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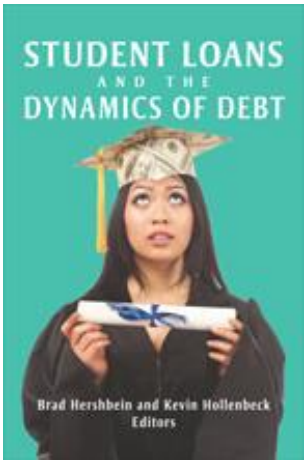

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The Effects of Student Loans on Long-Term Household Financial Stability

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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 1992–1993 and 2011–2012 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 because college and high school graduates may have different inherent abilities regardless of educational attainment (Willis and Rosen 1979). Using March Current Population Survey (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 more than $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 unintended consequences of student debt of which borrowers and policymakers should be mindful: 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 may have a pronounced positive impact on one's lifetime earnings stream or occupational attainment.

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 1995–1996 and 2003–2004 six years postcollege entry. They 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 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 a higher probability of being credit constrained and a greater likelihood of declaring bankruptcy. We find 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 positive return to

student loans. The relationship between education debt and financial status appears to be related to current economic conditions: it weakens when we control for aggregate economic conditions and consumer bankruptcy rates. 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, owing 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 substitute work hours for loans, which can affect academic performance and the probability of dropping out (e.g., Berkner, He, and Cataldi 2002; Stinebrickner and Stinebrickner 2003).

The other side of the coin is overborrowing, 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 education or underestimate the probability of dropping out .[2] 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 the Federal Reserve Bank of

New York Consumer Credit Panel/Equifax data, while 55.5 percent of borrowers owed $10,000 or less at the end of 2005, 17.7 percent had a balance of $25,000 or more, with 3 percent 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.

Our chapter 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 et al. 1996; Hauer et al. 2008; and Woodworth, Chang, and Helmer 2000, among others), law school graduates' choice to enter public sector law (Field 2009; Kornhauser and Revesz 1995) and other postgraduation 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., Chiteji 2007; Choy and Carroll 2000). 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 conditional on a rich set of covariates associated with higher labor market earnings. The study extends Gicheva (2013), where a similar instrumental variable approach is used and student debt is 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.

CONCEPTUAL FRAMEWORK

Suppose that household *i*'s earnings (in their natural logarithm form) are given by

$$Y_i = f(S_i) + \varepsilon_i,$$

where S is a measure of the respondent and spouse or partner's educational attainment that incorporates all productive components of schooling, such as education quality and highest degree attained. The additional component ε_i accounts for all other random and nonrandom factors that affect earnings. The function $f(s)$ is strictly increasing, which assumes positive returns to education. Educational attainment is a function of the amount of accumulated student debt L:

$$S_i = g(L_i).$$

The sign of $g'(L_i)$ depends on the counterfactual to a dollar of student loans. Under a fixed payment schedule, borrowers make a payment that constitutes a constant fraction of their total debt each period, mL, with m between zero and one. Household *i*'s earnings net of the loan payment are thus $(Y_i - mL_i)$.

Financial distress is experienced when net income falls below a certain threshold, c. The probability P_D of experiencing financial distress is

$$P_D = \Pr[\varepsilon_i < c - f(S_i) + mL_i].$$

This probability increases with the amount borrowed L as long as

$$\frac{\mathrm{d}(c - f(S) + mL)}{\mathrm{d}L} = -f'(S)g'(L) + m > 0.$$

Scenario 1: The counterfactual of a dollar of student loans is a dollar in grant aid or a dollar decrease in the tuition price charged by institutions of higher education. Then $g'(L) = 0$, and

$$\frac{\mathrm{d}(c - f(S) + mL)}{\mathrm{d}L} = m;$$

the probability of experiencing financial distress increases with student loans.

Scenario 2: Student debt is associated with increased educational attainment, so that $g'(L) \geq 0$. Then

$$\frac{\mathrm{d}(c - f(S) + mL)}{\mathrm{d}L} = -f'(S)g'(L) + m,$$

which may be positive or negative. Holding constant S_i, however,

$$\left.\frac{\mathrm{d}(c - f(S) + mL)}{\mathrm{d}L}\right|_{S=\bar{S}} = m \geq -f'(S)g'(L) + m.$$

The relationship between financial distress and student loans is stronger and positive when we condition on educational attainment.[3]

For individuals who obtain some postsecondary education but do not complete a degree, let

$$S_i = \tilde{g}(L_i),$$

with $0 \leq \tilde{g}'(L_i) \leq g'(L_i)$: educational attainment does not increase as much with the amount borrowed as it does for individuals who attain a degree. Then under Scenario 1, the relationship between financial distress and student borrowing would be similar for completers and noncompleters, but under Scenario 2, the probability of financial distress increases faster with student loans for noncompleters. The difference between the two groups should narrow once we condition on the available human capital measures. We explore these relationships empirically in the rest of the chapter.

EMPIRICAL METHODOLOGY

Specification

We estimate linear probability models in which the dependent variable is a binary measure of household financial stability. The observed relationship between student debt and the outcomes of interest is likely to be confounded by unobserved heterogeneity, even when all available human capital and occupation controls 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. 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.

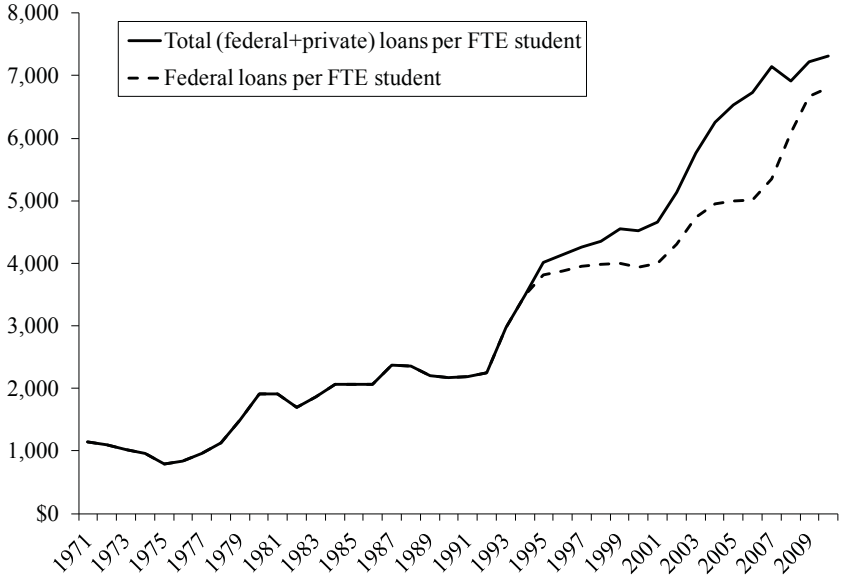
Our instrument is based on the observed upward trend in student borrowing since the 1970s, when the federal student loan program was in its early stages. The growth in the aggregate level of education debt can be attributed in part to policy changes that should be exogenous to households' financial stability. There have been multiple reauthorizations of the Higher Education Act (HEA) 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, and extended 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 1992–1993 and 1994–1995 academic years. The share of all federal student aid composed of federal loans increased from 61 to 73 percent over the same period (College Board 2012b). The introduction of non-federal loans in the mid-1990s also played a major role in the growth of aggregate student borrowing. Private debt peaked in 2006–2007, when the total amount of newly borrowed funds accounted for 26 percent 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 1995–1996 to 10.3 million in 2010–2011. 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 toward an online-based FAFSA application.

The instrument we use is constructed as the average amount borrowed per FTE student (including nonborrowers) in constant 2011 dollars, as reported by the College Board (2012b) in the year when a respondent was 17 years old (this is referred to as the cohort year in the rest of the chapter).[4] High school graduates who made their borrowing decisions in years that loans were more widely available and commonly used 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. Figure 9.1 shows the values used in the estimation, which combine federal and private loans. Policy-induced changes, such as the increase in federal borrowing after the 1992 reauthorization of the HEA or the upsurge in private loans in the early and mid-2000s, are reflected by the trends depicted in Figure 9.1, where in addition to a steady upward trend we observe more pronounced jumps in the expected years.

Since the variation in the instrument is only across cohorts, and the variable exhibits a persistent trend, it is possible that our estimation strategy may pick up similar trends in the outcome variables that are attributable to other factors unrelated to student borrowing. Figure 9.2 plots homeowner rates for two age groups (25–29 and 45–49), the annual unemployment rate for one age group (25–29) and the nonbusiness bankruptcy rate per household in years when respondents were surveyed. The bankruptcy rate fluctuates between less than 1 percent in 1995 and 2007 and 1.3 or 1.4 percent in 1998, 2001, 2004, and 2010. While 40 percent or fewer of younger households own their home, this

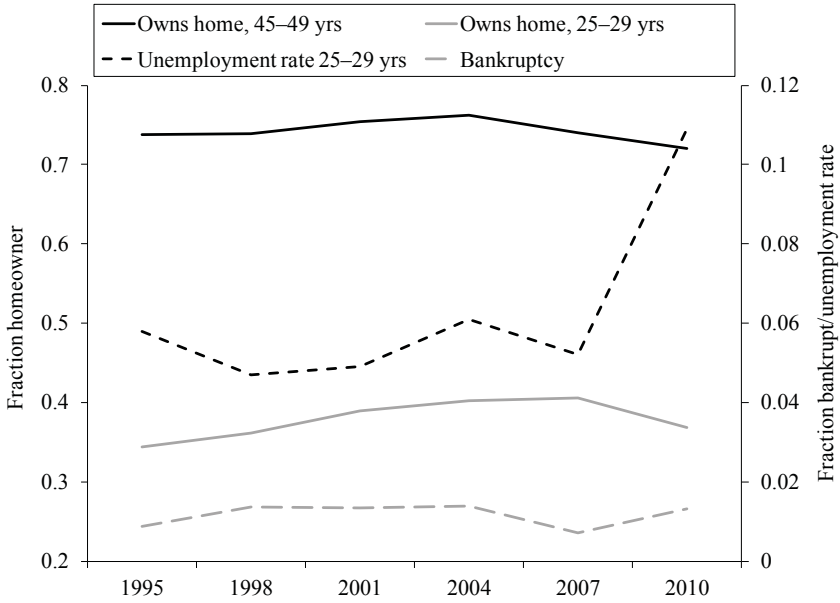
Figure 9.1 Average Education Loans per Full-Time Equivalent Student (2011 $)



SOURCE: College Board (2012b).

fraction is over 70 percent for the older age group. Homeownership rates increase for 25–29-year-olds between 1995 and 2007, with the most pronounced increase in the late 1990s, and drop between 2007 and 2010. The decline starts earlier for older individuals, and the preceding increase is not as pronounced. Other age groups (not plotted in Figure 9.2) are subject to comparable fluctuations. The unemployment rate fluctuates between 4.7 and 6.1 percent in the first five sampling years and increases sharply in 2010 to 10.9 percent. Overall, the trends in these data do not mirror the sustained upward movement exhibited by student loans, but we nonetheless include the aggregate bankruptcy rate, along with the homeownership rate by five-year age group as controls in the estimation. There may also be spurious correlation in the data between student debt and economic conditions, such as unemployment due to recessions happening for unrelated reasons at the time when education borrowing was on the rise. To account for this we also control for the survey-year unemployment rate specific to the age group (in five-year

Figure 9.2 Aggregate Trends in Homeownership, Bankruptcy, and Unemployment



NOTE: The bankruptcy rate is the annual number of nonbusiness bankruptcy filings from the American Bankruptcy Institute divided by total number of U.S. households from the U.S. census.

SOURCE: Data on household homeownership rates are from the U.S. census. The unemployment rate is reported by the Bureau of Labor Statistics using CPS data.

intervals) of the respondent and spouse or partner. All standard errors in the regressions are clustered by year of birth, and all regressions use the standard Survey of Consumer Finances (SCF) weights.

Survey of Consumer Finances Data

We use data from the six waves of the SCF conducted between 1995 and 2010. Several features of the survey 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 10 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 as some that are held more narrowly and 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 nonrandom survey response by wealth, the SCF also employs a list sample that is developed from statistical records derived from tax returns under an agreement with Statistics of Income.[5] (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.[6]

The SCF joins the observations from the AP and list sample through weighting.[7] 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 combines 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.[8] In our estimation we account for the likely situation in which parents accumulate education loans to finance their children's education by using information on children's ages and the time when the debt was incurred. An additional limitation of the SCF information about student loans is that the year of

loan origination is replaced by the year of consolidation for loans that were consolidated.

We focus on three distinct measures of financial hardship: 1) being denied credit, 2) not paying bills on time, and 3) filing bankruptcy in the 10-year period prior to the interview date. We also construct an indicator for homeownership as an additional measure of a household's financial stability.

We restrict the sample to respondents who were born in 1954 or later (or, in cases when a spouse or partner is present, the average year of birth is 1954 or higher), because earlier cohorts completed high school before the federal student loan program took off in the 1970s. We also drop observations with age lower 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 10-year interval covered by the bankruptcy indicator. Furthermore, the excluded age groups tend to have relatively low homeownership rates.[9] 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 (PEU), and disability status.

Summary statistics of these variables, for respondents in the cohorts for 1971 and after in the 1995–2010 surveys, are included in Table 9.1. The different dependent variables we consider in the next section of the chapter are listed at the top. More than one-third—36.5 percent—of households indicate that they 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) find that the SCF questions about credit applications and outcomes provide a useful indicator of households that are credit constrained. Jappelli (1990) finds 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 (60 days or more) while paying bills at some point in the last five years. Just over 8 percent of households have had a bankruptcy in the last 10 years, and slightly more than 6 in 10 households report owning their

Table 9.1 Summary Statistics

Variable	Mean	Min	Max
Denied credit (or did not apply because feared rejection)	0.365 (0.481)	0	1
Late payment (60 days or more) in last five years	0.085 (0.279)	0	1
Bankrupt in last 10 years	0.083 (0.275)	0	1
Homeowner	0.610 (0.488)	0	1
Female	0.542 (0.498)	0	1
College degree	0.199 (0.399)	0	1
Master's degree	0.062 (0.241)	0	1
Doctorate	0.013 (0.112)	0	1
White	0.684 (0.465)	0	1
Black	0.140 (0.347)	0	1
Hispanic	0.112 (0.315)	0	1
Age	40.564 (7.318)	29	70
Any college-aged kids in primary economic unit (18–24)	0.112 (0.315)	0	1
Disabled (either respondent or spouse/ partner)	0.065 (0.247)	0	1
County per-capita income ("relative" divided by national average)	1.0 (0.3)	0.5	3.0
County unemployment rate	6.031 (2.696)	1.1	16.4
Ln(normal income)	10.967 (0.953)	0	19.536
Ln(predicted wage)	10.493 (1.597	−0.693	13.933

NOTE: Weighted summary statistics for the 1995–2010 SCF samples. N = 12,413. Standard deviations in parentheses.

SOURCE: Authors' calculations using SCF data. County per-capita income and the county unemployment rate are derived from Bureau of Economic Analysis data.

primary residence, but as Figure 9.2 suggests, the rate varies considerably with age.

Slightly more than half of the respondents are female (54 percent). Twenty percent report a bachelor's degree as the highest degree earned, with 6 percent reporting a master's, and only 1 percent claiming a PhD. Nearly 70 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 is 40.6. Eleven percent of households live with a college-aged (18–24) person (other than the spouse). In 1 of every 15 households either the respondent or the spouse identifies themselves as having a work-related disability.[10]

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 percent and ranges from 1.1 to 16.4 percent. In addition to controlling for unemployment at the county level, we include the survey year age-specific unemployment rate reported by the Bureau of Labor Statistics using CPS data. Since economic conditions at the time of graduating college have been found to have lasting impact on the return to schooling (Kahn 2010) and on the decision to continue one's education (Johnson 2013), we also control for the cohort year unemployment rate for 24–29-year-olds in the United States. This variable ranges from 4.1 to 10.7 percent for observations in our sample. 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 using occupation, human capital, and demographic controls and CPS data.[11] Predicted earnings average nearly $52,000 and range from $0 to $1.1 million.[12]

Figure 9.2 suggests that the outcome variables we consider vary on an aggregate level with each installment of the SCF and with respondents' ages. To account for this we also include in the estimation the survey-year household bankruptcy rate in the United States. We construct this rate as the number of nonbusiness bankruptcy filings reported by the American Bankruptcy Institute (n.d.) divided by the U.S. Census estimate of the total number of households in the United States. Since the bankruptcy outcome we consider is retrospective, we calculate the average bankruptcy rate in the survey year and preceding four years to use in the estimation. The homeownership rates we use are based on

CPS/Housing Vacancy Survey housing inventory estimates (U.S. Census Bureau n.d.). In the models that estimate the effect of student loans on the probability of owning a home, we control for the age-specific homeowner rate in the survey year.

Nearly one in five households has some student loan debt, with the average loan (among debt holders) equal to $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 chapter, the share of households with educational loans and the size of the average loan rose. Table 9.2 shows trends in the share of households in the age group we study with any student loan debt and the average outstanding balance among those with loans. The share of households with student loans rose from 16 percent in 1995 to 24 percent in 2010. The average loan balance rose from nearly $19,000 to more than $37,000 (adjusted for inflation using U.S. CPI-U and expressed in 2010 dollars).

Table 9.2 Student Loans in the SCF

	Share of PEU with any student loan debt (%)	Average borrowing ($000s) among those with debt
1995	16.1	18.9
1998	15.1	22.1
2001	14.8	37.8
2004	16.7	29.5
2007	19.1	34.3
2010	24.1	37.6

SOURCE: Authors' calculations using SCF data.

RESULTS

Student Debt and Financial Stability among All Households

We begin our analysis by focusing on one outcome: bankruptcy. Our estimates for the relationship between student debt and the likelihood of filing for bankruptcy over a 10-year period are presented in Table 9.3, along with the coefficients on other covariates.

Column (1) of Table 9.3 shows the first-stage estimation results from a model that includes the full set of controls. The excluded instrument is highly significant and has the expected positive sign and an F statistic of 25.3. A dollar increase in the aggregate annual amount borrowed per FTE student in the cohort year defined in the previous section corresponds on average to a $2.53 increase in the total amount borrowed by the individual and other members of the PEU. More education is naturally associated with higher debt, and so is the presence of college-age children in the household. Higher predicted earnings are also correlated with more education debt, consistent with a positive expected return to student loans. The coefficient on the age-specific unemployment rate is positive and highly significant.

In order to explore the mechanism through which student loans are related to long-term financial distress, we report three sets of second-stage results. The model in column (2) is most parsimonious, using only student debt, indicators for female, African American, and Hispanic, and a quadratic in age as explanatory variables, but we still instrument for the amount borrowed. Debt has a strong positive impact on the probability of filing for bankruptcy, with $1,000 in loans increasing the likelihood by 0.8 percentage points. Based on the argument made earlier in the "Conceptual Framework" section, adding controls for educational attainment and other measures of human capital should strengthen the relationship when the counterfactual of student loans is lower educational attainment, which is indeed what we observe in column (3). This specification includes indicators for undergraduate and graduate degree attainment, the natural logarithm of predicted earnings and normal household income, disability status and presence of college-aged children in the PEU, as well as the county unemployment rate and county per-capita income as controls for economic conditions. The coefficient on student loans increases to 0.01. This result highlights the importance of including a rich set of human capital covariates in any model that examines the implications of student debt.

In the full model in column (4) we add more controls for the economic conditions affecting households in the sample. In particular, we include the age-specific unemployment rate at the time of the survey, the unemployment rate among 24–29-year-olds in the cohort year, and the five-year bankruptcy rate. The latter has a very strong, positive, and highly significant effect, with a 0.1 percentage point increase in the

Table 9.3 Full-Sample Estimation Results for the Probability of Bankruptcy

	(1) First stage (full model)	(2)	(3)	(4)
Amount borrowed		0.00793***	0.00956***	0.00644**
		(4.037)	(3.674)	(2.089)
Average loans per FTE	0.00253***			
	(4.655)			
College degree	3.273***		−0.113***	−0.103***
	(3.749)		(−10.06)	(−8.109)
Master's degree	8.418***		−0.162***	−0.137***
	(5.005)		(−6.266)	(−4.369)
Doctorate	15.51**		−0.288***	−0.239***
	(2.676)		(−5.489)	(−4.375)
College-aged kids in household	2.329***		−0.0139	−0.00756
	(3.722)		(−0.744)	(−0.433)
Disabled	0.372		0.0487***	0.0488***
	(0.625)		(3.442)	(3.471)
County relative per-capita income	0.307		−0.0607***	−0.0527***
	(0.430)		(−3.679)	(−3.519)
County unemployment rate	0.0208		-0.00325	0.000557
	(0.148)		(−1.669)	(0.274)
Ln(normal income)	0.989		−0.0208**	−0.0189***
	(1.482)		(−2.702)	(−2.978)
Ln(predicted earnings)	0.719***		0.00437*	0.00612**
	(4.906)		(1.815)	(2.661)
Age-specific unemployment rate	0.831***			0.00705
	(4.203)			(1.218)
Cohort unemployment rate aged 24–29	−1.055			0.0104
	(−0.669)			(0.486)
Five-year bankruptcy rate	155.9			17.86***
	(0.944)			(4.689)
Constant	−5.308	−0.740***	−0.494***	−0.624***
	(−0.517)	(−6.158)	(−3.866)	(−5.144)

NOTE: *significant at the 0.10 level; **significant at the 0.05 level; ***significant at the 0.01 level. The dependent variable is an indicator for bankruptcy during the previous 10 years. Robust *t*-statistics in parentheses. All specifications include controls for female, black, Hispanic, age, and age squared.

SOURCE: Authors' calculations using data from the SCF, the Bureau of Economic Analysis (county income and unemployment rate), the Bureau of Labor Statistics using CPS data (cohort-specific unemployment rates), and the American Bankruptcy Institute (bankruptcy rate).

aggregate bankruptcy rate increasing the 10-year probability of observing bankruptcy in our sample by 1.8 percentage points. The coefficient on the amount of student loans decreases but remains positive and significant (0.006).

The results from the full model in Table 9.3 are summarized in column (1) of Table 9.4, which also shows the estimation results for the other three outcomes of interest. All specifications in Table 9.4 include the full set of controls, and in the homeownership model we also hold constant the survey year homeowner rate by five-year age group. The coefficient on the amount borrowed for education has the "anticipated" sign when we consider the probability of being denied credit (column [2]) or owning a home (column [4]). While the coefficient in column (1) is positive and the same in magnitude as the one in the bankruptcy specification, it is not statistically different from zero (*t*-statistic of 1.3). On the other hand, $10,000 more in student loans decreases the probability of owning a home by 9 percentage points; this estimate is significant at the 10 percent level. The coefficient in the late payment specification (column [3]) is negative, close to zero in absolute value, and not statistically significant.

Overall, the results from the specifications in Table 9.4 are suggestive of a potentially causal relationship between outstanding student

Table 9.4 Full-Sample Estimation Results, All Outcomes

	(1)	(2)	(3)	(4)
Dependent variable	Bankrupt	Denied credit	Late payments	Homeowner
Amount borrowed	0.00644**	0.00643	−0.00274	−0.00899*
	(2.089)	(1.322)	(−1.105)	(−1.726)
Five-year bankruptcy rate	17.86***	−0.283	4.696	3.733
	(4.689)	(−0.0699)	(1.653)	(0.744)
Age-specific homeowner rate				−0.0232
				(−0.595)

NOTE: *significant at the 0.10 level; **significant at the 0.05 level; ***significant at the 0.01 level. Robust *t*-statistics in parentheses. All specifications include the controls from the full model in Table 9.3.

SOURCE: Authors' calculations using data from the SCF, the Bureau of Economic Analysis (county income and unemployment rate), the Bureau of Labor Statistics using CPS data (cohort-specific unemployment rates), the American Bankruptcy Institute (bankruptcy rate), and the U.S. Census (homeownership).

loan balances and household financial distress, but the findings are not particularly strong and tend to be noisy. The coefficients on the education variables in Table 9.3 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 noncompleters. As discussed in the "Conceptual Framework" section, we expect the relationship between student loans and financial distress to be more pronounced for individuals who attend college without attaining a degree. The next section of results includes a series of specifications in which we contrast the impact of outstanding student loan debt on financial distress measures for college completers and noncompleters.

Results by College Completion Status

We focus on college attendance because it is by far the most common level of postsecondary education in the data and among the U.S. population, and because the consequences of holding student debt and not completing an undergraduate degree are an important policy concern. As shown earlier in Table 9.1, college as the highest degree attained is much more common than graduate degrees. The more detailed college attendance and completion statistics in Table 9.5 show that only one quarter as many respondents (and spouses) report graduate school as the highest level of school attended as college. The rate of completion is also much higher among those who attend graduate school; only 1 in 10 graduate school attending respondents or spouses fail to complete.[13] Because there are relatively few graduate school attendees and

Table 9.5 Sample Distribution of College and Beyond College Attendance and Degree Completion

	Respondent		Spouse	
	Noncompleter	Completer	Noncompleter	Completer
Highest level of attendance				
College	2,060	3,365	1,306	2,856
Graduate school	205	1,862	140	1,171

SOURCE: Authors' calculations using SCF data.

even fewer noncompleters, the next step of our analysis focuses only on cases with college as the highest level of attendance.

Table 9.6 contains the key coefficient of interest, the one on student loans, for a similar instrumental variable specification for each of the dependent variables, as shown in Table 9.4, using several different sample selections to contrast completers and noncompleters among college attenders. The specifications include indicators for female, black, and Hispanic, a quadratic in age, county relative per-capita income, the county unemployment rate, the cohort unemployment rate for age 24–29, the five-year bankruptcy rate, and the age-specific homeowner rate in the case of the homeowner specifications. We estimate each model both with and without the predicted wage variable. Earlier we posit that holding constant the portion of earnings that varies with the amount and quality of schooling would magnify the coefficient on student loans more for completers than for noncompleters when education loans are not directly replaceable by grant aid. The odd-numbered columns in Table 9.6 contain results for the specifications without predicted earnings, while the results in the even-numbered columns account for this measure of schooling and occupation.

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 "noncompleters" to exclude households with both college-aged kids (18–24) in the home and with any of the student loans taken out within the past three years.

We consider three subsamples of college attenders. Results for the broadest subsample, including all PEUs where either the respondent or the spouse has college as the highest level attended, are contained in Panel A. Panel B includes results for a second subsample, which includes cases where either the respondent or the spouse has college as the highest level of school attended, while the other member of the couple reports some lower level of attendance. The final subsample 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).

The consistent result across each of the three subsamples of college attenders is that the magnitude of the impact of outstanding student loan balances is much greater among noncompleters than among those who obtain a college degree. The coefficient on student loans is almost always greater in absolute value in the noncompleter specifications. In addition, adding the predicted wage to the models tends to decrease the difference between the two groups.

Among households where either the respondent or the spouse/partner (possibly both) failed to complete college, $1,000 in outstanding education loans raises the probability of bankruptcy by 1.2 percentage points (Panel A, columns [5] and [6]) and lowers the probability of owning a home by 1.4 percentage points (column [4]). The student debt coefficients for the other outcomes have the anticipated sign but are not significant at standard levels. Among college completers, only the coefficient for late payments is statistically significant at the 10 percent level, though the magnitude of the student loan debt measure is slightly lower than it is for noncompleters.

In the households where the sole college attender did not receive a degree, $1,000 in outstanding college debt raises the probability of experiencing bankruptcy in the last 10 years by almost four percentage points. That level of outstanding loans decreases the probability of owning a home by 5.6 percentage points. The effects of debt are much smaller, and largely not significant, among households where the sole college attender completed his or her degree. The coefficient for late payments, while borderline insignificant, is positive and larger than that for noncompleters, where the point estimate is negative.

Among households in which both the respondent and spouse/partner attended college and at least one person failed to complete, $1,000 in outstanding student loan debt raises the probability of having late payments by two percentage points and decreases the probability of owning a home by three percentage points. There is only one outcome where the coefficient on outstanding student loans is statistically significant among completers when we condition on the CPS earnings variable (late payments). In each case, however, the magnitudes on these coefficients are much smaller among completers, ranging from one-fifth to one-half as large as the effects among noncompleters.

Table 9.6 Coefficients on Amount Borrowed by Dependent Variable and Completion Status for College Attenders (Any College Attended)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
	Denied credit		Late payments		Bankruptcy		Homeowner		*N*
Panel A									
At least one college attender among respondent (R) and spouse/partner (SP)									
At least one attender fails to complete	0.00685	0.00842	0.00559	0.00689	0.0124**	0.0124**	−0.00637	−0.0138**	4,047
	(0.966)	(1.111)	(1.021)	(1.175)	(2.424)	(2.324)	(−1.016)	(−2.182)	
All attenders complete	0.00229	0.00874	0.00184	0.00400*	0.000823	0.00168	−0.00144	−0.00671	2,921
	(0.808)	(1.051)	(1.443)	(1.854)	(0.913)	(1.132)	(−0.558)	(−1.640)	
Panel B									
Only one college attender among respondent and spouse/partner									
Attender fails to complete	0.0167	0.0220	−0.00876	−0.00816	0.0396*	0.0387*	−0.0399*	−0.0562*	1,604
	(0.467)	(0.575)	(−0.449)	(−0.400)	(1.976)	(1.883)	(−1.694)	(−1.917)	
Attender completes	0.00280	0.00279	0.00686	0.00756	−0.00106	−0.00118	0.0126	0.00909	1,758
	(0.355)	(0.338)	(1.584)	(1.665)	(−0.358)	(−0.399)	(1.406)	(1.118)	

Panel C									
Respondent and spouse/partner both attend college									
At least one attender fails to complete	0.00571	0.00830	0.0125	0.0201*	0.00665	0.00578	−0.0113	−0.0296**	1,058
	(1.084)	(1.102)	(1.549)	(1.804)	(0.648)	(0.445)	(−1.117)	(−2.180)	
Both attenders complete	0.00170	0.00414	0.00235*	0.00386**	0.00192	0.00244	−0.00226	−0.00574	1,276
	(0.721)	(1.210)	(1.764)	(2.069)	(1.480)	(1.534)	(−0.775)	(−1.591)	
Control for Ln(predicted earnings)	No	Yes	No	Yes	No	Yes	No	Yes	

NOTE: *significant at the 0.10 level; **significant at the 0.05 level; ***significant at the 0.01 level. Robust *t*-statistics in parentheses. All specifications include the controls for female, black, Hispanic, a quadratic in age, county relative per-capita income, the county unemployment rate, the cohort unemployment rate for aged 24–29, the five-year bankruptcy rate, and the age-specific homeowner rate (columns [7] and [8]).

SOURCE: Authors' calculations using data from the SCF, the Bureau of Economic Analysis (county income and unemployment rate), the Bureau of Labor Statistics using CPS data (cohort-specific unemployment rates), the American Bankruptcy Institute (bankruptcy rate), and the U.S. Census (homeownership).

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. Several related mechanisms 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 Federal Reserve Bank of New York Consumer Credit Panel of 25- and 30-year-old student borrowers having lower credit scores on average than the scores of similarly aged nonborrowers. 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 that obtained schooling in more recent years would fare worse financially, owing 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 suggest 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, the observed levels of student borrowing may be

ex ante efficient, but the households that are the "lottery losers" are observed experiencing financial distress. Student debt generally cannot be discharged in personal bankruptcy, and therefore 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 with which such policies may be associated.

Notes

The analysis and conclusions set forth are those of the authors and do not indicate concurrence by other members of the research staff or the Board of Governors. The authors would like to thank Jesse Rothstein and other participants at the Upjohn/EPI/Spencer Conference on Student Loans for their helpful comments.

1. See Lochner and Monge-Naranjo (2012) for an overview of the literature.
2. For example, Avery and Kane (2004) observe this trend among Boston high school students coming from both low-income and more affluent families. Avery and Turner (2012) show that in the Beginning Postsecondary Survey 2004:2009, 38 percent of dependent students entering college in 2003 who expect to attain a BA degree have not earned any postsecondary degree by 2009; 51 percent 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.
3. As researchers, we observe an imperfect measure of schooling S_i and occupation. In our empirical analysis it is used to construct a predicted wage income variable that is based on Current Population Survey (CPS) respondents' earnings.
4. Since in our data student loans are measured at the household level in our data, for respondents with a spouse or partner we use the mean of the two ages.
5. See Wilson and Smith (1983) and Internal Revenue Service (1992) for a description of the Statistics of Income file. The file used for each survey largely contains

data from tax returns filed for the tax year two years before the survey takes place. See Kennickell (1998) for a detailed description of the selection of the 1998 list sample.

6. 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.
7. The evolution of the SCF weighting design is summarized in Kennickell (2000), with additional background by Kennickell and Woodburn (1992).
8. In this chapter 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.
9. See, for example, U.S. Census Bureau (2013).
10. The disability status is not necessarily caused by work but is identified by the respondent in a battery of questions about employment status.
11. 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 nonwhite), 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 three-digit occupation group, either the SCF case was matched to a neighboring occupation group, or the match was made at the level of the two-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.

12. 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.
13. Attendance and completion in the SCF are constructed from two variables. The attendance variable asks (separate for respondent and spouse) the highest level of school attended, including four possible responses for college (one, two, three, or four 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 with 10 options, including associate's, bachelor's, master's, and a variety other advanced degrees.

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