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Article

Reverse Mortgage Participation in the United States: Evidence from a National Study

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Abstract: This paper uses the most recent wave of a nationally representative dataset to examine the factors associated with elderly homeowners' decision to obtain reverse mortgage loans. The findings of this study suggest that very few homeowners participated in the reverse mortgage market, and homeowners younger than 67 were less likely to have reverse mortgage loans. However, homeowners who were risk averse, and homeowners in the two highest quartiles of net worth were more likely to have reverse mortgage loans. Further analyses reveal that among the reverse mortgage participants, homeowners with long-term care insurance coverage were less likely to have reverse mortgage loans. Implications for financial economists, financial planners, policy-makers, and scholars of retirement economics are included.

Keywords: reverse mortgage; household wealth; financial decisions; retirement planning

JEL Classification: D91, E21, G21, J14, R21

1. Introduction

Reverse mortgage (RM) loans are hybrid financial products that allow elderly homeowners to borrow against the collateral of their housing wealth. However, in contrast to a regular loan, the key element of a reverse mortgage contract is that the homeowner is not required to pay off the debt or make interest payments on the loan as long as he or she chooses to stay in the house. A reverse mortgage loan has to be paid off only if and when the homeowner decides to either move out or sell the house, or when the last surviving borrower of the loan passes away. Additionally, reverse mortgages offer an option for low-income homeowners, who would otherwise not qualify for home equity loans, to borrow money by converting their housing equity [1]. Reverse mortgage loans can provide a financial buffer for elderly households that lack adequate retirement savings, or for those who are severely credit constrained. An alternative to borrowing against housing wealth would be for the elderly to sell their homes; the benefit of taking out a reverse mortgage loan instead is that the elderly homeowners do not have to move out or sell their homes to meet their financial obligations. The seminal paper on this subject by Rasmussen, Megbolugbe, and Morgan [2] suggests that approximately 80% of older homeowners could benefit from taking out a reverse mortgage loan. Although the market for reverse mortgages has been growing steadily, it is still very small, with only about 2% of the eligible elderly homeowners reporting borrowing against their housing wealth [3,4]. Nakajima and Telyukova [4] find that households with low incomes, modest wealth, and poor health were most likely to benefit from reverse mortgages.

In addition to the financial liquidity afforded to otherwise financially constrained consumers, reverse mortgages also offer other benefits. According to a study by Apgar and Di [5], a reverse mortgage provides a convenient alternative to many financially struggling older homeowners who are unwilling to downscale by selling their larger homes and moving to smaller homes. The trend of

increasing number of households retiring with inadequate savings is expected to continue, as many of the employer-sponsored retirement plans have moved from a defined benefit plan (in which employers guarantee a retirement pension) to a defined contribution plan (in which employers match employee contributions up to a point, but the responsibility for saving for retirement rests with the employee). Due to the two large stock market downturns over the past 15 years, many recent retirees may look favorably upon reverse mortgages as a way to supplement their retirement income needs [6–8]. Low participation rates of eligible households in the reverse mortgage market could be due to lack of information or to homeowners' suspicion of such products. Additionally, Epstein [9] argues that, although reverse mortgages provide substantial liquidity, these products may not be sufficient to provide households with a sustainable retirement income. The Great Recession of 2008 also showed that the volatility then present in the real estate markets could lower the actual principle of the house to a value lower than the amount of the loan taken out by many elderly homeowners. The Epstein [9] study also finds that tapping into the housing equity through a reverse mortgage could be suitable for households in sudden need of liquidity resulting from the death of a spouse or due to deteriorating health.

There are two other important considerations for households deciding whether to take out a reverse mortgage. First, any money drawn potentially reduces inheritance that the elderly individuals would otherwise have given as a bequest. Second, converting housing assets to cash could adversely affect Medicaid eligibility for many households, since housing is exempt from Medicaid's eligibility calculator, while cash is not.

Features of a Reverse Mortgage: Reverse mortgage (RM) loans can be taken as a lump sum payment, as a fixed periodic annuitized set of payments, as a line of credit, or as a combination of any of these three types of distributions [10]. In contrast to home equity loans, reverse mortgage participants do not have to pay interest on the loans they borrow. The amount of reverse mortgage loan that a homeowner can receive depends on the prevailing interest rates, and thus the amount of RM that is available to an individual is inversely proportional to the prevailing interest rate. Therefore, homeowners can borrow more when interest rates fall, and can borrow less when interest rates rise. The amount of RM loan available to a borrower also depends on the borrower's age and the value of the house. The largest and most popular type of reverse mortgage, known as a Home Equity Conversion Mortgage (HECM), is administered by the Federal Housing Administration (FHA). HECM reverse mortgage loans account for more than 90% of all reverse mortgage loans originating in the American markets [11]. HECM mortgages are available only to homeowners age 62 or older who live in their houses. The HECM applicants have to go through a mandatory HUD-approved homebuyer counseling session to be eligible for HECM loans.

The purpose of this study is to examine the determinants of elderly households' participation in the reverse mortgage market. Specifically, the study examines whether factors suggested in previous literature, including households' socioeconomic status, health, and marital status, as well as bequest motives, affect their decision to participate in the reverse mortgage market. In addition, the paper examines whether behavioral factors, such as the households' financial planning horizon, risk aversion, perceived health status, and longevity expectation, are associated with their decision to look into a reverse mortgage. This paper also examines whether having long-term care insurance is negatively associated with the demand for reverse mortgages among elderly homeowners.

2. Methods

2.1. Data

This study uses the 2012 wave of the Health and Retirement Study (HRS), a nationally representative dataset of elderly households age 50 or older, for it empirical analysis. The HRS dataset is maintained by the University of Michigan, and is funded by the Social Security Administration and the National Institute of Aging (a division of the NIH). The HRS dataset contains information on the

respondents' participation in the reverse mortgage market, household assets, and the demographic and socio-economic characteristics of the respondents. The HRS data also includes information on retirement planning, health, and behavioral characteristics of households. This study included 10,625 respondents who were primary financial respondents. For this study, we use homeowners age 62 or older, since the minimum age to qualify for an HECM reverse mortgage loan is 62. As shown in Table 1, a very small percentage of the respondents reported participating in a reverse mortgage contract. Therefore, to make the sample more nationally representative and make the empirical analyses of this study more robust, the data were weighted using information provided by HRS to account for the complex sample design of the dataset. After weighting the data appropriately as suggested by HRS [12], these 10,625 observations represented over 40 million respondents.

Table 1. Descriptive Statistics.

Variables	Mean, %	Have RM = 1	Have RM = 0	Chi^2 Test
	n = 10,625			
Have Reverse Mort.	1%, 104			
Avg. Loan Amt.	$45,884			
	(SD = $88,343)			
Median Loan Amt	$24,000			
Age Q1 (62–67 years)	26%	9%	26%	5.152 ***
Age Q2 (68–73 years)	26%	36%	26%	3.523 *
Age Q3 (74–79 years)	24%	42%	24%	3.439 **
Age Q4 (80–104 years)	24%	13%	24%	0.451
Female	58%	58%	58%	5.176
White	74%	80%	71%	1.878 **
Num. of children	3.1	3.5	3.1	1.982 *
<High School	24%	20%	24%	0.736
High School	34%	30%	34%	0.132
Some College	21%	28%	21%	4.591 ***
College	10%	12%	10%	2.711 **
Graduate	11%	11%	11%	1.498
Married	57%	76%	57%	4.157 **
Employed	11%	12%	11%	3.394
Income Q1	25%	11%	25%	11.355 ***
Income Q2	26%	25%	26%	3.341
Income Q3	24%	33%	24%	5.403 ***
Income Q4	25%	31%	25%	4.829 *
ADL	10%	4%	10%	5.701 ***
Net worth Q1	25%	6%	25%	10.917 ***
Net worth Q2	25%	19%	25%	4.931
Net worth Q3	25%	35%	25%	5.746 ***
Net worth Q4	25%	43%	25%	9.570 ***
Homeowner	79%			
Total Non-housing Wealth	$253,421.20 (SD = $856,104)	$106,226	$251,272	5.233 ***
Total Housing wealth	$120,865.50 (SD = $231,240)	$189,651	$120,171	7.432 ***
Excellent health	9%	12%	9%	4.171
Fin. Plng Horizon > 5 years	5%	8%	5%	2.653
Prob. Bequest	63%	81%	63%	11.655 ***
Prob. Live beyond 75	63%	67%	63%	1.141
Risk Averse	66%	78%	64%	6.532 **
Have LTCI	13%	5%	14%	5.273 ***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

2.2. Dependent Variable

The primary dependent variable of interest is whether the respondents had taken out reverse mortgage loans. The variable is binary and coded as 1 = have reverse mortgage or 0 = have no reverse mortgage. The second dependent variable is the amount of the money borrowed against

home equity by the household. This variable has been log-transformed in order to reduce the effect of residual heteroscedasticity.

2.3. Independent Variables

The independent variables for this study include the variables of interest, as well as other control variables that were found in the prior literature to be significantly associated with the likelihood of having a reverse mortgage loan. The variables have been grouped into the following sub-categories:

Financial and Behavioral Characteristics: This sub-category includes the following variables: whether the respondents had a financial planning horizon of five years or more (1 = YES; 0 = NO); respondents' self-reported probability of leaving a bequest; self-reported excellent health (1 = YES; 0 = NO); self-reported probability of living beyond 75 years; and risk aversion. Following the method suggested in Barsky *et al.* [13] and Neelakantan [14], the binary variable for risk aversion was constructed from the responses to the income questions included in the HRS. The four binary variables for the total net worth quartiles, and the log value of non-housing wealth are also included.

Human Capital: The human capital related characteristics included in the econometric model of this analysis include educational attainment, income, and employment status. The model also controls for the respondents' Activities of Daily Living (ADL) needs.

Demographic: The demographic variables included in this study are age, gender, race, and marital status.

3. Analyses

Descriptive statistics of the sample are first computed along with the chi-squared test results for the mean differences, after weighting the data as a complex sample design. Next, a weighted probit model within the complex sample specification is used to estimate the predictors of respondents' decision to participate in the reverse mortgage market, after controlling for various characteristics of the entire sample of respondents [15]. As can be seen from the descriptive statistics presented in Table 1, a small proportion of respondents reported having reverse mortgages. In order to remove any potential bias that may arise because of the low rate of participation in reverse mortgages, an additional rare events logistic regression for small probability events is also estimated following the method suggested by King and Zheng [16]. A third model includes only the reverse mortgage participants. The log transformed amount of reverse mortgage loan is regressed using an ordinary least squares model (OLS) on the control variables. A test using variable inflation factors is computed as a robustness check for multicollinearity. All three models have been estimated using robust standard errors.

4. Results

4.1. Descriptive Statistics

Table 1 shows the descriptive statistics for this study. The results indicate that approximately 1% of the homeowners above the age of 62 had a reverse mortgage loan. Females accounted for 58% of the respondents, while 74% of the respondents were non-Hispanic whites. Educational attainment variables from Table 1 indicate that 58% of the respondents had educational attainment of high school or lower. Approximately 10% of the respondents were unable to perform two or more activities of daily living (ADL). Nearly, 13% of the respondents had long-term care insurance, and 79% of the respondents were homeowners. On average, the respondents reported a 63% probability of living beyond age 75. The chi-squared test results for the mean differences, after weighting the data as complex sample design, indicate that a significantly higher percentage of respondents with reverse mortgage loans were between ages 68 and 79. Additionally, a higher percentage of respondents who participated in the reverse mortgage market had educational attainment of some college or college. Similarly, when compared with respondents without a reverse mortgage, the reverse mortgage loan participants were married, and were in the top two quartiles of income and net worth. In addition,

a significantly higher percentage of the participants with reverse mortgage loans reported a higher probability of leaving a bequest. The respondents who reported having a reverse mortgage were also more risk averse on average than respondents who did not have a reverse mortgage. When compared with the non-participants (14%), a significantly lower percentage of reverse mortgage participants (5%) had long-term care insurance coverage.

4.2. Probability of Having a Reverse Mortgage Using Probit

The results in Table 2 show the weighted probit model for the likelihood of having a reverse mortgage after adjusting for complex sample design. The results indicate that age was significantly associated with having a reverse mortgage. Interestingly, the youngest group of this aging cohort reported a lower likelihood of having reverse mortgages. When compared to the reference group of respondents who were 80 years of age or older, the respondents in the first quartile of age (62–67) were less likely to have a reverse mortgage. The married couples were also less likely to have a reverse mortgage. Educational attainment was significantly associated with the reverse mortgage participation of households. The results indicate that compared to those who had an educational attainment of lower than high school, respondents with educational attainment of some college or college were significantly more likely to participate in the reverse mortgage market. Respondents who reported having problems with two or more activities of daily living (ADLs) were significantly less likely to have a reverse mortgage. Similarly, when compared with respondents in the first quartile of net worth, respondents in the third and fourth quartiles of net worth were more likely to have a reverse mortgage. Interestingly, the risk averse respondents also had a higher likelihood of participating in a reverse mortgage. The likelihood of having reverse mortgage was negatively associated with respondents' possession of a long-term care policy.

Table 2. Probit for having Reverse Mortgage Loan.

Type	Variables	Coefficients	Marginal Effects	Robust SE	Significance
Demographic	Age Q1	−0.414	−0.041	0.068	***
	Age Q2	0.252	0.062	0.072	
	Age Q3	0.429	0.044	0.353	
	Female	−0.072	−0.011	0.041	
	White	0.186	0.023	0.107	
	Married	−0.271	0.024	0.093	***
	Num. of children	0.023	0.002	0.019	
Human Capital	High School	0.019	0.001	0.073	
	Some College	0.119	0.014	0.044	**
	College	0.133	0.018	0.066	*
	Graduate	0.219	0.128	0.128	
	Excellent Health	0.122	0.016	0.019	
	ADL Problem	−0.285	−0.026	0.037	***
	Employed	0.084	0.009	0.058	
	Income Q2	0.243	0.048	0.244	
	Income Q3	0.285	0.029	0.233	
	Income Q4	0.299	0.033	0.273	
Financial and Behavioral	NW Q4	0.206	0.036	0.091	**
	NW Q3	0.200	0.033	0.091	**
	NW Q2	0.006	0.001	0.099	
	Long Fin. Pln Horizn	0.133	0.018	0.181	
	Prob. Bequest	0.003	0.001	0.300	
	Risk Averse	0.048	0.010	0.009	***
	Have LTCI	−0.475	0.047	0.156	***
	Prob. Live >75 years	0.004	0.000	0.004	
	Intercept	−2.465		0.126	***
DF	10,572				
F-Stat	15.94 ***				

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

4.3. Probability of Having a Reverse Mortgage Using Rare Events Logit

The results in Table 3 show the results from the rare events logit that was estimated for this study. The results indicate that age was significantly associated with having a reverse mortgage. The youngest group of this aging cohort reported a significantly lower likelihood of having reverse mortgages. When compared to the reference group of respondents who were 80 years of age or older, the respondents in the first quartile of age (62–67) were less likely to have a reverse mortgage. The married respondents were also less likely to have a reverse mortgage. Educational attainment was significantly associated with reverse mortgage participation of households. The results indicate that respondents with educational attainment of some college or college had a significantly higher likelihood of participating in the reverse mortgage market. Respondents who reported having problems with two or more activities of daily living (ADLs) had a lower likelihood of having reverse mortgages on their homes. Similarly, when compared with respondents in the first quartile of net worth, respondents in the third and fourth quartiles of net worth were more likely to have a reverse mortgage. The risk averse respondents also had a higher likelihood of having a reverse mortgage contract. The likelihood of having a reverse mortgage was negatively associated with respondents who had a long-term care policy.

Table 3. Rare event logit for having Reverse Mortgage Loan.

Type	Variables	Coefficients	Robust SE	Significance
Demographic	Age Q1	−2.744	0.706	***
	Age Q2	0.482	0.375	
	Age Q3	0.783	0.535	
	Female	−0.141	0.230	
	White	0.821	0.632	
	Married	−0.506	0.227	**
	Num. of children	0.058	0.053	
Human Capital	High School	0.205	0.355	
	Some College	0.708	0.255	**
	College	0.709	0.366	*
	Graduate	0.266	0.542	
	Excellent Health	0.643	0.599	
	ADL Problem	−1.209	0.116	***
	Employed	1.038	0.958	
	Income Q2	0.168	0.362	
	Income Q3	0.209	0.370	
	Income Q4	0.471	0.544	
Financial and Behavioral	NW Q4	2.186	0.987	**
	NW Q3	2.256	0.941	**
	NW Q2	1.456	0.975	
	Long Fin. Pln Horizn	0.022	0.398	
	Prob. Bequest	0.004	0.003	
	Risk Averse	0.366	0.138	**
	Have LTCI	−1.105	0.506	**
	Prob. Live >75 years	0.007	0.008	
	Intercept	−4.034	0.243	***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

4.4. Determinants for the Amount Borrowed

Table 4 shows the results of the weighted OLS regression results [1] for the amount of borrowing against equity by the reverse mortgage holders within the complex sample design framework. The results indicate that educational attainment of college or higher positively associated with the amount borrowed. Respondents who reported excellent health were also more likely to have a higher amount of borrowing. Net worth was positively associated with the amount of loan taken. Conversely, households with a private long-term care policy were negatively associated with the amount of loan taken.

Table 4. Weighted ordinary least squares regression for the amount borrowed by the Reverse Mortgage participants.

Type	Variables	Coefficients	Robust SE	Significance
Demographic	Age	0.038	0.044	
	Female	−0.038	0.077	
	White	0.401	0.655	
	Married	0.038	0.096	
Human Capital	High School	0.024	0.139	
	Some College	0.187	0.147	
	College	0.360	0.173	**
	Graduate	0.468	0.202	**
	Excellent Health	3.939	1.116	***
	ADL Problem	−0.09	0.061	
	Num of children	−0.002	0.012	
	Employed	0.045	0.076	
	Log Income	0.163	0.108	
Financial and Behavioral	Log Net worth	4.833	1.171	**
	Long Fin. Pln Horizn	0.227	0.187	
	Prob. Bequest	0.001	0.001	
	Have LTCI	−4.302	1.102	**
	Prob. Live >75 years	0.002	0.002	
	Intercept	4.407	1.043	**
Design DF	96			
R-squared	0.1693			

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

5. Discussions

Reverse mortgages provide an opportunity for individual investors to diversify their portfolio. One recent study by Salter and Pfeiffer [17] suggested that reverse mortgages, if used strategically, can work like an additional line of credit in case of financial emergencies. The Salter and Pfeiffer [17] study suggests that using reverse mortgages as a retirement planning tool can reduce the risk in an individual's investment portfolio and can reduce the longevity risk in a retiree's portfolio. The findings from the current study indicate that risk averse individuals were more likely to participate in reverse mortgages. The potential benefits of reverse mortgage in reducing risk within individual retirees' portfolios [17] create a discussion opportunity for financial advisers when providing investment recommendations to their risk averse clients. Reverse mortgages can also be used effectively as a tool for estate planning purposes. Life expectancy has increased over time, with many individuals living beyond 80. Therefore, when receiving bequests, the average age of the beneficiary children in

[1] A Variable Inflation Factor (VIF) test for multicollineariy is presented in the appendix. The VIF results do not indicate any multicollinearity in this regression model.

many cases will be older than 60. The elderly households could instead use reverse mortgages to borrow from their equity, and make intergenerational transfers to their children or grandchildren while they are younger and need the money more. Merton [18] has suggested greater potential for reverse mortgages to play this role in making intergenerational wealth transfers more efficient, practical, and enjoyable for elderly households. However, the low participation rate for reverse mortgage identified in this study can be attributed to people's lack of knowledge of the true utility of reverse mortgages as a retirement and estate planning tool [19]. Financial planners need to be aware of these potential advantages of reverse mortgage loans in order to advise their clients effectively regarding their retirement portfolios. Munnell [6] suggested that one reason for the small participation rate was that the currently available reverse mortgages were expensive. She suggested that the reverse mortgage market needed the government to take a more active role in the future, in providing guarantees or subsidies, in order to make the reverse mortgage market more efficient and liquid. Perhaps the creation of a secondary market for reverse mortgage loans could also increase liquidity and bring in greater industry participation in the RM market. Another interesting finding of this study was that having long-term care insurance coverage was negatively associated with having a reverse mortgage loan. This finding provides further support to Mitchell and Piggot's [20] findings that many people used reverse mortgages as a tool to meet their long-term care needs.

6. Conclusions

The results of this study reveal several interesting nuances in older homeowners' decision to have reverse mortgage loans. This study finds that households with individuals younger than 66 were less likely to take out reverse mortgage loans, while households in the two top quartiles of net worth were more likely to participate in reverse mortgages. It is possible that at a later stage in their retirement many households understand the potential inadequacy in their retirement savings and thus explore options, including reverse mortgages, to supplement their income later in retirement. Previous studies suggest that reverse mortgages could be useful financial products for people with modest savings, people with poor health, and unmarried people [2,4,9]. However, the results of this study indicate that households with a greater stock of human capital—higher net worth, better educational attainment, and higher income—were more likely to have reverse mortgages. From a policy perspective, more can be done to make reverse mortgages accessible to the eligible low-income households. Programs to educate lower income, low net worth, and less informed homeowners about the possibility of accessing a reverse mortgage loan could be very beneficial to qualified retirees.

Previous research suggests that although the personal residence accounts for the largest percentage of an elderly household's net worth, few people are willing to sell their homes and downscale in order to monetize their assets for use in retirement. A reverse mortgage provides an opportunity for those households that may not have sufficient liquid assets or financial savings to convert some of their housing wealth to cash without needing to move or sell their residences. As baby boomers—the largest cohort of our population—continue to retire, reverse mortgages have the potential to benefit a number of these homeowners. This provides an opportunity for financial planners, non-profits, the government, and advocacy groups for retirees to educate elderly households about the potential benefits and pitfalls of using reverse mortgages as a retirement tool. One limitation of this study was the small number of respondents who reported having reverse mortgage in the HRS dataset. Further research is needed to examine the awareness of and demand for reverse mortgage products, perhaps using a more targeted dataset that includes a large number of reverse mortgage participants.

Conflicts of Interest: The author declares no conflict of interest.

Appendix: VIF test for multicollinearity

Type	Variables	VIF
Demographic	Age	1.95
	Female	1.25
	Nhwhite	1.93
	Married	1.35
Human Capital	High School	2.70
	Some College	2.95
	College	2.08
	Graduate	1.65
	Excellent Health	1.36
	ADL Problem	1.37
	Employed	1.92
	Log Income	1.80
	Log Net worth	2.20
	Long Fin. Pln Horizn	1.23
	Prob. Bequest	2.57
	Have LTCI	1.37
	Prob. Live >75 years	1.13

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