# Reverse Mortgages: What Homeowners (Don't) Know and How it Matters

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**Abstract:** Reverse mortgages help elderly homeowners to unlock and consume home equity while continuing residing in their homes. Demand for reverse mortgage is far behind predictions. Based on a representative survey of U.S. homeowners aged 58+ we assess the role of product knowledge (literacy) for reverse mortgage demand. We find that awareness of the product is very high while knowledge is fairly low. Lack of product knowledge relates to low demand. Respondents that would benefit most from reverse mortgages (lower income, insufficient savings) are more likely to accept a reverse mortgage. But, those respondents do not have good knowledge about the product. They may not make an informed decision and fail to evaluate alternative retirement planning options. We find no effect of knowledge transfer on reverse mortgage demand. This result suggests that a way to increase reverse mortgage demand might be the reduction of the product's inherent complexity.

**JEL Classification:** D14, D81, G11, G21

**Keywords:** Reverse Mortgage Demand, Reverse Mortgage Knowledge, Reverse Mortgage Literacy

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# 1 Introduction

Reverse mortgages enable homeowners to liquidize and consume home equity without moving to another place. Initially, nine to eleven million households in the US were envisioned to demand reverse mortgages (Mayer and Simons, 1994a, 1994b; Rasmussen et al., 1995). Throughout the last years, reverse mortgage demand increased. But, with 582,000 HECM reverse mortgages outstanding in 2012 (the most popular reverse mortgages type with 90% market share) (Shan, 2011; CFPB, 2012), actual demand is substantially behind predictions.

Anecdotal evidence hints that the elderly find reverse mortgages difficult to understand and for that reason shy away from using them. We empirically assess reverse mortgage product knowledge, that is, product-specific literacy, and its impact on reverse mortgage demand. We find that awareness of reverse mortgages within a representative sample of U.S. elderly homeowners is very high, with 97% of respondents indicating having heard about the product. In contrast, however, product knowledge is fairly low. Lack of knowledge is related to low demand. Especially the target group for reverse mortgages (e.g. households with low income, insufficient savings) does not have better knowledge and thus may not base retirement financial planning on informed decision making.

Housing assets are of utmost importance for retired households. For U.S. households aged 65+, the value of the primary residence comprises on average (median) 56% (57%) of total assets, with 87% of households owning a house (2013 Survey of Consumer Finances). Housing assets provide a valuable stream of services to their owners, but adjustment of these services and partial liquidation of those assets is difficult and costly. With improving life expectancy, retirement assets have to last for more years. That is, the illiquidity problem becomes more relevant as savings might not be sufficient for extended lifespans. Running out of savings is especially important given that 53% of U.S. households are at risk of not accumulating sufficient funds for their retirement (Munnell et al., 2012).

According to life-cycle saving and consumption theory, reverse mortgages increase a household's utility as they reduce liquidity constraints and allow smoothing consumption over the life cycle (Artle and Varaiya, 1978; Davidoff, 2009, 2010a, 2010b; Yogo, 2009; Nakajima and Telyukova, 2013; Cocco and Lopes, 2014; Hanewald, Post, and Sherris, 2014). Moreover, reverse mortgages

allow the household to continue residing in their own house and to consume homeownership-specific utility, for example, derived from the opportunity to "age in place" (Davidoff, 2010c).

The literature hints at psychological factors, financial literacy, and limited product knowledge potentially explaining low demand for reverse mortgages. Amongst the most frequently suggested reasons is the bequest motive (Caplin, 2002, Leviton, 2002, Creighton et al., 2005). Dillingh et al. (2013) find evidence in favor of this hypothesis in household survey data from the Netherlands. Based on Italian household survey data, Fornero et al. (2011) show that high debt aversion and high general financial literacy are related to lower demand for reverse mortgages. In both the Dutch as well as the Italian market, however, reverse mortgages are virtually not available or known by the general public. Duca and Kumar (2014) find in U.S. household survey data that financial literacy is negatively related to the use of standard home equity conversion loans. Based on 31 qualitative interviews in Massachusetts (U.S.), Leviton (2002) conjectures fear about losing one's home, arising due to misconception and a lack of understanding on the borrowers' side as a reason for low reverse mortgage demand. Finally, anecdotic evidence from the U.S. (CFPB, 2012; Stark et al., 2014) and survey evidence from Australia (Reed, 2009) suggests that the product's features may be misunderstood by the elderly with potential negative implications for demand.

In general, it is difficult to assess determinants of reverse mortgage demand, as large household surveys like the SCF or HRS do not contain information on reverse mortgage holdings. As an alternative Shan (2011) matches loan origination data with ZIP code level demographic data and county home price growth. Moulton et al. (2014), compare the demographic characteristics of households in the HRS with households attending a reverse mortgage counselling session, and those that took a reverse mortgage after attending counselling. Due to the nature of the data used in both studies, however, they focus on demographic variables and do not assess knowledge on reverse mortgages in the respective overall target group.

Our research contributes to the literature in two ways. First, in a representative survey, we empirically assess reverse mortgage product knowledge of U.S. elderly homeowners. That is, we provide a representative snapshot of the current knowledge and perceptions of reverse mortgages within the target consumer group. Second, we analyze the impact of product knowledge and general financial literacy on product demand. In doing so, we disentangle general and product-

specific literacy. Hereby, we build on earlier works that study literacy and knowledge for complex financial decisions and products, like debt literacy (Lusardi and Tufano, 2009) or stock market-specific literacy (Van Rooij, Lusardi, and Alessie, 2011). Those studies hint at that for complex products specific knowledge and literacy, next to general financial literacy, is potentially an important driver of decision making.

**2 Reverse Mortgages and the U.S. HECM Program**

A reverse mortgage is a non-recourse loan from a private lending institution using the borrower's home as collateral. While a conventional mortgage is used to finance the purchase of a home and over time home equity is built up, a reverse mortgage works the other way round. It can be used to extract (pay out) home equity to a homeowner while continuing to reside in the home.

The loan balance of a reverse mortgage grows over time. Interest accrued is not paid regularly, but added to the loan balance. To ensure that the collateral for the loan stays sufficiently large, initial loan balance is set below appraised home value. The homeowner retains a life-long right to reside in the home rent-free. The loan is repaid if the borrower dies, moves out, or wants to sell the home. Upon one of those events, the borrower (or his heirs) can decide to repay the total outstanding loan balance or to have the property sold. In the latter case, any remaining positive difference between sales proceeds and loan amount will be paid out to the borrower or his heirs. For a potential shortfall, however, the borrower or heirs are not liable (no-negative equity guarantee). Borrowers' longevity and home price risk are transferred to the lender.

To protect lenders from the risk of insufficient collateral when the reverse mortgage loan is due, U.S. Congress incepted the governmentally-backed Home Equity Conversion Mortgage (HECM) program in 1987. Under this program the lending institution purchases insurance from the Federal Housing Administration covering the risk of a potential shortfall. Today the market for reverse mortgages is dominated by the HECM type, which makes up about 90% of reverse mortgages outstanding (Shan, 2011). In this study, we focus on HECM contracts.

In addition to the general reverse mortgage characteristics described above, HECM contracts have the following features: To be eligible for a loan the youngest borrower in a household has to be at least 62 years old. The maximum home value is capped at $625,500. The home either needs

to be debt-free or the remaining conventional mortgage debt needs to be repaid with the reverse mortgage proceeds. Borrowers can choose between different payout options: line-of-credit, annuity, or lump-sum. The most commonly chosen option is the lump sum (CFPB, 2012). Recent reforms in force from 2014 onward limit the maximum lump-sum in the first year of the contract to 60% of the maximum loan amount (Munnell and Sass, 2014). Finally, households interested in HECM loans are required to attend a counseling session. This session is hosted by an independent counselor and aims to clarify any questions about the product, to make sure that certain product knowledge is maintained and households properly understand the implications and consequences of the loan (MetLife report, 2012). Costs for HECM loans include origination fees, third party closing costs and insurance premiums and accumulate to approximately 3-7% of home value.[1] The homeowner stays responsible for paying taxes, insurances, maintenance for the home. At the time of the survey, there were no income or credit rating checks for borrower. From 2015 onward, the borrower will be financially assessed to ensure being able to pay taxes and insurance (HUD, 2014).

## 3. Data and Methodology

### 3.1. Survey Design

To assess reverse mortgage product knowledge and relate it to demand we need data that matches information on product knowledge, product demand, and socio-demographic control variables. Large-scale household surveys such as the HRS or SCF do not specify reverse mortgage holdings or knowledge. The FIT (Financial Interview Tool) survey data, which is collected from each HECM applicant during the mandatory counseling session contains some demographic data as well as some data about the reasons why a household considers a reverse mortgage. However, this data includes only the selected subsample of households who are already interested in a HECM product and have potentially more favorable attitude towards them compared to the general population.

As existing data is not suited to address our research question, we design a survey to elicit the information of interest. This survey is distributed among U.S. homeowners aged 58 and older.

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[1] http://www.newretirement.com/reverse-mortgage/reverse-mortgage-interest-rates.aspx

That is, we chose a sample which is close to or already eligible for a HECM reverse mortgage, as the lower age boundary for HECM contracts is 62 (see Section 2). The questionnaire assesses respondents' reverse mortgage knowledge, perceived complexity, and willingness-to-accept a reverse mortgage. Drawing on predictions from life-cycle models and previous studies' arguments explaining low product demand, we additionally include questions eliciting, for example, bequest motives, risk aversion, debt aversion, and home attachment.

The first five questions of the questionnaire assess general attitudes towards conventional and reverse mortgages and ask about familiarity with reverse mortgages. Next, three questions assess general financial literacy (Lusardi and Mitchell, 2008) and 13 questions reverse mortgage knowledge (described in detail in Section 3.2). Subsequently, respondents are asked about personal experience with reverse mortgages and to indicate a minimal payout ratio required to rate a reverse mortgage as a good deal. Next, respondents are randomly assigned to two experiment conditions. Half (51.3%) of respondents proceed with the questionnaire, whereas the other half (48.7%) is shown an explanation of HECM loans and their features, that is knowledge about product features is provided (see Section 4.4).

Afterwards, willingness to accept a reverse mortgage is elicited by the question "In general, how likely is it that you will be taking out a reverse mortgage (HECM)?" (scored on a Likert scale from 1 to 7, with 1 = not likely at all to 7 = very likely). Perceived complexity is elicited by asking consent to the following statement "Reverse mortgages (HECMs) are complex products." (scored on a Likert scale from 1 to 7, with 1 = totally disagree to 7 = totally agree). In the questionnaire's final part, demographic information and potential demand factors based on previous literature on reverse mortgage demand are elicited. For example, we obtain information about age, income, savings, bequest motives, subjective life expectancy, subjective health, debt aversion, and home attachment. Table 1 contains variable definitions and corresponding survey questions.

- Table 1 here -

The survey was distributed to a representative sample in November 2013 by SurveyMonkey. Participants are recruited by SurveyMonkey and incentivized by donating 50 cents to a charitable organization to be chosen by the participant and by letting participants take part in a lottery to win $100. In total 575 completed questionnaires were obtained. We remove 18 respondents from the sample as demographic information provided by SurveyMonkey (gender and highest education level) was not available. Finally, we have a sample of 557 sufficiently filled in questionnaires for analysis.

**3.2 Eliciting Product Knowledge**

To measure product knowledge we use 13 questions. The questions are designed to assess knowledge about the main characteristics of reverse mortgages and indicate which aspects and features are familiar to households. For developing the questions, we build on the literature that hints at misunderstanding of debt contracts and reverse mortgages among elderly homeowners (Leviton, 2002; Lusardi and Tufano, 2009; Reed, 2009; CFPB, 2012; Stark et al., 2014) as well on the FIT (Financial Interview Tool) counselling questionnaire. Questions are labeled rmk'X', as an acronym for "reverse mortgage knowledge", question number "X". Based on responses to the 13 questions, we construct a reverse mortgage knowledge score. Each correctly answered question scores one point. The total score ranges between 0 and 13, where 13 means perfect understanding of revere mortgage features. The wording of the individual questions and descriptive statistics on the percentage of correct answers is given in Table 2.

- Table 2 here -

In Table 2, the percentage counted as being correctly answered contains two alternative percentages for questions rmk6 (minimum age requirement) and rmk11 (maximum percentage of home value that a reverse mortgage would pay out as a lump-sum). Responses to these two questions may vary depending on whether respondents perceive the questions as being asked about HECM loans or reverse mortgages in general. We cannot rule out that respondents know

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about other reverse mortgages products. Therefore, we use two different variants for coding a correct response. The first one, which is the baseline setting is to treat all answers as correct answers if they would fit reverse mortgages in general. The second one (in parentheses) restricts the answers to be counted as correct only if the answer fits precisely to HECM loans. By the time the survey was distributed, no income or credit score checks were required to qualify for a HECM loan. The loan was entirely secured by the home serving as collateral. Currently, reforms of the HECM program are under way to prevent borrowers from defaulting on the loan by not being able to pay property taxes and insurance (see, e.g., HUD, 2014; Moulton, Haurin, and Shi, 2014). Hence, from 2015 onward, lenders will perform credit and income checks for potential borrowers. Since we cannot rule out whether survey respondents were already aware of these in 2013 proposed changes, as a robustness check, analysis is performed without the question about prerequisites of reverse mortgages (rmk3).

### 3.3. Survey Data Quality and Additional Data Sources

SurveyMonkey samples from a representative set of respondents. To check for representativeness of our survey respondents, we compare the survey information on income, savings, age, home value, education, race, bequest motives, and conventional mortgage debt with data from the 2013-wave of Survey of Consumer Finance (SCF). Comparison with SCF in Table 3 shows that our sample is fairly representative for U.S. homeowners aged 58+.

- Table 3 here -

In general, respondents in our sample closely match the SCF statistics, however, they are better educated, and have slightly higher income and wealth. Average home value, however, is substantially larger in the sample ($680,000) than in the SCF ($270,000). A comparison with the sample median home value ($250,000) shows that the high average home value is driven by outliers (e.g., one respondent reporting a home value of $80 million). In order to account for such outliers, we winsorize the home value variable at the top 2 percentile. The winsorized variable,

which is used in later analysis, has a mean of \$337,000. This variable is highly correlated ($\rho$ = 0.400, p-value = 0.000) with five digit ZIP code level median home value from 2012 ACS (American Community Survey) data, whereas the correlation of the raw home value with ACS data is low ($\rho$ = 0.083, p-value = 0.052).

To additionally check for the quality of the survey data as well as for generating additional control variables in the regressions in Section 4, we match the survey data based on respondents' five digit ZIP codes with HECM reverse mortgage origination data from HUD (U.S. Department of Housing and Urban Development) and ACS data. The HUD HECM origination data contains complete mortgage level origination data for the U.S. until November 2011. We first use the HUD data to calculate the number of reverse mortgages outstanding per ZIP code as of November 2011. Then, from the American Community Survey data we use the matching 2011 wave to gather information on the number of households per ZIP code that are eligible for a reverse mortgage. The ACS contains ZIP code level information on the number of households aged 65+ as well as the fraction of homeowners aged 65+. Multiplying these numbers gives a close proxy for the number of households per ZIP code that are eligible for a reverse mortgage (a perfect proxy would include homeowners households aged 62+). Finally, by dividing the number of reverse mortgages outstanding (HUD) by the number of homeowners eligible for a reverse mortgage (ACS) we generate a ZIP code level reverse mortgage penetration variable (HECM penetration). To check for the quality of the survey data, we relate this variable to the survey variable indicating whether a respondent knows somebody else having a reverse mortgage. This survey indicator variable is positively ($\rho$ = 0.158, p-value = 0.000) correlated with the objective penetration variable. That is, indicating in our survey to know somebody else with a reverse mortgage is more likely if the objective likelihood to know somebody is higher.

A potential problem with online surveys is that respondents might look up information, for example, related to the reverse knowledge question on the internet. To check for this potential issue, we include in the regression explaining knowledge (see Section 4.2) additionally survey completion time as a covariate in the regression (detailed results available on request). The coefficient for survey completion time in seconds is not significant and virtually equal to zero (0.0003). Thus, it is unlikely that some respondents perform better on the knowledge questions because of looking up information on the internet.

**4 Results**

**4.1 What Do Elderly Homeowners Know about Reverse Mortgages?**

Table 4 contains descriptive statistics on the characteristics of the sample (reverse mortgage knowledge is given in Table 2). Of all respondents, 58% have a conventional mortgage on their home; 97% of respondents indicate that they have heard about reverse mortgages; 18% of respondents know at least one other person that has a reverse mortgage. Ten respondents, about 2% of the sample, have practical experience with reverse mortgages, which is in line with actual demand numbers (Shan, 2011). The mean response for perceived complexity of reverse mortgages is 5.4 (on a 7-point scale with 7 indicating highest complexity). That is, respondents rate reverse mortgages to be fairly complex.

- Table 4 here -

The average respondent in our sample scores 2.60 points (out of 3) for financial literacy. In line with this, the average self-assessed score on financial planning skills is relatively high (4.94 out of 7 points).

Next, we present details on the variables rmk1−13 that constitute reverse mortgage product knowledge. These are the 13 items we subsequently use to create the reverse mortgage knowledge score.

Three questions are answered correctly by most respondents (Table 2). Rmk1 checks respondents' understanding of the most basic feature of reverse mortgages: the ability to liquidize housing wealth (83% correct). Rmk6 asks for the minimum age requirement (62 years) to be eligible for a HECM mortgage. This question is correctly answered by 71% (applying the less strict answer range of 60–65 years) or 27% (applying only age 62 as correct answer). Rmk12 asks about the items for which the borrower still has to pay himself, that is, property taxes, homeowner insurance, and repair and maintenance costs (74% correct).

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Four questions are answered correctly by roughly half of the survey respondents. The confusion which can arise if homeowners are not aware of the fact that a reverse mortgage essentially is a loan is elicited by rmk2. 44% of all participants knows that they will not be debt-free by taking on a reverse mortgage, if they use the proceeds to repay a conventional mortgage. Rmk4, which determines whether survey participants are aware that the loan balance grows over time due to accrued interest being added to the loan balance, has 47% correct answers. 56% of respondents indicate correctly that a reverse mortgage grants a life-long living right for the borrower even if the loan balance exceeds the home value (rmk5). The probability perceived for this event to happen is on average 44% (compare Table 3). That no regular interest payments have to be made on a reverse mortgage loan is correctly indicated by 51% (rmk7).

Based on the percentage of correct answers, the remaining reverse mortgage knowledge questions turn out to be the most difficult ones. A share of roughly one third or even less of respondents correctly answer questions rmk3, 8, 9, 10, 11, and 13. Rmk3, which asks about prerequisites for a reverse mortgage loan, is correctly answered by 20% of respondents. Here, we identify whether survey respondents know that there are no credit history checks and income requirements, since the loan is backed exclusively by the home as collateral. To determine whether respondents are aware about the protection reverse mortgages offer from over indebtedness, which is the non-recourse nature of the loan, we have them judge about whether it is true or false that a lender can force a borrower to repay the loan with other assets than the home if the loan balance exceeds home value (rmk8). Due to the fact that unlike for conventional mortgages interest is added to the loan balance and the borrower is not obliged to pay interest on a regular basis, there can be no foreclosure process because of inability to make interest payments. We elicit whether respondents are aware of this fact in item rmk9. The home protection question (rmk9) as well as the one about the non-recourse feature of reverse mortgage loans (rmk8), is only answered correctly by one third (34% for each) of respondents. Slightly more than a quarter (28%) of respondents is able to comprehend the negative relationship between loan interest rates and total borrowing amount (rmk10). Rmk11 captures awareness about the costs borne by opting for a reverse mortgage, which are approximately 5% of home value (Section 2). Only 20% of all respondents answer this question correctly if the correct answer range for costs is set to 3-7%. For rmk13, respondents have to estimate the approximate payout ratio (as a percentage of home value), which would be applicable to a 62-year old reverse mortgage borrower. At the time of the survey, this payout

ratio was around 50% based on quotes from an online reverse mortgage calculator.[2] The mean (median) response for this question is 58% (60%). However, only 31% of respondents, using a range from 40-70% for correct answers, answer this question correctly within the interval of 40-70%.[3] Interestingly, the mean response to a question about the payout ratio that respondents would require to rate a reverse mortgage a good deal is 80% (compare Table 4). That is, the average "desired" payout ratio exceeds the payout ratio offered by the market. In particular, 26% of respondents indicate a higher desired payout ratio, than what they believe (rmk13) a reverse mortgage would actually pay.

Next, we aggregate the 13 product knowledge questions' responses into the reverse mortgage knowledge score (0 points for each incorrect and "don't know" response, 1 point for each correct answer). The resulting mean knowledge score is 5.91; the 25% (50%; 75%) quartile is 4 (6; 8). The overall distribution of scores reflects considerable heterogeneity in respondents reverse mortgage product knowledge.

**4.2 Explaining Reverse Mortgage Product Knowledge**

In this section, we relate reverse mortgage product knowledge to respondent characteristics. We first regress the 13-item knowledge score on a set of basic demographic characteristics (age, being retired, gender, education, race, marital status, having children, income, savings, home value) and a set of variables potentially related to financial sophistication and experiences with reverse mortgage products (financial literacy, financial planning skills, number of people known with a reverse mortgage, personal experience with reverse mortgages). Next, in a second regression model, we add a set of variables that in addition to demographic factors might potentially be related to incentives to acquire knowledge about reverse mortgages (plan to stay in house, subjective life expectancy, subjective health, having health insurance, having long-term care insurance, subjective sufficiency of savings, subjective sufficiency of pension income, and trust in mortgage brokers). In addition, we include the survey item eliciting the perceived complexity of reverse mortgages products. Regression results are given in Table 5.

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[2] http://www.reversemortgage.org/About/ReverseMortgageCalculator.aspx
[3] We use a range that is −10% to +20% around the correct payout ratio. We use an especially wide right end of the range as the payout ratio increases strongly with age (Shan, 2011). Many borrowers in the sample are older than 62 and might have answered this question reflecting more their own situation.

- Table 5 here -

With respect to demographics (Table 5, model 1), older, male (potentially proxying the household's financial planner), and white respondents have a better understanding of reverse mortgages. General financial literacy as well as self-assessed financial planning skills are positively and significantly related to product knowledge. Familiarity with reverse mortgages, that is, knowing other people having a reverse mortgage, as well as personal experience with the product is also positively and significantly related to product knowledge.

When adding additional factors related to incentives to acquire knowledge to the regression model (Table 5, model 2) we find that having long-term care insurance is negatively related to knowledge. Having insurance potentially decreases the necessity to rely on the home equity to fund future medical expenses and care costs; however, the theoretically expected relationship is complex and ambiguous (Davidoff, 2009). Higher trust in mortgage brokers is negatively related to knowledge indicating that greater reliance on a broker's expertise reduces incentives to acquire own knowledge. Age is no longer significant in the second model specification. Respondents that rate a reverse mortgage to be complex, have less product knowledge. Living in a ZIP code area with higher HECM penetration does not increase knowledge per se. The coefficient for this variable itself is not significant (this holds as well in univariate regressions). However, living in a ZIP code with more reverse mortgages makes it more likely to know other people that have a reverse mortgage (see Section 3.3). Thus, reverse mortgage penetration indirectly increases product knowledge. With higher penetration it is more likely to know somebody else with a reverse mortgage, and the coefficient for the latter indicator variable is positive and significant in both models.

Generally, regression results indicate a striking tendency: Especially those respondents that would benefit most from reverse mortgages and thus should have more incentives to acquire knowledge about the product do not have higher knowledge about the product. That is, for example, having lower income, higher home values, lower savings, an existing conventional mortgage and not having children is not associated with higher product knowledge. As the

regressions include both dollar measures for income and savings, as well as subjective evaluations of them (sufficient savings, sufficient pension income) the insignificance of these coefficients for measures might be caused by multicollinearity. However, including objective (dollar) and subjective measures separately yields results in line with the tendencies found for financial planning skills and literacy. Including only dollar measures yields still insignificant coefficients. But, including only subjective measures yields a positive and significant coefficient of 0.135 (p-value = 0.066) for the subjective evaluation for savings. Respondents who evaluate their savings to be sufficient know more about reverse mortgages. That is, contrary to an incentives to acquire knowledge channel, again, respondents that have potentially better financial planning skills and are better prepared for retirement (and in less need for a reverse mortgage) have better knowledge. Variables related to experience with reverse mortgages (having a reverse mortgage or knowing other people with a reverse mortgage) are related to higher knowledge. That is, overall, product knowledge is explained by financial sophistication, being well-prepared for retirement, individual and second hand experience with the product but not by financial needs to obtain a reverse mortgage.

## 4.3 Reverse Mortgage Knowledge and Product Demand

Next, we regress the respondents' willingness-to-accept (WTA) a reverse mortgage (elicited on a 7 point Likert scale, with a higher score indicating more willingness) on the reverse mortgage knowledge score. We estimate several specifications. The first two specifications employ the same independent variables used previously to explain reverse mortgage product knowledge (compare Table 5, models 1 and 2), with one exception. We exclude the variable indicating personal experience with reverse mortgages (currently having one or having had one in the past).[4] In the third specification, we add further variables that have been shown to be related to reverse mortgage demand in theoretical and empirical studies, that is, for example the bequest motive, risk aversion, and home price expectations (see, e.g., Davidoff, 2009; Nakajima and Telyukova, 2013; Cocco and Lopes, 2014; Hanewald, Post, and Sherris, 2014). Table 6 contains the regression results.

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[4] An alternative specification, in which we exclude the ten respondents with personal reverse mortgage experience from the sample yields similar results in terms of coefficient magnitudes and significance (detailed results available on request).

- Table 6 here -

In models 1 – 3, we find a strongly significant positive relation between product knowledge and WTA. Better understanding of reverse mortgages is related to be more willing to use a reverse mortgage. General financial literacy, however, is significantly and negatively related to WTA. The latter result resembles the Italian survey evidence from Fornero et al. (2011) and the U.S. evidence in Duca and Kumar (2014) for standard home equity conversion loans. Note however, that the channel trough which financial literacy operates in our case is not clear. Duca and Kumar (2014) conjecture that less financial literate households underestimate the downside risks from borrowing against one's home and for that reason borrow more (or even too much). For reverse mortgages, however, there is virtually no risk for the homeowner, as they have a lifelong living right and the loan is non-recourse. Potentially, homeowners' widespread misconception about the protective features of reverse mortgages may make the more financial literate shy away from the product as well. Alternatively, the financial literacy variable may be related to various aspects regarding being financially prepared for retirement, not fully controlled for by the measures for income and savings. Thus, as more financially sophisticated households have potentially better planned for retirement, there is less need for them to extract home equity.

Due to the cross-sectional nature of our data, we cannot establish causality. The question is whether reverse mortgage product knowledge drives WTA, or whether knowledge (like financial literacy) picks up retirement preparedness in general not being controlled for by financial sophistication and income and wealth indicators. We perform several robustness checks to analyze this question. First, we regress WTA only on product knowledge (no other covariates). This regression yields a coefficient of 0.050 (p-value = 0.013). Second, we regress WTA on product knowledge and financial literacy. This regression yields a coefficient of 0.069 (p-value = 0.001) for product knowledge and -0.247 (p-value = 0.001) for financial literacy. Third, when we exclude financial literacy from the regression with all covariates (Table 6, model 4), the coefficient for product knowledge becomes 0.062 (p-value = 0.004). That is, overall in very reduced as well as extended specifications, the coefficient for product knowledge is significant and of similar magnitude, supporting the interpretation of a causal effect of product knowledge on WTA.

A related concern with a causal interpretation of product knowledge is rooted in the questionnaire's design. As we want to test the impact of knowledge transfer on WTA (see next section), the question on WTA is asked after the survey items that elicit product knowledge. Thus, potentially, the causality could be reverse. In the survey situation, a respondent after having realized to have poor knowledge when answering the knowledge questions may indicate a low WTA. However, we do have a survey question to circumvent this problem. Before asking the product knowledge questions, in the introduction block of the survey we ask respondents to indicate consent with the statement "A reverse mortgage is generally a good deal" (1 = totally disagree, 2, 3, 4 = neutral, 5, 6, 7 = totally agree). The context of this question is similar to WTA. In Table 6, model 5 we use the good deal variable as an alternative dependent variable. Results show that the effect of product knowledge on WTA does not seem to be driven by reverse causality: In the regression with the good deal rating as dependent variable the coefficient of product knowledge is again positive and significant and of similar magnitude.

Next to product knowledge, we identify several other factors that are related to WTA. Knowing other people that have a reverse mortgage is positively related to WTA. The coefficient for this variable is significant in all models, even if we control for ZIP code specific HECM penetration (e.g., model 2). Hence, the variable is likely to indeed pick up peer effects and not unobserved location specific factors. That is, location specific factors that would increase both reverse mortgage demand (now controlled for by HECM penetration) and the likelihood to know other people with a reverse mortgage. This finding relates to the literature on peer effects in financial and retirement decision making. For example, Duflo and Saez (2002, 2003) find that enrollment in a pension plan as well as investment decisions are impacted by peer effects. Brown et al. (2008) find that through word-of-mouth communication an individual's stock market participation increases when more neighbors own stocks. Chalmers, Johnson, and Reuter (2014) find that retirement timing decisions are influenced by having coworkers in a similar decision situation. In our case, both familiarity with the product through personal knowledge as well as through knowing other people having a reverse mortgage increase WTA.

Having children reduces WTA in the first two specifications but not the third. Model 3 adds respondents' bequest motive to the set of independent variables. That is, as taking out a reverse mortgage (and consuming the proceeds) lowers the bequest, respondents with higher bequest

motives are reluctant to decide for a reverse mortgage. Having children is an imperfect proxy for bequest motives and it points into the same direction. For that reason, when including the directly measured bequest motive the coefficient becomes insignificant. Total household savings have no significant relationship with WTA. In line with theoretical models (e.g., Hanewald, Post, and Sherris, 2014), respondent income is negatively, and having existing conventional mortgage debt is positively related to WTA. Including alternatively, again to circumvent multicollinearity problems, subjective measures for savings and income without objective dollar ones, yields a marginally significant and negative coefficient of -0.059 (p-value = 0.112) for subjective savings, that is, respondents who rate their savings to be insufficient, have a higher WTA (compare Table 6, model 2).

The effect of risk aversion, however, is opposite to theoretical predictions. Being more risk averse reduces WTA. This effect may be driven by the general misconception of the product (see section 4.2). Instead of viewing the product as reducing risks (e.g. outliving financial resources, exposure to home prices), our results indicate that respondents often believe the opposite. That is, for example, with a reverse mortgage, one may be forced to move out of the home.

Trust in mortgage brokers, is positively related to WTA in the second model. A reverse mortgage is a difficult to understand product and some cases of scams have been reported (see, e.g., Carswell, et. al., 2013; Stark et al., 2014). Trusting the party offering the product thus helps to decide in favor of it. When adding risk aversion in the third model, the coefficient for trust becomes insignificant. Both variables are closely (and negatively) related to decision making in risky situations and thus including them both explains the no longer significant coefficient of trust. While trust helps to overcome the uncertainty of a risky situation (the choice in favor of a poorly understood product), risk aversion has the opposite effect (see, e.g., Johnson and Grayson, 2005). Contrary to results from an Italian survey (Fornero et al., 2011), debt aversion is positively related to WTA in Model 4. This finding is in line with product misperception in our sample, which is the belief reverse mortgages help to become debt free. Having health insurance increases WTA as being insured can reduce the need to keep the (complete) home's value as a buffer against large unexpected expenses (see, e.g., Davidoff, 2009).

Other factors which, according to theoretical models should be related to reverse mortgage demand (e.g., experienced and expected home price growth, subjective life expectancy, having long-term care insurance or home attachment) do not significantly relate to WTA.

Overall, taking the results of this section and the previous part together, they indicate two tendencies: First respondents with more knowledge about reverse mortgages are generally more likely to accept the product. Those respondents are more likely to base their decision on information. Second, respondents for whom a reverse mortgage is more appropriate (e.g., having lower income, insufficient savings) are more likely to accept a reverse mortgage. However, those respondents do not have higher product knowledge. Thus, potentially the target group for reverse mortgages is not making a well-informed choice and may insufficiently evaluate alternative options for their retirement financial planning.

## 4.4 The Impact of Information Transfer on Reverse Mortgage Demand

In this section we test whether respondents differ in their product acceptance (WTA) after they had the opportunity to learn about reverse mortgage product features. Half of the respondents were assigned to the treatment group that received information, the other half served as the control group. The treatment group was asked to read a short and rather simple[5] product description, which explains the most important features of HECM reverse mortgages. The following text was shown:

*Please read the following information carefully. If you have finished, please click 'next'. A Home Equity Conversion Mortgage (HECM) allows seniors to access their home equity without any requirement to meet income or credit qualifications. Similar to a "conventional" mortgage, it is a loan which uses the house as a security. The homeowner, who borrows money against his home, has the choice between a onetime payment (lump sum), a line of credit, which can be used any time, a supplement to monthly retirement income (annuity), or any combination of these. Over time, interest charges are added to the loan amount, thus the loan amount rises. Repayment of the loan*

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[5] The description has a Flesch-Kincaid grade level of 10.5. A Flesch-Kincaid grade level statistic of 10.5 indicates that the text requires the level of education of grade 10 to 11 based on U.S. education (e.g., Oakland and Lane, 2004).

*is required if the homeowner sells the home, moves out, or dies. When those events occur, the home can be sold to pay back the loan. HECM borrowers are protected against the possibility that their home may fall in value. If the home is worth less than the loan amount due, the borrower is not obliged to pay the bank more than the value of the home to satisfy the loan. As long as the loan is in place, the borrower remains the owner of the house, including all duties that come along with homeownership, such as obligation to pay property taxes and insurances. If the homeowner still repays an existing mortgage, a reverse mortgage can only be taken if the funds received from it are used to repay the existing mortgage.*

Survey respondents in the treated group seem to having read the text. On average they spent three minutes and 20 seconds on this survey page.

Results in Table 6, column (6) show that WTA is not significantly different between the treatment and control group. The difference in means for WTA between the treated and control group is -0.047 and not statistically significant (p-value = 0.657). Likewise, there are neither significant treatment effects in subsamples split by median product knowledge score nor interaction effects between treatment and product knowledge or time spent reading the text in the regression (detailed results available on request).

Educating potential borrowers about the product does not result in higher demand. The effect of education might be different in personal interviews, as done with the counselling sessions for HECM loans. However, in order for homeowners to attend counselling, at first they need a sufficient amount of interest in and knowledge about the product.

Helping homeowners with a relatively simple description of a complex product does not have an effect on their willingness to accept the products. This result relates to the literature in two ways. First, it is in line with the meta analysis of Fernandes, Lynch, and Netemeyer (2014) who find that interventions to improve general financial literacy have virtually no explanatory power for subsequent behaviors. Second, Wong-Parodi, Bruine de Bruin, and Canfield (2013) find in the domain of energy conservation brochure materials, that helping to educate via simplification does only work for straightforward information material but not for complex material. In our context - when homeowners have to decide about a relatively difficult and complex product, this could

imply that the way to increase product demand is not primarily through more education but by simplifying the product in the first place.

**Conclusion**

Reverse mortgages allow elderly homeowners to consume home equity while continuing to reside in their homes. Demand for reverse mortgages is low compared to predictions when the U.S. HECM program was initiated. We find that an important factor explaining low product demand is potential borrowers' insufficient knowledge - that is product-specific literacy.

Our results are based on a representative survey among elderly U.S. homeowners. We assess knowledge about HECM mortgages and potential demand in the respective target group. Almost all respondents claim that they have heard of reverse mortgages. However, on average, knowledge is fairly low among homeowners. Around three quarter of respondents understand the purpose of reverse mortgages to unlock home equity, know the minimum age requirement, and are aware that they need to continue to pay taxes and homeowner insurance as part of the duties of a reverse mortgage. Around half of respondents does know that a reverse mortgage is actually a loan, that the loan balance grows over time, that not regular interest payments have to be made, and that a reverse mortgage grants a life-long living right. Only one third of respondents knows about the absence of income and credit checks, knows that a lender cannot force them to leave the home when the loan balance becomes larger than the home value, gets the relationship between interest rates and maximum loan amounts right, and has realistic expectations about maximum payout amounts.

Respondents who are financially sophisticated, have personal experience with reverse mortgages, and/or know other people with reverse mortgages have superior product knowledge. However, especially those respondents that would theoretically benefit most from reverse mortgages (for example those having lower income, higher home values, lower savings, or an existing conventional mortgage) do not have better knowledge about the product.

Our results show that reverse mortgage product knowledge is positively related to product demand. As on average knowledge among respondents is fairly low, our results imply that potential factors for low product demand are limited knowledge and misconceptions of the

product. Homeowners who could benefit most are indeed more likely to demand a reverse mortgage. Our results show that those homeowners who theoretically could benefit most from the products do not have sound product knowledge. That is, they might not make a well informed choice and may insufficiently evaluate alternative options for their retirement financial planning.

Explaining important reverse mortgage product features does not affect reverse mortgage demand. We interpret these findings that an avenue to make the product more appealing to homeowners is not to educate them more, but to reduce the complexity inherent in the product itself.

## References

Artle, R., and Varaiya, P. (1978). Life Cycle Consumption and Homeownership. *Journal of Economic Theory*, 18: 38-58.

Brown, J. R., Ivcović, Z., Smith, P. A. and Weisbenner, S. (2008). Neighbors Matter: Causal Community Effects and Stock Market Participation. *The Journal of Finance*, 63: 1509-1531.

Caplin, A. (2002). The Reverse Mortgage Market: Problems and Prospects. In: O. S. Mitchell, Z. Bodie, B. Hammond, and S. Zeldes (Eds.), *Innovations in Retirement Financing* (pp. 234-253). Philadelphia, PA: University of Pennsylvania Press.

Carswell, A.T., Seay, M.C., and Polanowski, M. (2013). Reverse mortgage fraud against seniors: Recognition and education of a burgeoning problem. *Journal of Housing for the Elderly*, 27: 146-160.

Case, B., and Schnare, A. B. (1994). Preliminary Evaluation of the HECM Reverse Mortgage Program. *Journal of the American Real Estate and Urban Economics Association*, 22 (2): 301-346.

CFPB (2012). Report to Congress on Reverse Mortgages. *Consumer Financial Protection Bureau*, June 2012, Iowa, U.S.

Chalmers, J., Johnson, W. T., and Reuter, J. (2014), The effect of pension design on employer costs and employee retirement choices: Evidence from Oregon. *Journal of Public Economics*, 116: 17-34.

Cocco, J., and Lopes, P. (2014). Reverse Mortgage Design, Working paper, London Business School.

Costa-Font, J., Gil, J., and Mascarilla, O. (2010). Housing Wealth and Housing Decisions in Old Age: Sale and Reversion. *Housing Studies*, 25 (3): 375-395.

Creighton, A., Jin, H., Piggott, J., and Valdez, E. A. (2005). Longevity Insurance: A Missing Market. *The Singapore Economic Review*, 50: 417-435.

Davidoff, T. (2009), Housing, Health, and Annuities, *Journal of Risk and Insurance*, 76: 31–52.

Davidoff, T. (2010a), Financing Retirement with Stochastic Mortality and Endogenous Sale of a Home, Working paper, University of British Columbia.

Davidoff, T. (2010b), Home equity commitment and long-term care insurance demand, *Journal of Public Economics*, 94: 44–49.

Davidoff, T. (2010c), Interest Accumulation in Retirement Home Equity Products. Working paper, University of British Columbia.

Dillingh, R., Prast, H., Rossi, M., and Urzi Brancati, C. (2013), The psychology and economics of reverse mortgage attitudes: evidence from the Netherlands, working paper.

Duca, J. V. and Kumar, A. (2014). Financial literacy and mortgage equity withdrawals. *Journal of Urban Economics,* 80: 62-75.

Duflo, E., and Saez, E. (2002). Participation and investment decisions in a retirement plan: the influence of colleagues' choices. *Journal of Public Economics*, 85: 121-148.

Duflo, E., and Saez, E. (2003). The Role of Information and Social Interactions in Retirement Plan Decisions: Evidence from a Randomized Experiment. *Quarterly Journal of Economics*, 118: 815-842.

Fernandes, D., Lynch J. G., and Netemeyer, R. G. (2014). Financial Literacy, Financial Education, and Downstream Financial Behaviors, *Management Science*, 60: 1861-1883.

Fornero, E., Rossi, M., and Urzi Brancati, M. C. (2011). Explaining why, right or wrong, (Italian) Households do not like Reverse Mortgages. *Netspar Discussion Paper No. 09/2011-086.*

Hanewald, K., Post, T., and Sherris, M. (2014). Portfolio Choice in Retirement – What is the Optimal Home Equity Release Product? *Journal of Risk and Insurance* (forthcoming).

HUD (2014). Mortgagee Letter 2014-22. *U.S. Department of Housing and Urban Development*, November 2014, Washington, DC, U.S.

Johnson, D. and Grayson, K. (2005). Cognitive and affective trust in service relationships. *Journal of Business Research*, 58: 500-507.

Leviton, R. (2002). Reverse Mortgage Decision-Making. *Journal of Aging & Social Policy,* 13 (4): 1-16.

Lusardi, A. and Mitchell, O. S. (2008). Planning and Financial Literacy: How Do Women Fare? *American Economic Review,* 98 (2): 413-417.

Lusardi, A. and Tufano, P. (2009). Debt Literacy, Financial Experiences, and Overindebtedness. *NBER Working Paper No. 14808.*

Mayer, C. J., and Simons, K. V. (1994a). A New Look at Reverse Mortgages: Potential Market and Institutional Constraints. *New England Economic Review*, Mar/Apr 94:. 15-26.

Mayer, C. J., and Simons, K. V. (1994b). Reverse Mortgages and the Liquidity of Housing Wealth. *Journal of the American Real Estate and Urban Economics Association,* 22 (2): 235-255.

MetLife report (2012). Changing Attitudes, Changing Motives: The MetLife Study of How Aging Homeowners Use Reverse Mortgages.

Moulton, S., Haurin, D., Shi, W., and Eriksen, M. (2014), Who Gets a Reverse Mortgage? Identifying Household Level Determinants of Reverse Mortgage Choice and the Influence of Counseling, *Working Paper*, Ohio State University.

Moulton, S., Haurin, D., and Shi, W. (2014), An Analysis of Default Risk in the Home Equity Conversion Mortgage (HECM) Program, *Working Paper*, Ohio State University.

Munnell, A. H., and Sass, S. (2014). The Government's Redesigned Reverse Mortgage Program. *Center for Retirement Research at Boston College,* Issues in Brief 12-20.

Munnell, A. H., Webb, A., and Golub-Sass, F. (2012). The National Retirement Risk Index: An Update. *Center for Retirement Research at Boston College,* Issues in Brief 14-1.

Nakajima, M., and Telyukova, I. A. (2013). Reverse Mortgage Loans: A Quantitative Analysis. *Working Paper.*

Oakland, T., and Lane, H. B. (2004). Language, Reading, and Readability Formulas: Implications for Developing and Adapting Tests. *International Journal of Testing*, 4: 239-252.

Ong, R. (2009). House Price Appreciation Among Elderly Home Owners in Australia. *Centre for Research in Applied Economics*, Curtin University of Technology, Australia.

Rasmussen, D. W., Megbolugbe, I. F., and Morgan, B. A. (1995). Using the 1990 Public Use Microdata Sample to Estimate Potential Demand for Reverse Mortgage Products. *Journal of Housing Research*, 6 (1): 1-23.

Reed, R. (2009). The Increasing Use of Reverse Mortgages by Older Households. *Working Paper*, Deakin University.

Shan, H. (2011). Reversing the Trend: The Recent Expansion of the Reverse Mortgage Market. *Real Estate Economics,* 39 (4): 743-768.

Sherris, M., and Sun, D. (2010). Risk Based Capital and Pricing for Reverse Mortgages Revisited. *Research Paper No. 2010ACTL04*, UNSW Australian School of Business, Sydney, NSW.

Stark, D. P., Choplin, J. M., Mikels, J. A., and McDonnell, A. S. (2014). Complex Decision Making and Cognitive Aging Call for Enhanced Protection of Seniors Contemplating Reverse Mortgages. *Arizona State Law Journal*, 46: 299-364.

Van Rooij, M., Lusardi, A., and Alessie, R. (2011). Financial Literacy and Stock Market Participation. *Journal of Financial Economics,* 101: 449-472.

Wong-Parodi, G., Bruine de Bruin, W. and Canfield, C. (2013). Effects of simplifying outreach materials for energy conservation programs that target low-income consumers. *Energy Policy*. 62: 1157-1164,

Yogo, M. (2012). Portfolio Choice in Retirement: Health Risk and the Demand for Annuities, Housing, and Risky Assets. *Boston College Center for Retirement Research Working Paper No. 2009-3*.

**Table 1** Variable Definitions

| Variable | Definition |
|---|---|
| RM known | Indicator variable taking the value 1 if respondent already heard about reverse mortgages; 0 otherwise |
| RM experience | Indicator variable taking the value 1 if participant has prior experience with reverse mortgages; 0 otherwise |
| RM knowledge | Aggregate reverse mortgage-specific knowledge score composed of 13 items: 0 = no question correct … 13 = all thirteen questions correct (details on the survey questions are given in Table 2) |
| WTA | Willingness to accept reverse mortgage based on responses to the following question: "In general, how likely is it that you will be taking out a reverse mortgage (HECM)?" 1 = not likely at all … 7 = very likely |
| RM good deal | Agrement to the statement: "A reverse mortgage is generally a good deal.": 1 = totally disagree … 7 = totally agree |
| HECM penetration | Market penetration of HECM loans, based on ZIP code |
| Others known w. RM | Indicator variable taking the value 1 for respondent knowing other people who have a reverse mortgage; 0 otherwise |
| Required payout | Required payout (in % of home value) from a reverse mortgage to rate it as a good deal |
| Prob. loan underwater | Probability that loan balance exceeds home value based on responses to the following question: "How likely is it that the reverse mortgage loan balance over time becomes larger than the home value? Indicate a number ranging from 0 to 100, where 0 means "impossible" and 100 means "for sure"." |
| Complex | Self-assessed product complexity based on responses to the following statement: "Reverse mortgages are complex products." 1 = totally disagree … 7 = totally agree |
| Conv. mortgage | Indicator variable taking the value 1 for having a mortgage on home; 0 otherwise |
| Gender | Gender: 0 = female, 1 = male |
| Age | Age of respondent in years as of November 2013 |
| Marital status | Indicator variable taking the value of 1 for respondent being married; 0 otherwise |
| Retirement | Indicator variable taking the value of 1 for respondent being already retired; 0 otherwise |
| Higher education | Indicator variable taking the value of 1 for respondent reporting highest education being "associate or bachelor degree" or "graduate degree"; 0 for respondent reporting highest eduaction being "less than high school degree", "high school degree", or "some college". |
| White | Indicator variable taking value of 1 for respondent being white; 0 otherwise |
| Children | Indicator variable taking the value 1 if respondent has children; 0 otherwise |
| Bequest motive | Self-expressed bequest motive based on responses to the following statement: "I would like to leave an inheritance." 1 = certainly not … 7 = certainly yes |
| Financial literacy | Aggregate financial literacy score: 0 = no question correct … 3 = all three questions correct (Lusardi and Mitchell, 2008) |
| Planning skill | Self-assessed financial planning skills based on responses to the following question: "In general, how would you assess your understanding of financial planning?" 1 = very poor … 7 = very good (HRS) |

**Table 1** Variable Definitions – continued

| Variable | Definition |
|---|---|
| Risk aversion | Risk aversion based on responses to the following question: "Are you generally a person who is willing to take risk?"1 = unwilling to take risk … 10 = willing to take risk (Dohmen et al., 2011) |
| Debt aversion | Debt aversion based on agreement to the following statement: "Being in debt is never a good thing." 1 = disagree … 7 = totally agree |
| Broker trust | Trust in mortgage brokers based on agreement to the following statement: "Mortgage brokers are people that generally can be trusted." 1 = totally disagree … 7 = totally agree |
| Health | Self-perceived health: 1 = excellent ... 5 = poor (HRS, 2011) |
| Subj. life expectancy | Subjective life expectancy based on responses to the following question: "What chance do you think there is that you will live another 10 years or more? Please indicate the chance on a sclae of 0 to 100, where 0 means "no chance at all" and 100 means "absolutely certain"." |
| Obj. life expectancy | 10-year life expectancy (based on Lee-Carter stochastic mortality model) |
| Health insurance | Indicator variable taking the value 1 for respondent having health insurance; 0 otherwise |
| Long-term care insurance | Indicator variable taking the value 1 for respondent having long-term care insurance; 0 otherwise |
| Home value | Current home value (in $ '000) |
| Past home value growth | Subjective past development of home value based on responses to the satatement: "Over the last 5 years do you think the value of your home..." 1 = increased a lot (greater than 20%), 2 = increased moderately (between 5% and 20%), 3 = remained rather stable (between 5% and -5%), 4 = decreased moderately (between -5% and -20%), 5 = decrease a lot (greater than -20%) |
| Expected home value growth | Subjective future development of home value based on responses to the statement: "Over the next five years do you think the value of your home will..." 1 = increase a lot (greater than 20%), 2 = increase moderately (between 5% and 20%), 3 = remain rather stable (between 5% and -5%), 4 = decrease moderately (between -5% and -20%), 5 = decrease a lot (greater than -20%) |
| House price fluctuations | Agreement to statement "House prices can fluctuate a lot": 1 = totally disagree … 7 = totally agree |
| Stay home | Indicator variable taking the value 1 if respondent plans to stay in current home for at least seven more years; 0 otherwise (FIT) |
| Home attachment | Home attachment based on responses to the following question: "How many years have you lived in your current home? (Enter the closest round number. If you have live in your current home less than a year, please enter 1.)" |

**Table 1** Variable Definitions – continued

| Variable | Definition |
|---|---|
| Household savings | Total value of household savings (in $ '000) elicited with the question: "Excluding home value, what is the total value of your household savings? (including for example checking accounts, savings accounts, stocks, mutual funds, retirement accounts)" with answer choices being: "less than $1,500", "between $1,500 and $10,000", "between $10,000 and $35,000", "between $35,000 and $100,000", and "more than $100,000". As savings measure, interval mid-points are used. The upper bound of savings is set to be equal to $150,000. |
| Sufficient savings | Consent with "I have enough savings": 1 = certainly not … 7 = certainly yes |
| Household income | Average yearly household income (in $ '000) elicited with the question: "What is your approximate average household income per year?" with answer choices being: "under $10,000", "between $10,000 and $20,000", "between $20,000 and $35,000", "between $35,000 and $500,000", and "over $500,000". As income measure, interval mid-points are used. The upper bound of income is set to be equal to $75,000. |
| Sufficient pension | Consent with "I have/expect to have sufficient pension income": 1 = certainly not … 7 = certainly yes |

This table presents variable names and definitions. References for survey question wording which is based on existing literature or surveys are given in parentheses.

**Table 2** Reverse Mortgage Knowledge

| Variable | Feature | Survey Question | Correct Answer | Percent | | | Continuous Response | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Correct | Wrong | Don't Know | Mean | Median | Std |
| rmk1 | unlock equity | A reverse mortgage allows you to withdraw wealth invested in your home. | true | 82.59 | 6.64 | 10.77 | | | |
| rmk2 | loan character | A reverse mortgage helps you be debt-free if used to repay an existing mortgage. | false | 43.63 | 28.55 | 27.83 | | | |
| rmk3 | prerequisites | For getting a reverse mortgage, your credit history and income will be checked. | false | 19.93 | 50.99 | 29.08 | | | |
| rmk4 | loan balance | Over time, the loan balance of a reverse mortgage… [shrinks/stays constant/grows] | grows | 46.68 | 26.39 | 26.93 | | | |
| rmk5 | life-long living right | Even when the reverse mortgage loan balance becomes larger than the home value, you do not have to move out. | true | 56.01 | 8.26 | 35.73 | | | |
| rmk6 | age requirement | To be eligible for a reverse mortgage (HECM), how old do you have to be at least? | 60-65 years (62 years) | 71.10 (27.11) | 28.90 (72.89) | n/a | 58.62 | 62.00 | 11.99 |
| rmk7 | interest payments | When do you have to make interest payments on a reverse mortgage? [every month/once a year/when the loan is paid back/never] | when the loan is paid back/never | 51.16 | 11.49 | 37.34 | | | |
| rmk8 | non-recourse loan | If the reverse mortgage loan balance is larger than the house value, the lender can force you to pay the loan off with other assets. | false | 33.93 | 15.26 | 50.81 | | | |
| rmk9 | home protection | If you are unable to make your interest pay-ments on the reverse mortgage loan, a foreclosure process can be started on your home. | false | 33.75 | 20.11 | 46.14 | | | |
| rmk10 | interest rates | When interest rates are higher, one gets less money when taking out a reverse mortgage. | true | 28.37 | 19.57 | 52.06 | | | |
| rmk11 | costs | What percentage of home value are the likely costs for getting a reverse mortgage? [0.5%/1%/3%/…/15%] | 3% - 7% (5%) | 19.82 (8.73) | 15.82 (26.91) | 64.36 | 5.45 | 5.00 | 4.30 |
| rmk12 | obligations | If you have a reverse mortgage, for which items do you still have to pay yourself? | mult. choice | 73.61 | 10.95 | 15.44 | | | |
| rmk13 | payout | How much of a home's value would a reverse mortgage (HECM) currently pay out as a lump sum to a 62-year old borrower? [5%/10%/…/130%] | 40% - 70% | 30.70 | 69.30 | n/a | 58.48 | 60.00 | 31.41 |

This table presents the 13 questions used to construct the reverse mortgage knowledge score. Content in square brackets depicts the choices available to respondents; values in parentheses display alternative percentages correct/wrong if the narrower answer range is counted being correct. The variables' ordering resembles the original sequence in the survey.

**Table 3** Comparison of Survey Respondents' Characteristics with the Survey of Consumer Finances

|  |  |  | DGP | SCF |
|---|---|---|---|---|
| Age | mean |  | 64.84 | 69.91 |
|  | median |  | 64 | 68 |
| Health | excellent | % | 19.57 | 18.97 |
|  | very good | % | 46.50 |  |
|  | good | % | 24.96 | 46.60 |
|  | fair | % | 6.64 | 25.90 |
|  | poor | % | 2.33 | 8.52 |
| Race | white | % | 92.46 | 83.66 |
|  | black/ afr.-am. | % | 1.08 | 9.85 |
|  | hispanic/latino | % | 0.90 | 3.90 |
|  | other | % | 1.26 | 2.58 |
| Education | < high school | % | 0.54 | 12.00 |
|  | high school | % | 6.46 | 33.83 |
|  | some college | % | 19.21 | 15.80 |
|  | college degree | % | 73.79 | 38.37 |
| Bequest motive | not important | % | 23.52 | 19.72 |
|  | somewhat imp. | % | 16.16 | 31.90 |
|  | important | % | 28.73 | 27.11 |
|  | very important | % | 31.60 | 21.27 |
| Household income | less than $10,000 | % | 2.33 | 2.97 |
|  | $10,000 - $20,000 | % | 4.49 | 14.45 |
|  | $20,000 - $35,000 | % | 11.67 | 34.52 |
|  | $35,000 - $50,000 | % | 16.34 | 17.17 |
|  | more than $50,000 | % | 65.17 | 48.30 |
| Household savings | less than $1,500 | % | 9.16 | 13.83 |
|  | $1,500 - $10,000 | % | 6.82 | 13.47 |
|  | $10,000 - $35,000 | % | 7.90 | 13.63 |
|  | $35,000 - $100,000 | % | 15.44 | 13.67 |
|  | more than $100,000 | % | 60.68 | 45.40 |
| Home value ('000) | mean |  | 680 | 270 |
|  | mean (winsorized) |  | 337 |  |
|  | median |  | 250 | 170 |
| Conv. Mortgage | yes | % | 59.07 | 43.21 |
| N |  |  | 557 | 1,852 |

This table compares summary statistics of our own survey (DGP) with the 2013 wave of Survey of Consumer Finances (SCF). Statistics from SCF are for the subset of respondents that match our survey criteria, that is, homeowners aged 58+. Savings in the SCF correspond to the variable financial assets, home value to the value of the primary residence.

**Table 4** Descriptive Statistics

| | mean | std | median |
|---|---|---|---|
| RM known | 0.97 | 0.16 | |
| RM experience | 0.02 | 0.13 | |
| RM knowledge | 5.87 | 2.62 | 6 |
| WTA | 1.60 | 1.25 | 1 |
| RM good deal | 3.18 | 1.35 | 4 |
| HECM penetration | 0.03 | 0.02 | 0.03 |
| Others known w. RM | 0.18 | 0.38 | |
| Required payout | 79.99 | 34.21 | 80 |
| Prob. Loan underwater | 44.21 | 34.05 | 50 |
| Complex | 5.39 | 1.61 | 6 |
| Conv. mortgage | 0.58 | 0.49 | |
| Gender | 0.49 | 0.50 | |
| Age | 64.84 | 5.86 | 64 |
| Marital status | 0.75 | 0.43 | |
| Retirement | 0.54 | 0.50 | |
| Higher education | 0.74 | 0.44 | |
| White | 0.92 | 0.26 | |
| Children | 0.79 | 0.41 | |
| Bequest motive | 4.92 | 1.96 | 5 |
| Financial literacy | 2.60 | 0.71 | 3 |
| Planning skill | 4.94 | 1.39 | 5 |
| Risk aversion | 6.25 | 2.19 | 6 |
| Debt aversion | 5.06 | 1.85 | 5 |
| Broker trust | 3.24 | 1.46 | 3 |
| Health | 2.26 | 0.93 | 2 |
| Subj. life expectancy | 0.82 | 0.25 | |
| Obj. life expectancy | 0.75 | 0.15 | 0.80 |
| Health insurance | 0.82 | 0.38 | |
| Long-term care insurance | 0.28 | 0.45 | |
| Home value (in $ '000) | 337 | 332 | 250 |
| Past home value growth | 2.84 | 1.07 | 3 |
| Expected home value growth | 2.38 | 0.70 | 2 |
| House price fluctuations | 5.48 | 1.42 | 6 |
| Stay home 7+ | 0.71 | 0.45 | |
| Home attachment | 17.72 | 12.29 | 15 |
| Household savings (in $ '000) | 103.68 | 60.46 | 150 |
| Sufficient savings | 4.07 | 2.00 | 4 |
| Household income (in $ '000) | 59.82 | 21.96 | 75 |
| Sufficient pension | 4.69 | 1.95 | 5 |
| N | | 557 | |

This table presents summary statistics for the survey data. Home value is winsorized at the top 2% level. Variables are defined in Table 1.

**Table 5** Explaining Reverse Mortgage Product Knowledge

| | RM knowledge (1) | RM knowledge (2) |
|---|---|---|
| Age | 0.038* | 0.028 |
| | (0.021) | (0.021) |
| Retirement | 0.075 | -0.043 |
| | (0.243) | (0.250) |
| Gender | 0.706*** | 0.642*** |
| | (0.216) | (0.220) |
| Higher Education | 0.185 | 0.248 |
| | (0.248) | (0.247) |
| White | 0.933** | 0.916** |
| | (0.399) | (0.397) |
| Marital status | -0.023 | -0.045 |
| | (0.266) | (0.264) |
| Children | 0.191 | 0.352 |
| | (0.261) | (0.262) |
| Household income (in $ '000) | 0.001 | 0.006 |
| | (0.006) | (0.006) |
| Household savings (in $ '000) | 0.002 | 0.001 |
| | (0.002) | (0.002) |
| Ln(homevalue) | 0.033 | 0.007 |
| | (0.194) | (0.197) |
| Financial literacy | 0.772*** | 0.780*** |
| | (0.163) | (0.161) |
| Planning skill | 0.303*** | 0.306*** |
| | (0.082) | (0.084) |
| Conv. mortgage | 0.052 | 0.080 |
| | (0.225) | (0.225) |
| RM experience | 1.979** | 2.113*** |
| | (0.808) | (0.799) |
| Others known w. RM | 0.573** | 0.518* |
| | (0.271) | (0.272) |
| HECM penetration | | 5.707 |
| | | (5.091) |
| Stay home 7+ | | 0.010 |
| | | (0.233) |
| Subj. life expectancy | | -0.665 |
| | | (0.474) |
| Health | | 0.027 |
| | | (0.127) |
| Health insurance | | -0.409 |
| | | (0.277) |
| Long-term care insurance | | -0.592** |
| | | (0.236) |
| Sufficient savings | | 0.118 |
| | | (0.079) |
| Sufficient pension | | -0.028 |
| | | (0.072) |
| Broker trust | | -0.209*** |
| | | (0.071) |
| Complex | | -0.123* |
| | | (0.064) |
| Constant | -2.089 | 0.142 |
| | (1.411) | (1.726) |
| | | |
| Observations | 557 | 557 |
| Adj. R² | 0.172 | 0.196 |

This table presents the results from OLS regressions of the 13 item reverse mortgage product knowledge score on respondent characteristics. Variables are defined in Table 1. Standard errors are given in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

**Table 6** Explaining Willingness to Accept a Reverse Mortgage

| | WTA (1) | WTA (2) | WTA (3) | WTA (4) | RM good deal (5) | WTA (6) |
|---|---|---|---|---|---|---|
| RM knowledge | 0.070*** | 0.078*** | 0.070*** | 0.062*** | 0.039* | 0.070*** |
| | (0.021) | (0.022) | (0.022) | (0.021) | (0.024) | (0.022) |
| Age | -0.001 | 0.002 | 0.000 | 0.000 | -0.002 | 0.000 |
| | (0.010) | (0.011) | (0.011) | (0.011) | (0.012) | (0.011) |
| Retirement | -0.117 | -0.048 | -0.026 | -0.037 | -0.213 | -0.032 |
| | (0.120) | (0.125) | (0.126) | (0.126) | (0.137) | (0.127) |
| Gender | 0.110 | 0.089 | 0.032 | 0.030 | 0.277** | 0.028 |
| | (0.108) | (0.111) | (0.112) | (0.112) | (0.122) | (0.112) |
| Higher Education | -0.029 | -0.025 | 0.005 | -0.031 | -0.023 | 0.007 |
| | (0.123) | (0.124) | (0.125) | (0.124) | (0.136) | (0.125) |
| White | -0.091 | -0.112 | -0.086 | -0.067 | -0.164 | -0.087 |
| | (0.198) | (0.199) | (0.199) | (0.200) | (0.217) | (0.199) |
| Marital status | 0.063 | 0.060 | 0.036 | 0.048 | -0.101 | 0.035 |
| | (0.132) | (0.132) | (0.131) | (0.132) | (0.143) | (0.132) |
| Children | -0.249* | -0.293** | -0.191 | -0.199 | -0.148 | -0.190 |
| | (0.129) | (0.131) | (0.136) | (0.136) | (0.148) | (0.136) |
| Household income (in $ '000) | -0.008*** | -0.008*** | -0.008** | -0.009*** | -0.001 | -0.008** |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) |
| Household savings (in $ '000) | -0.001 | 0.000 | 0.000 | -0.000 | -0.002 | 0.000 |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Ln(homevalue) | -0.054 | -0.034 | -0.044 | -0.002 | -0.101 | -0.044 |
| | (0.096) | (0.098) | (0.101) | (0.099) | (0.110) | (0.101) |
| Financial literacy | -0.128 | -0.138* | -0.188** | | -0.179** | -0.187** |
| | (0.082) | (0.082) | (0.083) | | (0.091) | (0.083) |
| Planning skill | -0.043 | -0.024 | -0.038 | -0.045 | 0.031 | -0.038 |
| | (0.041) | (0.043) | (0.043) | (0.043) | (0.047) | (0.043) |
| Conv. mortgage | 0.287*** | 0.250** | 0.278** | 0.288** | 0.031 | 0.277** |
| | (0.111) | (0.112) | (0.115) | (0.115) | (0.126) | (0.115) |
| Others known w. RM | 0.698*** | 0.665*** | 0.651*** | 0.669*** | 0.449*** | 0.650*** |
| | (0.131) | (0.134) | (0.134) | (0.135) | (0.146) | (0.134) |
| HECM penetration | | 0.450 | -0.035 | -0.183 | -1.813 | 0.028 |
| | | (2.549) | (2.565) | (2.574) | (2.800) | (2.571) |
| Stay home 7+ | | -0.008 | 0.057 | 0.057 | 0.060 | 0.061 |
| | | (0.116) | (0.119) | (0.119) | (0.129) | (0.119) |
| Subj. life expectancy | | 0.200 | 0.053 | 0.056 | -0.368 | 0.044 |
| | | (0.238) | (0.241) | (0.242) | (0.263) | (0.242) |
| Health | | 0.065 | 0.078 | 0.082 | -0.026 | 0.077 |
| | | (0.064) | (0.064) | (0.064) | (0.069) | (0.064) |
| Health insurance | | 0.291** | 0.299** | 0.289** | 0.148 | 0.298** |
| | | (0.139) | (0.138) | (0.139) | (0.151) | (0.138) |
| Long-term care insurance | | 0.063 | 0.026 | 0.029 | 0.096 | 0.026 |
| | | (0.119) | (0.119) | (0.120) | (0.130) | (0.119) |
| Sufficient savings | | -0.057 | -0.063 | -0.063 | -0.037 | -0.063 |
| | | (0.040) | (0.039) | (0.040) | (0.043) | (0.039) |

**Table 6** Explaining Willingness to Accept a Reverse Mortgage – continued

| | | | | | |
|---|---|---|---|---|---|
| Sufficient pension | -0.033 | -0.024 | -0.024 | 0.008 | -0.024 |
| | (0.036) | (0.036) | (0.036) | (0.039) | (0.036) |
| Broker trust | 0.063* | 0.045 | 0.043 | 0.155*** | 0.045 |
| | (0.036) | (0.037) | (0.037) | (0.040) | (0.037) |
| Complex | -0.024 | -0.017 | -0.021 | -0.154*** | -0.017 |
| | (0.032) | (0.033) | (0.033) | (0.036) | (0.033) |
| Bequest motive | | -0.066** | -0.061** | -0.029 | -0.066** |
| | | (0.028) | (0.028) | (0.030) | (0.028) |
| Risk aversion | | -0.080*** | -0.070*** | -0.018 | -0.080*** |
| | | (0.026) | (0.026) | (0.028) | (0.026) |
| Debt aversion | | 0.046 | 0.051* | -0.031 | 0.046 |
| | | (0.029) | (0.029) | (0.032) | (0.029) |
| Past home value growth | | -0.008 | -0.015 | 0.072 | -0.007 |
| | | (0.054) | (0.054) | (0.059) | (0.054) |
| Expected home value growth | | -0.127 | -0.115 | 0.038 | -0.123 |
| | | (0.089) | (0.089) | (0.097) | (0.089) |
| Home attachment | | 0.002 | 0.003 | 0.001 | 0.002 |
| | | (0.004) | (0.004) | (0.005) | (0.004) |
| House price fluctuations | | 0.015 | 0.017 | 0.052 | 0.014 |
| | | (0.038) | (0.038) | (0.042) | (0.038) |
| Prob. loan underwater | | -0.001 | -0.001 | 0.003 | -0.001 |
| | | (0.002) | (0.002) | (0.002) | (0.002) |
| Required payout | | 0.000 | 0.000 | -0.003** | 0.000 |
| | | (0.002) | (0.002) | (0.002) | (0.002) |
| Treatment group | | | | | -0.046 |
| | | | | | (0.103) |
| Constant | 2.378*** | 1.757** | 2.883*** | 2.422** | 4.666*** | 2.892*** |
| | (0.699) | (0.863) | (1.030) | (1.014) | (1.125) | (1.031) |
| | | | | | | |
| Observations | 557 | 557 | 557 | 557 | 557 | 557 |
| Adj. R² | 0.099 | 0.105 | 0.122 | 0.115 | 0.110 | 0.121 |

This table presents the results from OLS regressions of the willingness to accept a reverse mortgage survey variable (WTA) on the 13 item reverse mortgage product knowledge score and respondent characteristics. Model 5 uses an alternative specification and regresses the variable RM good deal on reverse mortgage product knowledge, respondent characteristics, and further covariates. Variables are defined in Table 1. Standard errors are given in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.