

The Effects of Student Loans on Long-Term Household Financial Stability

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1. Introduction

Student debt has been growing at a pace considerably faster than inflation, but so have the costs of and returns to postsecondary education. For full-time undergraduate students in four-year colleges and universities, the average cost, in 2012 dollars, of published tuition, fees, room and board net of grant aid and tax benefits has increased from \$7,620 to \$11,630 for public institutions and from \$17,470 to \$22,830 for private nonprofit institutions between the 1992-93 and 2011-12 academic years (College Board 2012a). Since many students use loans to supplement grant aid, it is not surprising that the average inflation-adjusted amount of federal loans per full-time-equivalent (FTE) undergraduate student has increased by over \$3,000 (in 2012 dollars) during the same period (College Board 2012b). Combined with an increase from 9 million to 14 million FTE undergraduate students and growth in graduate enrollment and costs, these trends have amounted to remarkable growth in aggregate student borrowing, even without accounting for the private loan industry and the private for-profit education sector. At the same time, there is evidence that the return to college and graduate degrees has been increasing as well during the same period, although it is more difficult to quantify the increase due to selection. Using March CPS data, Avery and Turner (2012) estimate that the discounted value of the difference in mean earnings of college graduates and high school graduates, accounting for tuition payments and a four-year delay in labor market entry, has increased by over \$100,000 in 2009 dollars over the period above. It is difficult to disentangle all of these concurrent trends and to determine based on aggregate statistics alone whether the current debt levels are excessively high or still below the efficient level.

By examining how student borrowers fare financially after graduation, we attempt to further the existing knowledge of the costs associated with education debt and the manageability of the typical debt burden. We compare the financial stability of individuals who have borrowed for education to similar individuals who have not. We show one unintended consequence of student debt that borrowers and policy makers should be mindful of: impaired access to financial markets after graduation and implied financial hardship for many borrowers. Our results, however, should be interpreted with caution because the optimal level of student debt and its repercussions vary considerably with individual ability, family background and other

characteristics. Furthermore, it is difficult to define a counterfactual outcome for a student borrower because this type of debt has impact on one's lifetime earnings stream. We show the impact of debt keeping education and other factors constant, which translates to comparing a dollar of loans to a dollar of grant aid or reduction in posted tuition and fees.

We explore further the manageability of student debt for individuals who do not complete a Bachelor's degree, for whom the net benefit of education loans is expected to be considerably lower without the boost in earnings associated with a college degree. Wei and Horn (2013) compare two cohorts of respondents from the Beginning Postsecondary Survey 1995-96 and 2003-04 six years post college entry and show a steady noncompletion rate but a pronounced increase in the student debt-to-income ratio of individuals in the sample without a degree, from 24 percent to 35 percent, as well as a substantial fraction of noncompleters with debt exceeding annual income. Our study provides more information about the financial hardship faced by this segment of borrowers.

We show that, keeping education constant, more student debt is associated with higher probability of being credit constrained, more difficulty staying current on payments on different types of debt, and greater likelihood of declaring bankruptcy. We find some evidence that homeownership rates may also be affected by education loans. Controlling for earnings tends to strengthen these relationships, which is consistent with omitted variable bias combined with a positive return to student loans. The relationship between and financial status appears to be related to current economic conditions: it weakens when we control for the unemployment rate in the county where a household resides. Households that hold student debt and include a noncompleter tend to be more credit constrained.

Student loans have undisputed value. Many high school graduates are otherwise unable to borrow against future income and would not enroll in college or persist until graduation due to credit constraints. Although there is no consensus in the literature about the fraction of high school graduates who face credit constraints when making education decisions, researchers are generally in agreement that the importance of these constraints has been increasing since the 1980s.¹ There is further evidence that some students borrow less than the optimal amount and

¹ See Lochner and Monge-Naranjo (2012) for an overview of the literature.

substitute work hours for loans, which can affect academic performance and the probability of dropping out (e.g. Stinebrickner and Stinebrickner 2003, Berkner and Cataldi 2002).

The other side of the coin is over-borrowing, which can be defined as borrowing above the efficient amount or beyond what constitutes a manageable level of debt given the obtained education. Inefficiently high borrowing can occur when students overestimate the expected returns to education² or underestimate the probability of dropping out³. Lack of full information combined with the high risk inherent in education investments can lead to financial hardship for many borrowers. Hansen and Rhodes (1988) attempt to quantify the manageable education debt level and find that in the early 1980s in California only about 4 or 5 percent of college seniors held potentially unmanageable student debt, assuming earnings roughly equal to the average starting salary for a college graduate at the time (\$20,000). The debt levels in their sample are subject to considerably less variation than what we currently observe; only 2 percent of the students they analyze accumulated more than \$16,000 in debt. Baum and Schwartz (2006) expand the analysis and point out that the manageable loan repayment to income ratio increases with household income and varies by family structure, location and other demographic characteristics. The median debt level at the time of their study, \$20,000, is manageable for a single individual whose income is at least \$30,000. However, student loans may be one area where focusing on outliers is no less important than analyzing trends around the median. According to FRBNY Consumer Credit Panel / Equifax data, while 55.5% of borrowers owed \$10,000 or less at the end of 2005, 17.7% had a balance of \$25,000 or more, with 3% owing above \$75,000 (Lee 2013). It is of course likely that many borrowers from the right tail of the debt distribution are also found in the right tail of the income distribution, for example individuals who borrowed large amounts to complete professional degree programs with large expected returns.

² For example, Avery and Kane (2004) observe this trend among Boston high school students coming from both low-income and more affluent families.

³ Avery and Turner (2012) show that in the Beginning Postsecondary Survey 2004:2009, 38% of dependent students entering college in 2003 who expect to attain a BA degree have not earned any postsecondary degree by 2009; 51% of these students end up with student loans, with the average borrower holding \$14,500 in student debt. According to analysis of the same data presented by the College Board (2012b), 5 percent of students who borrowed \$75,000 or more and 10 percent of students who borrowed between \$50,000 and \$75,000 left school without a degree by 2009.

Our paper adds to the existing literature that examines implications of student debt beyond increased educational attainment. Previous studies have analyzed the relationship between school loans and the decision to attend graduate school (Fox 1992, Schapiro, O'Malley and Litten 1991, Weiler 1994), the choice of specialty by medical school graduates (e.g. Bazzoli 1985, Colquitt, Zeh and Cultice 1996, Woodworth and Helmer 2000 and Hauer et. al 2008 among others), law school graduates' choice to enter public sector law (Kornhauser and Revesz 1995, Field 2009) and other post-graduation career decisions (Minnicozzi 2005, Rothstein and Rouse 2011). These studies are conducted in fairly specialized settings or focus on the graduates of one specific institution. Analyses of more inclusive groups of graduates tend to be more descriptive than causal and ignore the endogeneity of student loans and a wide range of omitted variables (e.g. Choy and Carroll 2000, Chiteji 2007). Our goal is to study a more nationally representative sample of households who accrued education debt at different points in time. To at least partially account for the complex relationship between student loans, education, career outcomes and income, we instrument for the amount borrowed and show results using predicted, rather than actual earnings as a regressor. The study extends Gicheva (2013), where a similar instrumental variable approach is used to show that student debt is likely linked to lower probability of marriage, and Bricker and Thompson (2013), who find correlation between previously accumulated student debt and the likelihood of experiencing financial distress during the recession of 2009.

2. Empirical Methodology

2.1 Specification

We estimate linear probability models in which the dependent variable is an indicator for financial hardship or home ownership. The observed relationship between student debt and the outcomes of interest is likely to be subject to omitted variable bias even when controls for the education level of respondents and their spouses are included. By their nature, student loans are correlated with the type of education obtained and with academic success (Stinebrickner and Stinebrickner 2003) – variables we do not observe – which may in turn affect factors such as job stability, starting wages and career wage growth, as well as other correlates of financial status. It is difficult to disentangle all of these relationships and to design a clear-cut counterfactual. To

help us avoid some of these issues, we use an instrument for the amount of accumulated student debt that exploits time variations in the size of the federal and private student loan programs.

Our instrument is based on the observed upward trend in student borrowing since the 1970s, when the federal student loan program was in its early stages. The growth in the aggregate level of education debt can be attributed in part to policy changes that should be exogenous to households' financial stability. There have been multiple reauthorizations of the Higher Education Act of 1965 that have impacted the amount and types of financial aid available to postsecondary students. The 1992 reauthorization has had the strongest impact on federal loans. The amendment introduced unsubsidized Stafford loans, increased the annual and aggregate limits for subsidized Stafford loans, substantially increased the annual and eliminated aggregate PLUS loan limits, in addition to extending federal loan eligibility to more students from middle and high income families. As a result, the total amount of federal student loans, in 2011 dollars, increased from \$23 billion to \$35.5 billion between the 1992-93 and 1994-95 academic years. The share of all federal student aid comprised of federal loans increased from 61% to 73% over the same period (College Board 2012b). The introduction of nonfederal loans in the mid-1990s also played a major role in the growth of aggregate student borrowing. Private debt peaked in 2006-07, when the total amount of newly borrowed funds accounted for 26% of all student borrowing, and experienced a sharp decline after 2008. It is more difficult to measure changes in the take-up rate for student loans, but it has likely increased along with the mean and median debt level among borrowers. The College Board (2012b) reports that the number of borrowers under the Stafford loan program increased from 4.4 million in 1995-96 to 10.3 million in 2010-11. Increasing costs of higher education are potentially part of the explanation, as well as policy changes that increase the appeal of loans for certain groups of the population, such as allowing parents to defer repayment on PLUS loans until six months after the student has left school, changing interest rates, or transitioning towards an online-based FAFSA application.

The instrument we use is constructed as the average amount borrowed per full-time equivalent student (including non-borrowers) in constant 2011 dollars, as reported by the College Board (2012b) in the year when a respondent was 17 years old. High school graduates who made their borrowing decisions in years when loans were more widely available and their use was prevalent among one's peers are more likely to borrow or take on larger debt. Our instrument

accounts for changes in the take-up of student loans as well as changes in eligibility, so we are able to exploit variations in both. This instrument is used in Gicheva (2013) to examine the impact of student debt on the rate of transitioning into first marriage.

2.2 SCF Data

We use data from the six waves of the Survey of Consumer Finances (SCF) conducted between 1995 and 2010. Several features of the SCF make it appropriate for addressing the questions of interest and implementing our empirical approach. The survey collects very detailed information about households' financial assets and liabilities, including full student borrowing histories. This allows us to observe the long-term impact of education-related debt, as many borrowers are interviewed ten years or more after incurring their debt. The fact that the SCF is a triennial cross-sectional survey lets us observe the financial status of households with student loans during years characterized by differing economic conditions.

As a survey of household finances and wealth, the SCF includes some assets that are broadly shared across the population (bank savings accounts) as well some that are held more narrowly and that are concentrated in the tails of the distribution (direct ownership of bonds). To support estimates of a variety of financial characteristics as well as the overall distribution of wealth, the survey employs a dual-frame sample design.

A national area-probability (AP) sample provides good coverage of widely spread characteristics. The AP sample selects household units with equal probability from primary sampling units that are selected through a multistage selection procedure, which includes stratification by a variety of characteristics, and selection proportional to their population. Because of the concentration of assets and non-random survey response by wealth, the SCF also employs a list sample which is developed from statistical records derived from tax returns under an agreement with SOI.⁴ (See Kennickell (2000) for additional details on the SCF list sample.) This list sample consists of households with a high probability of having high net worth.⁵

⁴ See Wilson and William J. Smith (1983) and Internal Revenue Service (1992) for a description of the SOI file. The file used for each survey largely contains data from tax returns filed for the tax year two years before the year the survey takes place. See Kennickell (1998) for a detailed description of the selection of the 1998 list sample.

⁵ For reasons related to cost control on the survey, the geographic distribution of the list sample is constrained to that of the area-probability sample.

The SCF joins the observation from the AP and list sample through weighting.⁶ The weighting design adjusts each sample separately using all the useful information that can be brought to bear in creating post-strata. The final weights are adjusted so that the combined sample is nationally representative of the population and assets. These weights are used in all regressions.

The SCF measure of student loans groups together all debt accumulated by household members, so we are implicitly making the assumption that a dollar of student loans has the same impact on household financial hardship regardless of whether the debt was incurred by the household head, the head's spouse, or someone else.⁷

We focus on four distinct measures of financial hardship: being denied credit, not paying bills on time, high credit payment to income ratio and bankruptcy filing in the ten-year period prior to the interview date. We also construct an indicator for home ownership.

We restrict the sample to respondents who were born in 1954 or later because earlier cohorts completed high school before the federal student loan program took off in the 1970s. We also drop respondents younger than 29. Most schooling should be completed by this age and in addition the age restriction eliminates individuals who were too young to incur consumer debt at the beginning of the ten-year interval covered by the bankruptcy indicator. Furthermore, the excluded age groups tend to have relatively low homeownership rates.⁸ Other covariates that we include in the regressions include demographic characteristics of the survey respondent (gender, race and a quadratic in age) and indicators for the highest completed education level, presence of college-age children in the primary economic unit, and disability status.

Summary statistics of these variables, for respondents in the cohorts for 1971 and after in the 1995 to 2010 surveys, are included in **Table 1**. The different dependent variables we consider below are listed at the top. More than one third – 37 percent – of households indicate that they

⁶ The evolution of the SCF weighting design is summarized in Kennickell (2000), with additional back-ground by Kennickell and Woodburn (1992).

⁷ In this paper we use the term “household” for simplicity. The SCF actually uses a concept of “Primary Economic Unit” (PEU), which includes family members living together in the housing unit who are financially dependent on the respondent. “Family” here includes unmarried partners and their children. Residents of the household who do not usually live in the residence or who are economically independent of the survey respondent are not considered to be part of the PEU, and any student loans they may hold are not included in the SCF.

⁸ See for example U.S. Census Bureau, “Housing Vacancies and Home Ownership,” <<http://www.census.gov/hhes/www/hvs.html>>

were either denied credit, granted less credit than they had applied for initially, or did not apply at all because they feared rejection in the previous five years. Jappelli (1990) and Duca and Rosenthal (1993) have found the SCF questions about credit applications and outcomes provide a useful indicator of households that are credit constrained. Jappelli (1990) found that the families who believed they would be turned down looked and behaved like the families that had applied for and been denied credit.

Nearly 9 percent of households experienced a spell of late payment (of sixty days or more) paying bills at some point in the last five years. Over ten percent of all households have a “high PIR” (payment to income ratio over 40 percent); 11.4 percent have high PIR when all loans are included, and 10.8 percent have high PIR after excluding payments on educational loans. This figures drops to just two percent when both education and mortgage payments are excluded. Nearly ten percent (8.3 percent) of households have had a bankruptcy in the last ten years, and slightly more than 6 in ten households report owning their primary residence.

Slightly more than half of the respondents are female (56 percent). Twenty percent report Bachelor’s as the highest degree earned, with six percent reporting Master’s, and only one percent claiming a Ph.D. Nearly seventy percent of the sample is White, 14 percent African American, and 11 percent Hispanic, with the remainder identifying as either Asian or “other.” The average age of survey respondents was 40.5. Nearly 10 percent of households had a college-aged (18 to 24) person (other than the spouse) living in the home. In one of every 15 households either the respondent or the spouse identifies themselves as having a work-related disability.⁹

Annual average county-level unemployment rate and per-capita personal income figures from the Bureau of Economic Analysis are merged into the SCF for each survey year. Unemployment averages 6.0 percent, and ranges from 1.1 to 16.4 percent. County per-capita personal income, relative to the national average, ranges from 0.5 (half the national average) to 3.0). We also use “predicted wage income,” which is calculated using the internal SCF data

⁹ The disability status is not necessarily caused by work, but is identified by the respondent in a battery of questions about employment status.

using occupation, human capital, and demographic controls and Current Population Survey data.¹⁰ Predicted earnings average nearly \$52,000, and range from \$0 to \$1.1 million.¹¹

Nearly one in five households has some student loan debt, with the average loan (among debt holders) of \$32,000. The questions in the SCF on student loans reflect loans with an outstanding balance for any member of the PEU. Over the period we are studying in this paper, the share of households with educational loans and the size of the average loan rose. **Table 2** shows trends in the share of households (including all households regardless of age) with any student loan debt and the average outstanding balance among those with loans. The share of households with student loans rose from 12 percent in 1992 to 19 percent in 2010. The average loan balance rose from nearly \$18,000 to more than \$34,000 (adjusted for inflation using US CPI-U and expressed in 2010 dollars).

3. Results

3.1 Initial Specifications

Our initial results use an instrumental variable linear probability model. All standard errors are clustered by year of birth, and all regressions using the standard SCF weights. Results from the IV specification for each of the potential dependent variables (along with coefficients on all of the covariates included) are included in **Table 3**. In general these results are suggestive of a relationship between accumulated student loan debt and household financial distress, conditional on educational attainment. The coefficient on the amount borrowed for education has the

¹⁰ As described in the 2010 SCF documentation: “For each occupation group, regressions were run separately for males and females of the log of annualized wages on a constant, a spline on age (AGE, MAX(0, AGE-35), MAX(0,AGE-55)), a dummy variable for part-time employment (1 = working fewer than 20 hours per week), a dummy variable for self-employment (1 = self-employed), a dummy for race (1 = Hispanic or non-white), and dummy variables for years of education (1 = : 12 years of education, some college or an Associate's degree, Bachelor's degree, higher degree than Bachelor's degree). If there were too few people in a CPS 3-digit occupation group, either the SCF case was matched to a neighboring occupation group, or the match was made at the level of the 2-digit occupation code. Some of the model coefficients may be identically zero where there are too few cases in the appropriate cells in the CPS data to identify these coefficients; for example, a coefficient for the [36,55) element of the age spline may be identically zero if there are no CPS cases in that age group for the given occupation.”

¹¹ Before taking the natural log of predicted earnings, which is the variable included in the regressions below, we add \$0.50 to all observations reporting zero predicted earnings. Predicted earnings are not adjusted for inflation.

“anticipated” sign in each regression, and the covariates in those regressions also tend to tell a reasonable and consistent story.

Outstanding student loans increase the probability of being denied credit, with \$10,000 in debt raising the probability by six percentage points (Column 1). The same amount of debt raises the probability of experiencing bankruptcy in the last ten years by seven percentage points (Column 2) and having a period of being significantly late paying bills by two percentage points (Column 3). For each of these outcomes, higher levels of educational attainment and residence in a county with relatively high average income diminish the probability of experiencing distress, while being female or having a disability (of either the respondent or the spouse) exacerbate it. County-level unemployment raises the probability of being denied credit and having late payments, but decreases the probability of bankruptcy.

Student loan debt also appears to decrease the probability of owning a home (Column 4), though the coefficient is not statistically significant. A number of the additional covariates do, however, have a strong impact on this outcome, which potentially can be linked to long-term household economic well-being. Older respondents, households with a college-aged child at home, and those with higher predicted earnings are more likely to own a home. Residents of high unemployment counties are less likely to have ever owned a home. The same is true, however, for residents of counties with relatively high per-capita income. Female respondents are less likely to own their home. Race and ethnic status appear strongly related to home ownership, with white respondents more likely to own and African Americans and Hispanics less likely. Higher levels of educational attainment raise the probability of home ownership.

The final two columns of Table 3 repeat the same IV specification for two different measures of high payment to income ratio. The first (Column 5) uses PIR for all types of loan payments (credit cards, mortgages, and all other revolving and non-revolving credit and debt arrangements), while the second (Column 6) excludes educational debt payments from the PIR. Conditional on educational attainment and all of the other covariates, ten thousand dollars in outstanding education loans raises the probability of a high PIR for all loans by nearly three percent, significant at the ten percent level. Attaining advanced degrees (Masters degrees and Doctorates) lowers the probability of having high total PIR, but none of the other covariates has a statistically significant relationship. When we exclude payments on the education loans from

the PIR (Column 6) the magnitude the outstanding debt variables is reduced by two-thirds and is no longer statistically significant.

Overall the results from the specifications in Table 3 are suggestive of a potentially causal relationship between outstanding student loan balances and household financial distress. The results from the specifications using the payment to income ratio dependent variables further suggest that the PIR measure itself is likely of limited value and is mechanically driven by having debt on both sides of the equation. The coefficients on the highest degree variables also indicate that since higher attainment levels are negatively related to various “financial distress” measures, we might be able to get a clearer picture of the long-term impacts of student loans by contrasting completers and non-completers.

The first stage estimation results for the models in Table 3 are shown in Table 4. The excluded instrument is highly significant and has the expected positive sign and an F statistic of 57.5. A dollar increase in the aggregate annual amount borrowed per full-time-equivalent student in the year when a respondent was 17 years old corresponds on average to a \$3 increase in the total amount borrowed by the individual and other members of the PEU up to the interview date. More education is naturally associated with higher debt, and so is the presence of college-age children in the household. Higher predicted earnings and county per-capita income are also correlated with higher education debt, consistent with a positive expected return to student loans. White and African American respondents tend to borrow more. The coefficient on the county unemployment rate is positive and highly significant.

3.2 Non-completers

The next section of results includes a series of specifications where we contrast the impact of outstanding student loan debt on financial distress measures for college completers and non-completers. We focus on college attendance because it is the most common level of post-secondary education, by far, in the data. As shown above in Table 1, nearly 20 percent of respondents have college as their highest degree, while six percent have a Master’s degree, and only one percent have a doctorate. Only one quarter as many respondents (and spouses) report graduate school as the highest level of school attended as college. (**Table 5**). The rate of completion is also much higher among those who attend graduate school; only one in ten

graduate school attending respondents or spouses fail to complete.¹² Because there are relatively few graduate school attendees and even fewer non-completers, the next step of our analysis focuses only on cases with college as the highest level of attendance.

Table 6 contains the key coefficient of interest, the one on the instrumented variable, for a similar IVREG specification for each of the dependent variables as shown in Table 3 using several different sample selections to contrast completers and non-completers among college attenders. The specification is “stripped-down” in that it only includes covariates for age, race/ethnicity, gender, county unemployment and relative income, and predicted earnings. The consistent result across each of the three sub-samples of college attenders is that the magnitude of the impact of outstanding student loan balances is much greater among non-completers than among those who obtain a college degree. Among the non-completers the coefficient on student loans is statistically significant in half of the cases and is always of the anticipated sign. With only one exception, the coefficient on student loans is always greater in absolute value in the non-completer specifications.

Results for the broadest sub-sample, including all PEUs where either the respondent or the spouse has college as the highest level attended, are contained in **Panel A**. Among households where either the respondent or the spouse/partner (possibly both) failed to complete college, \$10,000 in outstanding education loans raised the probability of bankruptcy by 1.9 percent (Panel A1, Column 2), and lowered the probability of owning a home by 3.2 percent (Column 4). The student debt coefficients for the other outcomes have the anticipated sign, but are not significant at standard levels.

Because the SCF student loan questions pertain to any outstanding loans for any member of the PEU, it is possible that the debt will actually be for currently (or recently) attending children and not have meaningful relationship with the college completion status of the respondent or spouse/partner. To isolate households where the loans are for the respondent and/or spouse/partner, we further restrict the sample of “non-completers” to exclude households with both college-aged kids (ages 18 to 24) in the home and with any of the student loans taken out

¹² Attendance and completion in the SCF are constructed from two variables (x5901/6101 and x5905/6105). The attendance variable asks (separate for respondent and spouse; x5901, x6101) the highest level of school attended, including four possible responses for college (1, 2, 3, or 4 years of college) and only one for any level of graduate school attended. Among those with any college attendance both respondent and spouse are asked the degree completed (x5905, x6105) with ten options, including associates, bachelor’s, master’s, and a variety other advanced degrees.

within the past three years. This restriction removes an additional 453 implicates, or 90 households (for non-completers in Panel A), but has minimal impact on the student loan coefficients. For the remainder of this section we will only refer to the broader of these two sample selections, the one which includes PEUs with college-aged kids in the home. Among college completers (Panel A.2) only the coefficient for late payments is statistically significant, though the magnitude of the student loan debt is only one-fifth to one-quarter as large as it is for non-completers.

Panel B includes results for a second sub-sample, which includes cases where only one of respondent or spouse has college as the highest level of school attended and the other reports some lower level of attendance. In the households where the sole college attender did not receive a degree (Panel B.1) \$10,000 in outstanding college debt raises the probability of being denied credit by 4.7 percent and experiencing bankruptcy in the last ten years by 2.8 percent. That level of outstanding loans decreases the probability of owning a home by 11.5 percent. The effects of debt are much smaller, and largely not significant, among households where the sole college attender completed his or her degree (Panel B.2). The coefficient for late payments, while relatively small at 1.1 percent, is larger than that for non-completers, where it is truly zero.

The final sub-sample is restricted to households where both the respondent and the spouse/partner (if there is one present) have college as the highest level of school attended (**Panel C**). Among households where at least one of the respondent or spouse/partner failed to complete, \$10,000 in outstanding student loan debt raises the probability of being denied credit by 1.6 percent, the probability of having late payments by 1.5 percent, and decreases the probability of owning a home by 2.8 percent (Panel C.1). For this sample restriction there are three outcomes where the coefficients on outstanding student loans are statistically significant among completers (denied credit, late payments, and home owner). In each case, however, the magnitudes on these coefficients are much smaller among completers, ranging from one-sixth to one-third as large as the effects among non-completers.

To learn more about the mechanism through which student loans are related to long-term financial distress, we next explore any variations in the estimated coefficient on education debt when subsets of the covariates in the main regression models shown in Table 3 are excluded. Since student debt is related to the other explanatory variables, excluding some of them allows us to consider different counterfactuals – for example, how much of the estimated effect of loans operates through educational attainment. These results are shown in **Table 7**, where each cell

shows the IV coefficient on student loans from a different regression, and the results in each row apply to the same outcome. Column 7 replicates the results in Table 3 with the full set of covariates. All specifications in Table 7 include controls for gender, age and age squared, and race.

Comparing the coefficient in Columns 1 and 2 shows the change in the estimated impact of student debt as we include the indicators for highest completed education. All of the estimated coefficients increase in absolute value. This is not surprising, given that education debt has a strong positive correlation with educational attainment, and more education decreases the likelihood of experiencing financial distress. Without controls for education the coefficient on student loans is picking up the positive relationship between schooling and financial stability. Since our education controls are very general, it is not unlikely that our main results are still biased toward zero because we are not controlling for factors such as the quality of the obtained education.

We next add the indicators for disability and presence of college-age children in the PEU. The estimated coefficients change slightly toward zero. The observed change is much larger when household income is included in the regressions. The increase in the absolute value of the estimated effect of \$10,000 in student loans is between 0.4 percentage points (in the bankruptcy specifications) and 4 percentage points (when the outcome of interest is home ownership). The home ownership coefficient goes from not statistically significant to significant at the 5 percent level. In many ways the role of income as a covariate in these models is similar to the role of educational attainment: student loans are positively correlated with income, but higher income is likely to lead to lower likelihood of experiencing financial distress. This observation again highlights the importance of including a rich set of covariates in any model that examines the implications of student debt.

In the regressions shown in Column 5 we include the county unemployment rate as a control for economic conditions. In all but one case (bankruptcy), this leads to somewhat smaller estimated effect of student debt, but including the average income in the county that the household resides in has the opposite effect in the bankruptcy and credit availability regressions. The relationship between the amount borrowed for education and the economic conditions is not straightforward because borrowing may be higher when and where economic conditions are less favorable but in turn tends to increase household income and may be linked to the household

relocating to a more affluent area. In addition, there may be a spurious correlation in the data between student debt and the unemployment rate for example due to the recessions of the early 1990s and early 2000s, when education borrowing was on the rise for unrelated reasons.

Finally, the model in Column 7 – our main specification – replaces reported household income with predicted wage earnings. This generally shrinks the absolute value of the estimated coefficients but does not change the main implications. One reason why this is the preferred specification is that it does not hold constant the positive or negative income shocks that households may experience that are reflected in reported income.

4. Discussion

Our results indicate that holding student debt is likely associated with decreased financial stability, particularly for individuals who accumulate debt but do not complete a Bachelor's degree. There are several related mechanisms that can lead to the observed relationship between student loans and financial distress. Further work is needed to provide more information about the specific issues caused by education debt. Debt repayment has a direct impact on disposable income, which can place financial strain on households when combined with liquidity constraints that prevent graduates from borrowing against future income. Brown and Caldwell (2013) show a recent trend in the FRBNY Consumer Credit Panel of 25 and 30 year old student borrowers having lower credit scores on average than the scores of similarly aged non-borrowers. This comparison, however, does not account for correlates of income, financial stability and good credit rating that are linked to student debt, such as educational attainment and occupation. Homeownership can be affected through a higher consumer debt to income ratio, which mortgage lenders take into account, or the ability to save enough for a down payment. Even if student debt does not play a role in the rate at which graduates transition into homeownership, it can affect the value of the homes they purchase or the resources that are devoted to other consumption categories.

Changing aggregate labor market conditions may indirectly lead us to observe a relationship between education loans and financial hardship if the ongoing steady increase in student borrowing has coincided with continued decline in the returns to postsecondary education. Under this scenario, it would not be the case that loans per se cause financial hardship. Households who

obtained schooling in more recent years would fare worse financially due to the lower returns to their education, but such households are also more likely to hold debt because of exogenous increases in aggregate borrowing. However, trends from the March CPS have been suggestive of an increasing, not decreasing, high school-college wage differential (see for example Avery and Turner (2012) and Day and Newburger (2002)).

Given the high uncertainty in the ex post return to a college or advanced degree, it may be the case that the observed levels of student borrowing are ex ante efficient, but the households that are the “lottery losers” are observed experiencing financial distress. Given that student debt generally cannot be discharged in personal bankruptcy, borrowers who experience bad income shocks after graduation are unable to use a major component of the safety net available to holders of other types of debt. Borrowers who leave school without completing a degree have been identified as a group that is particularly susceptible to being burdened by student debt, and we present evidence that confirms this. The currently existing insurance mechanism that is built into the federal loan program includes such options as income-contingent and income-based repayment plans and deferment options, but private student loans come with little borrower protection. Our results may indicate the need for more borrower protection, although we draw no conclusions about the potential for moral hazard issues that such policies may be associated with.

Table 1. Summary Statistics for SCF 1995 to 2010, Weighted, Age 29+, Cohort 1971+

Variable	Mean	Std. Dev.	Min	Max
Denied Credit (or did not apply because feared rejection)	0.368	0.482	0	1
Late Payment (60 days or more) in last five years	0.086	0.280	0	1
High Payment to Income Ratio (PIR) (all loans) (>40%)	0.114	0.318	0	1
- High Debt (other than Education) PIR	0.108	0.310	0	1
- High Nonmortgage Debt (other than Education) PIR	0.022	0.145	0	1
Bankrupt	0.127	0.332	0	1
Bankrupt in last 10 years	0.083	0.276	0	1
Home Owner	0.608	0.488	0	1
Any Student Loan Debt?	0.183	0.386	0	1
Total Borrowed to date (\$1,000)	6	24	0	836
- Borrowing among education debt holders				
IV: Average Loans Per FTE	1,739	827	794	7,145
Female	0.559	0.496	0	1
College Degree	0.198	0.399	0	1
Masters Degree	0.061	0.240	0	1
Doctorate	0.012	0.111	0	1
White	0.683	0.465	0	1
Black	0.141	0.349	0	1
Hispanic	0.111	0.314	0	1
Age	39.5	7.2	18	56
Any College-age Kids in PEU (18-24)	0.109	0.311	0	1
Disabled (either R or SP)	0.065	0.247	0	1
County Per-capita Income ("Relative" divided by national average pcinc)	1.0	0.3	0.5	3.0
County Unemployment Rate	6.0	2.7	1.1	16.4
Normal Income	86,731	211,841	0	305,000,000
Predicted Wage	51,618	65,206	0	1,124,437

Note: 12,037 observations for each of the covariates

Table 2. Student Loan Details in SCF (All Households)

	Share of PEU with Any Student Loan Debt	Average Borrowing among those with Debt (\$1,000 in inflation- adjusted 2010 dollars)
1995	11.8%	17.6
1998	11.3%	23.7
2001	11.5%	29.6
2004	13.4%	26.2
2007	15.2%	31.4
2010	19.1%	34.5

Table 3. Main IV Specification with Full Set of Covariates

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:	Denied Credit	Bankrupt	Late Payments	Home Owner	High PIR (all loans)	High PIR (non- education)
Amount Borrowed	0.00601** (2.099)	0.00723** (2.680)	0.00225 (1.184)	-0.00207 (-0.691)	0.00290* (1.848)	0.000970 (0.662)
Female	0.0340*** (3.189)	0.0153* (1.718)	0.0129* (1.930)	-0.0145* (-1.857)	0.00255 (0.486)	0.00103 (0.211)
College_degree	-0.129*** (-7.079)	-0.112*** (-10.92)	-0.0489*** (-5.810)	0.144*** (8.984)	-0.0191 (-1.495)	-0.0257** (-2.406)
Masters_degree	-0.181*** (-6.662)	-0.148*** (-5.425)	-0.0677*** (-3.033)	0.141*** (4.190)	-0.0805*** (-4.137)	-0.0588*** (-3.524)
Doctorate	-0.299*** (-4.880)	-0.256*** (-5.923)	-0.119*** (-4.092)	0.115 (1.587)	-0.139*** (-5.473)	-0.113*** (-4.194)
White	-0.0664*** (-3.206)	-0.0313** (-2.056)	-0.0106 (-0.953)	0.123*** (6.423)	0.0197 (1.314)	0.0287** (2.162)
Black	0.115*** (5.775)	-0.0188 (-0.978)	0.0260 (1.548)	-0.0841*** (-3.705)	0.00294 (0.149)	0.0141 (0.859)
Hispanic	0.00864 (0.380)	-0.0406** (-2.062)	-0.00572 (-0.429)	-0.0569*** (-3.266)	0.0394* (2.027)	0.0464** (2.396)
Age	0.00306 (0.382)	0.0298*** (5.710)	0.00423 (1.157)	0.0296*** (3.520)	0.00619 (0.657)	0.00815 (0.929)
Age ²	-0.000113 (-1.264)	-0.000278*** (-4.890)	-5.89e-05 (-1.615)	-0.000229** (-2.539)	-6.74e-05 (-0.550)	-9.33e-05 (-0.821)
Any_collkids	0.0258 (1.115)	-0.0107 (-0.608)	0.00231 (0.183)	0.0433* (2.018)	0.0201 (1.621)	0.0227 (1.667)
Disabled	0.145*** (7.880)	0.0527** (2.493)	0.0535*** (3.349)	-0.219*** (-9.980)	-0.0146 (-0.835)	-0.00848 (-0.473)
County Relative per- capita Income	-0.0823*** (-4.319)	-0.0703*** (-5.466)	-0.00860 (-0.858)	-0.0515** (-2.407)	-0.00646 (-0.529)	0.00302 (0.265)
County UR	0.00212 (0.931)	-0.00196 (-0.882)	0.00382** (2.332)	-0.00761*** (-2.803)	0.000502 (0.331)	0.00227 (1.466)
Predicted Earnings	-0.00728 (-1.660)	0.00302 (0.963)	-0.000813 (-0.326)	0.0420*** (10.07)	0.00186 (0.795)	0.000897 (0.349)
Constant	0.584*** (3.457)	-0.548*** (-5.343)	0.00346 (0.0479)	-0.621*** (-3.479)	-0.0695 (-0.398)	-0.119 (-0.720)
Observations	12,037	12,037	12,037	12,037	12,037	12,037

*** p<0.01, ** p<0.05, * p<0.1. Robust t-statistics in parentheses

Regressions using SCF for 1995 to 2010, using only first implicate, for ages 29 and older, with SCF sample weights and robust standard errors clustered by cohort.

Table 4. First Stage Estimation Results

Average Loans per FTE	0.00317*** (7.581)
Female	0.381 (0.739)
College_degree	3.601*** (4.097)
Masters_degree	9.074*** (5.648)
Doctorate	16.15*** (3.518)
White	3.239** (2.434)
Black	4.280** (2.693)
Hispanic	-0.121 (-0.0988)
Age	-0.680** (-2.299)
Age ²	0.00679* (1.944)
Any_collkids	2.356*** (3.237)
Disabled	-0.357 (-0.523)
County Relative per-capita Income	1.560* (1.700)
County Unemployment Rate	0.350*** (4.563)
Predicted Earnings	0.912*** (5.012)
Constant	-1.570 (-0.214)
F statistic of excluded instrument	57.47

*** p<0.01, ** p<0.05, * p<0.1

Table 5. Sample Distribution of College and Beyond College Attendance and Degree Completion (Imputation= 1, Age 29+, Cohort 1971+, 1995-2010 Survey Years)

	Respondent		Spouse	
	Non-completer	Completer	Non-completer	Completer
Highest-level of Attendance:				
College	2,060	3,365	1,306	2,856
Graduate School	205	1,862	140	1,171

Table 6. Coefficients on Amount Borrowed by Dependent Variable and Completion Status for College-Attenders (College as Highest Level Attended)

	(1)	(2)	(3)	(4)	(5)	
Attendance and Completion	Denied	Bankrupt	Late	Home	High (non	
Sample Selection	Credit	(last 10)	Payments	Owner	ed debt)	# OBS
					PIR	

Panel A. Respondent (R) and/or Spouse/Partner (SP) Attends College

A.1. R and/or SP fails to complete (at least one, maybe both)	0.0162 (1.649)	0.0185* (1.772)	0.0102 (1.402)	-0.0320*** (-2.790)	0.00382 (0.650)	15514
Drop if Any College-Aged Kids AND Loans in Recent Years						
	0.0160 (1.523)	0.0192 (1.641)	0.0100 (1.290)	-0.0347*** (-2.857)	0.00278 (0.460)	15061
A.2. Neither R nor SP fail to complete (all attenders complete)	0.000791 (0.268)	0.000866 (0.955)	0.00195** (2.070)	0.00149 (0.719)	0.00125 (1.448)	20412
Drop if Any College-Aged Kids AND Loans in Recent Years						
	0.000959 (0.312)	0.000789 (0.803)	0.00236** (2.414)	0.00165 (0.776)	0.00107 (1.177)	19933

Panel B. Respondent OR Spouse (only one, not both) attends College

B1. Attender Does NOT Complete	0.0472* (1.919)	0.0280* (1.754)	-0.000426 (-0.0238)	-0.115*** (-2.792)	0.0137 (0.879)	4034
Drop if Any College-Aged Kids AND Loans in Recent Years						
	0.0475* (1.962)	0.0251 (1.611)	-0.000891 (-0.0481)	-0.115*** (-3.068)	0.0141 (0.908)	3900
B.2. Attender Completes	0.00835 (0.593)	-0.00301 (-0.419)	0.0110 (1.200)	-0.0158 (-1.148)	0.000837 (0.0989)	4134
Drop if Any College-Aged Kids AND Loans in Recent Years						
	0.0116 (0.742)	-0.00543 (-0.709)	0.0138 (1.429)	-0.0173 (-1.147)	-0.00107 (-0.127)	4004

Table 6 CONTINUED. Coefficients on Amount Borrowed by Dependent Variable and Completion Status for College-Attenders (College as Highest Level Attended)

	(1)	(2)	(3)	(4)	(5)	
Attendance and Completion					High (non ed debt)	
Sample Selection	Denied Credit	Bankrupt (last 10)	Late Payments	Owner	PIR	# OBS

Panel C. Respondent AND Spouse Both Attend College

C.1. R and/or SP fails to complete (at least one, maybe both)						
	0.0166*	0.00518	0.0153*	-0.0276**	0.00291	5490
	(1.731)	(0.814)	(1.695)	(-2.129)	(0.630)	
Drop if Any College-Aged Kids AND Loans in Recent Years						
	0.0181	0.00599	0.0160	-0.0317**	0.00230	5325
	(1.592)	(0.820)	(1.527)	(-2.088)	(0.452)	
C.2. Both R and SP complete						
	0.00648	0.00289	0.00353***	-0.00639*	-0.000537	6522
	(1.641)	(1.685)	(2.868)	(-1.827)	(-0.282)	
Drop if Any College-Aged Kids AND Loans in Recent Years						
	0.00670*	0.00265	0.00366***	-0.00626*	-0.000638	6392
	(1.702)	(1.565)	(2.896)	(-1.794)	(-0.334)	

Table 7. The Role of Covariates in the Main IV Specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Denied Credit	0.00634 (2.847) ***	0.00680 (3.039) ***	0.00666 (2.966) ***	0.00822 (3.393) ***	0.00709 (2.601) **	0.00733 (2.653) **	0.00601 (2.099) **
Bankrupt	0.00676 (3.271) ***	0.00712 (3.378) ***	0.00702 (3.375) ***	0.00741 (3.361) ***	0.00760 (2.800) ***	0.00793 (2.931) ***	0.00723 (2.680) **
Late Payments	0.00356 (2.616) **	0.00374 (2.717) **	0.00365 (2.642) **	0.00411 (2.831) ***	0.00272 (1.465)	0.00271 (1.464)	0.00225 (1.184)
Home Owner	-0.00182 (-0.846)	-0.00232 (-1.061)	-0.00176 (-0.794)	-0.00548 (-2.550) **	-0.00430 (-1.694) *	-0.00352 (-1.411)	-0.00207 (-0.691)
Female	X	X	X	X	X	X	X
Race	X	X	X	X	X	X	X
Age	X	X	X	X	X	X	X
Education Attainment		X	X	X	X	X	X
Disabled			X	X	X	X	X
College-age Kids in PEU			X	X	X	X	X
Normal Income				X	X	X	
County Unemployment					X	X	X
County Avg Income						X	X
Predicted Wage							X
Observations	12,037	12,037	12,037	12,037	12,037	12,037	12,037

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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