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Do Loans Increase College Access and Choice? Examining the Introduction of Universal Student Loans

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Abstract

The returns to college are substantial, including increased earnings and public benefits, such as better health and increased involvement in public service and giving. As a result, since the introduction of the Guaranteed Student Loan program in 1965 and the Pell Grant in 1972, the federal government has experimented with using financial aid to increase college access, choice, and affordability.

Although years of research support the notion that financial aid can influence students' post-secondary decisions, questions remain about the best ways to design such programs and the relative effectiveness of different types of aid. Due to the fact that an overwhelming proportion of the research on financial aid focuses on grants, little is known about how a recent shift to loans has affected student access to higher education and their choice of institutions. Because loans are a much more complicated form of financial aid than grants, there is reason to suspect that their effectiveness differs from other aid.

This paper attempts to provide additional information on the impact of loans on college decisions by focusing on the period during which college loans were made available to all families, regardless of financial need. The major shift in aid policy occurred due to the 1992 Higher Education Reauthorization Act (HEA92). By exploiting this 1992 policy change as a natural experiment, this paper examines the impact of introducing a student loan program on college enrollment and choice. The analysis uses the Consumer Expenditure Survey (CES) to detail how the number of students in college (e.g., the access question) and the amount of money spent on higher education and related expenses (e.g., the choice question or "how much" education was bought) changed after the policy change.

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I. Introduction

The returns to college are substantial, as demonstrated by increased earnings (Barrow and Rouse, 2005) and public benefits, such as better health (Cutler and Lleras-Muney, 2006) and increased involvement in public service and giving (College Board, 2004). As a result, since the introduction of the Guaranteed Student Loan program in 1965 and the Pell Grant in 1972, the federal government has experimented with using financial aid to increase college access, choice, and affordability.¹ However, even after decades of aid policy, the likelihood of attending college varies substantially by family income. Among high school graduates in 2004, only 43 percent of students from families who made less than \$30,000 immediately entered a post-secondary institution, compared to 75 percent of students from families who made more than \$50,000.² Even after accounting for differences in academic preparation and achievement, the gaps remain large. Low-income high school graduates in the top academic quartile attended college at only the same rate as high-income high school graduates in the bottom quartile of achievement (ACSFA, 2001). Recent evaluations of the aid system have concluded affordability remains a major concern. According to the federal Commission on the Future of Higher Education, which was appointed by Secretary of Education Margaret Spellings, “There is no issue that worries the American public more about higher education than the soaring cost of attending college.” (2006, p. 19).

Although years of research support the notion that financial aid *can* influence students’ post-secondary decisions, questions remain about the best ways to design such programs and the relative effectiveness of different types of aid. These questions have become especially important due to significant shifts in the types of aid programs available to help students pay for college. During the last 15 years, loans have become increasingly prominent as a means of funding post-secondary education. This is especially true for full-time, full-year students. From 1989-1990 to 2003-2004, the percentage of full-time, full-year students with loans rose from 36 percent to 50 percent. Moreover, average annual loan amounts during this period grew 38 percent in constant 2003 dollars, from \$4,486 to \$6,200 (Long and Riley, 2007).³ In 2005-2006, the federal Stafford Loan Program, the largest of the student loan programs, awarded more than \$57.4 billion in aid (College Board, 2006). Due to the fact that an overwhelming proportion of the research on financial aid focuses on grants,

¹ The National Defense Student Loan Program began in 1958 but it was not until the 1960s that wider access began to be a serious goal of the federal government.

² Author’s calculations, using Current Population Survey data from October 2004.

³ These loan amounts reflect all sources, excluding amounts parents borrowed under the PLUS program.

aid that does not need to be repaid, little is known about how this shift to loans has affected student access to higher education and which institutions they choose.

Because loans are a much more complicated form of financial aid than grants, there is reason to suspect that their effectiveness differs from other aid. First is the obvious difference in the net present value of a loan versus a grant, even if the student loan is subsidized by the federal government. Second, loans entail additional information costs, and some families, particularly those unfamiliar with other forms of debt, such as a mortgage, may be reluctant to take out loans because they do not fully understand them or fear the consequences of not meeting the repayment terms. While loans may address the market failure of liquidity constraints for families with students in college, as was the initial justification for the creation of the federal Guaranteed Student Loan Program in 1965, some have questioned whether this is really the main barrier for college access. Carneiro and Heckman (2002) conclude that the long-term influence of background is more to blame than the short-term credit constraints addressed by loans in explaining differences in attainment.

Without much information on the role of loans in creating access to higher education, concerns about their disadvantages are often emphasized. Unlike grants and scholarships, loans may also influence students' decisions long after they are first received, and many fear their impact could be negative. Researchers suggest that debt burden may influence choices of field of study, and, more narrowly, that loans may deter students from entering public service careers (Swarthout, 2006; Long and Riley, 2007). Another concern is the possibility that high debt might encourage students to delay such decisions as buying a house, getting married, and having children. On the other hand, loans may be a more cost-effective policy when considering the budget implications of grants versus loans.

This paper attempts to provide additional information on the impact of loans on college decisions by focusing on the period during which college loans were made available to *all* families, regardless of financial need. The major shift in aid policy occurred due to the 1992 Higher Education Reauthorization Act (HEA92), which had two main effects.⁴ First, HEA92 created the Stafford Unsubsidized Loan Program, which extended federal loans to previously ineligible families. While groups of students with demonstrated financial need have been able to secure loans from the

⁴ Every six years, Congress is tasked with reviewing the programs and policies related to higher education, including student financial aid, aid to college and universities, programs to improve K-12 teacher training, and services designed to help with the transition to college. Although the Higher Education Act was supposed to be reauthorized in 2004, competing demands and debates about the specifics of the reauthorization have delayed its passage.

federal government since 1965, it was not until 1992 that prolonged access was given to all families with students in college.⁵ This drastically changed the landscape of financial aid and marked the beginning of the rapid increase in the use of loans to fund higher education. As shown in Figure 1, prior to the early 1990s, there was not much of a difference in the expenditures on grants versus loans. However, after 1992, there was a major increase in expenditures on loans, which was prompted by the expansion of the Stafford Loan program (the middle line).

A second change further expanded eligibility for financial aid by instituting a new system, called the Federal Methodology, for determining a family's need. Most importantly, the new needs analysis system removed home equity from the federal calculation of how much a family could afford to pay. As a result, many families became eligible not only for the unsubsidized loan program but also possibly federally subsidized loans, for which the interest is paid by the government while the individual is in college. This was significant for many families, as Dynarski (2003) calculates that prior to HEA92, "[E]ach dollar of home equity reduced by three to six cents the federal aid eligibility of families on the margin of receiving more aid" (p. 2). In the data used for this paper, home equity constitutes 59.5 percent of a family's total assets.⁶

By exploiting the 1992 policy change as a natural experiment, this paper examines the impact of introducing a student loan program on college enrollment and choice. The analysis uses the Consumer Expenditure Survey (CES) to detail how the number in college (e.g., the access question) and how much money was spent on higher education and related expenses (e.g., the choice question or "how much" education was bought) changed after the policy change. Unlike previous studies on college access and choice, I use the detail of the CES data to fully replicate the federal financial aid calculation to produce an estimate of what the federal government determined the family could afford to pay for college. This allows one to predict which families were previously not eligible for financial aid and thus became eligible for a federal student loan only after the 1992 Higher Education Reauthorization. Because of the complexity of the federal aid system, the treatment and control groups could be very similar in terms of income and assets but receive very different levels of financial aid. This paper adds to the scant research literature and contributes to the important debate on the effectiveness of student loans. The results of this work are timely, as

⁵ For a short period, federal loan eligibility was extended to the middle class. In 1978, the Middle Income Student Assistance Act (MISAA) expanded eligibility for and removed the income ceiling from subsidized student loans. Due to exploding costs, Congress reinstated a needs test for the Guaranteed Student Loan Program in 1981 (Hearn, 1993).

⁶ Total assets includes all checking and savings accounts, cash on hand, and the net value of any business or farm, investments, and real estate.

federal and state governments are currently considering how to reform their loan programs in an attempt to make them more effective.

II. Background and literature review

The role of financial aid in college decisions

In theory, the decision to attend college should be negatively related to price, so with the reduction of costs through financial aid, one would expect an increase in post-secondary attendance. Economists have utilized this demand framework to study how changes in the price of higher education have affected individuals' choices about college. A great deal of research has focused on estimating the price elasticity of students by either using tuition prices or the introduction of a grant. Leslie and Brinkman (1987) provide a comprehensive meta-analysis of early research and conclude that without grant aid, the enrollment of low-income students would be reduced by 20 to 40 percent. The estimated effect on middle-income students is much smaller (7.4 to 19.5 percent). More recently, Kane (1995) provides estimates utilizing several data sources and exploiting both between-state differences and within-state changes in public tuition prices over time. He finds that during the late 1970s and 1980s, states with higher public tuition levels had lower college entry rates, and within-state tuition increases led to lower enrollment rates. Low-income students and those attending two-year colleges seemed to be most affected. Using logistic and conditional logistic models and data on the potential matches between individuals and nearly 2,700 colleges, Long (2004) also confirms that state tuition subsidies, which reduce the price in-state students pay for college, are influential in students' decision of whether to attend college and which school to attend.

A number of additional studies exploit changes in financial aid policy to estimate the response of students to a reduction in college prices, a strategy used by this paper. For example, Dynarski (2000) examines the impact of the introduction of the Georgia Hope Scholarship, which was introduced in 1993 and gave free public college tuition or a \$3,000 grant to students with a B-average in high school. Using the October Current Population Survey (CPS) to compare enrollment rates in Georgia versus other southern states before and after the program, she finds that the aid program increased the college attendance rate in Georgia by 3.7 to 4.2 percentage points for each \$1,000 in aid (1998 dollars). Cornwell, Mustard, and Sridhar (2006) also examine Georgia Hope but instead use the Integrated Post-Secondary Education Data System (IPEDS). They estimate that the

scholarship increased the overall freshmen enrollment rate by 6.9 percentage points, with the gains concentrated in four-year schools.

Instead of studying the introduction of a new program, Dynarski (2002) examines the impact of eliminating a financial aid policy. The Social Security Student Benefit (SSSB) Program gave 18- to 22-year-old children of dead, disabled, or retired Social Security beneficiaries' monthly support while they were enrolled full-time in college. After 1982, when Congress decided to discontinue the program, Dynarski estimates that college access and attainment fell by more than 25 percent for the formerly eligible students. This translates into \$1,000 (1997 dollars) of grant aid increasing education attainment by 0.2 years and the probability of attending college by five percentage points.

All research on grants programs has not been positive. For instance, the evidence on the impact of the Pell Grant is mixed. Using the Difference-in-Differences (DD) technique, several papers compare enrollment decisions before and after the 1972 introduction of the Pell Grant. Using the October CPS, Kane (1996) finds that, contrary to predictions, enrollment grew 2.6 percentage points *more slowly* for the lowest quartile. Only public, two-year college enrollment seemed to grow more quickly for low-income youth.⁷ Other work by Manski and Wise (1983) and Hansen (1983) also found no disproportionate growth in college enrollment or completion of a bachelor's by low-income students. Though researchers have been surprised not to find an effect, several possible reasons include low program visibility, the complexity of the application process, and the length of time it took to completely phase in the Pell Grant. Because the current Pell Grant program is somewhat different in generosity than it was in the early 1970s, it is unclear whether these studies reflect on the present nature and effectiveness of the policy.

Research on the impact of student loans

The increasing use of loans suggests that they have grown in importance, perhaps due to unmet financial need. However, research on the role of loans in college decisions is scant, relative to that about grants. As noted, the 1990s were a period of major change in the use of loans. Savoca (1991) examines earlier movement towards loan usage and how that affected college enrollments in the 1970s and 1980s. Her estimates suggest that the probability of attending college falls when loans replace grants, dollar-for-dollar, in the financial aid package.

⁷ Kane only studies women in order to avoid the influence of the Vietnam draft on men's decisions, a known impetus for encouraging many men to enroll,

Dynarski (2003) also investigates the 1992 changes in loan policy. She uses CPS and the 1990 Panel of the Survey of Income and Program Participation (SIPP) and proxies for changes in loan eligibility by instrumenting for home equity. Dynarski concludes that she has “weak evidence” on the positive impact of loan eligibility on attendance. She also finds that the policy change appears to have shifted students toward four-year, private colleges. Reyes (1995) uses a similar approach to study the impact of the Middle Income Student Assistance Act of 1978. She concludes that the policy, which expanded loans to middle- and upper-income families, had a positive impact on enrollment.

Researchers have also explored other possible ways to conduct loans programs, such as using an income-contingent payment scheme rather than the usual repayment schedule. Krueger and Bowen (1993) outline the debate among policy makers about income-contingent loans and illustrate the role economic analysis could have in informing the debate. Chapman (1994) builds on the work of Krueger and Bowen, emphasizing the view that income-contingent loans offer default-protection for borrowers. Given that default on a college loan could mean diminished access to other credit markets, this feature could be very relevant for risk-averse students and those from disadvantaged backgrounds.

HEA92 and the financial aid system

Financial aid in the United States is awarded based on information submitted to the federal government through a financial aid application called the Federal Application for Financial Student Aid (FAFSA). The aid application collects information on family income and assets to determine the Expected Family Contribution (EFC), the amount that a family is estimated to be able to provide towards higher education expenses. The size of the family, the number of family members in college, and the age of the oldest parent, as well as information on the student's earnings and assets all affect this calculation. For independent students, who are defined as being 24 or older, married, having legal dependents, being orphans, or having served in the Armed Forces, the EFC calculation differs slightly in that parental contributions are not counted.

To determine a student's financial need, the government subtracts the EFC from the total cost of attendance.⁸ Students who have a low EFC *and* financial need (i.e., low-income students) are eligible for federal need-based grants, like the Pell Grant. Prior to HEA92, there were also

⁸ The total cost of attendance is pro-rated, based on the student's enrollment intensity (whether they attend full- or part-time) and includes tuition, fees, room and board, and other costs at the institution the student attends.

subsidized Stafford loans, available only to needy students as determined by the FAFSA, for which the government pays the interest while the student is in college.⁹ However, until 1992, families who had a higher EFC or could demonstrate need (i.e., the cost of attendance was less than their calculated EFC) did not receive any federal aid. Then, on July 23, 1992, the Higher Education Amendments of 1992 were signed into law.

The first major change of HEA92 was to create the Stafford Unsubsidized Loan Program. Effective for post-secondary enrollment on or after October 1, 1992, students from families with higher EFCs became eligible for unsubsidized Stafford loans “with provisions paralleling those for subsidized Stafford loans, except that interest during in-school, grace, and deferred periods is not paid by the Department” (Common Manual, 2003, Appendix H, p. 11). Although some loans were given out during the first year, the policy did not fully become effective until the 1993-94 school year, as is reflected in Table 1. While only \$159,000 in loans were awarded during 1992-93, this amount jumped to \$742,000 in 1993-94 and \$2.1 million in 1994-95.

Figure 2 displays how the amount of loans grew over time. With the creation of the Stafford Unsubsidized Loan Program, HEA92 also phased out the Supplement Student Loan program (the bottom line in the graph). Meanwhile, the total amount of unsubsidized student loans matched the amount given in subsidized loans by 2005-06. The receipt of unsubsidized loans was concentrated among upper-income families, although families of all income levels have benefited from the policy, as shown in Table 2. Few families qualified for a loan before HEA took effect, particularly those above an Adjusted Gross Income of \$60,000.

There are limits on the amount of Stafford Loans that could be secured. In 1992, a first- or second-year student could get up to \$2,625 total in subsidized and unsubsidized Stafford Loans or up to the total cost of attendance, whichever was lower. For third- and fourth-year students, the maximum was \$4,000. However, effective July 1, 1993, the loan limits for some students were increased. Second-year students could secure up to \$3,500 and third- and fourth-year students \$5,000 annually.

The Federal Stafford subsidized and unsubsidized Loan Program is today the largest student loan program in the United States. It is the foundation of all college student loans in America and continues to be subject to reform. Recent changes have increased the amounts students can receive. As of July 1, 2007, students may borrow up to \$3,500 during their first year of undergraduate education; the limit increases in subsequent years and is higher for independent

⁹ Low-income, high-need students may also be eligible for other federal and state need-based grants and the Federal Work Study program, which subsidizes the wages of the students employed in on-campus jobs.

students. Other loan programs include the Federal Perkins Loan Program, a need-based program distributed by campuses, and the Federal Parent Loan for Undergraduate Students (PLUS) Loan Program, which has no annual or aggregate limits up to the cost of attendance net other financial aid.

The extension of eligibility for federal financial aid with HEA92 occurred not only through the creation of the Stafford Unsubsidized Loan Program but also through a change in how the EFC was calculated by the federal government. The former Congressional Methodology was replaced with the Federal Methodology (FM), which had two notable differences. First, it excluded home and family farm equity in the calculation of the assets from which one would be expected to contribute for higher education expenses.

The second difference of the FM is that it included a new "simplified needs test," which allowed all applicants with incomes less than \$50,000 to exclude all of their family's assets from consideration. Previously, only families with incomes less than \$15,000 could exclude all assets and use the simplified needs test (M. Long, 2004). These two changes made many more families eligible for subsidized Stafford Loans, in addition to unsubsidized loans. Also, a few middle-income students who would have previously been on the margin of qualifying for a Pell Grant may now have received a small award.

The changes in need analysis with the FM were not fully implemented until the 1993-94 school year given the time necessary to alter procedures and the normal cycle of applying for aid. As confirmed by Tuma, Geis, and Malizio (1995), the older Congressional Methodology was used to determine financial need during the 1992-93 school year, including counting home equity as part of a family's assets (p. 2, footnote 3). Therefore, as with the Stafford Unsubsidized Loan program, the changes effectively took place during the 1993-94 school year.

III. Data and empirical strategy

The Consumer Expenditure Survey

This analysis uses the Consumer Expenditure Survey (CES), a data set collected by the Census Bureau for the U.S. Bureau of Labor Statistics. The survey includes quarterly interviews of families with extensive questions on their expenditures, income, and household characteristics. Approximately 5,000 households were interviewed each quarter out of the total non-institutionalized population of the United States. I used the National Bureau of Economic Research (NBER) files created by John Sabelhaus and Ed Harris of the Congressional Budget Office and maintained by

Jean Roth of the NBER.¹⁰ These files are annual “family-level” data that are the result of linking the four quarterly interviews for each CES respondent family. In this paper, I refer to the first quarter that a family is interviewed. For example, a family that began to be interviewed during the second quarter of 1993 gave information from April 1993 until March 1994. The Sabelhaus and Harris files also collapsed hundreds of spending, income, and wealth categories into a consistent set of groups across all the years, so the data are useful for studying changes over time. These data have been used for studying trends in saving over time, the distributional implications of consumption taxes, and other research involving the joint distribution of expenditures and income.¹¹

The analysis imposed several data restrictions to the sample. First, respondents must have reported complete income information and finished all four quarterly interviews. As a result, many student households were dropped, as young renters often did not complete all four surveys. However, for each family included, I have enough information to replicate the calculations used by the federal government when determining eligibility for financial aid. As with the naming convention of Sabelhaus and Harris, each cohort is referred to by the first quarter they were interviewed. For instance, information for families in the third quarter of 1992 refers to families first interviewed in July 1992 who were repeatedly interviewed until June 1993.

Estimating the impact of loans: Differences-in-differences model

To test for the impact of the introduction of loan eligibility, the paper compares how enrollment decisions and expenditures evolved over time for newly-eligible families relative to families who were always eligible for student loans and grants. By noting the timing of the policy change, I determine whether the introduction of the Stafford Unsubsidized Loan Program caused discontinuities in the variables of interest. To account for any general trends that have affected college enrollment, students who were already eligible for aid are used as the control group. As noted above, this differences-in-differences (DD) methodology has been employed to study student demand responses to other financial aid programs (e.g., Kane (1996), Dynarski (2000), and Cornwell, Mustard, and Sridhar (2006)).¹² Using ordinary least squares estimation, the calculation can be made:

$$(1) \quad y_i = \beta_1 + \beta_2 (\text{Newly-Eligible}_i * \text{After}_i) + \beta_3 \text{Newly-Eligible}_i + \beta_4 \text{After}_i + \beta_5 X_i \\ + \text{Yr-Quarter}_i + \text{State}_i + \varepsilon_i$$

¹⁰ Available at: http://www.nber.org/data/ces_cbo.html.

¹¹ For examples of other papers written with the dataset see: Bosworth, Burtless, and Sabelhaus (1991); Sabelhaus (1993); and Sabelhaus (1998).

¹² Meyer (1995) discusses of the advantages of natural experiments and the use of the DD methodology.

where i is the i^{th} college and y is the outcome of interest. The parameter β_2 is the reduced-form effect of the loan program. The variables “Newly-Eligible” and “After” are dummy variables equal to one if the family became eligible for a federal student loan only after HEA92 or the quarter of the data is after the policy change took place, respectively; otherwise the variables are equal to zero. X is a vector of family characteristics and ε is the error term. Specifications also use year-quarter (Yr-Quarter _{i}) and state (State _{i}) fixed effects to control for fluctuations by year-quarter or state. In the case of dichotomous dependent variables, a logistic regression model is used rather than OLS.

Two types of outcomes are under investigation. The first involves college attendance either in any college or full- or part-time. Second, the CES has good information on expenditures. “Higher Education” expenditures is defined as tuition paid by the family for college. There is a separate category for Nursery, Elementary, and Secondary Education, which is not included in this analysis. “Other Educational Expenditures” includes tuition for other schools (not K-12 or colleges so likely other training programs), the rental costs of books, equipment, and other school-related expenses, and contributions to educational organization. Therefore, this category may include expenditures for things not directly related to post-secondary education. A summary of all the variables of the analysis is shown in Table 3.

Defining Difference #1: Before versus after

To estimate the results, one must first pinpoint the exact timing of the policy change. Based on the quarterly nature of the CES, families who began to be interviewed in the fourth quarter of 1992 and before are considered the “before” period. Families first interviewed during the first quarter of 1993 and afterwards are assumed to be under the new policy, although the first and second quarter families for 1993 only had part of their time after the change.¹³ With the time span of the analysis data being from the third quarter of 1990 until the second quarter of 1995, the sample includes a balanced panel of 10 quarters pre- and post-policy change. Because the sampling frame changed in 1996, the sample could not be extended past the second quarter of 1995.¹⁴ Limiting the

¹³ Families in the fourth quarter of 1992 were interviewed from October 1992 until September 1993, and so are not considered to be impacted much by a policy change that took place during the 1993-94 school year. Families first interview the first and second quarter of 1993 represent January to December 1993 and April 1993 to March 1994, respectively. Each is assumed to have experienced the policy change during at least part of their interview year.

¹⁴ Families who entered the survey in the last two quarters of 1995 cannot be tracked across a full year and were therefore not included (Sabelhaus and Harris, 2000).

analysis to two and one-half years before and after the policy change may reduce the ability to detect a response, as policies often take several years before individuals are informed enough to adequately respond.

Difference #2: Defining the families newly eligible for federal loans

The second difference for the model is families who became eligible for a federal loan versus those who previously were already eligible to receive aid from the federal government before HEA92. This is not, however, a straightforward comparison between low- and high-income families since the groups differ in ways that might make comparisons between them troubling. Eligibility for student loans was based on a much more complicated set of factors than just income. Two families with identical incomes, and even identical assets, could have had very different eligibility levels due to differences in the age of the head of household, family size, the cost of the college attended, or the amount of equity in their home. This analysis exploits these differences to identify similar families who differ in aid eligibility. The paper uses two methods to identify the families who became eligible for loans after HEA92.

It is important to note that in the effort to have the most comparable control and treatment group possible, all models include a long list of control variables. To account for differences across families, the models have controls for background (i.e., vector X), including demographics such as the gender, age, race/ethnicity of the head of household. The models also account for the marital status of the head, highest level of education of the either the head or spouse (if present), and family size. A number of variables control for income, including total wages, income from other sources, government transfers, the number of earners in the household, whether the family owns their home, and the number of cars owned. Finally, there are a series of dummy variables for the head of household's occupation and industry of employment.

The first method used to identify "newly eligible" families focuses on home equity. As noted above, with the introduction of the Federal Methodology, home equity was removed from the calculation used to determine a family's EFC. Therefore, the amount of home equity is a proxy for the degrees to which families were not previously eligible for student loans. However, the amount of equity a family had in their home could be endogenous after the policy change (M. Long, 2004). The reason stems from the fact that HEA92 gave families the incentive to reallocate assets from other "taxable" forms to paying off the home mortgage in order to avoid being penalized in terms of federal aid eligibility. Dynarski (2003) also notes this in her paper, and similar to her methodology, I

will use home value as an instrumental variable that predicts home equity. The IV approach is described as follows:

$$(2) \quad y_i = \beta_1 + \beta_2 (\text{Home Equity}_i * \text{After}_i) + \beta_3 \text{Home Equity}_i + \beta_4 \text{After}_i + \beta_5 X_i \\ + \text{Yr-Quarter}_i + \text{State}_i + \varepsilon_i$$

where: $\text{Home Equity}_i = f(\text{Home Value}_i) + \varepsilon_i$

The second method takes a more direct approach in determining which families were not previously eligible for a federal student loan. Eligibility for federal aid is determined by need, which is defined as the cost of attendance minus the EFC. For the first part of this equation, I utilize state-specific tuition costs. All else being equal, a student attending a public, four-year university in Massachusetts will pay a much higher price than a similar student in California, due to differences in tuition, so the student in Massachusetts would be more likely to have financial need in the eyes of the federal government. The analysis uses data from the Digest of Education Statistics for 1991-92 to approximate the tuition costs faced before the policy change.

The second part of the calculation of need, the family's EFC, is a little more complicated, but the CES provides the appropriate detail to approximate the government's pre-HEA92 calculation (under the Congressional Methodology). To summarize, for a family with college-age children, one determines the parent's available income by subtracting federal income taxes, a portion of state and local taxes depending on the state and family's income, and social security taxes from the parent's total income (taxable and untaxed). There is an income protection allowance, based partly on family size, and an employment expense allowance, each of which reduces the amount of a parent's income that is expected to go towards college costs. The net worth of assets is then considered, including (prior to HEA92), home equity. There is an asset protection allowance that enables families to safeguard a portion of these assets from the aid calculation based on the age of the older parent. Together, the parent's available income and contribution from assets are multiplied by an assessment percentage, and this is the total parent's contribution. Added to this is the student's contribution, which is calculated similar to the parent's, but the rates much higher than those applied to the parents, with 50 percent of available income and 35 percent of net assets expected to go towards paying for college. For independent students, those who are aged 24 or older, married, who have legal dependents, who are orphans, or who have served in the Armed Forces, the EFC calculation differs slightly in that parental contributions are not counted. Using the

information in the CES, this formula was simulated for each family. For families without children 14-23 who had completed high school and not a bachelor's degree, the independent calculation was used. The EFC calculation for this analysis assumes one person is in college at a time within the family.

IV. Results and implications

The analysis begins by examining how the college attendance behavior of families with higher home values, a proxy for home equity, changed after HEA92. The empirical approach is a DD design with the estimate of interest being in the first row, home value interacted with the "after" dummy variable. In Table 4, the results suggest that college enrollment increased for these families, who had just become eligible for federal student loans. The enrollment effect was concentrated in terms of full-time enrollment, as shown in specification (2). Expenditures on higher education also increased after the policy. This is robust, even with including fixed effects for year-quarter and state. Table 5 specifies the outcomes as zero-one answers and uses logistic regressions to estimate the results. Similar results are found. Per \$10,000 in home value, enrollment increased 1.4 percentage points.

Table 6 uses home value as an instrumental variable for home equity due to possible endogeneity after 1992. This also produces very similar results to those discussed earlier. In summary, as measured by home equity, an important factor in the changes introduced by HEA92, federal student loans appeared to increase the probability of enrollment, particularly full-time attendance.

A second way to measure eligibility is calculating a family's need prior to the policy changes. Table 7 displays the results using this method with a dummy variable for families calculated as not having need prior to HEA92 (i.e. their EFC was greater than the cost of attendance). The results suggest the full-time enrollment increased for this group. There may have been some substitution from part-time enrollment, but the negative estimate is not statistically significant for that variable. Similar results are found in Table 8 using logistic regressions with more families signifying that a member attended college full-time after the policy change.

This early evidence suggests that the expansion of federal student's loans did positively impact college enrollment, especially in terms of full-time attendance. Using two possible methods to identify the group of newly eligible families, the results are consistent even with the inclusion of a number of background control variables and state and year-quarter fixed effects. These results are

similar to those of Dynarski (2003) and Reyes (1995), who both examined the impact of increasing the availability of student loans. However, more research is needed to get a detailed picture of the impact of loans. Future analyses will explore other methods of identifying newly-eligible families.

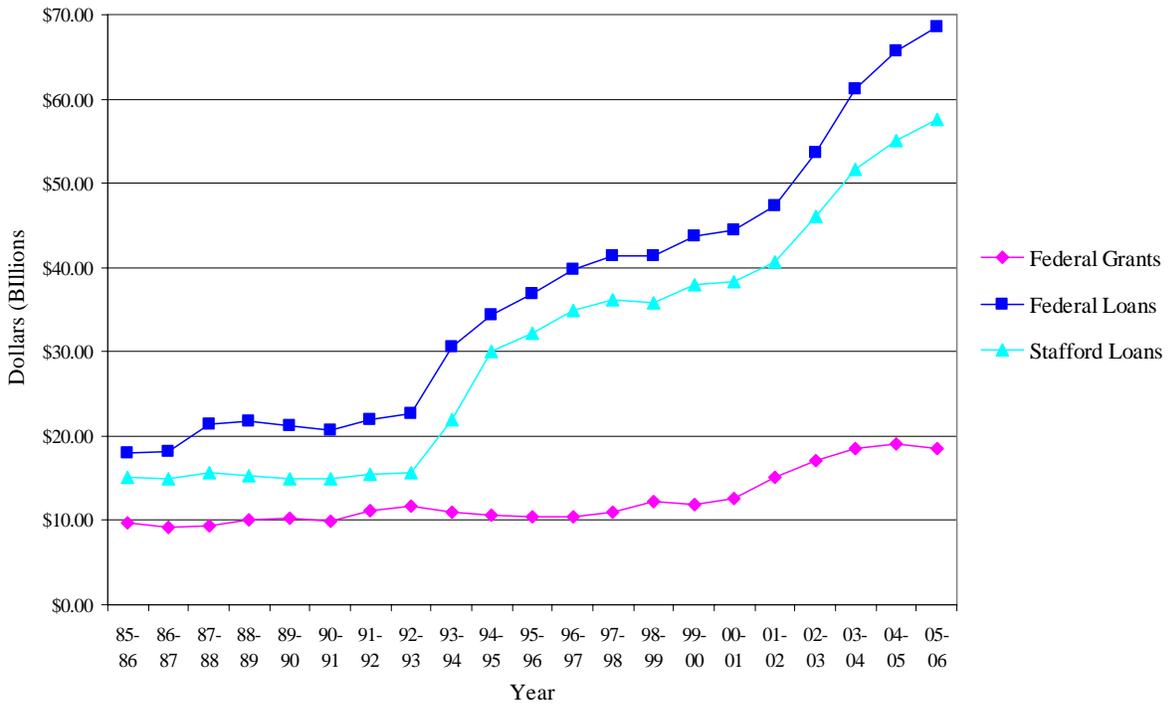
Caution should also be taken to compare these estimates with those of grant programs. Because loans need to be repaid, they may have a different impact on access than grants, which do not have to be repaid. One implication of this is that although all students with college expenses are eligible for a loan, not all students will choose to obtain one, and there are differences in the propensity to take out a loan by background. Financial aid administrators report anecdotally that students from traditionally disadvantaged backgrounds often are unwilling to incur substantial debt to attend college. This may be related to socio-economic differences, as suggested by a 2003 report by ECMC Group Foundation that investigated cultural barriers to debt incurrence. Long and Riley (2007) find that minority students utilize student loans at equal if not higher rates than others, although they borrow smaller amounts, on average. In short, reliance on student loans is not limited to any one characteristic or profile. However, it is unclear how many students are kept out of college of an aversion to debt.

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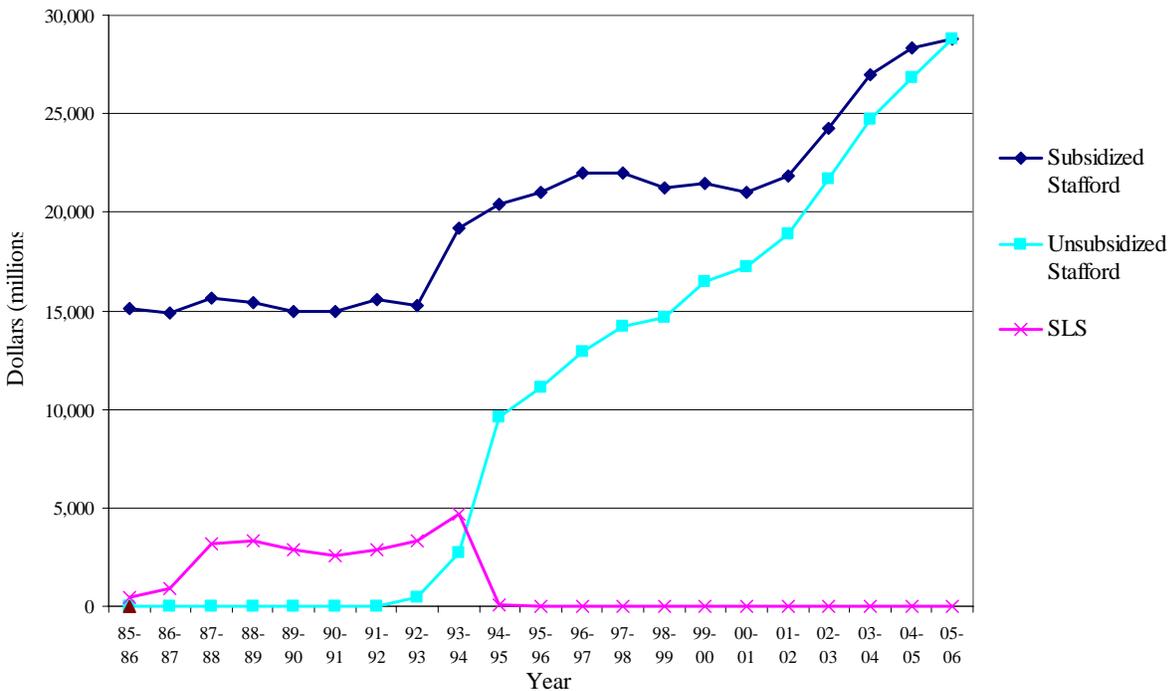
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Figure 1: Federal Financial Aid, 1985-86 to 2005-06 (\$ billions)



Source: College Board (2006).

Figure 2: Federal Loan Programs, 1985-86 to 2005-06 (millions)



Source: College Board (2006).

Table 1: Undergraduate borrowing in subsidized and unsubsidized Federal Stafford Loan Programs (nominal dollars)

	1989- 90	1990- 91	1991- 92	1992- 93	1993- 94	1994- 95	1995- 96	1996- 97	1997- 98	1998- 99	1999- 00	2000- 01	2005- 06
<i>Stafford Subsidized Loan Program</i>													
# Borrowers (000)	—	—	—	—	3,655	3,840	3,609	3,841	3,933	3,880	3,931	3,988	5,353
# Loans (000)	3,619	3,689	3,889	3,883	4,433	4,540	3,967	4,237	4,338	4,264	4,293	4,367	6,468
Avg. Loan (Current)	2,627	2,712	2,778	2,817	3,193	3,392	2,928	\$2,957	\$2,965	\$2,956	\$3,002	\$2,990	\$3,074
<i>Stafford Unsubsidized Loan Program</i>													
# Borrowers (000)	—	—	—	—	667	1,778	1,689	1,941	2,135	2,186	2,423	2,606	4,009
# Loans (000)	—	—	—	159	742	2,093	1,879	2,176	2,396	2,447	2,677	2,883	4,874
Avg. Loan (Current)	—	—	—	2,035	2,730	3,556	2,782	\$2,844	\$2,920	\$2,945	\$3,085	\$3,137	\$3,398

Source: College Board (2006) using information from the U.S. Department of Education, Office of Post-secondary Education, National Student Loan Data System (NSLDS).

Notes: The statistics include both the Federal Family Education Loan (FFEL) and Ford Direct Student Loan (FDSL) Programs. The 2004-05 figures are estimated and the 2005-06 figures are preliminary

Table 2: Receipt of the subsidized and unsubsidized Federal Stafford Loan Before and after the policy change (percentages)

Adjusted Gross Income	1992-93 <i>Before</i> the policy change	1995-96 <i>After</i> the policy change
<i>All Federal student loan borrowers</i>		
Less than \$20,000	30.6	22.9
\$20,000 to \$39,999	39.6	28.2
\$40,000 to \$59,999	21.3	24.0
\$60,000 to \$79,999	6.4	14.9
\$80,000 and Over	2.1	10.0
<i>Stafford subsidized loan borrowers</i>		
Less than \$20,000	30.2	26.6
\$20,000 to \$39,999	39.3	32.1
\$40,000 to \$59,999	21.7	24.9
\$60,000 to \$79,999	6.5	11.6
\$80,000 and Over	2.2	4.9
<i>Stafford unsubsidized loan borrowers</i>		
Less than \$20,000	n/a	8.0
\$20,000 to \$39,999	n/a	15.9
\$40,000 to \$59,999	n/a	26.1
\$60,000 to \$79,999	n/a	27.4
\$80,000 and Over	n/a	22.5

Source: Redd (1999) using the data from the National Post-secondary Student Aid Survey (NPSAS) on financially-dependent undergraduates.

Notes: Adjusted Gross Income (AGI) levels are adjusted for inflation into constant dollars. The Stafford Unsubsidized Loan Program did not begin until 1993-94 and so students did not receive the aid during 1992-93.

Table 3: Summary statistics of the consumer expenditure survey

	Mean	Standard deviation
<i>Variables of interest</i>		
After the policy change	0.497	
Home value	\$74,317	\$78,389
Home equity	\$70,327	\$76,517
Expected family contribution (pre-HEA92)	\$3,925	\$6,700
State mean public four-year tuition, 1991-92	\$2,202	\$696
Had no need pre-HEA	0.428	
<i>Outcome variables</i>		
Number in college	0.136	0.406
Number in college full-time	0.062	0.273
Number in college part-time	0.074	0.299
Log(higher educational expenditures)	0.877	2.304
Log(other educational expenditures)	0.999	2.003
Anyone in college	0.115	
Anyone in college full-time	0.055	
Anyone in college part-time	0.064	
Any higher educational expenditures	0.133	
Any other educational expenditures	0.219	
<i>Background control variables</i>		
Age of head of household	50.254	16.957
Head of household female	0.358	0.479
Head of household Black	0.109	0.312
Head of household Native American	0.005	0.070
Head of household Asian	0.028	0.164
Head of household married	0.597	0.491
Highest level of education of head of household	18.365	7.884
Family size	2.667	1.501
Number of children	0.936	1.194
Income	\$33,309	\$31,426
Number of earners	1.408	1.009
Government transfers	\$4,814	\$8,959
Own home	0.713	0.453
Number of cars	1.283	0.946

Source: Consumer Expenditure Survey, 1990Q3 to 1995Q2.

Notes: The other control variables are dummy variables for the head of household's occupation and industry. The occupation categories are managerial and professional specialty; service; farm, forestry and fishing; precise production, craft and repair; operator, fabricator and laborer; and armed forces. The industry categories are agriculture, farming, fish and mining; construction; manufacturing; transportation, communication, and public utilities; wholesale and retail trade; professional and related services; other services; public administration; and industry not reported.

Table 4: The impact on college attendance and expenditures - OLS estimates

	Number in college	Number in college full-time	Number in college part-time	Log(higher education expend.)	Log(other education expend.)
	(1)	(2)	(3)	(4)	(5)
Home Value * After	0.0016** (0.0006)	0.0012** (0.0004)	0.0004 (0.0004)	0.0074** (0.0035)	0.0012 (0.0028)
Home Value (000s)	-0.0005 (0.0006)	-0.0001 (0.0004)	-0.0004 (0.0004)	0.0133** (0.0032)	0.0256** (0.0026)
After HEA92 in effect	0.0033 (0.0157)	0.0076 (0.0111)	-0.0043 (0.0114)	-0.1627* (0.0902)	-0.0017 (0.0722)
Year-Quarter	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Observations	25,846	25,846	25,846	25,846	25,846
R-squared	0.0765	0.0584	0.0385	0.1186	0.1675

** Significant at the 5% level

* Significant at the 10% level

Source: Consumer Expenditure Survey, 1990Q3 to 1995Q2. See the notes to Table 5.

Table 5: The impact on college attendance and expenditures - logistic regression estimates

	Anyone in college	Anyone in college full-time	Anyone in college part-time	Any expend. on higher education	Any expend. on other education
	(1)	(2)	(3)	(4)	(5)
Home Value * After	0.0136** (0.0054)	0.0224** (0.0072)	0.0047 (0.0073)	0.0074 (0.0049)	0.0035 (0.0044)
Home Value (000s)	-0.0015 (0.0051)	0.0038 (0.0072)	-0.0078 (0.0066)	0.0084* (0.0046)	0.0203** (0.0040)
After HEA92 in effect	0.2183 (0.1703)	0.4139* (0.2254)	-0.0466 (0.2193)	-0.0676 (0.1519)	-0.1141 (0.1348)
Year-Quarter	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Observations	25,837	25,837	25,799	25,846	25,846

** Significant at the 5% level

* Significant at the 10% level

Notes: Standard deviations are shown in parentheses. All models include controls for demographics of the head of household (gender, age, race/ethnicity), marital status, highest level of education, family size, income, government transfers, number of earners in the household, whether the family owns their home, and the number of cars owned as well as a series of dummy variables for the head of household's occupation and industry of employment. Higher Education Expenditures (specification 5) include tuition paid for college. "Other" Educational Expenditures (specification 6) include tuition for schools other than K-12 or college, the rental costs of books, equipment, and other school-related expenses, and contributions to educational organization.

Table 6: The impact on college attendance and expenditures using an instrumental variable approach

	Number in college	Number in college full-time	Number in college part-time	Log (higher education expend.)	Log (other education expend.)
	(1)	(2)	(3)	(4)	(5)
Home Value * After	0.0017** (0.0006)	0.0012** (0.0005)	0.0004 (0.0005)	0.0080** (0.0037)	0.0014 (0.0030)
Home Value (000s)	-0.0006 (0.0006)	-0.0001 (0.0004)	-0.0004 (0.0004)	0.0139** (0.0034)	0.0268** (0.0027)
After HEA92 in effect	0.0032 (0.0157)	0.0074 (0.0111)	-0.0043 (0.0114)	-0.1692* (0.0902)	-0.0115 (0.0722)
Year-Quarter	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Observations	25,846	25,846	25,846	25,846	25,846
R-squared	0.0765	0.0584	0.0385	0.1186	0.1675

** Significant at the 5% level

* Significant at the 10% level

Source: Consumer Expenditure Survey, 1990Q3 to 1995Q2.

Notes: Standard deviations are shown in parentheses. All models include controls for demographics of the head of household (gender, age, race/ethnicity), marital status, highest level of education, family size, income, government transfers, number of earners in the household, whether the family owns their home, and the number of cars owned as well as a series of dummy variables for the head of household's occupation and industry of employment. Higher Education Expenditures (specification 5) include tuition paid for college. "Other" Educational Expenditures (specification 6) include tuition for schools other than K-12 or college, the rental costs of books, equipment, and other school-related expenses, and contributions to educational organization.

Table 7: The impact on families without need before HEA92 - OLS estimates

	Number in college	Number in college full-time	Number in college part-time	Log (higher education expend.)	Log (other education expend.)
	(1)	(2)	(3)	(4)	(5)
No Need Pre- HEA92 * After	0.0138 (0.0126)	0.0161* (0.0086)	-0.0023 (0.0096)	0.0323 (0.0693)	-0.0590 (0.0584)
No Need Pre- HEA92	0.0097 (0.0116)	0.0001 (0.0079)	0.0096 (0.0088)	0.0353 (0.0635)	-0.0753 (0.0535)
After HEA92 in effect	0.0313 (0.0210)	0.0226 (0.0143)	0.0087 (0.0159)	-0.0310 (0.1151)	-0.0855 (0.0969)
Year-Quarter	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Observations	16,145	16,145	16,145	16,145	16,145
R-squared	0.0929	0.0770	0.0372	0.1485	0.1828

** Significant at the 5% level

* Significant at the 10% level

Source: Consumer Expenditure Survey, 1990Q3 to 1995Q2. See the notes to Table 8.

Table 8: The impact on families without need before HEA92 - logistic regression estimates

	Anyone in college	Anyone in college full-time	Anyone in college part-time	Any Expend. on higher education	Any Expend. on other education
	(1)	(2)	(3)	(4)	(5)
No Need Pre- HEA92 * After	0.0779 (0.1035)	0.2847* (0.1459)	-0.0373 (0.1302)	0.0943 (0.1019)	-0.0567 (0.0851)
No Need Pre- HEA92	0.0894 (0.0955)	-0.0992 (0.1360)	0.1371 (0.1194)	0.1208 (0.0926)	-0.0209 (0.0780)
After HEA92 in effect	0.2848 (0.1820)	0.0806 (0.2909)	0.1336 (0.2470)	-0.3727* (0.2057)	-0.1785 (0.1604)
Year-Quarter	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Observations	16,138	16,123	16,111	16,145	16,145

** Significant at the 5% level

* Significant at the 10% level

Notes: Standard deviations are shown in parentheses. All models include controls for demographics of the head of household (gender, age, race/ethnicity), marital status, highest level of education, family size, income, government transfers, number of earners in the household, whether the family owns their home, and the number of cars owned as well as a series of dummy variables for the head of household's occupation and industry of employment. Higher Education Expenditures (specification 5) include tuition paid for college. "Other" Educational Expenditures (specification 6) include tuition for schools other than K-12 or college, the rental costs of books, equipment, and other school-related expenses, and contributions to educational organization.