Student Loans and Life Cycle Decisions

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Objective

The present study explores the impact of student loan debt on decisions related to home ownership, marriage, and family size. The following specific research questions are addressed: 1. How are the home purchase decisions of recent college graduates impacted by type and amount of student loan debt that they possess? 2. Among homeowners, what effect does student loan debt have on home purchase amount and equity position in the home? 3. What effect does student loan debt have on family formation and growth, specifically detailing timing of marriage and children? Sub-analyses will also be conducted to differentiate based on loan type (and degree to which multiple borrowing sources are leveraged) and explore the impact of specific support programs such Pell grants. By differentiating between the various means of education funding, the general impact of different products or programs available to students can better be explored.

Significance

In recent years, student loan debt has climbed to become the second highest category of consumer debt behind mortgage debt. Student loan debt reached an all-time high with an average loan balance of $35,512 per student in mid-2015 and roughly 70% of students indicated graduating with some debt. [1] Factors such as the rising costs associated with obtaining a degree, coupled with flagging support programs have contributed to this increased reliance on borrowing to cover critical education expenses. [2, 3] Previous studies have noted decreased economic stability associated with student loan debt, and there is evidence that high levels of student loan debt might have an impact on degree attainment, school program and career choices, and later borrowing decisions. [3, 4, 5]

Methodology

In the first set of regressions, we employ a logistic framework to regress the binary independent variable indicating if the respondent had student loans, to the binary dependent variable indicating if the respondent delayed their home/marriage/child decision due to the financial cost of education. A logistic model with a maximum likelihood estimator is appropriate because it models the probability of a yes outcome (indicating the respondent answered yes to the survey question) given the independent regressor and the control variables.

$$\Pr(decisiondelay \neq 0 \mid hadundergradloans) = \frac{\exp(\beta * hadundergradloans)}{1 + \exp(\beta * hadundergradloans)}$$

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In the second set of regressions, we use an instrumental variable to control for the endogeneity problem inherent in student loan variables in survey data. We use the percent increase in tuition in the state the student attended college as an instrument for the following two reasons: the percent increase is correlated with the amount of debt a student takes out for college (cumborrowundergrad) and is not correlated with the unobservable characteristics of the individual that impacts homeownership.

IV Probit uses a maximum likelihood estimator and is appropriate when you have endogenous continuous independent variables and dichotomous dependent variables. We regress homepurchase, whether the respondent had purchased a home during the four-year window, on the cumulative student loan borrowing amount, with appropriate control variables.

$$homepurchase_{12} = \beta_0 cumborrowundergrad + \beta_1 controls + u_i$$

$$cumborrowundergrad = \alpha_1 tuitionpctchange + v_i$$

Homepurchase_12 is defined as

$$homepurchase_{12} = \begin{cases} 1 \ if \ respondent \ purchased \ a \ home \ between \ 2009 \ and \ 2012 \\ 0 \ if \ respondent \ already \ owned \ or \ did \ not \ purchase \ a \ home \end{cases}$$

Cumborrowundergrad is the cumulative amount the respondent borrowed for their baccalaureate education. Tuitionpctchange, as defined above, is the instrumental variable defined as the percent increase in in-state tuition in the state the respondent attended college. We control for race, gender, income, age, marriage status and dependency status.

Data Description

The 2008:2012 Baccalaureate and Beyond Study conducted by the NCES within the U.S. Department of Education studies a sample of bachelor's degree recipients' labor market experiences from graduation (2008). Of the 137,800 students selected for the sample in2008, roughly 17,000 were determined eligible for the dataset. The respondents were initially surveyed in 2009, one year after graduation, and again interviewed four years after graduation in 2012. The level of attrition from 2009 to 2012 is 9.7% (1,556 observations dropped).

To prepare the data for our analyses, we performed the following “data cleaning”: (1) merged the 2008 panel data with the 2012 panel data, losing 1,556 observations to attrition, (2) using a complete case approach, only included respondents in our analyses who did not have any missing data for the variables we were regressing (see N in appendix regression tables), (3) created discrete income and student loan categories useful for logit/probit regressions, (4) created age variables for the respondents under 60 and for the respondents under 30, who we call “traditional students”, and (5) merged the tuition percent increase information with the panel dataset to use for instrumental variable regressions.

Results

Logit Regression Results

In the first set of regressions, we regress the binary delay dependent variable (home delay, marriage delay, child delay) on having undergraduate student loans, with control variables for income, race, age, gender, marriage status and dependency status. See Table 2 in the appendix for a comprehensive table of results

Our finding in this section of the paper is that having undergraduate student loans is associated

with delays in all three life cycle decisions by the following: you are 109% more likely to delay purchasing a home, 72% more likely to delay marriage, and 75% more likely to delay having a child. Note that if we restrict our sample to only respondents who are under the age of 30, these results do not change significantly.

We divide the income variable into categories based on the Pew Research Center's income class categories: category 1 is 0-24,000 (note that there are roughly 900 respondents who reported no income in 2011), category 2 is 24,001-73,000, category 3 is 73,001-150,000, and category 4 is anything above 150,001. Being a respondent in income category 2 is associated with a 23% decrease in home purchase delays, relative to being in the low-income category 1 group. A respondent in category 3 is associated with a 64% decrease in home purchase delays, relative to the low-income category 1 group, and a respondent in the high-income category 4 group is associated with 75% decrease in home purchase delays. As expected, a respondent who is married at the time of the 2012 panel interview is 25% less likely to delay their home purchase.

The same trends apply to the marriage and child-rearing decision, though on a smaller magnitude. A respondent with undergraduate student loans is 72% more likely to delay marriage and 75% more likely to delay having children. The same trends apply for the income categories – if you are in the middle-income category (income_cat2), you are 32% less likely to delay marriage when compared to the low- income category 1 group.

In a subsample of traditionally aged college graduates (restricting the sample to those under 30), already having a dependent at the time of the 2012 panel interview makes the respondent49% less likely to delay the decision to have a child. Including the non-traditional students in the regression (all ages below 60), having a dependent at the time of the interview makes the respondent 52% less likely to delay having another child.

Probit Regression Results

We conducted a Wald Test to determine the exogeneity of the instrumented variable cumborrowundergrad in the homepurchase regression. We reject the null hypothesis of no endogeneity at the 0.001 level. Note that the cumborrowundergrad instrumented variable is not endogenous (fail to reject) on homedelayduetosloan. However, it is endogenous when using homepurchase as the dependent variable.

Initial IV probit results are attached in Table 3 in the appendix. Further analysis is required, but the initial results trend in the direction that we expect.

Conclusion

This paper estimates the effects of student loan debt on major life decisions, including homeownership, marriage decisions, and the decision to have a child. We use a logistic regression framework with maximum likelihood estimators to analyze binary yes-no decisions reported by the panel respondent.

After, we instrument the cumulative amount borrowed with tuition percent increases in the respondent state to remove endogeneity and run a series of instrumental variable probit regressions. We find that having student loan debt significantly postpones homeownership, marriage, and child-rearing, even after controlling for income level, race, age, marriage status, and dependency status.

Table 1: Logit Regression Results

	(1) homedelay	(2) marriagedelay	(3) childdelay
main			
hadundergrloan	2.356***	1.937***	1.744***
	(12.35)	(8.04)	(7.66)
age_trad	1.080***	1.130***	1.116***
	(3.48)	(4.93)	(4.80)
income_cat2	0.815**	0.698***	0.843*
	(-2.99)	(-4.64)	(-2.41)
income_cat3	0.347***	0.331***	0.473***
	(-6.31)	(-5.09)	(-4.34)
income_cat4	0.212*	1	0.0290***
	(-2.44)	(.)	(-4.74)
hispanic	1.177	1.832***	1.393**
	(1.32)	(4.40)	(2.61)
asian	0.641*	0.743	0.611**
	(-2.45)	(-1.50)	(-2.65)
black	1.021	1.142	1.152
	(0.11)	(0.69)	(0.78)
white	0.726*	0.604**	0.692*
	(-2.06)	(-2.95)	(-2.32)
female	1.013	1.054	1.185*
	(0.19)	(0.67)	(2.37)
married	0.796	0.248***	0.878
	(-1.67)	(-6.17)	(-0.90)
depany	0.882	0.898	0.537***
	(-0.79)	(-0.54)	(-3.59)
N	10360	10280	10330

Exponentiated coefficients; t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 2: Instrumental Variable Probit Regression Results (Initial)

	(1) homepurchase	(2) homepurchase	(3) homepurchase
homepurchase			
cumborrowu~d	1.000***	1.000***	1.000***
	(-6.04)	(-4.67)	(-6.10)
age_trad		1.087***	1.084***
		(6.40)	(6.21)
hispanic		0.798*	0.819*
		(-2.08)	(-1.99)
asian		0.678**	0.675**
		(-3.18)	(-3.03)
black		0.989	1.019
		(-0.06)	(0.10)
white		0.983	0.958
		(-0.18)	(-0.45)
female		1.141***	1.171***
		(3.33)	(3.89)
income_cat2			1.427
			(1.76)
income_cat3			1.711
			(1.37)
income_cat4			2.066
			(1.56)
N	9410	8680	8680

Exponentiated coefficients; t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

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