CENTER for RETIREMENT RESEARCH at BOSTON COLLEGE

HOW DOES STUDENT DEBT AFFECT EARLY-CAREER RETIREMENT SAVING?

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Abstract

This paper examines the relationship between student loans and retirement saving behavior by 30-year-old workers. Total outstanding student loan debt in the United States has quintupled since 2004. Rising student debt levels mean that young workers must reduce either their consumption or their saving. To what extent do these workers cut back on retirement saving? Existing studies have lacked adequate data or controls for studying this issue: conventional financial datasets include too few younger households; the study samples used include older households whose student debt may be from their children's education instead of their own; and many studies lack important controls to capture differences between attendees with more or less student debt. This study uses the *National Longitudinal Survey of Youth 1997 Cohort*, a larger sample of workers turning 30, and includes detailed controls including school quality, parental background, and the underlying ability of the college attendee. The analysis focuses on participation in an employer-sponsored retirement plan and retirement assets as of age 30.

This paper found that:

- The estimated relationship between student debt and participating in a retirement plan – whether or not their employer offers one – is small and statistically insignificant, and we can rule out any large negative correlation.
- Contrary to expectations, individuals with a large loan balance who were offered a plan are *more* likely to accept it, though the estimated relationship is small.
- Some evidence indicates that bachelor's degree-holders who have student loans have lower retirement assets at age 30, though the estimates are statistically insignificant, and retirement assets levels are unrelated to the size of their student loan balances.
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The policy implications of this paper are:

- Though young workers' balance sheets are clearly hurt by student debt, the preliminary results indicate that they do not substantially reduce retirement saving to compensate.
- This lack of a relationship between student loans and retirement plan saving suggests that the detrimental effect of student debt manifests itself either through reduced consumption or other reductions in net worth, such as credit card debt.

- Despite these findings, it will be worth watching future cohorts to determine whether a stronger relationship between student debt and retirement savings will emerge in the future, as those who built up even more debt move toward financial and economic maturity.

Introduction

Workers who have attended college increasingly begin their working lives with a financial responsibility not shared by prior generations: paying off substantial student loan debt. In 1993, 47 percent of graduates had student loans, but the debt burden was typically low – borrowers owed around $10,000 on average (in 2013 dollars). Today, 70 percent of graduates have loans and the average debt burden has tripled to $30,000.[1]

The rapid rise in student debt has clearly weakened the balance sheet of younger workers. How have they responded? Some students may cut back on consumption. Others might rack up other types of debt; indeed previous research has found that higher student debt burdens are associated with decreased creditworthiness (Gicheva and Thompson 2013).

Alternatively, student borrowers may reduce their retirement saving, opting to shore up short-term needs at the expense of the longer run. Workers who begin saving for retirement while they are young give themselves a leg up by taking advantage of employers' matching contributions, enjoying compounded interest, and establishing good saving habits. Given the rapid rise in student debt and the increasing importance of individual retirement saving, a natural question arises: how does the presence of student debt affect young adults' decisions to save for retirement, and how does it alter early-career asset accumulation?

The popular press has aired concerns that rapidly rising student debt could set back efforts to save for retirement (Nason 2014). Yet academic literature on the relationship between student loan debt and retirement saving has been thin. The lack of research likely stems from the recency of the problem – in just 12 years, the national total of outstanding student loan debt has nearly quintupled (Federal Reserve Bank of New York 2016) – and the shortcomings of the data typically used to answer questions about savings and debt. Nearly all of the existing studies reviewed below use the *Survey of Consumer Finances* (SCF), a nationally representative cross-sectional dataset. Because of the rising incidence and amount of student debt, young adults are most likely to be impacted by this issue. Yet the SCF includes only a small number of young adults, which may lead to noisy results.[2] Furthermore, existing studies often include older households, whose educational debt likely arose later in life when they helped finance their children's education, rather than when they were young themselves.

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[1] The Institute for College Access and Success (2014).

[2] The SCF included just 1,623 individuals under age 40 in 2013, and only 616 had student loans. The *Health and Retirement Study* also collects information on assets and debt – and longitudinally, unlike the SCF – but includes very few adults under age 50.

Moreover, the SCF contains little information on the individual's family background, college quality, or underlying intellectual ability, all of which are likely correlated with the need to take out a student loan and with one's propensity to save for retirement. Failing to control for these factors may lead to surprising results. For example, students with larger student debt loads may actually have *more* retirement saving at age 30 – not because of the debt per se, but because that debt was accumulated while completing a degree at an elite private university and/or pursuing an advanced degree that led to a higher-paying job. Alternatively, the relationship between student debt and retirement saving may be overstated in the absence of these controls – for example, students who attend for-profit universities take out larger student loans but also disproportionately come from disadvantaged backgrounds that may leave them less familiar with the retirement saving infrastructure (Deming, Goldin, and Katz 2012; Lang and Weinstein 2013). Indeed, in research focusing instead on homeownership, the negative relationship with student debt diminishes to statistical insignificance after controlling for similar factors (Houle and Berger 2015).

To overcome these shortcoming, this project uses the *National Longitudinal Survey of Youth 1997 Cohort* (NLSY97), which samples a larger cohort of recent college graduates than would be available in standard surveys of household finances, and includes rich information on students' family background, college quality, and intellectual ability. Whereas some previous studies examined wealth accumulation in general, this study focuses more narrowly on retirement plan participation and assets. Importantly, the controls provided by the NLSY97 allow the project to analyze students who differ with respect to their levels of student debt but are otherwise similar in all other observable characteristics.

The results indicate that young workers with student loans do not save substantially less for retirement. The relationship between student loans and retirement plan participation is statistically insignificant and small. The presence of a student loan may be associated with lower assets for young workers with bachelor's degrees, but the estimated relationship is statistically insignificant, and heavier student loan burdens do not appear to be associated with lower retirement asset levels. Although students do seem to be putting money in their retirement accounts at a rate similar to workers unburdened by college debt, these results indicate that young workers with student debt must face other hardships relative to households without student loans.

The paper proceeds as follows. The first section describes the state of the literature on how student debt affects retirement savings and other markers of financial and economic maturity. The second section describes the NLSY97 data. The third section outlines the econometric strategy used in this study. The fourth section reviews the results, and the final section concludes that young indebted workers – at least so far – do not substantially reduce their retirement saving, and so the negative impact of student debt must manifest itself in other ways.

Previous Literature

This study builds off of the few previous studies that examine the relationship between retirement saving and student debt. The most relevant is Elliott, Grinstein-Weiss, and Nam (2013), which finds that having a student loan reduces retirement savings accumulation by about 40 percent, though they find no relationship between the size of the student loan debt and saving for retirement. Their analysis is limited, however, by the insufficient coverage of younger households in the SCF. Their sample includes households in their 60s or even older, who may have racked up student debt paying for their children's tuition rather than their own education, and who may have very little debt relative to recent graduates. This sample limitation means that the analysis is not focused on how workers are influenced by their own student loans.

While this study focuses on the retirement savings of younger workers, retirement security also depends on saving throughout the lifecycle. However, the increase in student debt burdens is too recent to determine how actual workers' retirement savings have been, and will be, affected by student debt. Instead, Hiltonsmith (2013) and Munnell, Hou, and Webb (2016) both build models of how student loan debt could affect retirement saving over stylized career paths. Both studies conclude that student debt could become a substantial hindrance to retirement security. Hiltonsmith (2013) finds that the typical career profile of a worker with student debt would leave this worker with $208,000 less wealth at retirement than workers without student debt, due both to lower retirement saving and less home equity. Munnell, Hou, and Webb (2016) find that today's typical student debt load substantially raises the probability that retirement income will be insufficient to maintain debtors' pre-retirement standard of living, in particular for people who attend college and rack up student debt but do not graduate.

Other studies have examined the association between student debt and financial well-being more generally, without focusing on retirement saving in particular. Cooper and Wang (2014) find that homeowners with student debt have substantially less financial wealth than

homeowners who attended college without student loans. Fry (2014) finds that net worth is much lower for households with student debt, in particular if college attendees did not graduate. Gicheva and Thompson (2015) find that greater student loan debt is associated with greater credit constraint and greater risks of bankruptcy and falling behind on other debt payments.

Another common hypothesis is that student debt reduces homeownership, with numerous studies documenting reduced homeownership rates as loan balances increase.[3] This reduction, in turn, cuts into assets that would be available to support oneself in retirement. But Houle and Berger (2015) find no association between student debt and homeownership rates. Their study, like ours, uses the NLSY97, citing its larger sample of younger households and ability to control for factors that the SCF and other datasets usually lack that bias the relationship.

A few studies examine other markers of adulthood, such as marriage and parenthood. Chiteji (2007) finds no statistically significant relationship between student debt and either marriage or parenthood, but Addo (2014) and Gicheva (2016) find that young adults with student debt are less likely to marry, and Nau, Dwyer, and Hodson (2015) find that young women with high student debt levels delay motherhood.

All of these studies used nationally representative datasets to examine the consequences of educational debt, and most of them attempted to deal with the potential endogenous buildup of student debt by either including control variables not often available in major datasets or using an instrumental variable approach. Rothstein and Rouse (2011) use a different approach to determine whether debt affects later economic outcomes: a natural experiment – the phase-in of a "no-loans" policy at an elite private university. They focus entirely on career choice, finding that students with debt choose higher-paying careers than comparable students who benefited from the no-loans policy.[4] To our knowledge, however, no study has found a natural experiment to compare post-graduation retirement savings by student debt levels.

Data

The NLSY97 dataset collects information about the transition from childhood to adulthood for American youths, including educational experience (and how it is paid for) and

[3] Chiteji (2007); Brown and Caldwell (2013); Cooper and Wang (2014); Gicheva and Thompson (2015).
[4] Somewhat relatedly, Field (2009) compares the career choices of law students who are randomly assigned to two financial aid packages to encourage graduates to work in public interest law: 1) a tuition waiver, or 2) a loan paid by the school. She finds that the tuition waiver encourages greater participation in public interest law, but it is not clear how these results apply to the comparison between students with and without student debt.

labor market outcomes. The NLYS97 began with 8,984 individuals born between 1980 and 1984, interviewing them and their parents for the first time in 1997. Follow-up interviews were conducted annually until 2011, and biennially thereafter. Respondents are ages 29-33 by 2013, which is the most recent wave that is currently available and the last wave used in this project.

The NLSY97 includes yearly data on respondents' employment status and whether their employer offered a retirement plan. Information on assets and debts are collected only once every five years, around the respondents' 20th, 25th, and 30th birthdays. Some questions in these Young Adult Asset Modules are asked of each individual in a family unit: in particular, each adult in a couple is asked about student debt. Other questions are asked of a couple jointly: most relevant to our study are participation in a retirement plan and total retirement assets. This project's outcome variables are, thus, an indicator for having at least one retirement plan that was acquired through the respondent's or his spouse's employer, and the total value of those plans, as of their first interview during or after the calendar year in which they reached age 30.[5] The two key independent variables – an indicator for whether the respondent himself has educational debt, and the outstanding balance on that debt – are measured in the first interview after reaching his 25th birthday.[6] To ensure that the results are not driven by the fact that the outcome variable is based on couples and the independent variable is based on the individual, the results restricting the sample to single individuals are included as a robustness check.

The NLSY97 also collects many variables that are unavailable in cross-sectional finance surveys such as the SCF. First, it includes detailed data on underlying individual ability, as measured by the standardized Armed Services Vocational Aptitude Battery (ASVAB), which respondents were given in 1997 and early 1998 (ages 12-16, though results are standardized by age). The ASVAB tests respondents on their knowledge of subjects such as math, English, and science, and on their reading comprehension and problem-solving ability. Second, the NLSY97 includes information on whether the student attended a private, public, or for-profit college; this categorization speaks to the quality of the college attended, as attendees of for-profit colleges

[5] Although the data also contain separate information for the amount of money saved in non-employer-sponsored retirement accounts such as IRAs, in practice only a small fraction of people have this type of savings by age 30. The project, therefore, focuses on employer-sponsored retirement accounts.

[6] We use the 25th birthday rather than the 20th birthday because many students will continue to accumulate student loan debt after their 20th birthdays. A few NLSY97 respondents may have been able to pay off all of their debt by the time the asset and debt module is asked around age 25, but it's likely their outstanding balances at that point are not that much less than at graduation.

fare worse in their early-career labor market outcomes (Deming, Goldin, and Katz 2012).[7] Third, the NLSY97 includes each parent's educational attainment and household income when the student was 18. These variables are essential controls if any difference in retirement saving behavior is to be attributed to student loans and not to other factors.

Table 1 describes the selection of the sample used in this analysis. Nearly 6,000 of the almost 9,000 respondents had reached age 30 by the 2013 interview round. The sample is limited to the 3,700 respondents who ever attended college; as Houle and Berger (2015) point out, several prior studies include individuals who never attended college and were thus never eligible for student debt, which would bias downward any correlation between debt and retirement savings. The sample also excludes the few respondents who have missing information on whether they completed their degree or about their student loan balance.

Table 2 tabulates the proportion of the sample with a student loan, separately by whether the respondent completed a four-year degree. The sample includes more than 1,400 individuals with student loans, more than triple the sample size available in the SCF. Among those with loans, approximately three-quarters have a degree, but only 41 percent of those without loans have a degree. Among degree holders, nearly 47 percent never had loans or, at least, have no outstanding debt at the age-25 interview.[8]

Methodology

The first part of this project documents unconditional differences in participation and asset accumulation in employer-sponsored retirement plans by age 30, based on the presence and amount of student debt. The comparisons using the raw, unadjusted data are presented separately for those who have and have not completed a four-year degree; individuals with associate's degrees are excluded from these comparisons as it is unclear whether they should be considered degree recipients, though they are included in the regression analysis (with a separate control for having an associate's degree). For the analysis of whether the magnitude of the

[7] Whether private colleges are of higher quality than comparable public colleges – as measured by, say, returns to a degree – is unclear. Brewer, Eide, and Ehrenberg (1999) and Dale and Krueger (2002) find clear evidence of a wage premium to attending an elite or even middle-ranked private institution relative to a bottom-ranked public university, but the difference in the returns to a degree from a public university versus a private university of similar standing do not appear to be statistically significant.

[8] King (2005) reports that 38 percent of people receiving bachelor's degrees in 2003-2004 graduated with no student loan debt, so the NLSY97 share is somewhat higher. Huelsman (2016) finds that more recent graduates (from 2012) without student debt come from higher-income families, are less likely to have other kinds of debt such as credit card debt, and are less likely to be black.

outstanding loan balances affect retirement saving (adjusted for inflation, using the Current Price Index, in 2013 dollars), the sample is split into either terciles or quintiles, with individuals without loans as a separate category. To date, no study has documented the early-career retirement asset accumulations of individuals with different amounts of student debt, so this simple exercise is informative.

The analysis focuses, however, on estimates from linear regression models where the dependent variable, $Y_{i,30}$, is: 1) an indicator for participating in any employer-sponsored retirement plan by age 30, whether or not the individual works for an employer who offers a plan; 2) the same indictor variable, but limiting the sample to individuals who have ever been offered a retirement plan – i.e., the take-up of any retirement plan offer by age 30; or 3) the natural logarithm of the level (in 2013 dollars) of assets in all retirement accounts combined, among individuals with positive assets.

$$Y_{i,30} = \alpha_0 + \alpha_1 AnyLoan_{i,25} + \alpha_2 \ln\left(LoanBal_{i,25}\right) + X'_{i,30}\beta + D'_{i,30}\delta \qquad (1)$$
$$+ SQ'_i\gamma + P'_i\theta + \psi ASVAB_i + \tau_{i,30} + \varepsilon_{i,30}$$

The independent variables of interest relate to student loan borrowing. $AnyLoan_{i,25}$ is an indicator variable equal to one if the individual *i* had a positive outstanding balance on an educational loan at age 25, and $\ln\left(LoanBal_{i,25}\right)$ is the natural logarithm of that loan balance.[9] A negative α_1 would indicate that student loans are associated with lower rates of pension participation or retirement asset accumulation, and a negative coefficient α_2 would indicate that the correlation is stronger with higher debt burdens.

The vector X'_i contains standard demographic variables like gender, race, Hispanic ethnicity, marital status, and an indicator for the presence of children in the household; these variables are included even in the base specification of the regression. The base specification also includes the natural logarithm of the respondent's earnings at age 30. Because the NLSY dataset does not contain information on the auto-enrollment feature of an employer's retirement saving plan, X'_i also includes a categorical variable for firm size; this variable captures the

[9] Individuals with a zero loan balance are assigned a log value of zero; the $AnyLoan_{i,25}$ indicator will pick up the difference between these individuals and someone with a very small loan balance.

expectation that larger firms are more likely to offer auto-enrollment, which encourages participation and saving.[10] In addition, each regression includes birth cohort fixed effects to capture changes over time in loan accrual; this variable also accounts for differences in the exact age at which respondents were asked the asset and debt modules.[11] Some specifications of the asset regression also include the number of years an individual's employer offered a pension plan by age 30 to ensure that differences in asset accumulation are not due to the length of time a retirement savings plan is available.

Separate specifications add three indicator variables for the degree earned by age 30, $D'_{i,30}$: associate's, bachelor's, or any advanced degree, with no degree earned as the omitted condition. These variables are added separately to determine how accounting for educational attainment affects the estimates. For most regressions, we report results for the full sample, as well as results for separate samples of individuals with no college degree and those with only a bachelor's degree (i.e., excluding advanced degree recipients).

In addition to summarizing how retirement saving among recent college attendees differs by their student loan burden, this project's contribution to the literature is to use variables unique to the NLSY that better account for differences between debtors and non-debtors, and those with small or large student debt balances. In the full specification, the regression model includes a series of vectors aimed at better controlling for otherwise-unobservable differences in the background of student debtors, as in Houle and Berger (2015). The vector SQ_i captures school quality, as indicated by the public, private non-profit, and private for-profit status of the main institution attended.[12] The regression also includes the vector P'_i controlling for the respondent's parents' background: separate indicator variables for whether each parent earned a 4-year degree, as well as the parents' combined income when the respondent was age 18.[13] Finally, as a measure of innate ability, $ASVAB_i$ is the person's percentile score on the Armed Services Vocational Aptitude Battery prior to entering college.

[10] Celis (2010).
[11] Because the survey was not fielded in 2013 for the 2012 calendar year, most of the 1982 cohort was surveyed in 2014 about the 2013 calendar year, when they were age 31.
[12] We are in the process of applying for geographic indicators which will permit further controls for school quality, including application selectivity and the standardized test scores of matriculating students. These data come from the National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS). IPEDS variables are collected from government reports submitted by colleges and universities. The NLSY97 includes a code for merging in the IPEDS data but requires state identifiers not available in the public-use version of the NLSY97.
[13] The model also includes dummies to account for missing values for each parent variable.

Results

Unconditional results. Table 3 outlines the differences in debt and assets between respondents with and without student loans, separately by degree status. Consistent with prior research, individuals with student loans have higher levels of debt from other sources. The median debt level (excluding student loans) at age 25 is almost the same for college graduates with and without student loans, but by age 30, graduates with loans have median debt of $7,500, more than twice the $3,000 median for college graduates without student loans. Among non-graduates who attended college, those with student loans had a median non-student debt of $4,500 at age 30, compared to $1,750 for non-graduates without student loans. Non-retirement assets are clearly higher when college graduates have no student debt – again, more than double the non-retirement assets of college graduates with student loans. Surprisingly, the difference in non-retirement assets for non-graduates with and without student loans is small, and even going the wrong way by some measures, though the asset levels are typically small for this group, so they are vulnerable to outliers.

The focus of this paper is on the last panel of Table 3: the comparison of retirement assets. Figure 1 shows the differences between people with and without student loans in their participation in retirement plans and in the median assets they have accumulated in those plans. Surprisingly, respondents with student loans are more likely to participate in a retirement plan (either as participants themselves or coupled with someone else who participates). Among college graduates, the participation rate is essentially equal: just less than two-thirds of graduates have retirement plans, regardless of whether or not they have student loans (Figure 1a). The difference is greater for non-graduates – 40 percent of those with loans have retirement plans, versus 31 percent with no loans – though, as Table 1 detailed, the sample of non-graduates with loans is fairly small. The pattern for the participation rates conditional on having been offered a plan (not shown) are similar.

Figure 1b presents median retirement assets only among those with positive retirement-plan balances, because the medians including non-participants would be zero for each group. Median assets are almost exactly equal among those with and without loans overall, and among non-graduates. But college graduates appears to be impacted by the harmful effect of loans: respondents without loans have median retirement assets of $19,000, almost double the $10,680 median for graduates with loans. Mean retirement levels (not shown), also excluding non-participants, are closer but exhibit the same pattern: the average level of retirement assets at age

30 is almost $33,000 for graduates without loans, compared to nearly $28,000 for graduates with loans.[14]

Figure 2 examines the same outcome variables but breaks down the sample with student loans into quintiles of their outstanding balances at age 25. Among graduates, the participation rate with respect to the size of the loan hovers between 60 and 70 percent, but without the downward trend (Figure 2a) expected as balances increase. Reinforcing the results for Figure 1, non-graduates with larger student loans are actually more likely to participate than those with small loans or no loan at all, though the sample in each quintile is quite small.

Figure 1 suggested that the level of assets in retirement plans differed by whether the respondent had a student loan, but Figure 2b indicates that the magnitude of that loan does not matter. The median asset level is almost exactly the same (about $10,000) for the two highest and two lowest quintiles, though the middle quintile has a median of almost $14,000. No clear pattern is discernible among non-graduates with loans, either, though their middle quintile also has the highest asset level. Mean asset levels are larger, as expected, and exhibit more of a downward slope as student loan balance increases for both graduates and non-graduates, though the small number of respondents in each quintile leaves the mean more susceptible to outliers (Figure 2c).

The evidence in Figures 1 and 2 that college loans put a damper on retirement saving is weak, in part because looking at how the saving patterns of groups who differ in college loans misses the differences in the characteristics among these groups. Tables 4a and 4b outline the differences in these observable characteristics, including parental background or underlying ability, by college loan tercile (and among those with no loans) separately for college graduates and non-graduates.

College graduates without loans clearly have the most advantaged backgrounds, echoing Huelsman (2016): they come from homes with more educated and higher-earning parents, and the graduates have higher ASVAB scores, are less likely to be black or female, and earn more than any other group at age 30 (Table 4a, leftmost column).

[14] These numbers are similar to the most recent SCF. The Federal Reserve Board of Governors (2013) reports that 39.3 percent of families headed by someone age 35 or younger have retirement accounts, but this share is almost certainly brought down by much younger household heads; by comparison, the share of families with heads age 35-44 with retirement accounts is 55.4 percent. The age-30 median retirement asset level in the NLSY97 of just over $10,000, on the other hand, is somewhat smaller than the under-35 asset level in the 2013 SCF of $12,000.

College graduates with heavy student loan burdens – an average $45,000 in the top tercile – report greater earnings and work for larger firms at age 30 than graduates with low student loan balances (Table 4a, rightmost three columns). These results are similar to Rothstein and Rouse's (2011) natural experiment, suggesting that heavily indebted students feel compelled to work at higher-paying jobs for longer hours and at more stable firms in order to pay off their loans. The high-loan tercile is also the most likely to attend private non-profit institutions, though not much more than the middle tercile, and the high-loan tercile is more likely to attend for-profit colleges. The heavily indebted are disadvantaged in some obvious ways. They are more likely to be female and black and less likely to have parents with college degrees, but their ASVAB scores are higher than the lowest-debt group, and their parents' income when they are 18 is no different than the tercile with the smallest (positive) loans.

For non-graduates, the sample sizes for those with loans are small, but the highest loan tercile earns the highest salary, comes from the most-educated and highest-income households as children, are least likely to be Hispanic or female, and have higher ASVAB scores than the groups with no loans or in the lowest tercile (Table 4b). These factors might help explain why non-graduates with loans have greater retirement saving than those with no loans. The most-indebted are most likely to have attended a non-profit private college – but, interestingly, those with the most debt are also the most likely to have attended a for-profit school. But by nearly all measures, non-graduates, as expected, have fewer advantages than graduates in each respective student loan category.

Regression results: Retirement plan participation. Table 5 displays the estimates from a series of linear regressions, each using participation in an employer-sponsored retirement plan as the dependent variable. The mean participation rate is reported in the first row for reference. The most basic specification includes only one control variable for student loans: an indicator for whether the young adult has a positive outstanding balance at age 25. In addition, that specification – and all others throughout this paper – include log earnings, firm size categories, and demographic controls.

Counterintuitively, respondents with student loans in the first column are 27 percentage points more likely to have participated in an employer retirement plan, bringing their participation rate to about half the average participation rate. This coefficient loses its statistical significance, however, when the loan balanced is controlled for, but the unexpected result is now

on the loan balance coefficient: it is positive and statistically significant. The estimate in the second column indicates that a 10-percent increase in the outstanding balance on educational loans is associated with an increase in retirement plan participation of 0.25 percentage points.

Adding controls to the model to account for the differences in background between student debtors and non-debtors yield similar results: there is no evidence of a negative correlation between debt and retirement plan participation. The regression model in the third column adds controls for degrees earned; the statistical significance of the loan balance coefficient (which had been unexpected because of its sign) disappears, but both student loan controls remain positive. Finally, in the fourth column, we add the background variables unique to the NLSY97: college quality, parental education and income, and the ASVAB score. Neither student loan variable – whether the young adult borrowed and how much they borrowed – moves to the expected negative and statistical significant estimate. We can rule out large negative correlations between student debt and retirement plan participation. For example, the lower limit of the confidence interval on the student loan balance coefficient is -0.008. At that magnitude, a 10-percent increase in the outstanding balance on educational loans is associated with an increase in retirement plan participation of only 0.08 percentage points.

The other results in the final specification of Table 5 are largely in keeping with expectations. Higher earners and those with higher degree attainment, higher ASVAB scores, and greater parental income are more likely to participate in retirement plans. Relative to for-profit students, attendees of both public and private non-profit institutions are more likely to participate in a retirement plan, though only the results for public institutions are statistically significant, and the public and private results are not statistically different from each other. More surprisingly, parental education's coefficients are small and statistically insignificant.[15]

Table 6 reports retirement plan participation regression estimates from two subsamples: 1) respondents with no college degree; and 2) respondents with only a bachelor's degree. For each group, we report estimates from the base specification (as in column 2 from Table 5) and the full specification (as in column 4 from Table 5, except without degree indicators). In all four columns, the student loan variables are statistically insignificant. The coefficients are small in magnitude for non-graduates. Among bachelor's degree holders, whether or not a young adult

[15] Other coefficients that are suppressed for space (and available upon request) indicate that retirement plan participation is greater in larger firms and among women, married persons, parents, and Asians, and lower among blacks.

has any student loans has a large negative, but imprecisely estimated, coefficient, but the correlation between plan participation and the student loan balance is small and positive, as it is in Table 5. In the case of bachelor's degree holders, the very bottom of the confidence interval around the point estimate indicates that a 10-percent increase in the student loan balance is associated with an increase in retirement plan participation of only 0.15 percentage points.

Regression results: Plan participation conditional on offering. The results shown in Table 7 are limited to individuals who report that any previous employer has offered them a retirement plan. The dependent variable is again plan participation, so this regression effectively estimates the correlation between student loans and the take-up of pension offers.[16]

As in Tables 5 and 6, the positive coefficient on the outstanding loan balance in Table 7 is statistically significant for the full sample, suggesting that, if anything, young workers with larger loan balances are more likely to take up an offer of a retirement plan. The estimates in the full specification are similar among the subsamples sorted by educational attainment, but the standard errors are also larger, in part due to the subsamples' small sizes. The magnitudes are small, however: a 10-percent increase in the loan balance is associated with a 0.26 percentage point increase in take-up for the full sample, small in comparison with a 55-percent average take-up rate. The coefficient on the student loan indicator is small and inconsistently signed for both the full and the no-degree sample; it is negative and fairly large for bachelor's degree holders, though statistically insignificant.

Regression results: Retirement assets. Table 8 reports estimates for the same three subsamples – the full sample, no college degree, and bachelor's degree only – when the dependent variable is the natural logarithm of retirement assets; these regressions exclude individuals without retirement accounts. The unconditional means in Figure 2c suggest a negative correlation between loan balances and retirement assets, and the estimates for college graduates shown in Table 8 are, indeed, negative. But the magnitudes are small, and none of the estimates is statistically significant.

Notably, the lack of statistical significance for the presence of student loans contrasts with the descriptive statistics in Figure 1b, which show a large difference in median asset levels

[16] In regressions where the dependent variable is an indicator for ever receiving a pension offer, the student loan coefficients are small and statistically insignificant, and mostly positive.

between college degree recipients with and without student loan debt. To show where the correlation moves toward zero, Table 9 presents a progression of specifications for those with bachelor's degrees, with each specification adding more controls. The first column includes only an indicator for having a student loan, as well as a constant; the negative and statistically significant coefficient matches Figure 1b. The second column includes only the log of the loan balance (and a constant); as in the first specification, the loan balance has a negative and statistically significant correlation with retirement assets. But in the third column, when both the loan indicator and the balance are the only two variables, neither coefficient is statistically significant, though the loan indicator still has a fairly large negative coefficient. After adding the base controls – earnings, demographics, and firm size – in column 4, the coefficient moves even closer to zero;[17] the full specification in column 5 is similar. At the same time, the loan balance coefficient becomes very small and not close to statistical significance. In summary, some evidence exists that the assets of workers with bachelor's degrees are negatively correlated with having a student loan, but the estimate is noisy; meanwhile, the size of the loan balance does not affect retirement asset accumulation.

Robustness check: Retirement plan access. One potential concern is that differences in retirement asset accumulation across groups with differing student loan burdens might capture differences in how many years they have had access to a retirement plan. The descriptive statistics in the last row of Tables 4a and 4b do not indicate any clear relationship, however, between the loan balance and the number of years a plan was offered. To be certain, we add the number of years to regressions in Table 10, and these results reinforce the evidence from Table 8 that greater student loan balances do not deter retirement wealth accumulation; none of the coefficients on student loans is negative and statistically significant.[18]

Robustness check: The linearity of the student loan balance. One possible explanation for why student loans have no relationship with retirement saving in the regression described

[17] In a specification that includes just the loan indicator as well as demographics, earnings, and firm size – essentially, column 4 without the loan balance variable – the loan indicator's coefficient is negative and/or borderline significant (at the 10 percent confidence level, but not at the 5 percent level). This result suggests that including the loan balance does use up some of the regression's power. Conceptually, however, the size of the loan balance should affect retirement savings, so specification 4 or 5 is the preferred model.

[18] In each model in Table 10, the number of years a plan was offered has the expected positive, statistically significant, and large correlation with retirement assets.

above is that student loans may have a non-linear relationship with retirement saving. On the one hand, for a rational economic actor, small loan balances with small monthly payments should not substantially impair debtors' ability to afford to contribute to their retirement accounts, but large loan payments would. On the other hand, student debtors, fitting a more behavioral model, may be deterred by the mere presence of the student loan obligation, prioritizing the near-term loan repayment over starting to save for the distant future; in that case, small and large loans are little different. The large negative (albeit statistically insignificant) relationship between the presence of student loans and retirement assets among bachelor's degree holders, coupled with the null coefficient on the balance, may be evidence for the behavioral model.

Table 11 re-estimates each of the previous regressions (with the full specification), and for each subsample defined by educational attainment, with one modification: the addition of a quadratic term for the student loan balance. The overall marginal effect is still expected to be negative; if that relationship is established, the quadratic term tests whether debtors are on the whole rational (positive, implying the increasing importance of student loans as they increase) or behavioral (negative, implying a diminishing relationship).

The estimates fail to confirm the first hypothesis, however: none of the coefficients on loan balance itself is negative, and the few that are statistically significant are positive. The negative coefficient on the quadratic term in all but one of the regressions provide evidence that participation, take-up, and assets are increasing at a decreasing rate as student loan balances increase, but the estimates are statistically insignificant. This result is already hard to square with the intuition that student loans dampen retirement savings efforts, so forming a conclusion on whether debtors act rationally or behaviorally is difficult.

Robustness check: Unmarried individuals. Another potential concern is that most of the control variables, most notably the student loan variables, represent only individual respondents, while the dependent variables represent respondents and, if they are married, their spouses. Table 12 limits the sample to unmarried individuals, and the results are similar to the full sample estimates in Tables 5-8.[19] In both the participation (top panel) and take-up (middle panel)

[19] Regression estimates for married individuals (not shown) are also similarly inconsistent with the expected results. The student loan indicator is negative and statistically significantly related to plan participation and take-up for married bachelor's degree holders, though the coefficient on the loan balance is positive and statistically significant. These estimates are more dubious than the estimates for unmarried individuals, given that the retirement saving

regressions, the student loan indicator's coefficient is positive and statistically insignificant, and the coefficient on the loan balance is negative but very small and statistically insignificant. In the asset regression (bottom panel), the student loan indicator is negative in each specification, and fairly large, but only statistically significant for individuals with no degree. For that same group, the coefficient on the loan balance is large and statistically significant, but positive. These results indicate no consistently statistically significant relationship between student loans – on either the extensive or intensive margin – and retirement saving.

Other margins of adjustment for student debtors. If young workers with student loans are no less likely to participate in a retirement plan, and have no less in retirement assets than similar workers without student loans, then how do they adjust their finances to make their educational debt payments? More non-student debt and lower non-retirement assets (as observed in Table 3) are obvious possibilities but two others are that young workers with student loans, and especially those with large loan balances, will opt to take higher-paying jobs or work more hours in order to afford their loan payments. Table 13 reports regression results when the dependent variables are log real earnings or hours worked. The coefficients on the loan indicator are positive for both of these earnings model, and statistically significant for the full sample; the coefficient on loan balance is negative and statistically significant for bachelor's degree recipients, but small, and small and insignificant for the full sample and non-graduates. Hours worked is also statistically significantly larger for student debtors in the full sample and the non-graduate sample, but the relationship does not strengthen as loan balances grow. These estimates suggest that student debtors may work somewhat harder than those without loans, but this effort does not vary by the magnitude of the debt.

Conclusion

A near quintupling in the level of outstanding student debt just in the past decade has hurt the finances of young workers. Previous studies have documented how educational debt spills over into increases in other kinds of debt (Gicheva and Thompson 2013) and potentially reduces

variables refer to either member of the married couple, without regard for which spouse faces student loan debt. But if the burden of student loan debt is borne by both spouses, and retirement saving decisions are made jointly, the estimates may indicate that the presence of student loans, rather than the magnitude of those loans, lower plan participation. Both loan coefficients in the asset regressions among married couples, in contrast, are statistically insignificant and/or positive.

homeownership rates (e.g., Cooper and Wang 2014). But few studies have examined the question of how the presence of student loans affect retirement saving, and those studies that have used data ill-suited to the purpose, with small samples of young households and insufficient controls for student debtors' backgrounds.

This project uses more suitable data from the NLSY 1997 cohort, which recently reached age 30, a milestone in adulthood when the need to start saving for retirement (hopefully) becomes more salient. The results of this study rule out a substantial relationship between student loans and participation in retirement plans or in the take-up of plans that are offered by employers. The relationship between the size of the student loan balances and retirement assets is small and statistically insignificant. There is some evidence to indicate that assets are negatively related to the presence of a student loan, particularly for young workers with bachelor's degrees, but the estimates are noisy. These results differ from some previous studies that find that student debt suppresses homeownership and marriage rates, but better matches the findings from Houle and Berger (2015), who, using the same dataset, find no evidence that student loans decrease homeownership after accounting for more detailed differences between student debtors and non-debtors.

The negative impact of student loans on younger workers, at least to date, has not shown itself in the form of lower early-career retirement savings. Instead, younger workers with substantial student loan debt may be at a financial disadvantage that manifests itself in other ways: higher credit card debt or lower consumption or in working more hours or taking higher-paying jobs than they would prefer. Whether the relationship with retirement saving would strengthen as the later cohorts with even higher student debt burdens advance into financial maturity will require further study.

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Table 1. *Sample Selection Criteria*

	Number of persons
	Full sample
Full NLSY97 sample	8,984
Age 30+ by 2013	5,660
Ever attended college	3,728
Not missing info on degree	3,720
Not missing info on loan	3,673

Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Table 2. *Cross-Tabulation of Degree-Holding and Loan-Holding*

	With degree	Attended but no degree
No loan	933	1,322
Percent among those without loans	41.4%	58.6%
Have loan	1,033	385
Percent among those with loans	72.8%	27.2%

Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Table 3. *Debt and Assets at Age 30, by Student Loan Status and Degree Status*

		Degree		No degree	
		With loan	Without loan	With loan	Without loan
Student loan debt	Mean	26,467		10,937	
	Median	20,281		6,744	
Debt excluding student loans	Mean	17,255	14,466	10,492	5,508
	Median	10,776	4,800	5,508	3,000
Retirement assets	Mean	16,018	20,734	5,709	5,389
	Mean > 0	25,595	34,947	14,967	18,311
	Median	400	7	0	0
	Median > 0	10,360	18,270	5,874	7,252
Non-retirement assets	Mean	18,508	34,675	7,741	7,469
	Mean > 0	19,716	37,998	10,879	10,495
	Median	5,000	11,190	620	550
	Median > 0	6,000	15,090	2,000	2,000
	N	783	725	319	1,376

Notes: "Mean > 0" is the mean among respondents with positive assets; "Median > 0" is similar.
Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Table 4a. *Summary Statistics by Student Loan Balance, College Degree or Greater*

Characteristic at age 30 (except where noted)	No loans	College loan tercile at age 25		
		Bottom	Middle	Top
Student loan amount at age 25	0	3,795	16,010	45,280
Retirement plan	0.623	0.634	0.658	0.631
Retirement plan amount	20,734	17,215	18,224	13,715
Earnings	47,931	42,208	43,464	45,027
Firm size	575	504	583	668
ASVAB before college	3.920	3.678	3.962	3.871
Public institution	0.653	0.683	0.657	0.607
Private non-profit institution	0.281	0.238	0.280	0.289
For-profit institution	0.066	0.079	0.063	0.103
Mom with college degree or more	0.453	0.350	0.341	0.330
Dad with college degree or more	0.503	0.430	0.378	0.339
Parents' income when respondent is 18	83,017	62,650	73,781	62,512
Male	0.461	0.428	0.418	0.364
Married	0.641	0.598	0.599	0.617
Any kids	0.396	0.396	0.442	0.370
Black	0.133	0.191	0.187	0.273
Asian	0.049	0.056	0.023	0.029
Hispanic	0.075	0.086	0.065	0.073
Other race	0.016	0.019	0.015	0.035
Number of years plan offered	4.502	4.837	5.216	4.842
Sample size	725	166	268	349

Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Table 4b. *Summary Statistics by Student Loan Balance, No College Experience*

Characteristic at age 30 (except where noted)	No loans	College loan tercile at age 25		
		Bottom	Middle	Top
Student loan amount at age 25	0	3,508	15,316	33,869
Retirement plan	0.315	0.348	0.494	0.477
Retirement plan amount	5,389	4,604	8,232	5,554
Earnings	25,495	26,274	29,297	33,604
Firm size	725	412	1,357	545
ASVAB before college	2.573	2.857	3.368	3.231
Public institution	0.792	0.732	0.683	0.444
Private non-profit institution	0.060	0.093	0.122	0.267
For-profit institution	0.148	0.175	0.195	0.289
Mom with college degree or more	0.112	0.138	0.193	0.190
Dad with college degree or more	0.149	0.142	0.183	0.211
Parents' income when respondent is 18	35,110	33,518	42,748	59,996
Male	0.493	0.413	0.494	0.533
Married	0.736	0.600	0.738	0.644
Any kids	0.549	0.608	0.446	0.578
Black	0.313	0.461	0.305	0.372
Asian	0.015	0.017	0.024	0.023
Hispanic	0.132	0.050	0.085	0.023
Other race	0.024	0.017	0.000	0.000
Number of years plan offered	3.580	4.344	4.318	4.333
Sample size	1,376	189	85	45

Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Table 5. *Retirement Plan Participation Regression Results*

	(1)	(2)	(3)	(4)
Mean	0.474	0.475	0.475	0.493
Student loan (0/1)	0.270***	0.071	0.030	-0.007
	(0.048)	(0.099)	(0.101)	(0.103)
Ln real loan balance at 25		0.025**	0.011	0.013
		(0.011)	(0.011)	(0.011)
Log earnings at 30	0.079***	0.079***	0.071***	0.066***
	(0.007)	(0.008)	(0.008)	(0.008)
Associate degree			0.178**	0.161**
			(0.074)	(0.077)
Bachelor's degree			0.504***	0.370***
			(0.060)	(0.065)
Advanced degree			0.615***	0.414***
			(0.081)	(0.090)
Public institution				0.178**
				(0.077)
Private institution				0.154
				(0.096)
Mom had degree				0.093
				(0.069)
Dad had degree				-0.027
				(0.069)
Parents' income at 18 ($10k)				0.007*
				(0.004)
ASVAB score				0.114***
				(0.023)
Sample size	3,336	3,313	3,313	3,074
R^2	0.132	0.135	0.155	0.160

Notes: Students' variables are measured as of age 30. Regressions also include gender, marital status, and the presence of children, race, and Hispanic ethnicity. *** p<0.01, ** p<0.05, * p<0.1.
Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Table 6. *Participation Regressions by Degree Status*

	No degree		Bachelor's	
	(1)	(2)	(3)	(4)
Mean	0.334	0.350	0.609	0.611
Student loan (0/1)	0.038	0.010	-0.142	-0.147
	(0.172)	(0.176)	(0.168)	(0.173)
Ln real loan balance at 25	0.028	0.026	0.022	0.020
	(0.021)	(0.021)	(0.017)	(0.018)
Log earnings at 30	0.071***	0.070***	0.058***	0.057***
	(0.011)	(0.012)	(0.015)	(0.016)
Public institution		0.159		0.371**
		(0.112)		(0.174)
Private institution		0.262		0.301
		(0.174)		(0.188)
Mom had degree		0.001		0.047
		(0.129)		(0.107)
Dad had degree		-0.076		-0.068
		(0.130)		(0.109)
Parents' income at 18 ($10k)		0.028***		0.005
		(0.009)		(0.007)
ASVAB score		0.036		0.179***
		(0.036)		(0.043)
Sample size	1,508	1,293	985	978
R^2	0.128	0.134	0.097	0.1268

Notes: Students' variables are measured as of age 30. Regressions also include gender, marital status, and the presence of children, race, and Hispanic ethnicity. *** p<0.01, ** p<0.05.
Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Table 7. *Participation Regressions among Workers Ever Offered a Plan*

	All		No degree		Bachelor's	
	(1)	(2)	(3)	(4)	(5)	(6)
Mean	0.530	0.546	0.394	0.408	0.649	0.652
Student loan (0/1)	0.074	0.001	0.036	-0.002	-0.172	-0.171
	(0.107)	(0.109)	(0.188)	(0.193)	(0.179)	(0.186)
Ln real loan balance at 25	0.026**	0.026 **	0.033	0.034	0.029	0.025
	(0.011)	(0.012)	(0.023)	(0.023)	(0.018)	(0.019)
Log earnings at 30	0.080***	0.070 ***	0.068 ***	0.069 ***	0.084***	0.078***
	(0.009)	(0.009)	(0.013)	(0.014)	(0.019)	(0.019)
Public institution		0.245		0.173		0.499***
		(0.082)		(0.123)		(0.187)
Private institution		0.254		0.320 *		0.403**
		(0.101)		(0.189)		(0.202)
Mom had degree		0.174		0.068		0.058
		(0.073)		(0.145)		(0.115)
Dad had degree		0.038		-0.028		-0.015
		(0.074)		(0.143)		(0.117)
Parents' income at 18 ($10k)		0.008		0.031 ***		0.003
		(0.005)		(0.010)		(0.009)
ASVAB score		0.144 ***		0.029		0.201***
		(0.024)		(0.040)		(0.046)
Sample size	2,804	2,626	1,184	1,025	881	876
R^2	0.118	0.138	0.110	0.124	0.094	0.128

Notes: Students' variables are measured as of age 30. Regressions also include gender, marital status, and the presence of children, race, and Hispanic ethnicity. *** p<0.01, ** p<0.05, * p<0.1.
Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Table 8. *Asset Regressions*

	All		No degree		Bachelor's	
	(1)	(2)	(3)	(4)	(5)	(6)
Mean	7.736	7.788	7.023	7.099	8.295	8.293
Student loan (0/1)	0.298	0.163	-0.244	-0.355	-0.381	-0.414
	(0.410)	(0.408)	(0.838)	(0.851)	(0.612)	(0.609)
Ln real loan balance at 25	-0.003	-0.009	0.068	0.055	-0.017	-0.009
	(0.043)	(0.043)	(0.098)	(0.099)	(0.062)	(0.062)
Log earnings at 30	0.206***	0.188***	0.177**	0.181**	0.119*	0.104
	(0.041)	(0.041)	(0.071)	(0.077)	(0.065)	(0.065)
Public institution		-0.191		-0.273		-0.385
		(0.341)		(0.584)		(0.671)
Private institution		-0.006		0.049		-0.620
		(0.394)		(0.858)		(0.716)
Mom had degree		0.106		0.349		0.312
		(0.252)		(0.597)		(0.347)
Dad had degree		0.054		-0.861		0.374
		(0.256)		(0.608)		(0.352)
Parents' income at 18 ($10k)		0.043***		0.080**		0.000**
		(0.016)		(0.039)		(0.000)
ASVAB score		0.324		0.220		0.370**
		(0.443)		(0.731)		(0.157)
Sample size	1,472	1,420	468	422	565	564
R^2	0.070	0.090	0.092	0.115	0.062	0.101

Notes: Dependent variable is the log of retirement assets. Students' variables are measured as of age 30. Regressions also include gender, marital status, and the presence of children, race, and Hispanic ethnicity. *** p<0.01,
** p<0.05, * p<0.1.
Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Table 9. *Asset Regressions among College Graduates*

	(1)	(2)	(3)	(4)	(5)
Mean	8.268	8.288	8.288	8.299	8.293
Student loan (0/1)	-0.757***		-0.428	-0.381	-0.414
	(0.293)		(0.598)	(0.612)	(0.609)
Ln real loan balance at 25		-0.073**	-0.035	-0.017	-0.009
		(0.030)	(0.061)	(0.062)	(0.062)
Log earnings at 30				0.119*	0.104
				(0.065)	(0.065)
Public institution					-0.385
					(0.671)
Private institution					-0.620
					(0.716)
Mom had degree					0.312
					(0.347)
Dad had degree					0.374
					(0.352)
Parents' income at 18 ($10k)					0.063
					(0.025)
ASVAB score					0.370**
					(0.157)
Sample size	599	595	595	565	564
R^2	0.011	0.010	0.011	0.062	0.101

Notes: Dependent variable is the log of retirement assets. Students' variables are measured as of age 30. Regressions also include degree earned (in full-sample regressions), college quality measures, parental background, ASVAB score, earnings, gender, marital status, presence of children, race, and Hispanic ethnicity. *** p<0.01, ** p<0.05, * p<0.1.
Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Table 10. *Asset Regressions with Controls for the Number of Years Plan Was Offered*

	All		No degree		Bachelor's	
	(1)	(2)	(3)	(4)	(5)	(6)
Mean	5.490	4.175	4.872	4.656	6.970	5.052
Student loan (0/1)	0.250	-0.528	-0.277	-0.658	-0.370	0.261
	(0.404)	(0.915)	(0.816)	(1.853)	(0.602)	(1.481)
Ln real loan balance at 25	-0.002	0.106	0.065	-0.020	-0.020	0.008
	(0.042)	(0.098)	(0.095)	(0.222)	(0.061)	(0.152)
Log earnings at 30	0.132***	0.120***	0.094	0.096	0.020	0.017
	(0.041)	(0.042)	(0.071)	(0.078)	(0.067)	(0.068)
Number of years plan offered	0.238***	0.245***	0.286***	0.224***	0.275***	0.334***
	(0.035)	(0.045)	(0.057)	(0.071)	(0.062)	(0.090)
(Loan) x (Years plan offered)		0.112		0.041		-0.116
		(0.142)		(0.275)		(0.236)
(Ln(loan)) x(Years plan offered)		-0.020		0.013		-0.003
		(0.015)		(0.033)		(0.024)
Sample size	1,472	1,420	468	422	565	564
R^2	0.098	0.116	0.140	0.152	0.094	0.130

Notes: Dependent variable is the log of retirement assets. Students' variables are measured as of age 30. Regressions also include degree earned (in full-sample regressions), college quality measures, parental background, ASVAB score, earnings, gender, marital status, presence of children, race, and Hispanic ethnicity. *** p<0.01.
Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Table 11. *Regression Results with a Quadratic Function of the Student Loan Balance*

	Student loan	Loan balance	Loan balance squared	N and R2
Participation - all	0.109*	0.003	-0.002	3074
	(0.065)	(0.028)	(0.002)	0.161
Participation - no degree	0.040	0.287*	-0.049	1293
	(0.122)	(0.149)	(0.032)	0.136
Participation - bachelors	-0.014	0.048	-0.009	978
	(0.121)	(0.062)	(0.007)	0.127
Participation | ever offered - all	0.133*	0.007	-0.001	2626
	(0.070)	(0.030)	(0.002)	0.145
Participation | ever offered - no degree	0.091	0.288*	-0.052	1025
	(0.133)	(0.160)	(0.034)	0.125
Participation | ever offered - bachelors	-0.031	0.075	-0.010	876
	(0.131)	(0.066)	(0.007)	0.129
Assets - all	0.084	-0.113	0.013	1420
	(0.278)	(0.155)	(0.016)	0.096
Assets - no degree	-0.206	0.598	-0.155	422
	(0.623)	(0.820)	(0.201)	0.115
Assets - bachelors	-0.526	0.021	-0.001	564
	(0.424)	(0.231)	(0.029)	0.101

Notes: Dependent variable is the log of retirement assets. Students' variables are measured as of age 30. Regressions also include degree earned (in full-sample regressions), college quality measures, parental background, ASVAB score, earnings, gender, marital status, presence of children, race, and Hispanic ethnicity. * $p<0.1$.
Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Table 12. *Regression Results among Unmarried Individuals*

	All	No degree	Bachelor's
	(1)	(2)	(3)
Participation			
Mean	0.378	0.259	0.502
Student loan (0/1)	0.052	0.262	0.127
	(0.154)	(0.251)	(0.256)
Ln real loan balance at 25	0.005	-0.024	-0.004
	(0.016)	(0.030)	(0.026)
Sample size	1,437	634	470
R^2	0.170	0.152	0.143
Participation | Offer			
Mean	0.446	0.324	0.561
Student loan (0/1)	0.065	0.214	0.202
	(0.170)	(0.296)	(0.285)
Ln real loan balance at 25	0.008	-0.009	-0.010
	(0.018)	(0.035)	(0.029)
Sample size	1,168	472	408
R^2	0.151	0.130	0.157
Log assets			
Mean	7.287	6.763	7.848
Student loan (0/1)	-0.867	-2.435*	-0.734
	(0.676)	(1.314)	(0.966)
Ln real loan balance at 25	0.119*	0.418***	0.002
	(0.071)	(0.162)	(0.097)
Sample size	517	160	220
R^2	0.111	0.193	0.154

Note: Regressions also include all controls from previous models.
Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Table 13. *Earnings and Hours Worked Regressions*

	All	No degree	Bachelor's
	(1)	(2)	(3)
Log real earnings at age 30			
Mean	8.998	8.230	9.722
Student loan (0/1)	0.601**	0.427	0.376
	(0.246)	(0.470)	(0.341)
Ln real loan balance at 25	-0.024	0.025	-0.060*
	(0.026)	(0.057)	(0.035)
Sample size	3,093	1,301	984
R^2	0.184	0.189	0.171
Hours worked at age 30			
Mean	36.308	33.331	38.693
Student loan (0/1)	1.848*	3.248*	1.535
	(1.064)	(1.928)	(1.619)
Ln real loan balance at 25	0.052	-0.004	0.016
	(0.114)	(0.233)	(0.164)
Sample size	3,093	1,301	984
R^2	0.332	0.365	0.257

Notes: Regressions also include all controls from previous models. ** p<0.05, * p<0.1.
Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Figure 1a. *Retirement Plan Participation by Degree Status and Student Loan Status*

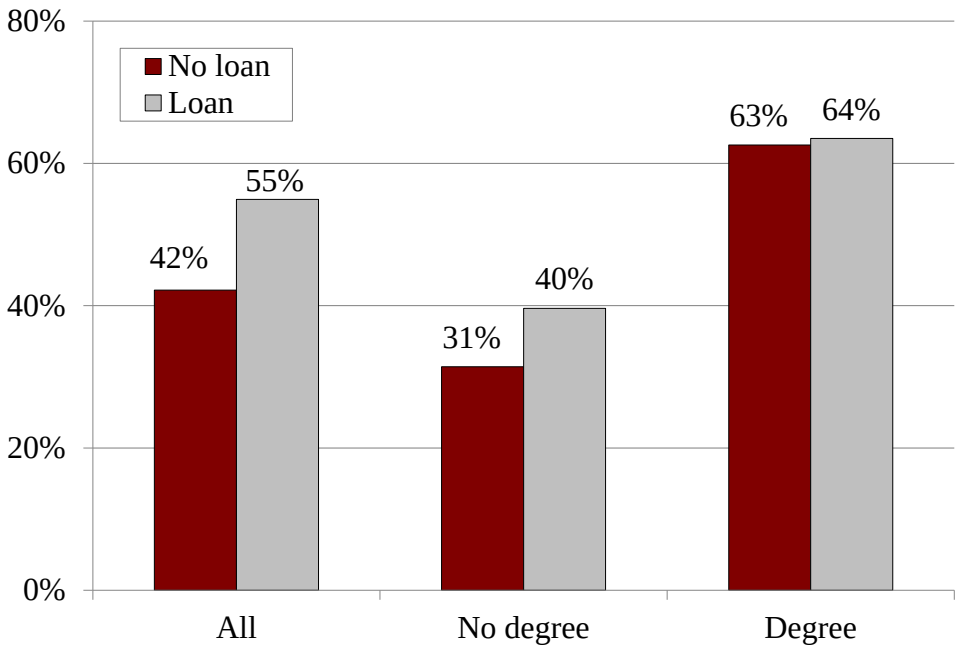
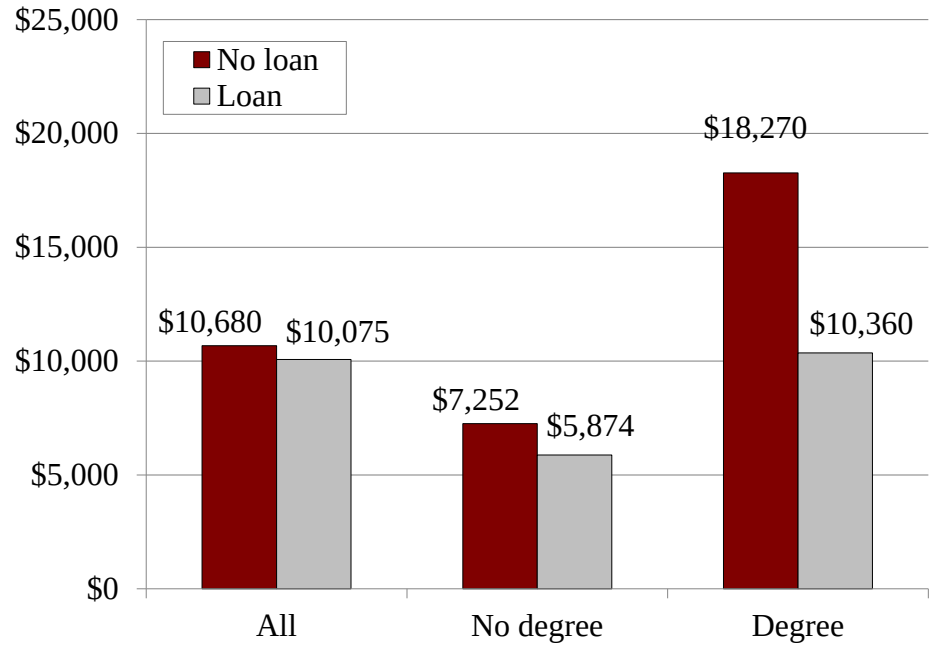


Figure 1b. *Median Retirement Assets by Degree Status and Student Loan Status*



Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

Figure 2a. *Retirement Plan Participation Rate by Student Loan Amount and Degree Status*

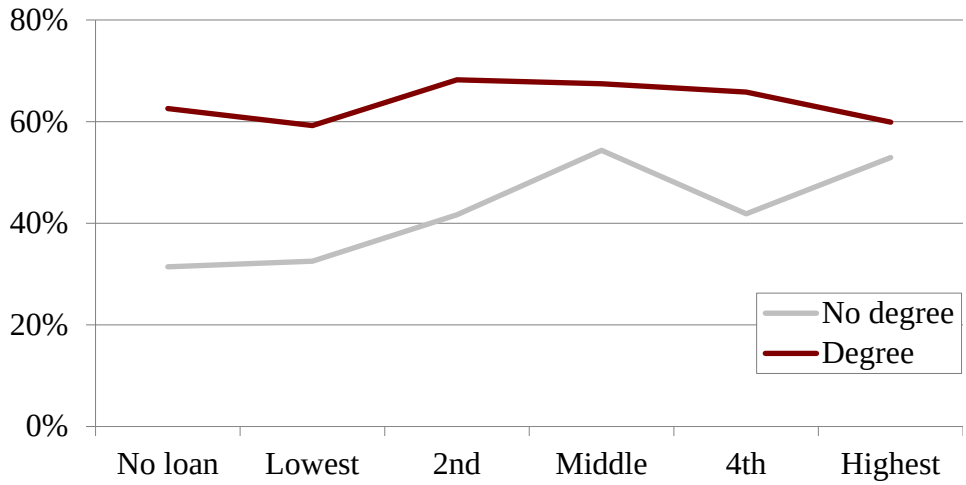


Figure 2b. *Median Retirement Assets by Student Loan Amount and Degree Status*

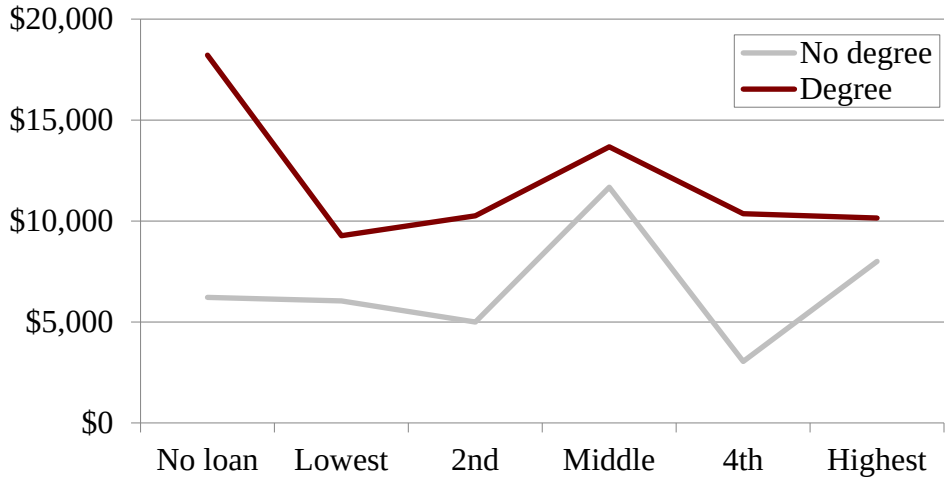
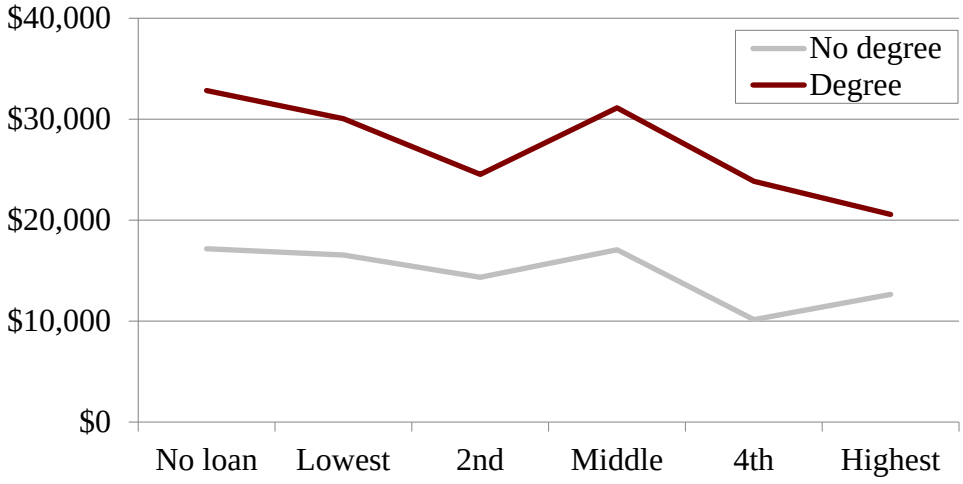


Figure 2c. *Average Retirement Assets by Student Loan Amount and Degree Status*



Source: National Longitudinal Survey of Youth 1997 Cohort, 1997-2013.

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