

Table A1

Adjusted Net Worth of Family Business or Farm (in 1992 Dollars)

Net Worth of Family Business or Farm	Adjusted Net Worth of Family Business or Farm
Less than 1	0
1 to 75,000	.4 × Net Worth of Family Business or Farm
80,001 to 230,000	.5 × Net Worth of Family Business or Farm – 30,000
230,001 to 380,000	.6 × Net Worth of Family Business or Farm – 107,500
380,001 or more	Net Worth of Family Business or Farm – 200,500

Table A2

Education Savings and Asset Protection Allowance (in 1992 Dollars)

	Education Savings and Asset Protection Allowance	
Age of the Older Parent	Two Parents	One Parent
25 or less	0	0
26	2,100	1,500
27	4,300	3,000
28	6,400	4,600
29	8,600	6,200
30	10,700	7,700
31	12,900	9,200
32	15,200	10,800
33	17,200	12,300
34	19,300	13,900
35	21,500	15,400
36	23,600	16,900
37	25,800	18,500
38	27,900	20,000
39	30,100	21,600
40	32,200	23,100
41	33,000	23,500
42	33,900	24,100
43	34,700	24,500
44	35,400	25,100
45	36,300	25,600
46	37,200	26,200
47	38,500	26,900
48	39,400	27,500
49	40,500	28,000
50	41,500	28,700
51	42,800	29,400
52	43,900	30,200
53	45,300	31,000
54	46,700	31,800
55	47,900	32,500
56	49,400	33,300
57	50,900	34,300
58	52,500	35,300
59	54,400	36,100
60	56,000	37,100
61	58,100	38,200
62	59,800	39,300
63	61,900	40,400
64	64,100	41,500
65 or more	66,300	42,900

Table A3

Income Protection Allowance (in 1992 Dollars)

Family Size (Including Student)	Number in College				
	1	2	3	4	5
2	10,620	8,800			
3	13,230	11,420	9,600		
4	16,330	14,510	12,710	10,900	
5	19,280	17,460	15,650	13,830	12,020
6	22,540	20,720	18,910	17,100	15,300
For each additional family member add $2,540					
For each additional college student subtract $1,810					

Table A4

Assessment Schedule and Rates (in 1992 Dollars)

$\gamma(\cdot)$	Contribution
Less than 0	0
0 to 9,500	$.22()$
9,501 to 11,900	$2{,}090 + .25(I_g + \pi(\cdot) - IPA_g - \min(2{,}400, .35 \times EI^M, .35 \times EI^F) - 9{,}500)$
11,901 to 14,400	$2{,}690 + .29(I_g + \pi(\cdot) - IPA_g - \min(2{,}400, .35 \times EI^M, .35 \times EI^F) - 11{,}900)$
14,401 to 16,800	$3{,}415 + .34(I_g + \pi(\cdot) - IPA_g - \min(2{,}400, .35 \times EI^M, .35 \times EI^F) - 14{,}400)$
16,800 to 19,100	$4{,}231 + .40(I_g + \pi(\cdot) - IPA_g - \min(2{,}400, .35 \times EI^M, .35 \times EI^F) - 16{,}800)$
19,101 or more	$5{,}151 + .47(I_g + \pi(\cdot) - IPA_g - \min(2{,}400, .35 \times EI^M, .35 \times EI^F) - 19{,}100)$

Table A5

1990 NPSAS and 1996 NPSAS Mean Demographic Characteristics by Income Group for Dependent Students

	Full Sample (1)	Family Income ≥$50,000 (2)	Family Income <$50,000 (3)	Difference (4)
Age	19.34	19.18	19.41	.23
	(.01)	(.02)	(.01)	(.02)
Non-White	.27	.14	.33	.19
	(.003)	(.004)	(.004)	(.01)
Parents' Income ($)	44,815	81,072	27,642	-53,430
	(272)	(523)	(140)	(413)
Parents' Net Worth ($)	22,069	41,763	12,742	-29,021
	(648)	(1,718)	(474)	(1,369)
Parents Married	.42	.47	.41	-.06
	(.004)	(.01)	(.01)	(.01)
Parent Attended College	.63	.81	.55	-.26
	(.004)	(.01)	(.01)	(.01)
Siblings in College	.42	.52	.37	-.15
	(.01)	(.01)	(.01)	(.01)
Full-Time Student	.89	.93	.87	-.06
	(.002)	(.003)	(.003)	(.01)
School Price ($)	12,707	14,176	12,013	-2,163
	(48)	(91)	(56)	(102)
Two-Year College	.17	.10	.20	.10
	(.003)	(.004)	(.004)	(.01)
Private College	.49	.55	.47	-.08
	(.004)	(.01)	(.003)	(.01)
For-Profit College	.08	.04	.09	.05
	(.002)	(.003)	(.003)	(.004)
N	16,900	5,460	11,440	16,900

Notes: Data are from the 1990 NPSAS and the 1996 NPSAS. Standard errors are shown in parentheses. Groups are based on predicted family income. All values are in 1992 dollars.

DISCLOSURE

The author declares that she has not relevant or material financial interests that relate to the research described in this paper and did not receive financial support of any kind for this particular research project. The data was obtained under a restricted data license from the National Center (NCES) for Education Statistics at the Department for Education. The NCES does review every paper written using restricted-access data. All errors and opinions are those of the author and should not be taken to represent the views of any of the organizations with which she is affiliated. In accordance with the guidelines of the National Center for Education Statistics, this paper contains no information that can be used to identify individuals and all sample sizes are rounded to the nearest ten.