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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 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, especially for younger workers. 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 is small, and the analysis can rule out any substantial negative relationship.
- Bachelor's degree-holders who have student loans have significantly lower retirement assets at age 30 than those without loans, indicating that having a student loan payment each month reduces retirement plan contribution rates.
- The actual size of the student loan does not seem to matter – those with student loans have lower retirement savings, but retirement wealth accumulation is similar for those with small loans and large loans.

The policy implications of this paper are:

- College graduates seem to reduce savings in the presence of debt regardless of its size, indicating that policies that reduce student loan burdens or tie loan balances to income will be ineffective at helping graduates increase retirement saving as long as the loans remain outstanding.
- Instead, policymakers may find it more effective to focus on helping graduates with manageable balances determine what they can afford to save, while helping to put their student debt in perspective.
- While the presence of student loans seems to loom large in the minds of the cohort examined in this paper (born 1980-1984), more recent cohorts are even more likely to have loans, which will likely suppress retirement wealth accumulation even further.

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, especially at younger ages, 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.

[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 most other observable characteristics.

The results indicate that young workers with student loans are just as likely to *participate* in retirement plans as those without loans, perhaps because they are passive savers auto-enrolled into plans. But college graduates with debt actually *accumulate* only half as much in retirement assets by age 30 than graduates with student debt. Interestingly, young workers with bachelor's degrees seem to respond to the mere presence of a student loan, but not the amount of debt – those with small and large loans accumulate similar retirement asset levels. For those that attend college and do not graduate, participation rates and retirement wealth accumulation are similar whether or not they had student debt.

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 college graduates with loans are just as likely to save for retirement, but their lower monthly contributions result in less retirement wealth accumulation by age 30.

Previous Literature

This study builds off of the few previous research 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 headed by respondents as old as 60, 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 early in their lives.[3]

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.[4] This reduction, in turn, cuts into assets that would be available to support oneself in retirement. However, Houle and Berger (2015) find no association between student debt and homeownership rates. Their

[3] Other researchers have noted that while it would be useful to examine the impact of student loan debt on individuals over the entire lifespan, the problem is too recent to provide adequate data. Instead, Hiltonsmith (2013) and Munnell, Hou, and Webb (2016) both lay out examples of how typical 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.

[4] Chiteji (2007); Brown and Caldwell (2013); Cooper and Wang (2014); Gicheva and Thompson (2015).

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 non-financial 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.[5] To our knowledge, however, no study has found a natural experiment accompanied by the necessary data to compare post-graduation retirement savings by student debt levels.

Data

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

[5] 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.

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.[6] 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.[7] To ensure that the results are not driven by the fact that the outcome variable is based on couples while 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 the institution(s) where the respondent attended college. The public-use NLSY97 includes an indicator for 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 fare worse in their early-career labor market outcomes (Deming, Goldin, and Katz 2012).[8] This project also used restricted data on the specific institution(s) attended that allow for merging in more detailed measures of college

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[6] 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.

[7] 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.

[8] 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.

quality from U.S. Department of Education's Integrated Post-Secondary Education Data System (IPEDS).

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 for a comparable age range. 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.[9]

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 outstanding loan balances affect retirement saving (adjusted for inflation, using the Current Price

[9] 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.

Index, in 2013 dollars), the sample is split into either terciles or quintiles, with individuals without loans as a separate category.

The analysis also estimates 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 has worked 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. The participation and take-up models are estimated as linear probability models, though the marginal effects from probit models are similar to the reported results. The asset model is estimated as a quantile regression at the median, though results are qualitatively similar with a log-linear regression.[10]

$$Y_{i,30} = \alpha_0 + \alpha_1 AnyLoan_{i,25} + \alpha_2 LoanBal_{i,25} + X'_{i,30}\beta + D'_{i,30}\delta \qquad (1)$$
$$+ \alpha_3 Auto_i + SQ'_i\gamma + P'_i\theta + \psi ASVAB_i + \tau_{i,30} + \varepsilon_{i,30}$$

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 $LoanBal_{i,25}$ is the that loan balance (in thousands of 2013 dollars).[11] A negative α_1 would indicate that the presence of 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. In addition, each

[10] A Q-Q plot of the log-linear regression indicates that the residuals are not normally distributed. The advantage of the median regression is that it does not involve an assumption of normality. The results are also similar with the median asset level – that is, not its natural logarithm – as the dependent variable, but the results for the log results are shown because elasticities are easier to interpret.

[11] In some specifications, the natural logarithm of the loan balance is included instead. 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.

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.[12] 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. Advanced degree recipients are excluded from the subgroup analysis because they may be more likely to have loans while having had less time to accumulate retirement wealth.

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).

Two of these controls are at least partially derived from government reports. One is $Auto_i$, the share of workers in worker i's industry that are automatically enrolled in their firm's 401(k) plan.[13] This variable is derived from U.S. Department of Labor Form 5500, where retirement plan sponsors detail the characteristics of their plan offerings. A positive coefficient – as expected – indicates that workers in industries where auto-enrollment is more common have greater participation in retirement plans and greater assets when participating. Furthermore, in all specifications, X'_i includes a categorical variable for firm size; this variable captures the

[12] 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.

[13] $Auto_i$ is the weighted average of the auto-enrollment share of each industry where the worker was observed between ages 22 and 30, where the weights are their duration in that job. The auto-enrollment share is calculated separately for firms of 100 or fewer employees vs. more than 100 employees.

expectation that larger firms are more likely to offer auto-enrollment, which encourages participation and saving.[14]

The other is the vector SQ_i, which captures school quality. This vector includes indicators for public, private non-profit, and private for-profit status of the main institution attended. The vector also includes separate indices of the quality of the NLSY respondent's undergraduate and, if applicable, graduate institution, calculated using the same methodology as Dillon and Smith (2017).[15] Each index is calculated from a principal components analysis that includes the college's mean SAT score of entering students, the application rejection rate, the faculty-student ratio, and the average salary of instructional faculty. These data come from the National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS), collected from government reports submitted by colleges and universities.

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.[16] 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.

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

[14] Celis (2010).
[15] The authors are grateful to Eleanor Dillon for sharing their code for the college quality index. In cases where the NLSY respondent attended multiple undergraduate (or graduate) institutions, the index is the weighted average of the institutions' scores, where the weights are the number of years attending each school.
[16] The model also includes dummies to account for missing values for each parent variable.

non-retirement assets for non-graduates with and without student loans is small, and even going the opposite 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 $18,270, almost double the $10,360 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 $35,000 for graduates without loans, compared to nearly $26,000 for graduates with loans.[17]

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 (Figure 2a), the participation rate with respect to the size of the loan hovers between 60 and 70 percent, but without the downward trend expected as balances increase. Reinforcing the results for Figure 1,

[17] 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.

non-graduates with larger student loans are actually more likely to participate than those with small loans or no loan at all, but these differences are not statistically significant.

Figure 1 suggests 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 appear to matter. The median asset level is almost exactly the same (about $10,000) for the lowest and the two highest quintiles, though the 2nd-lowest quintile has a median of almost $15,000. The one group that is clearly different is college graduates with no loan. 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).

Figures 1 and 2 indicate that the presence of loans seems to matter, at least among college graduates, yet the evidence that the magnitude of college loans put a damper on retirement saving is weak. Of course, these results may reflect differences in personal and school characteristics between those with and without loans. 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-income parents, 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).

College graduates with heavy student loan burdens – an average of $47,000 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; their results suggest 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 both their undergraduate and graduate institutions score higher on the quality index. Interestingly, however, the high-loan tercile is also 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 are higher than the tercile with the smallest (positive) loans.

For non-graduates, the sample sizes for those with loans are small,[18] but the highest loan tercile earns the highest salary, grew up in the most-educated and highest-income households, 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. As with graduates, the most-indebted non-graduates are most likely to have attended a private non-profit college, and their institutions score higher on the quality index, but those with the most debt are also the most likely to have attended a for-profit school. 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, the share of firms in the worker's industry that auto-enroll employees in retirement plans, firm size categories, and demographic controls.

Counterintuitively, respondents with student loans in the first column are 9.5 percentage points more likely to have participated in an employer retirement plan, or about one-fifth of the average participation rate. Adding the real level of the outstanding student loan balance reduces this coefficient only slightly. In specification (3), where the natural logarithm of the outstanding balance is included instead, the coefficient on student loan falls loses its significance. In this case, the unexpected result is that the log balance itself is positive and statistically significant, though quite small: a 1-percent increase in the loan balance increases retirement participation by only 0.8 percentage points, on a mean of 47.5 percent. Whether the balance is included as a level or a log, however, does not appear to change the conclusion: student loans appear to be associated with *more* retirement plan participation, not less.

[18] The bottom tercile has more observations than the middle and top tercile because of ties.

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 the size of the debt and retirement plan participation. The regression model in the fourth column adds controls for degrees earned, as well as 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, therefore, any large negative correlations between student debt and retirement plan participation.

The other results in the final specification of Table 5 are largely in keeping with expectations. Higher earners; workers in industries with high auto-enrollment rates; 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 and the college quality indices are small and statistically insignificant.[19]

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). The coefficients are slightly larger in magnitude for non-graduates, but in all four columns the student loan variables are statistically insignificant. Even without statistically significant estimates, we can rule out any large negative association between having a student loan and retirement plan participation – specifically, no negative effect in excess of 1.7-2.2 percent for non-graduates, or 3.9-5.6 percent for graduates.

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

[19] 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.

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.[20]

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 student loans are more likely to take up an offer of a retirement plan. The relationship between the loan balance and take-up of retirement plan offers is minuscule and statistically insignificant for the full sample, and for both non-graduates and those with bachelor's degrees. As with unconditional participation rates, retirement plan take-up rates are clearly not lower among those with student loans.

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 median regressions exclude individuals without retirement accounts. As suggested by the unconditional medians in Figure 2b, the results provide no evidence that greater student loan balances are associated with lower retirement wealth accumulation – the magnitudes are small, and none of the estimates is statistically significant.

The presence of student loans, however, is associated with lower retirement asset accumulation for bachelor's degree-holders. Student debtors with a 4-year degree have about 65 percent less retirement wealth at age 30 than similar individuals without loans, after accounting for their personal characteristics, as well as more detailed information on college quality, parents' background, and ASVAB scores. This coefficient is actually somewhat larger than the 43-percent difference in the descriptive statistics in Figure 1b that do not adjust for differences between debtors and non-debtors.

Figure 3 shows the implied difference between non-debtors and debtors at the 25th, 50th, and 75th percentiles of the student debt distribution, based on the regression results (for the full specification) for graduates with only bachelor's degrees versus those who went to college but did not graduate. By these estimates, non-graduates accumulate very little retirement wealth by age 30, regardless of their student loan status (and the estimates are not statistically significantly different from each other). For graduates, however, the presence of debt matters greatly: those

[20] 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.

without debt accumulate $18,200 in retirement assets by age 30, twice as much as graduates with debt. But the level of the debt does not appear to matter: debtors with small, medium, and large loans all accumulate about $9,000 by age 30.

This result holds regardless of how student loans are accounted for by the regression. Table 9 shows the results for graduates with only bachelor's degrees for three different specifications: (1) only including an indicator variable for the presence of a student loan; (2) adding the level of the loan (i.e., repeating the results from columns (5) and (6) of Table 8 for comparison); and (3) instead of the level, including the natural logarithm of the real student loan balance. In each case, the magnitude of the student loan indicator's coefficient is large and fairly consistent. The one exception is the fully-specified model including the log balance, but the version of that model that does not include the additional controls – which do not change the results appreciably in any other specification – has a coefficient on the student loan indicator that is similar in magnitude to the other results, but with a larger standard error.[21] The large, negative coefficient on the loan indicator persists in other specifications, as well: when the loan balance is a quadratic; when earnings are also included in levels instead of logs; and when the sample is trimmed to eliminate the top and bottom 2 or 5 percent, or just the top 2 or 5 percent.

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 with access to a retirement plan to the regressions in Table 10. The number of years a plan is offered is positively and statistically significantly related to retirement wealth accumulation, as expected. But the student loan measures' coefficients are similar to the results in Table 8, and interactions between the number of years of plan access and the loan measures are small and statistically insignificant.

[21] Q-Q plots indicate that the loan balance is neither normally distributed nor log-normally distributed. The fact that the asset regressions are estimated at the median, rather than the mean, helps to account for the long right tail in the distribution. The choice of specifications does not alter Figure 3: the estimates using the log of student loans also show twice as much retirement wealth for graduates without debt compared to those with debt, though the confidence intervals would be wider.

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 11 limits the sample to unmarried individuals, and the coefficients are similar in magnitude to the full sample estimates in Tables 5-8, but the larger standard errors due to the small sample size make none of the results statistically significant.

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 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.

This study finds that bachelor's degree-holders with student loans accumulate less in retirement wealth by age 30 than graduates without loans, though those with large and small loans accumulate similar amounts. At the same time, the results 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. Together, these results imply that college graduates with loans are indeed saving for retirement, but at lower contribution rates or with a greater degree of leakage.[22] And, interestingly, their decision to contribute less appears unrelated to the size of the loan payment, but instead reflects the mere fact that they have to make a payment each month.[23]

The results suggest that reforms aimed at making student debt more manageable may prove ineffective at increasing retirement saving among young workers. These reforms, such as tying student loan payments to income, may leave more room in the budget for contributing to

[22] The NLSY97 does not include direct information on 401(k) contribution rates.
[23] The finding of a relationship between retirement wealth and the presence of a loan, but not its magnitude, is in line with Elliott, Grinstein-Weiss, and Nam (2013).

retirement plans. But the results suggest that student debtors are not making their contribution decision based on what they can afford, but on the mere presence of the loan. In fact, if income-based repayment lengthens the loans' term, it may actually set student debtors even further back – they will wait that much longer to begin saving in earnest. Instead, policymakers may find it more effective to focus on helping graduates with manageable balances determine what they can afford to save, while helping to put their student debt in perspective.

The cohort studied here, however, are just ahead of the large run-up in student debt. In more recent cohorts, student debt has become more common, and outstanding loan balances larger. For example, between 2003 and 2012, the share of students with no debt dropped from 35 to 30 percent while the share of those with cumulative debt above $40,000 increased from 2 to 18 percent (Wine, Bryan, and Siegel 2013). The results in this paper suggest that college graduates will prioritize student loans over retirement saving. Moreover, if their loan payments are much larger than the cohorts studied in this paper, they may have to begin compensating by not only reducing their retirement contribution rates – as the cohort studied here seems to have done – but by not participating altogether. This effect could put student debtors on an even more vulnerable financial trajectory.

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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 Study 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 Study 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	27,729		12,006	
	Median	21,640		8,092	
Debt excluding student loans					
At age 25	Mean	6,473	7,923	6,128	7,905
	Median	2,393	3,000	2,215	2,000
At age 30	Mean	12,461	10,674	9,771	8,636
	Median	7,500	3,000	4,500	1,750
Non-retirement assets	Mean	19,378	36,112	8,193	7,777
	Mean > 0	19,974	38,239	11,051	10,539
	Median	5,140	13,380	715	700
	Median > 0	6,050	15,231	2,000	2,000
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
	N	783	725	319	1,376

Notes: “Mean > 0” is the mean among respondents with positive assets; “Median > 0” is similar.
Source: National Longitudinal Study 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	5,636	17,007	46,960
Retirement plan	0.623	0.640	0.649	0.634
Retirement plan amount	20,734	18,660	17,280	13,697
Earnings	47,931	42,116	43,057	45,434
Share of industry autoenrolled	0.058	0.058	0.057	0.058
Firm size	575	498	560	690
Public institution	0.653	0.687	0.662	0.601
Private non-profit institution	0.281	0.240	0.273	0.293
For-profit institution	0.066	0.073	0.065	0.107
Undergraduate quality index	35.217	33.903	35.096	35.746
Graduate quality score	17.358	12.709	16.953	20.039
Mom with college degree or more	0.453	0.379	0.340	0.317
Dad with college degree or more	0.503	0.417	0.392	0.333
Parents' income when respondent is 18	83,017	57,807	71,808	65,657
ASVAB before college	3.920	3.693	3.915	3.892
Male	0.461	0.441	0.406	0.367
Married	0.641	0.605	0.588	0.625
Any kids	0.396	0.408	0.436	0.365
Black	0.133	0.188	0.196	0.269
Asian	0.049	0.047	0.025	0.033
Hispanic	0.075	0.101	0.063	0.069
Other race	0.016	0.013	0.021	0.033
Number of years plan offered	4.502	4.895	5.198	4.805
Sample size	725	152	293	338

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	4,441	16,514	36,601
Retirement plan	0.315	0.353	0.466	0.512
Retirement plan amount	5,389	4,592	8,543	4,710
Earnings	25,495	26,261	29,671	33,269
Share of industry autoenrolled	0.050	0.057	0.069	0.048
Firm size	725	944	219	462
Public institution	0.792	0.738	0.635	0.500
Private non-profit institution	0.060	0.082	0.129	0.310
For-profit institution	0.148	0.180	0.235	0.190
Undergraduate quality index	8.933	19.956	23.611	27.732
Mom with college degree or more	0.112	0.138	0.195	0.184
Dad with college degree or more	0.149	0.149	0.176	0.200
Parents' income when respondent is 18	35,110	34,004	42,826	59,333
ASVAB before college	2.573	2.887	3.364	3.105
Male	0.493	0.423	0.489	0.500
Married	0.736	0.624	0.655	0.707
Any kids	0.549	0.604	0.453	0.585
Black	0.313	0.451	0.357	0.308
Asian	0.015	0.016	0.024	0.026
Hispanic	0.132	0.055	0.071	0.026
Other race	0.024	0.016	0.000	0.000
Number of years plan offered	3.580	4.370	4.534	3.762
Sample size	1,376	189	88	42

Source: National Longitudinal Study 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)	0.095***	0.091***	0.030	0.053**
	(0.016)	(0.020)	(0.039)	(0.021)
Real loan balance at 25 ($1,000s)		0.000		-0.001
		(0.001)		(0.001)
Ln real loan balance at 25			0.008*	
			(0.004)	
Log earnings at 30	0.025***	0.025***	0.025***	0.020***
	(0.002)	(0.002)	(0.002)	(0.003)
Share of industry auto-enrolled	0.273***	0.269***	0.270***	0.252**
	(0.099)	(0.099)	(0.099)	(0.099)
Associate degree				0.057**
				(0.026)
Bachelor's degree				0.152***
				(0.024)
Advanced degree				0.197***
				(0.037)
Public institution				0.052**
				(0.026)
Private institution				0.048
				(0.032)
Undergrad quality index				0.000
				(0.001)
Graduate quality index				-0.001
				(0.001)
Mom had degree				0.028
				(0.023)
Dad had degree				-0.007
				(0.023)
Parents' income at 18 ($10k)				0.003*
				(0.001)
ASVAB score				0.040***
				(0.008)
Sample size	3,336	3,313	3,313	3,074
R^2	0.170	0.171	0.172	0.204

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

Table 6. *Retirement Plan Participation Regression Results, by Degree Status*

	No degree		Bachelor's	
	(1)	(2)	(3)	(4)
Mean	0.334	0.350	0.609	0.611
Student loan (0/1)	0.049	0.049	0.035	0.017
	(0.034)	(0.037)	(0.037)	(0.037)
Real loan balance at 25 ($1,000s)	0.003	0.003	-0.001	-0.001
	(0.002)	(0.002)	(0.001)	(0.001)
Log earnings at 30	0.020***	0.020***	0.020***	0.019***
	(0.003)	(0.003)	(0.005)	(0.005)
Share of industry autoenrolled	0.365**	0.431***	0.129	0.109
	(0.159)	(0.167)	(0.163)	(0.163)
Public institution		0.052		0.118*
		(0.036)		(0.060)
Private institution		0.094*		0.100
		(0.057)		(0.066)
Undergrad quality index		-0.001		0.000
		(0.002)		(0.002)
Mom had degree		-0.004		0.013
		(0.042)		(0.036)
Dad had degree		-0.011		-0.030
		(0.042)		(0.037)
Parents' income at 18 ($10k)		0.010***		0.002
		(0.003)		(0.002)
ASVAB score		0.016		0.059***
		(0.012)		(0.015)
Sample size	1,508	1,293	985	978
R^2	0.155	0.169	0.125	0.163

Notes: Students' variables are measured as of age 30. Regressions also include gender, marital status, presence of children, race, Hispanic ethnicity, firm size, and birth cohort dummies. *** p<0.1, ** p<0.05, * p<0.1.
Source: National Longitudinal Study 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)	0.091***	0.057**	0.069*	0.069	0.038	0.022
	(0.022)	(0.023)	(0.039)	(0.042)	(0.039)	(0.039)
Real loan balance at 25 ($1,000s)	0.001	0.000	0.002	0.002	-0.001	0.000
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Log earnings at 30	0.027***	0.021***	0.021***	0.021***	0.029***	0.025***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.006)	(0.006)
Share of industry auto-enrolled	0.310***	0.297***	0.470**	0.607***	0.259	0.235
	(0.114)	(0.114)	(0.208)	(0.220)	(0.184)	(0.183)
Includes college quality, parental characteristics, and ASVAB	No	Yes	No	Yes	No	Yes
Sample size	2,804	2,626	1,184	1,025	881	876
R^2	0.153	0.188	0.142	0.167	0.120	0.165

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

Table 8. *Asset Regressions*

	All		No degree		Bachelor's	
	(1)	(2)	(3)	(4)	(5)	(6)
Mean	7.663	7.712	6.949	7.016	8.237	8.234
Student loan (0/1)	-0.008	-0.110	0.084	0.100	-0.638***	-0.647**
	(0.201)	(0.197)	(0.535)	(0.560)	(0.231)	(0.269)
Real loan balance at 25 ($1,000s)	-0.002	-0.006	-0.028	-0.041	0.004	0.002
	(0.005)	(0.005)	(0.029)	(0.030)	(0.007)	(0.008)
Log earnings at 30	0.261***	0.280***	0.533***	0.543***	0.092**	0.092**
	(0.035)	(0.034)	(0.072)	(0.078)	(0.039)	(0.046)
Share of industry auto-enrolled	0.265	0.090	2.236	0.850	-0.262	-0.281
	(1.016)	(0.953)	(2.393)	(2.435)	(1.091)	(1.263)
Associate degree		0.107				
		(0.273)				
Bachelor's degree		0.453*				
		(0.243)				
Advanced degree		0.592*				
		(0.349)				
Public institution		0.148		-0.309		0.206
		(0.280)		(0.605)		(0.483)
Private institution		0.219		-0.056		0.210
		(0.331)		(0.904)		(0.513)
Undergrad quality index		-0.002		0.015		0.007
		(0.010)		(0.037)		(0.013)
Graduate quality index		0.002				
		(0.013)				
Mom had degree		0.017		0.289		0.046
		(0.208)		(0.612)		(0.246)
Dad had degree		0.055		-0.018		0.303
		(0.210)		(0.621)		(0.251)
Parents' income at 18 ($10k)		0.021		0.015		0.000
		(0.013)		(0.040)		(0.000)
ASVAB score		0.122		0.039		0.168
		(0.371)		(0.752)		(0.114)
Sample size	1,486	1,434	473	427	569	568

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

Table 9. *Asset Regressions for Graduates with Bachelor's Degrees, With Different Student Loan Measures*

	(1)	(2)	(3)	(4)	(5)	(6)
Mean	8.216	8.213	8.237	8.234	8.237	8.234
Student loan (0/1)	-0.503***	-0.562***	-0.638***	-0.647**	-0.663	-0.368
	(0.188)	(0.207)	(0.231)	(0.269)	(0.434)	(0.480)
Real loan balance at 25 ($1,000s)			0.004	0.002		
			(0.007)	(0.008)		
Ln real loan balance at 25					0.014	-0.022
					(0.044)	(0.048)
Log earnings at 30	0.103**	0.085*	0.092**	0.092**	0.079*	0.094**
	(0.040)	(0.044)	(0.039)	(0.046)	(0.040)	(0.044)
Share of industry autoenrolled	-0.270	-0.658	-0.262	-0.281	-0.133	-0.258
	(1.112)	(1.206)	(1.091)	(1.263)	(1.108)	(1.225)
Includes college quality, parental characteristics, and ASVAB	No	Yes	No	Yes	No	Yes
Sample size	569	568	569	568	569	568

Notes: Dependent variable is the log of retirement assets. Students' variables are measured as of age 30. Regressions also include gender, marital status, presence of children, race, Hispanic ethnicity, firm size, and birth cohort dummies.
Source: National Longitudinal Study 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	6.020	5.068	3.209	3.112	8.624	6.621
Student loan (0/1)	-0.054	-0.124	0.095	0.311	-0.597**	-0.453
	(0.188)	(0.410)	(0.579)	(1.390)	(0.237)	(0.569)
Real loan balance at 25 ($1,000s)	0.001	-0.005	-0.029	-0.111	0.002	0.004
	(0.005)	(0.011)	(0.032)	(0.069)	(0.007)	(0.017)
Log earnings at 30	0.234***	0.187***	0.496***	0.441***	0.017	-0.033
	(0.034)	(0.034)	(0.080)	(0.091)	(0.043)	(0.045)
Number of years plan offered	0.181***	0.187***	0.159**	0.123	0.203***	0.221***
	(0.029)	(0.036)	(0.065)	(0.083)	(0.039)	(0.059)
(Loan) x (Years plan offered)		-0.003		-0.038		-0.002
		(0.065)		(0.197)		(0.094)
(Loan balance) x (Years plan offered)		0.000		0.014		0.000
		(0.002)		(0.011)		(0.003)
Sample size	1,486	1,434	473	427	569	568

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, auto-enrollment share, gender, marital status, presence of children, race, Hispanic ethnicity, and birth year dummies.
Source: National Longitudinal Study of Youth 1997 Cohort, 1997-2013.

Table 11. *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)	0.011	0.019	0.019
	(0.031)	(0.047)	(0.057)
Real loan balance at 25 ($1,000s)	-0.001	0.001	0.000
	(0.001)	(0.003)	(0.002)
Sample size	1,437	634	470
R^2	0.210	0.166	0.192
Participation | Offer			
Mean	0.446	0.324	0.561
Student loan (0/1)	0.026	0.043	0.030
	(0.035)	(0.061)	(0.061)
Real loan balance at 25 ($1000s)	-0.001	0.001	-0.001
	(0.001)	(0.003)	(0.002)
Sample size	1,168	472	408
R^2	0.201	0.157	0.212
Log assets			
Mean	7.217	6.721	7.742
Student loan (0/1)	0.069	0.617	-0.700
	(0.396)	(1.325)	(0.649)
Real loan balance at 25 ($1000s)	-0.010	-0.080	0.005
	(0.012)	(0.076)	(0.018)
Sample size	522	161	223

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

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

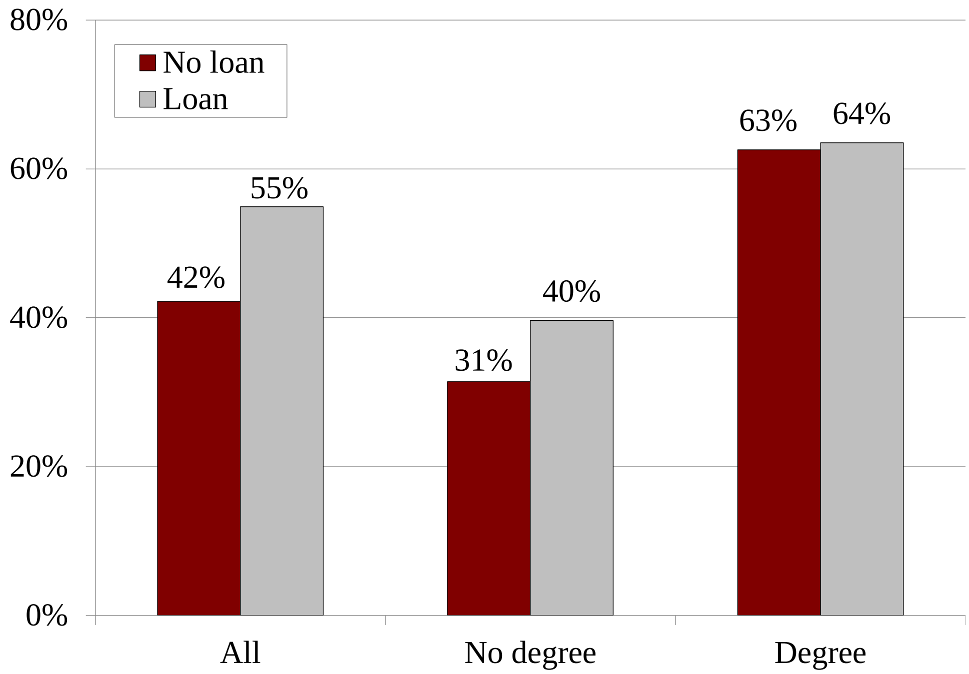
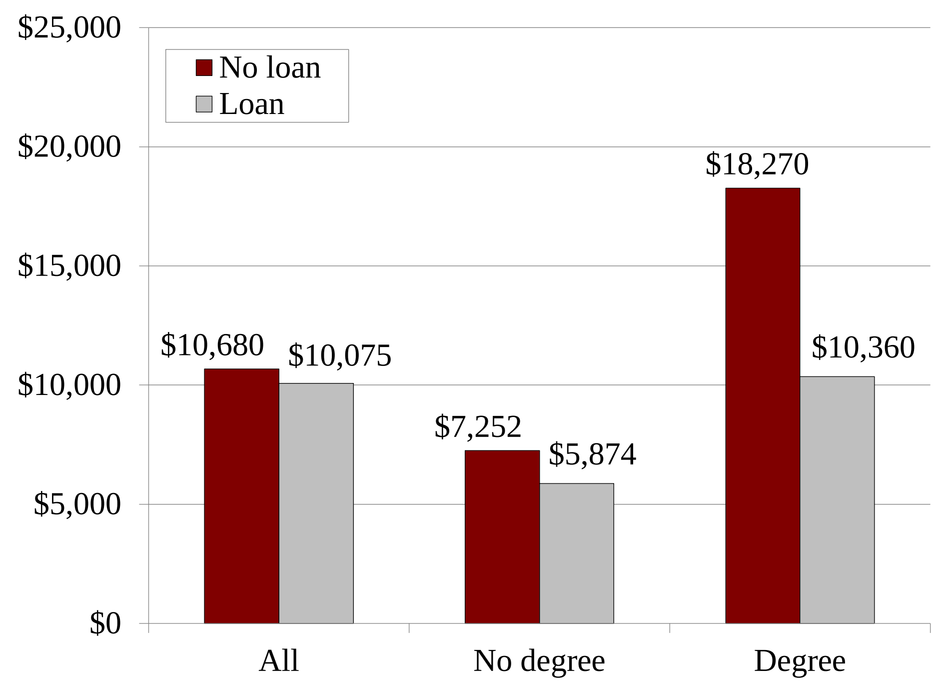


Figure 1b. *Median Retirement Assets by Degree Status and Student Loan Status*



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

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

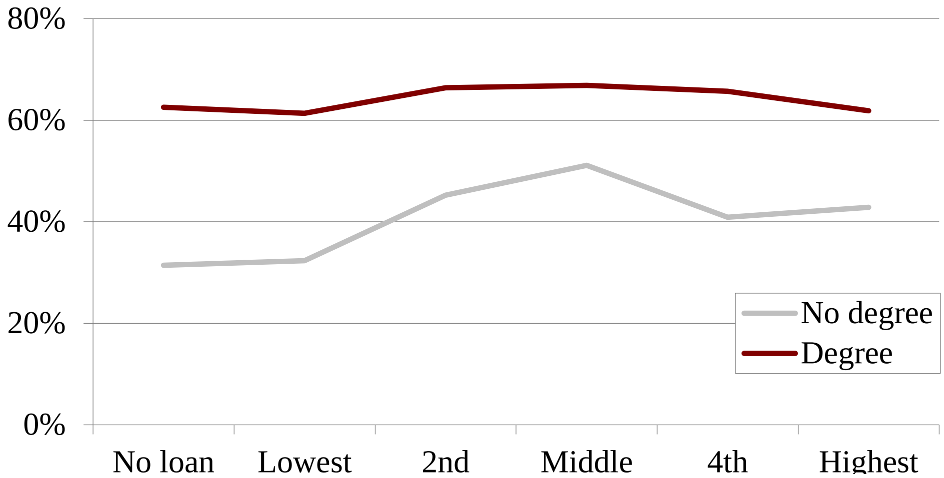


Figure 2b. *Median Retirement Assets by Student Loan Amount and Degree Status*

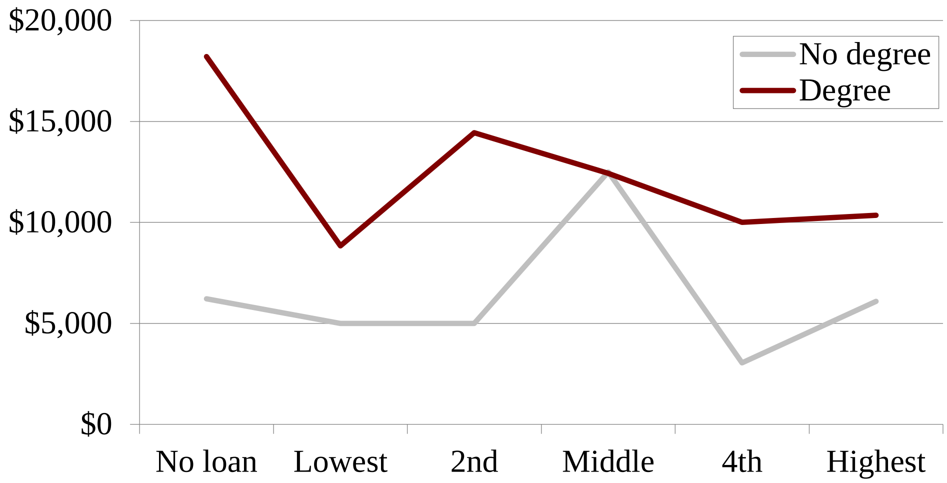
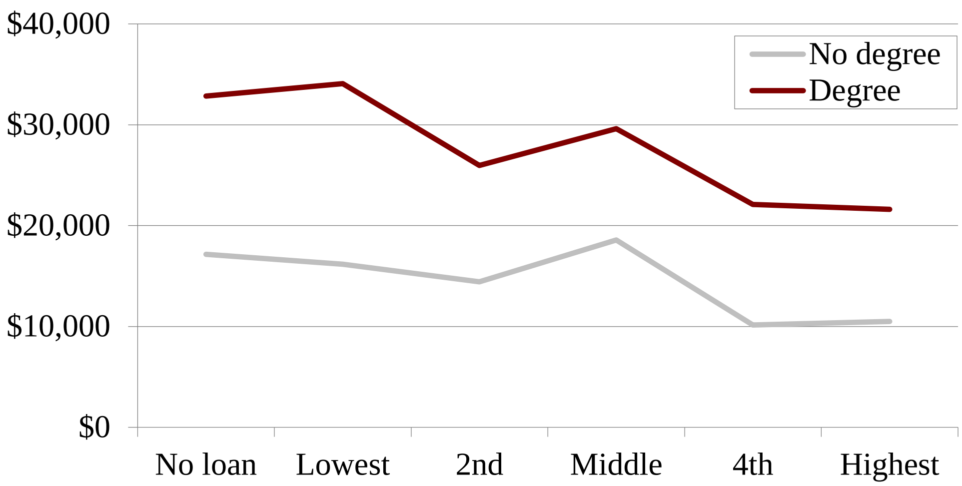
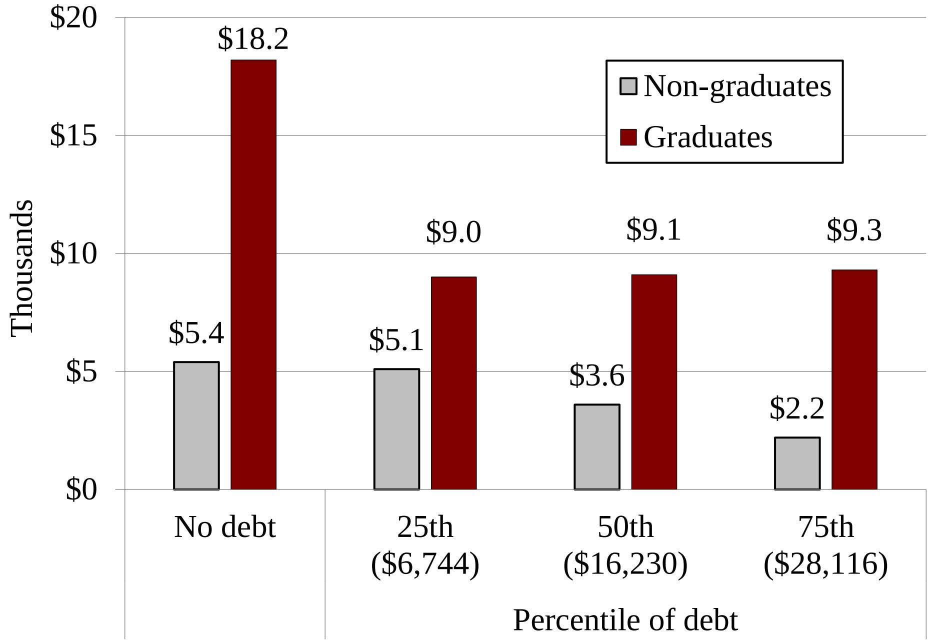


Figure 2c. *Average Retirement Assets by Student Loan Amount and Degree Status*



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

Figure 3. *Predicted Retirement Assets at Age 30, by Percentile of Student Debt*



Note: Student loan balances at the 25th, 50th, and 75th percentiles shown in parentheses.
Source: National Longitudinal Study of Youth 1997 Cohort, 1997-2013.

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