Student Loan, Financial Literacy, and Homeownership among Millennials in the United States

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Objective and Significance

Homeownership rates among young adults has dramatically lowered since the end of the Great Recession. Goodman and Mayer (2018) examined homeownership and the American dream and pointed to home ownership rates of 25-34 year olds holding fairly steady at ~45% in 1985 and 1995, increasing to 49 percent in 2005, and then decreasing to 34.5 percent in 2015. While 2005 represented a peak homeownership year for most age groups, younger households were impacted by much steeper declines. Four reasons for this change in homeownership are often explored: student loan debt, tightening of available credit, shift in attitudes towards homeownership, and the effects of the Great Recession (Goodman & Mayer, 2018; Goodman, Pendall, & Zhu, 2015).

Of those four reasons, we are most interested in student loans. Houle and Berger (2015) found limited evidence that student loan debt is related to homeownership when they examined actual housing decisions using the National Longitudinal Survey of Youth. Meanwhile, Mezza, Ringo, Sherlund, and Sommer (2018) found that a $1,000 increase in student loan debt lowers, by 1.8 percent, the homeownership rate when looking at credit bureau data and Pell Grand and federal student loan information of individuals.

The purpose of our study is to explore the role that student loans have on the timing of anticipated homeownership of millennials in the United States, not whether millennials plan or do not plan on being a homeowner. To the best of our knowledge, this has not been explored *ex ante* before. We explore this by collecting primary data of millennial households across the United States and ask them questions regarding their interest in homeownership, reasons for wanting or not wanting to be a homeowner, and the timing of this home purchase. We also ask them detailed information regarding their student loan debt. Regarding the timing of the purchase, we ask this in two different ways: one is their ideal time to purchase; two is when they think they will buy a home.

Method

We designed and implemented an online survey in 2016 that had participants in every state in the U.S. The respondents were eligible to complete the survey if they 1) agreed to participate in the research study through the informed consent and 2) report their birth year within year 1981 to 1997, which represents the *Millennial Generation*. As suggested by Garson (2016), we included cross-check items and queries at different points of the

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survey and in different formats in order to verify the data consistency. Specifically, our survey incorporates two cross-check items on respondent age and household annual income: self-reported age information at the beginning of the survey was compared to the birth year reported by respondents at the end of the survey; and self-reported annual household income (exact dollar amount) at the beginning of the survey was also compared to the income level (dollar amount range) at the end of the survey. Respondents who failed to answer consistently for either age or income cross checks and queries were excluded in the analysis. After data cleaning, the dataset contains 1,482 millennial adults living in the U.S.

Since this research aims to explore the determinants of millennial adults' expectation to purchase housing, we further restrict our sample to those respondents who indicated willingness to buy a home at some point in the future and those who are currently in the process of buying a home.

The dependent variable is an indicator of the respondent's expectation to purchase a housing property in the future. Our survey has two corresponding questions: 1) "When do you *THINK* you will buy a home?" and 2) "When would be your *IDEAL* time buy a home?" Thus, the dependent variable in this research include two measurements which are non-negative integer:

1. The year the respondent *THINK* to buy a home – 2016 (the survey year)

2. The *IDEAL* year to buy a home reported by the respondent – 2016 (the survey year)

In terms of independent variables, we are particularly interested in the effect of student loan situation on millennial adults' expectation to buy a home. Student loan situation are measured in three categories based on answers reported by respondents in the survey: "Never had student loan when left school", "Paid off all student loan" and "Still have student loan now". Other key covariates include respondent's financial literacy, investment risk tolerance level, reasons to buy a home, and health status. Besides, socio-economic variables such as age, marital status, gender, have children or not, education background and income are also included. Specifically, Lusardi and Mitchell's (2007) three items on financial knowledge including concepts of inflation, interest, and diversification of risk are utilized to measure the construct of financial literacy. The covariates are aggregated to household level if the respondent has a spouse or partner. Furthermore, based on 2011-2017 Housing Price Index (HPI) published by Federal Housing Finance Agency (FHFA, 2018), three HPI categories (i.e., low, medium, high) are created in order to account for the regional fixed effects in terms of housing price at state level since our survey reached respondents nationwide. Table 1 shows descriptive statistics of the variables we used. In our sample, 49.46% households left school without any student loan, 43.09% still had student loans, and 7.45% had already paid off all student loans.

Since the dependent variable is non-negative integer which is not continuous, traditional OLS estimation could lead to inflated significance (Type I error) although it is still unbiased (Gardner, Mulvey, & Shaw, 1995). In this case, Poisson regression is a natural model choice for count data or non-negative integer (Cameron & Trivedi, 2013). It has the same assumptions as classical model with one exception that the dependent variable is assumed to be Poisson distributed. However, Poisson regression model has a restrictive assumption such that the variance of the dependent variable distribution equals its mean, namely the equidispersion (Greene, 2003). When the distribution's variance is greater than the distribution's mean, i.e. overdispersion, Poisson regression fails to satisfy the assumption of homoskedasticity. In this case, a statistical test of overdispersion is necessary for Poisson regression. If overdispersion is detected, the Negative Binomial (NB2) model should be implemented instead of Poisson regression model since it relaxes the equidispersion assumed in Poisson model and becomes a more general mode for count data (Cameron & Trivedi, 1986; Gurmu, 1991; Gurmu & Trivedi, 1992; Lee, 1986). Based on the fact that the variance is greater than the mean of the dependent variables reported in Table 1, we employ OLS, Poisson and Negative Binomial models in this study.

Results

Table 2 shows the OLS, Poisson and Negative Binomial estimation results using two dependent variables *THINK* and *IDEAL*. When *THINK* is used as dependent variable, most coefficients have expected signs. Compared to households who never had any student loans, the households with student loans expect to buy a home later no matter whether the loan has been paid off or not, after controlling other covariates. Financial literacy, coded as a dummy variable equal to1 if answers all three questions correctly and zero otherwise, and its coefficient is positive and statistically significant, indicating that the respondent with higher financial literacy prefer to purchase a primary residence later. It might be because they tend to apply their financial knowledge (e.g., loan rate fluctuation, housing market risk) into decision making so they have a relatively longer expectation on home purchasing. Besides, if the respondent has below-average investment risk tolerance level, he/she, as a conservative investor, will choose to purchase a home later. Also, if respondent rank "Renting is wasting money" as the top reason to buy a home, then he/she will purchase a home as soon as possible. Somewhat surprisingly, the regional fixed effects represented by housing price index (HPI) are all insignificant. It may be the case that we three categories are not enough to fully distinguish statistical differences in home appreciation; we will explore this in future drafts.

Additionally, below-average health status significantly delays a household's expectation to buy a home. It makes sense since household with poor health condition would have to spend more budget on medical bill instead of home mortgage so home purchasing is somewhat delayed. When it comes to demographic characteristics, younger millennial households (relative to older millennials), households with higher income, and more educated households tend to want to buy a home as soon as possible. While the households with children and sing female households tend to delay their home purchasing.

However, when the dependent variable uses the measurement of *IDEAL* time to buy a home, there are fewer significant coefficients with smaller magnitudes reported than the estimation using *THINK*. Although the two dependent variables *THINK* and *IDEAL* have a relatively high correlation reported at 0.77, respondents might have different underlying cognitions on the two measurements. When answered "when do you *THINK* to buy a home", people may spend some time to perform the actual thinking behavior based on his/her current financial situation, expectation on housing market, and other potential factors so as to give an estimated time. While when answering "when if your *IDEAL* time to buy a home", people may place themselves in a perfect state so it is much easier for them to report a time without considering too much about the reality. Thus, the covariates, which are based on facts stated/answered by the respondents, might fail to have enough explanatory power to affect the dependent variable *IDEAL*.

In order to examine the reason why estimation results differ using these two dependent variables, we will run an auxiliary estimation using $\Delta = THINK - IDEAL$ or $|\Delta|$ as dependent variable with the same covariates. Further results will be provided in the formal paper.

Conclusions

Young adults have treated student loans as a major impediment to home purchasing (Stone, 2012). Limited studies examined the link between student loan debt and the desire to purchase a home and this study adds a new literature on this topic. This research aims to determine the factors which have impacts on millennial adults' expectation to buy a home with special focuses on their student loan situation and financial literacy. Instead of conducting *ex post* analysis using homeownership (discrete or % rate) as dependent variables like previous research, this research is *ex ante* analysis emphasizing on the expectation to buy a home where the dependent variables are measured in two different ways in terms of respondent's cognitions. We conclude that having student loans when leaving school depresses millennials' expectation to buy a home even if the loan has been paid off. Another important conclusion drawn is that households with higher financial literacy would like to purchase a home later than those with lower financial literacy.

For policy makers, our results suggest that promoting student loan forgiveness might help increase the homeownership. Furthermore, slowing down the tuition growth may also help students become a homeowner in a shorter time period. Increasing financial knowledge, through financial education activities, may delay home ownership. This, on its own, is viewed as neither good or bad, further research would need to be done looking at financial well-being of millennials who purchased homes earlier and later.

In terms of methodology, we found that using two similar (correlated) measurements on respondents' expectation to buy a home generates distinct estimation results in terms of coefficient's significance and magnitude. This interesting finding provides researchers some insights such that: the understanding and cognitions of respondents toward a survey question might differ in response to the diversity of literal expression of the question.

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Table 1. Descriptive Statistics (N=1,114)

	Mean	Std. Dev.	Percentage
Dependent Variables (DV):			
THINK	6.43	6.06	
IDEAL	4.95	4.76	
Independent Variables:			
Student loan situation:			
Never had student loan			49.46%
Paid off student loan			7.45%
Still have student loan			43.09%
Financial Literacy (=1: all correct)			30.88%
Risk Tolerance Level:			
Below Average Risk Tolerance			36.98%
Average Risk Tolerance			46.95%
Above Average Risk Tolerance			16.07%
Top reason to why do you want to buy a home			
Don't want to move			17.15%
Job Stability			35.46%
Good Credit			10.32%
Renting is wasting money			24.42%
Investment			12.66%
Housing Price Index Regions:			
Low HPI			29.08%
Medium HPI			30.34%
High HPI			40.57%
Health Status:			
Below Average Health Status			1.71%
Average Health Status			12.03%
Above Average Health Status			86.27%
Demographics:			
Married			54.94%
Female			55.66%
White			78.01%
Have Children			56.82%
Income Level ($10k)	7.23	6.70	
Education (At least Bachelor degree)			44.52%

Table 2. OLS, Poisson and Negative Binomial Estimation (Selected) Results for THINK and IDEAL Models

	DV=THINK			DV=IDEAL		
	OLS	Poisson	NB2	OLS	Poisson	NB2
Student Loan Situation (base=No Loan)						
Paid off loan	**1.229***	**0.198*****	**0.228****	0.850	**0.176*****	**0.218****
	(0.693)	**(0.046)**	**(0.093)**	(0.532)	**(0.052)**	**(0.095)**
Still have student loan	**1.016*****	**0.165*****	**0.168*****	0.358	**0.077****	0.076
	(0.383)	**(0.026)**	**(0.052)**	(0.294)	**(0.030)**	(0.053)
Financial Literacy Ability	**0.812****	**0.127*****	**0.095***	-0.091	-0.017	-0.021
	(0.398)	**(0.027)**	**(0.053)**	(0.305)	(0.032)	(0.055)
Risk Tolerance Level (base=Average)						
Above-average	0.365	0.058	0.063	-0.119	-0.030	-0.018
	(0.511)	(0.037)	(0.070)	(0.392)	(0.042)	(0.072)
Below-average	**1.250*****	**0.189*****	**0.186*****	0.443	**0.086*****	0.083
	(0.402)	**(0.027)**	**(0.054)**	(0.309)	**(0.031)**	(0.055)
Top reason is “Renting is wasting money”	**-1.542****	**-0.247*****	**-0.251*****	**-1.279*****	**-0.289*****	**-0.292*****
	(0.610)	**(0.042)**	**(0.083)**	**(0.468)**	**(0.050)**	**(0.085)**
Household Health (base=Average)						
Above Average	**-1.072***	**-0.136*****	**-0.151****	-0.592	**-0.113*****	-0.085
	(0.561)	**(0.035)**	**(0.073)**	(0.431)	**(0.042)**	(0.076)
Below Average	**3.626****	**0.379*****	**0.371****	0.427	0.071	0.087
	(1.436)	**(0.075)**	**(0.182)**	(1.103)	(0.101)	(0.193)
HPI Fixed Effect (base=Low HPI Region)						
Medium HPI Region	0.293	0.042	0.024	0.086	0.013	0.002
	(0.452)	(0.030)	(0.061)	(0.347)	(0.035)	(0.063)
High HPI Region	-0.013	-0.008	-0.021	-0.234	-0.054	-0.049
	(0.440)	(0.030)	(0.060)	(0.338)	(0.035)	(0.061)
Marital Status (base=Single Male)						
Married	**-1.996*****	**-0.319*****	**-0.346*****	**-1.122****	**-0.220*****	**-0.260*****
	(0.690)	**(0.046)**	**(0.093)**	**(0.530)**	**(0.053)**	**(0.097)**
Partnered	-0.349	-0.056	-0.069	**-1.079****	**-0.206*****	**-0.241****
	(0.708)	(0.046)	(0.095)	**(0.544)**	**(0.054)**	**(0.097)**
Single Female	**1.283***	**0.152*****	0.131	0.248	0.040	0.020
	(0.680)	**(0.042)**	(0.089)	(0.522)	(0.049)	(0.092)

Note: ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels.

