

# Retire on the House: The Use of Reverse Mortgages to Enhance Retirement Security

Literature Review, Current Market Terms, Empirical Analysis and Simulations, International Comparisons, and Public Policy Ideas<sup>1</sup>

By Mark J. Warshawsky and Tatevik Zohrabyan

MIT Center on Finance and Policy

July 26, 2016

## Introduction

There is a near-consensus in the professional literature that many, perhaps, most American households working today will face a significant retirement funding gap, on present trends, behaviors, conditions, and policies.<sup>2</sup> Some have even gone so far as to term this finding in the literature a retirement crisis. Although many solutions have been offered to reduce the estimated funding gap, that is, to improve the retirement security of working households and even current retirees, this paper focuses on one that uses a currently available financial tool – the reverse mortgage, also known as the HECM (home equity conversion mortgage).

Perhaps the most comprehensive and carefully done recent article showing inadequate retirement savings is by Gaobo Pang and Mark Warshawsky (2014). Like other models in this literature, they compare the actual wealth of households with model-indicated target levels. They use data from the 2007 and 2010 Surveys of Consumer Finances and calculate the proportion of the population that is saving inadequately. Their model is based on the life-cycle theory, that is, households have the goal of maintaining a similar living standard before and after retirement. Their model calculates for every household the desired income replacement rate in retirement and simultaneously the necessary savings rate in working years. The model uses estimated workers' earnings profiles, work- or age-related expenses, tax schedules, retirement account benefits, and plan provisions, including of Social Security and 401(k) and defined benefit pension plans. Investment returns are conservatively assumed to be a nominal 5.5 percent.

Pang and Warshawsky's definition of household wealth is similar to that of other studies, and it excludes housing equity, implicitly assuming that housing equity is devoted to the payment of long-term care

---

<sup>1</sup> Our thanks to Josephine Huang of HUD for providing us with useful information and data about the HECM program, to Professors Steven Venti and Alan Gustman of Dartmouth for helpful conversations about the HRS, in particular, its retirement data, and to Professors Debbie Lucas and Jim Poterba of MIT and Frank Nothaft of CoreLogic for helpful comments and suggestions about this paper.

<sup>2</sup> A few analysts disagree, and Warshawsky (2015) fully explains their views, but, as discussed immediately below, the most careful research in this area is indeed consistent with a significant retirement funding gap.

services and supports later in life. (Long-term care spending and planning is not usually explicitly included in these types of models, but, as discussed later in this paper, contingent planning for it is an empirically founded and reasonable behavior.) In the model, individuals in their working years earn, consume, and save for retirement. Total income each year is used for taxes, life-cycle expenses (food, clothes, transportation, housing, and healthcare, all estimated with age and income effects), savings, and other discretionary consumption. The presence of children and their unique expenses for the household are explicitly included in the model. The model equilibrium, giving optimal saving and replacement rates, is such that other discretionary consumption is the same just before and after retirement. Common to some of the other studies, here retirees are assumed to convert their accumulated wealth into income using a life annuity; this assumption produces higher income flow than systematic withdrawals from asset portfolios.

Pang and Warshawsky's result for 2010 is that 44 percent of working households age 40 and older are not saving adequately for retirement, by the criterion of having a 10 percent or larger gap, if they were planning to retire at the normal Social Security retirement age. Fifty-one percent of households are inadequately prepared if we take seriously their survey-indicated and desired retirement age, typically younger. Workers in their 40s are proportionately less prepared; married workers are better prepared. Households with pension coverage are much better prepared, reflecting the sometimes quite generous terms of these plans, especially in the government sector. Overall, the retirement outlook was better in 2007, when 39 percent of households were deemed to be at risk; some of the deterioration between 2007 and 2010 reflected the closing and freezing of defined benefit pension plans in the private sector during that time, as well as losses on retirement account assets.

As noted, these results did not include housing equity in the calculation of spendable assets during retirement. Housing equity was excluded because it is often kept in reserve in case the retired household will need to spend significant amounts on long-term services and supports at the end of life. But what if the long-term care issue was solved some other way (perhaps through insurance) and housing equity was instead used to support consumption in retirement – would this lessen the retirement funding gap? Yes, according to Munnell, et al., 2012. In their base case, 59 percent of households fall short of target if the retirement age is 65. But if a reverse mortgage with tenure payments is widely used, only 48 percent of households fall short of target at this retirement age. This represents a significant improvement.

But is it realistic and reasonable that, among those who can, older households would use a reverse mortgage? If so, how much retirement income could they realize? That is the main subject of this monograph. First, we explain how a reverse mortgage works. Then we review the large professional literature of how reverse mortgages might be used during retirement, and explore the possible reasons given there why they are not used much now (the current penetration rate is less than 2 percent of all retired households, which is quite small given that nearly 80 percent of retired households own a home, compared to only about 50 percent with retirement assets). We compare, roughly, the current terms, that is, incomes that would result from tenure-payment-reverse mortgages on housing with incomes from immediate life annuities from retirement assets. Life annuities are somewhat favored in this comparison, particularly for individuals, and should probably be used by retired households with

significant financial and retirement asset holdings (generally the two upper deciles of the wealth distribution) instead of reverse mortgages on the housing asset to increase retirement income.

The next, longest, section of this monograph shows the results of our simulation exercise analyzing which older households, according to survey data in the 2012 Health and Retirement Study, are minimally appropriate to, that is, “eligible for,” and then for whom it might be most sensible to use, reverse mortgages, given the high initial and on-going costs of such mortgages. In the course of this empirical analysis we report extensive statistics and cross-tabs on the balance sheets and incomes of retired households, with an emphasis on the levels of their housing assets and relationships with other asset and insurance holdings, income, and preferences. The main goal of all this data work is to estimate what percent of retired households with sufficient home value and significant but not too large financial asset holdings that can best use a reverse mortgage to generate significant extra retirement income.

The bottom line is that from 12 to 14 percent of all retired households are eligible for, and might sensibly use, HECMs. If coverage by long-term care insurance or a low bequest motivation are added to the use criteria, then the percent of retired households who can be expected to get a HECM plunges further, to 4.6 or even as low as 1.3 percent. A 12 percent rate of penetration would increase the current size of the reverse mortgage market almost seven times over, and the retirement welfare of these elderly households could be significantly improved; at the median, annual income would be increased by about \$6,000, or around 19 percent. Moreover, the welfare improvement, although not necessarily the penetration rate, could be made even larger (income increased by 2 percentage points) if the initial and on-going costs of the HECM were reduced in half. If, however, the reduction in costs could only be accomplished by a comparable reduction in the principal loan limit, then the resulting loss in income (halving) is not counterbalanced by an increase in the penetration rate. Instead, however, if lower value homes are sensibly eligible because of the decrease in the costs of the HECM, there becomes a legitimate trade-off between the lower average improvement in consumer welfare of retired elderly households (8 percent of income at the median) and a higher penetration rate among households (as high as 23 percent). Moreover, with a lower principal loan limit, there is no longer as much of a need for government backing to the product because the default risk to lenders is lowered. This reduction in costs and fees could also possibly lead to a sustainable and innovative market to help retired households of modest means.

We conclude the monograph with a brief review of reverse mortgages in other countries, which are mostly not government insured and have had varying degrees of success. We propose some incremental public policies that might be employed to lower costs and increase demand for the sensible use of reverse mortgages in the United States, that is, to improve retirement security and welfare.

### Literature Review

Below we give a critical review of the academic and professional literature on reverse mortgages and HECMs (Home Equity Conversion Mortgages, the reverse mortgage program for seniors sponsored by the Federal Housing Administration (“FHA”)), with fulsome summaries of the more important studies.

We start with a detailed description of the product and its history. We then focus on studies that examine the role that housing plays in the consumption and net worth choices and outcomes of retired households, with due consideration of the many risks (especially of uninsured spending on long-term services and supports (LTSS)) that these households face. The roles of relevant public insurance and welfare programs (especially Medicaid) and their eligibility criteria are also reviewed, with a view to explain the decisions of retired households whether to take out home equity through a reverse mortgage. At the conclusion of the review, we will give our own judgement of the key determinants of demand for reverse mortgages and a possible explanation for the current relatively low usage, before starting examination of current terms in the market and our empirical analysis and simulations.

Based on FAQs about HUD's Reverse Mortgages (viewed October 2014); "New Directions for Policy and Research on Reverse Mortgages," by Barbara R. Stucki, PPAR; and "Retirement Trends, Current Monetary Policy, and the Reverse Mortgage Market" by David W. Johnson and Zamira S. Simkins, JFP, 2014.

The Home Equity Conversion Mortgage (HECM) is the FHA's reverse mortgage program. It enables older homeowners to withdraw some of the equity from their homes, either immediately or later in life (through a line of credit), and either in a lump-sum or over a period of time or for as long as the owner (or spouse) lives in the home. Unlike a home equity loan or a second mortgage, HECM borrowers do not have to repay the HECM loan until the last surviving borrower dies, sells the home, or has not used the home as their principal residence for more than a year (e.g. after entry into a nursing home) or fails to meet the obligation of the mortgage, such as paying property taxes and insurance. To be eligible for a HECM, the FHA requires that the homeowner be 62 years of age or older (as of August 2014, a younger non-borrowing spouse is allowed), own the home outright or have a relatively low mortgage balance that can be paid off at closing with proceeds from the reverse loan, have the financial resources to pay ongoing property charges, and live in the home. The home must be a single-family home, or a 2-to -4 unit home with one unit occupied by the borrower; condominiums and manufactured homes may also be eligible.

When the home is sold or no longer used as a primary residence, the cash payments, interest and other HECM finance charges must be repaid. Any proceeds from or value of the home beyond the amount owed on the HECM belong to the owners, or if deceased, the surviving spouse or estate. No debt is passed along to the estate or heirs. It is a non-recourse loan. Therefore if the value of the house declines over the lifetime of the retired homeowner, or the cash payments extend for a long time, interest rates increase, and so on, it is possible that the deceased or relocated borrower will pay back less than what he owes.

By FHA rules, the amount available for borrowing ("eligible benefit") varies and depends on the age of the youngest borrower or non-borrowing spouse, the current expected interest rate, the lesser of appraised value or the HECM mortgage limit of \$625,500, and the initial mortgage insurance premium. The older the homeowners, the more valuable their home, and the lower the interest rate, the higher is the loan available. Availability has not depended directly on income, credit history or health. Beginning in April 2015, however, FHA requires lenders to assess and document a borrower's ability to pay,

particularly focusing on property taxes and insurance, before originating a loan, following minimum credit, debt and affordability standards. Borrowers failing these standards can be required to set aside a portion of their available principal in a lender managed escrow account to cover future tax and insurance expenses.

For adjustable interest rate mortgages, the following are the possible payment plans:

- **Tenure ('life' annuity)** – equal monthly payments as long as at least one borrower lives and occupies the property as a principal residence.
- **Term ('fixed period' annuity)** – equal monthly payments for a fixed period of months selected.
- **Line of credit** – unscheduled payments or in installments, at times and in an amount of the homeowner's choosing until the line is exhausted. A unique aspect of a HECM line of credit is that it rises over time by the interest rate on the line.
- **Modified tenure** – combination of line of credit and scheduled monthly payments for time of residence.
- **Modified term** – combination of line of credit and term.
- **Single disbursement lump-sum** – a single payment at mortgage closing (for fixed rate mortgages, this is the only payment plan available). The maximum disbursement is restricted to 60 percent of the eligible benefit or the various closing costs plus 10 percent of the benefit. This restriction was put into place in 2013 to reduce loan defaults which were more common with this payment option.

The line of credit option is now the most popular payment plan, according to HUD, either chosen alone (68%) or in combination with the term or tenure plans (20%).

The first reverse mortgage in the U.S. was issued by a bank in Maine in 1961 to a widow; there was no government insurance backing then. The market apparently did not grow much until 1987 when HUD began, on an experimental basis, the HECM program, whose product was insured by the FHA. The HECM became a permanent program in 1998. During the early years, most borrowers were elderly women using the tenure payment plan. As the housing market heated up in the 2000s, borrowers were more likely to be couples and to use the line of credit plan. To supplement the HECM, private lenders introduced proprietary jumbo reverse mortgages. Cross-selling with other financial products was outlawed in 2008. Since the financial crisis, HECMs account for nearly the entire reverse mortgage market. Also, the largest "name-brand" lenders (Bank of America, MetLife, and Wells Fargo) as well as established niche players (Generational) exited the program following the crash, reportedly because evictions of older homeowners who were not paying property taxes and insurance were difficult and harmful to their public reputations, and because they were prevented by law from marketing HECMs to their existing customers. Now there are many "no-name" lenders. American Advisors Group is now the largest HECM lender, with a 25 percent market share; it employs an aggressive media outreach and call center marketing strategy.

Several years ago, the HECM Saver loan option, which had lower upfront fees and lower eligible borrowing amounts, was introduced. It has since been removed, apparently to simplify the product

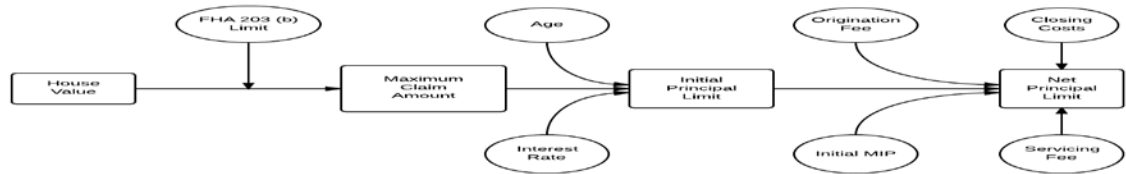
menu. Quite recently, HUD introduced changes in the HECM program which reduced the eligible benefit amount, in response to concerns about recent and prospective losses to taxpayers through the FHA insurance fund.

Mortgage insurance issued by FHA is a mandatory part of the HECM product. The premium on it pays for the federal guarantee that the lender is protected against credit risk and is part of the product design (non-recourse) that borrower will never owe more than the value of the home. Similar to those found in traditional forward mortgages, HECM closing costs include an origination fee to the lender (for processing the HECM loan, a lender can charge the greater of \$2,500 or 2% of the first \$200,000 of the home's value plus 1% of the amount over \$200,000; HECM origination fees are capped at \$6,000), third-party fees such as appraisal, title search and insurance, surveys and inspections, recording fees, mortgage taxes and credit checks, and if less than 60 percent of the available funds are accessed in the first year of the HECM, the upfront mortgage insurance premium equal to 0.50 percent of the home value. There is also a fee for mandatory counseling (about \$125), which is charged to the potential borrower. Fees that accrue over the life of the loan include interest expense, a monthly servicing fee of up to \$35, and mortgage insurance premium equal to 1.25 percent of the outstanding loan balance. The monthly adjusting interest rate is commonly set at the one-month LIBOR plus a lender's margin of approximately 2.5%, with a lifetime cap of the initial interest rate plus 10%. According to more recent (September 2015) HUD rules and experience, the average margin was 2.185%, and the adjustable interest rate could be either the one-month LIBOR or the one-month or one-year constant-maturity Treasury (CMT) for monthly adjustment or the one-year LIBOR or one-year CMT for annual adjustment.

The eligible benefit amount is based on the age of the youngest member of the borrowing household, the home value (up to \$625,500, the current FHA 203(b) limit), and the loan's expected rate; the latter for adjustable rate loans is equal to the lender's margin and the ten-year LIBOR swap rate (note that this differs from the LIBOR interest rate actually charged on the mortgage; if one of the CMTs are used for the variable rate, then the ten-year CMT is used for the expected rate). More specifically, the eligible benefit is the product of the home value and a principal limit factor, determined, in turn by the borrowers' ages and the expected interest rate, less the various initial cash payments, liens, upfront mortgage insurance, closing costs mentioned above and funds set aside for monthly servicing fees. For example, on October 22, 2013, for a \$400,000 home owned by a 75-year-old, the principal limit factor based on a margin of 2.5% and an expected rate of 2.75% is 0.563, so the initial principal limit is \$225,200, and further assuming \$2,000 in initial mortgage insurance premium, an origination fee of \$6,000 (the maximum allowed), closing costs of \$2,322, and a servicing set-aside of \$4,466.98 (the present value of \$30 monthly for 25 years discounted using the expected rate plus the ongoing mortgage insurance premium of 1.25%) gives an eligible benefit amount of \$210,411.02. Figure 1 shows a schematic of the flow of this calculation.

Figure 1

Determination of the Amount That an Eligible Household Can Initially Borrow on a HECM Loan



Source: Authors, based on Figure 1 in Shan (2009).

The term payment and tenure payment options pay out assuming a discount rate equaling the expected rate, the margin and the on-going mortgage insurance premium. On October 22, 2013, this was 6.50%. (Recall that the loan itself carries a variable rate based on LIBOR, which was 0.17% on that date.) The tenure option calculates monthly payments as if the borrower will reach age 100. Regardless of the actual loan balance, payments continue even past age 100, as long as the borrower is living in the property. So there is a small element of life contingencies in the HECM. Insurance companies issuing immediate life annuities in October 2013 would have assumed a lower life expectancy than 100 for the 75-year-old in our example above, but would also have used much lower interest rates than 6.50%, so, on net, it is not clear whether the life annuity from the commercial market or the tenure HECM will give higher lifetime monthly payments on the same asset value. As we will explain below, the life annuity equivalent to the tenure HECM is the cash refund life annuity product; we will compare the income amounts recently produced by these life annuities and tenure HECMs.

Below is a table of selected principal limit factors under program rules as of August 19, 2014 by borrower age at origination.

Table 1

## Selected Principal Limit Factors by Borrower or Younger Non-Borrowing Spouse Age at Origination

Expected Mortgage Interest Rate	45	55	65	75	85
5.50%	0.381	0.419	0.478	0.553	0.644
7.00%	0.228	0.270	0.332	0.410	0.513
8.50%	0.133	0.171	0.227	0.304	0.414

Source: From Exhibit I-1, FY 2014 HECM Actuarial Review.

The Dodd-Frank Act gave an oversight role to the Consumer Financial Protection Bureau (“CFPB”) over the HECM program. Given that the HECM is largely a creation of the rule-making and guarantee of the FHA and HUD, that is, federal government agencies, it is unclear how the CFPB performs its oversight, for example, on whether the fee structure of the products is reasonable and not abusive of consumers.

HECM lenders are largely protected from default risk by the FHA guarantee. The guarantee covers a maximum claim amount (MCA), defined below. Because the loan accrues interest and mortgage insurance premiums over time, it is possible that the outstanding balance could exceed the MCA. Lenders, however, have the option of selling a HECM to the FHA when its balance reaches near the MCA, which they do typically exercise. If there is a technical default, for example, the borrower does not pay insurance and property taxes, and if the lender fails to work out a solution or accelerate the property sale in a timely manner, the lender may lose the FHA insurance for the HECM loan and be required to assume the debt.

IRS website viewed January 14, 2016, Barry H. Sacks, Nicholas Maningas, Sr., Stephen R. Sacks, and Francis Vitagliano, “Recovering a Lost Deduction,” 2016, *Journal of Taxation*, forthcoming, and Thomas Davison, “Delay Social Security: Funding the Income Gap with a Reverse Mortgage,” 2014.

Regarding the tax treatment of reverse mortgages, the IRS (Publication 936) says:

Depending on the plan, your reverse mortgage becomes due with interest when you move, sell your home, reach the end of a pre-selected loan period, or die. Because reverse mortgages are considered loan advances and not income, the amount you receive is not taxable. Any interest (including original issue discount) accrued on a reverse mortgage is not deductible until you actually pay it, which is usually when you pay off the loan in full. Your deduction may be limited because a reverse mortgage loan generally is subject to the limit on home equity debt. That limit is the smaller of:

- \$100,000 (\$50,000 if married filing separately), or
- The total of each home's fair market value (FMV) reduced (but not below zero) by the amount of its home acquisition debt and grandfathered debt. Determine the FMV and the



outstanding home acquisition and grandfathered debt for each home on the date that the last debt was secured by the home.

So there does not seem to be any tax advantage or disadvantage to a HECM compared to a HELOC, or certainly, to a refinanced mortgage. As noted by Sacks, et al. (2016), however, there is a significant risk that the deduction on HECM interest will be lost in many situations. Because interest is not deducted until it is actually paid, and in many circumstances, the home is sold and interest is paid by the estate after the borrower has died and when there is often not that much taxable income generated by the estate, the deduction is often lost. Sacks, et al. therefore recommend that the deduction be “recovered” by having the beneficiaries, rather than the estate, sell the home and pay off the reverse mortgage, and then use the deduction to lower their taxable income, if they have substantial income or through extra withdrawals from their own or inherited deductible traditional IRAs.

Davison (2014) has proposed using HECMs in a sort of tax and annuity arbitrage as follows: delay claiming Social Security until age 70, avoid any distributions from traditional IRAs, and fund any income gap with the proceeds from the HECM. The idea is to let the IRAs accumulate, with their tax-advantaged status on investment earnings, and to also realize an implicit pricing advantage from the delayed claiming credits Social Security gives because it uses a 3 percent real interest rate and static unisex mortality rates. Of course, if the retired household also has other assets on which it has already paid taxes (which we will see below is common for households with IRAs), the above strategy could be alternatively implemented without a HECM. Also, if the household is a single male or a couple, the value of the Social Security claiming arbitrage, that is, the actuarial advantage to delay of claim, is reduced.

As we will explain further below about Medicaid specifically, eligibility to means-tested public welfare benefits, such as SSI or food stamps, may be affected by reverse mortgage loan advances. Although reverse mortgage loan advances are not considered income, loan advances that are retained in a borrower’s bank account may be counted as assets (also referred to as “liquid resources” or “reserve”), which could throw the individual off the welfare rolls.

“FHA Production Report, August 2015” Office of Risk Management and Regulatory Affairs, Office of Evaluation, Reporting and Analysis Division, US Department of Housing and Urban Development.

According to the FHA, as of August 2015, there was about \$147 billion in HECM loans outstanding, as measured by the maximum claim amount (MCA) payable by HUD (the MCA is defined as 98 percent of the initial property value or the FHA loan limit, whichever is lower) and about 607,000 loans outstanding. Note that actual HECM borrowing is likely to be lower than the MCA aggregate. In 2015, there were roughly about 36 million households with a householder age 62 or older in the U.S. So, quite roughly, the HECM penetration rate was about 1.7 percent. Over the month of August 2015, growth was quite slow; growth is the result of new loans made (endorsements) less payoffs (repayments), assignments (loan sales to third parties), and shortfall claims (mainly foreclosures). See Table 2 below.

Table 2

## HECM Insured Mortgage Portfolio Change during August 2015

	Loan Count	MCA (in Millions)
In-Force (Beginning)	607,061	\$146,653
Payoffs	(2,320)	(675)
Assignments	(1,334)	(334)
Shortfall Claims	(1,962)	(368)
Endorsements	5,749	1,767
In-Force (End)	607,194	\$147,044

Source: Table 5, FHA Production Report, HUD, September 2015

According to the FHA (Table 6, Production Report), in August 2015, about 84 percent of HECMs were used for equity takeout, while the rest were used for refinance and home purchase. About 87 percent were adjustable rate. In terms of demographics, 20 percent were issued to individual men, 41 percent to individual women, and the rest to couples; 46 percent were issued to those ages 62 to 69, 36 percent to ages 70 to 79, 15 percent to ages 80 to 89, and 3 percent to those ages 90 and older. About 28 percent of loans had initial principal limits up to \$100,000, 35 percent were for \$101,000 to 200,000, 18 percent for \$201,000 to \$300,000, almost 15 percent for \$301,000 to \$400,000, 4 percent for \$401,000 to \$500,000, and none above \$500,000.

“Reversing the Trend: The Recent Expansion of the Reverse Mortgage Market” by Hui Shan, FEDS Number 2009-42.

Shan combines administrative records from HUD on HECM loans – borrower and loan characteristics and experience from 1989 to 2007 – with zip-code and county level data on demographic and socio-economic characteristics of geographic areas of borrowers. The author establishes some basic facts about the HECM program through most of its history. The median age of HECM borrowers at the time of loan origination was 73.5, although it got somewhat younger over time, with a spike of originations appearing at age 62, the youngest borrowing age. Single males and especially single females are more likely to take HECM loans than couples, as compared to their proportions in the relevant age groups of the population. Median house values are somewhat higher for HECMs than the stock of housing owned by those ages 62 or older. The line of credit has been the most popular payment plan (over 70 percent), but term and tenure plans are also taken (5 and 8 percent, respectively, in 2007).

HECMs are most concentrated in DC, Nevada, California, Colorado and Utah, with penetration rates above 3%, and least concentrated in Mississippi, West Virginia, North Dakota, Kentucky, Alabama and Iowa, with penetration rates below 0.5%. In regression analysis, Shan finds that reverse mortgages are more likely to originate in geographic areas with lower incomes, higher home values, lower average credit scores, higher owner costs relative to income, better-educated residents and with higher fractions of minorities. The author finds that loan termination rates are consistently higher than the corresponding mortality rates for the same age and gender, indicating at least some mobility risk among borrowers. Those who chose term and tenure plans were less likely to exit homes permanently within

five years of loan origination than those with lines of credit; single females and couples had lower termination rates than single males; those with higher house values exited earlier, on average. The rate of loan losses is higher for single males and line of credit payment plans.

“The Government’s Redesigned Reverse Mortgage Program” by Alicia H. Munnell and Steven A. Sass, Center for Retirement Research at Boston College, January 2014.

The HECM program grew over the 2000s, from less than 10,000 loan originations annually in 1999, to more than 110,000 in 2008 and 2009, before falling back to around 60,000 originations in recent years. The increase was likely due to rising home values, falling interest rates, an increased acceptance among the elderly of borrowing (whether secured or not), retirees’ needs for cash in the recent recession, higher FHA loan limits until recently, and a regulatory change allowing fixed rate mortgages on lump-sum loans. The fixed-rate lump-sum payment form quickly became the norm, with borrowers taking the maximums allowed as lump-sums, accounting for about 70 percent of HECM originations during 2010-2013. According to surveys of borrowers, most of these lump-sums were used to pay off an existing mortgage.

These institutional and economic changes caused losses to rise for the HECM program; nearly 10 percent of borrowers were in default, and there were sharp declines in collateral backing HECM loans. In response, the FHA reformed the program, cutting back on the eligible amounts and raising the insurance premium on the outstanding balance, as we described above. A moratorium was placed on the standard fixed rate-full draw HECM product in 2013.

“Actuarial Review of the Federal Housing Administration Mutual Mortgage Insurance Fund HECM Loans for Fiscal Year 2014,” Integrated Financial Engineering, November 2014.

According to this complex actuarial model, the estimated net economic value to the FHA of HECM loans issued since 2009 as part of the relevant insurance fund is negative \$1.2 billion as the end of FY2014. This baseline estimate is the mean of the economic values over 100 simulated paths; each alternative scenario under different future interest rate and house price appreciation rates simulated. This estimate represents a significant worsening from the prior year, when the net economic value was positive \$6.5 billion; the change was caused mainly by an increase in the assumed and projected levels of discount factors.

“An analysis of default risk in the Home Equity Conversion Mortgage (HECM) Program” by Stephanie Moulton, et al., JUE, 2015.

As of June 30, 2014, more than 12 percent of HECM borrowers were in technical default for not paying property taxes or homeowner’s insurance. Analyzing data on some 30,000 seniors who were counseled for reverse mortgages between 2006 and 2011, including household financial information and credit attributes, the authors estimated the likelihood of tax and insurance default. They found that the percentage of funds withdrawn in the first month of the loan, a lower credit score, a higher ratio of property tax to income, low liquidity, and a history of being past due on mortgage payments or having a

tax lien on the property increased default risk. Default rates are greater for Hispanics, blacks, single male and female borrowers, younger borrowers and those with an advanced college degree.

Simulations indicate that default risk can be reduced with little effect on program participation by establishing a minimum credit score and requiring some households to establish an escrow fund for paying future property tax and insurance costs. Moreover, imposing a restriction on initial withdrawals substantially lowers default risk, although it also lowers somewhat program participation. All of these changes have, in fact, been put in place recently.

“Is Housing Wealth a Sideshow?” by Jonathan S. Skinner, in *Advances in the Economics of Aging*, January 1996.

The sense of the economics literature through the mid-1990s, according to Skinner, was that housing wealth changes do not influence consumption and saving behavior. Also, the elderly do not usually spend down their housing equity in retirement. Skinner considers three models of savings for, and decumulation during, retirement in light of these apparent empirical findings. The first model is the conventional life-cycle model with the addition of costs of moving and no reverse mortgage markets. According to the conventional life-cycle model, changes in any wealth holdings, including the value of housing, should affect saving when young, but when adding into the model moving costs and the lack of reverse mortgages, all households are prevented from tapping into housing equity. Hence, in the latter case, housing is a sideshow, with no effect on real variables. The second model adds a bequest motive or posits mental-accounting savings behavior. Hence, here too changes in housing wealth have little impact on saving or lifetime welfare. The third model adds uncertainty about retirement income or its obverse – uninsured health expenses. In this precautionary approach, housing is used as a form of hedge because in a bad state with high uninsured health and long-term care expenses, housing can be cashed out to pay for the care or because the demand for housing has declined. Hence, housing has eventual contingent worth to the household, and fluctuations in its value will influence consumption even when young.

Using both macro and micro data sources, Skinner tests these models and hypotheses. He does find some effect of housing wealth on saving, especially with the macro data, consistent with the conventional life-cycle and precautionary approaches. But Skinner also finds in the micro data that few retirees actually draw down their housing wealth, but many more do upon widowhood or because of adverse events, especially health declines. For those that do tap into housing equity, the draw-down is large and quick. Neither the life-cycle model with added moving costs and financial constraints, nor the mental-accounting or bequest models can explain simultaneously these empirical observations. Rather the precautionary model can explain all the empirical findings – homeowners spend down housing windfalls while young, but not when old because housing wealth is a form of self-insurance, that is, a hedge against contingencies during retirement when cash is needed and the demand for housing services falls. The precautionary approach also explains why the demand for reverse mortgages has not been strong.

“Housing Price Volatility and Downsizing in Later Life” by James Banks, Richard Blundell, Zoe Oldfield, and James P. Smith, Research Findings in the Economics of Aging, February 2010.

Banks, et al., adds an empirical analysis to the literature, focusing on housing transitions of older households just before, and during, retirement; they broaden the literature’s measures of downsizing, look at longer sample periods, look at housing consumption, and compare behavior and outcomes in the United States with Britain. They use panel data sets, from 1968 to 1999 for the US, and from 1991 to 2004 for Britain. They also consider the effect of housing price risk on housing transitions by comparing geographic areas with low and high price volatility. Banks, et al. posit that, because it places the future flow of non-housing consumption at risk, greater housing price risk provides an incentive to downsize in all ways, more quickly. In general, they do find a downward path of housing consumption by age, even after controlling for changes in household size and retirement from the labor force; this result reflects the influences of time preferences and mortality risk in a conventional life-cycle model, with lifetime uncertainty but without life annuities, according to Banks, et al.

Banks, et al., show that slightly more than 80 percent of all Americans over age 50 are homeowners. About one in six Americans are renters and the rest live with relatives or in a nursing home. There is a gradual decline in the fraction who are homeowners across age groups, past age 70; in the age 80 and older category, a bit more than six-tenths are homeowners, about 30 percent rent, and almost 7 percent live with relatives or in a nursing home. In Britain, overall homeownership rates are somewhat lower and the negative age pattern is sharper, although cohort effects are also present.

Looking at housing transitions over a decade, Banks, et al. show that almost one in every three American homeowners who were at least age 50 moved out of an originally owned home. About 70 percent of these movers did, however, purchase another home. Mobility is somewhat lower in Britain. Renters in both countries are more mobile than homeowners (72 percent of American renters moved over ten years, and nearly one of four became homeowners). Examining differences by age, in the 80 plus age group for American homeowners, almost 60 percent move, mostly to renting and more than 6 percent to nursing homes or to live with relatives. Almost 60 percent of the 80 plus age renter group move.

Counting the number of rooms in the house as one way to measure downsizing, Banks, et al. show that older Americans relocating tend to move into a smaller dwelling, by about 0.7 rooms, or 16 percent smaller than their current home. Among those transitioning from homeownership to renting, the decline is much larger – about two and a third fewer rooms. Moreover, this tendency to downsize is somewhat stronger if the homeowners originally lived in a risky housing price area. Overall, the tendency to move to less price volatile areas peaks during the dominant retirement ages – 60 to 69. Employing a regression analysis, Banks, et al. find that the transition from married to single, widowhood, kids leaving home, from work to no work, higher price volatility, and higher home value cause downsizing, while higher incomes discourage it. There is a clear pattern of downsizing by age, even after controlling for other demographic and income effects.

“Housing and Saving in Retirement Across Countries” by Makoto Nakajima and Irina Telyukova, Forthcoming, *Proceedings of International Economic Association's 2014 World Congress*, J. Stiglitz, ed.

Nakajima and Telyukova collect statistics from various national retired household surveys on cross-country differences in saving behavior of retirees, to ascertain globally how widespread is the phenomenon found in the US that many households have significant wealth late in life. They find that countries in South and Central Europe (and the UK and Belgium) do look like the US but in Northern European countries, the more common observation is that retirees spend down their wealth more rapidly. The authors also note that a major part of the story underlying dissaving in retirement is dissaving in housing, in particular, owing to differences in the speed of decline of the homeownership rate with age, a phenomenon highly correlated with overall dissaving at the median. They speculate that the existence or non-existence of social insurance for LTSS expenses might account for the cross-country differences, that is, universal LTSS insurance coverage results in more rapid retirement dissaving, although not necessarily, counterintuitively, more rapid housing equity spend-down. A significant methodological shortcoming of the Nakajima and Telyukova study is that they only examine the 2006 cross-sectional age profiles of the variables, so that the statistics are likely affected by unknown and varied composition and cohort effects.

“Home equity commitment and long-term care insurance demand” by Thomas Davidoff, JPubE, 2010.

Davidoff is explaining several empirical phenomena simultaneously – the elderly remain in their largely mortgage-free homes throughout retirement, moving only when seriously ill or a spouse dies. Upon that move, that is, when entering a nursing home or other expensive long-term care facility, the elderly can use their home equity to pay for a sometimes extended bout of care, or simply find it easier, psychologically, to sell their home. This “consumption commitment” to a particular quantity of housing while well, combined with this “asset commitment” to home equity that is not spent while alive, absent a move, serves as an explanation for the observed general lack of demand for long-term care insurance (“LTCI”), according to Davidoff. The asset commitment implies that home equity has a payout highly correlated with that which would be forthcoming from LTCI.

Davidoff’s explanation assumes that the bequest motive is not too strong, that Medicaid is a poor substitute for LTCI, at least for those with significant wealth, and that there is effectively no reverse mortgage market. (He also abstracts from mortality risk and annuitization issues.) In the alternative, if a reverse mortgage were to be taken on the home, so that the consumption commitment would remain while the asset commitment would disappear, LTCI would be more commonly purchased. If the bequest motive were strong, then all components of wealth, including home equity, would tend to be saved, regardless of health status, and LTCI would be more commonly purchased. If Medicaid is regarded as a decent substitute for LTCI in terms of the types and quality of LTSS provided, then the public policy fact that home equity is largely exempt from the Medicaid means tests implies that the lack of demand for LTCI is better explained by the existence of Medicaid coverage, as modeled by Brown and Finkelstein (2007); the holding of home equity by the elderly would then be better explained by a bequest motive rather than by substituting for LTCI.

Davidoff uses the recent waves of the Health and Retirement Study (“HRS”) panel data base to show that, for a significant portion of the elderly (those above age 62 and retired) population, home equity is large relative to long-term care costs and its payouts are highly correlated with the incidence of moving to a nursing home. In particular, in this sample, he found that uninsured nursing home costs averaged \$40,000 annually in 2004, that 80 percent of households were homeowners, that the median home equity is \$110,000 among owners, that the median ratio of home equity to total wealth among homeowners is 55%, that only 12 percent of homeowners owed any mortgage debt, and that the mean ratio of equity to home value rises from 0.84 among owners in their 60s to 0.96 among owners in their 90s. Davidoff also found that trading down owner housing and moving to renting are all uncommon among the elderly except when the need for long-term care arises, and that LTCI coverage was higher when the ratio of home equity to total wealth was lower.

Davidoff creates a formal economic model of LTCI demand and gives a numerical example. He shows in general that home equity crowds out LTCI. He also shows in his example that when there is a reverse mortgage market, that is, when home equity is liquid, homeowners always demand LTCI for more than 50 percent of expected LTSS costs, regardless of wealth and risk aversion. By contrast, when housing wealth is large and illiquid, LTCI demands falls almost to zero. These results are largely due to the asset commitment present in homeownership as opposed to the consumption commitment.

This analysis leads naturally to viewing favorably the policy proposal by Ahlstrom, et al. (no date) to link reverse mortgages and LTCI. As discussed below in this paper’s policy section, bundling of LTCI with immediate life annuities may also result in cost advantages on the annuity segment and a lessened need for underwriting and therefore to wider availability of LTCI. Also, eliminating Medicaid’s favorable treatment (through exclusion) of home equity might spur LTCI and reverse mortgage demand, even with some bequest motive.

“Elderly Assets, Medicaid Policy, and Spend-Down in Nursing Homes” by Edward C. Norton, *RelW*, 1995.

Norton purports to show empirical evidence for Medicaid welfare aversion in nursing home financing by the elderly, which would support one of Davidoff’s key assumptions above. On closer examination of Norton’s model, however, his conclusion is shaky.

Spend-down refers to the period of time between when a person enters a nursing home as a private- or Medicare-pay patient and when Medicaid starts to pay, presumably because the individual has exhausted his assets. Norton compares the distribution of the actual spend-down outcomes of a nationally representative sample of the elderly with the distribution that would be produced based on the observed countable wealth (that is, as seen in surveys, excluding housing) and the national average cost of a day in a nursing home. He shows that among private nursing home residents, only about 25 percent spend down after five years. He finds that actual spend-down is less common than predicted by data on assets of the elderly. Norton’s model prediction has spend-down occurring at about a 70 percent rate after five years. He then claims that this finding implies that the elderly receive transfer payments from children or liquidate housing assets instead of trying to shelter assets from Medicaid.

There are a couple of reasons to be skeptical of Norton's findings. First, his data sources for wealth holdings of elderly households are varied and less highly regarded than the HRS or the Survey of Consumer Finances more commonly used in more recent research. Second, and more significantly, he uses a national average nursing home charge. But nursing home charges vary considerably, by a factor of more than two, across regions and between urban and rural settings. Furthermore, the elderly tend to migrate upon retirement, often to more economical locales than where they accumulated their wealth. For the same observed wealth holdings, predicted spend-down would occur later in a cheaper area, than if a national average charge is used in the model. It is unclear how large this effect would be if implemented, but it does cast doubt on Norton's strong conclusion.

"Medicaid and the housing and asset decisions of the elderly: Evidence from estate recovery programs" by Nadia Greenhalgh-Stanley, JUE, 2012.

Like Davidoff, Greenhalgh-Stanley is examining the nexus of the housing and long-term care financing decisions of the elderly. Unlike Davidoff, however, Greenhalgh-Stanley dismisses LTCI as too small and weak an insurance product to be relevant to the issue, but posits that Medicaid coverage of LTSS and its detailed eligibility and financing rules are a major influence on the overall decision whether to keep housing equity as a significant part of the retired household's asset portfolio, so as to leave as a bequest. In particular, she emphasizes that housing (up to more than \$800,000) is exempt from the asset spend-down requirement for Medicaid eligibility for payments for LTSS.<sup>3</sup> At the same time, gradually states have implemented a 1993 federal requirement that they set up Medicaid estate recovery programs, whereby states have the right to reclaim the value of Medicaid expenditures on LTSS after the death of the unmarried individual by placing liens on the homes of Medicaid beneficiaries. Some states have gone further and impose a lien while the owner is living.

Greenhalgh-Stanley conducts an empirical investigation of the impact of Medicaid and means-testing on asset and portfolio behavior by using state-by-calendar-year level variation in the adoption of these estate recovery and lien programs from 1993 through 2004. She uses HRS panel data on elderly housing, portfolio and bequest decisions. She finds that state adoption of estate recovery programs induce the elderly to decrease their homeownership rate by 4.6%. These program changes also cause a 15% decrease in home equity and a decrease in the proportion of the total wealth portfolio that is made up of primary housing assets (by 7.8 percentage points – on a base housing share of 54.9%, this is a 14.2% decrease). Greenhalgh-Stanley also finds that adoption of the recovery programs results in a decrease in homeownership at death by 33%, and that trusts are used as a substitute asset protection method to carry out bequest motives. These results are robust to including proxies for local housing market conditions, Medicaid generosity, and state-by-time trends.

Although one might be skeptical of these empirical results, given that the decision to keep one's housing assets is influenced by so many different economic, social, and policy factors, some detailed aspects of Greenhalgh-Stanley's findings make her case more persuasive. The impact she finds is stronger for lien

---

<sup>3</sup> In many states, retirement assets in distribution status are also exempt; it would be interesting to look at differences in retiree behavior with these assets across states with different policies at various times towards retirement assets.



programs, which is sensible because liens placed during the beneficiary's lifetime are highly visible and salient, both to the affected individuals and to others. Furthermore, she finds a differential impact by marital status – stronger on singles – which is also sensible because liens are not placed on a house when there is a surviving spouse and, for purposes of estate recovery, states do not track the home for the duration of the community spouse's stay in the house.

Weaker aspects of the results in Greenhalgh-Stanley's empirical analysis include the relatively modest size of the effects she found, that most of the home equity decrease is driven by the upper end of the distribution, and that there is no consideration of the level of enforcement of these programs by states (as we will review below, there is evidence that enforcement is quite variable and oftentimes minimal). Also she does not consider that, over this time period, there has been something of a shift in the way that LTSS is provided, away from nursing homes (covered by Medicaid) toward home health care (somewhat more spottily covered by Medicaid and Medicare) and toward assisted-living facilities (not covered by Medicaid at all but covered by LTCI).

US Government Accountability Office, "Medicaid Long-Term Care: Information Obtained by States about Applicants' Assets Varies and May Be Insufficient" July 2012.

According to the GAO, Medicaid paid for nearly half of LTSS expenditures of \$263 billion in 2010, representing about a quarter of total Medicaid spending. To be financially eligible for Medicaid coverage for LTSS, applicants cannot have some types of assets above certain limits. Federal law discourages individuals from artificially impoverishing themselves in order to establish eligibility. In particular, those who transfer assets during a five-year look-back period before applying for Medicaid will be ineligible for a period of time. States are responsible for assessing eligibility according to their varied rules, under broad federal guidelines.

GAO conducted a survey in late 2011 to gather information on states' requirements and practices for assessing Medicaid financial eligibility. In particular, the GAO examined the extent to which states required documentation of assets from applicants, obtained information from third parties to verify applicants' assets, and obtained information about applicants' assets to enforce the look-back period rules. The GAO found that almost all states did ask applicants for information about income and some assets, but only 37 states asked for information about the primary residence (with some of the remainder looking at county property records). Less than half the states asked for information going back five years. All states matched reported Social Security income with Social Security Administration records, but matching with other government agencies, like the IRS and unemployment insurance, was spottier. Most states did not contact financial institutions, whether listed or not on the application. Despite a federal law requirement that most states should have implemented by 2011 an electronic asset verification system to obtain information from financial institutions, none had done so, although 18 states said they had begun such implementation.

“Medicaid Coverage for Long-Term Care: Eligibility, Asset Transfers, and Estate Recovery” by Julie Stone, Congressional Research Service, January 2008

The main pertinent fact from this study is that the amount of funds collected through states’ estate recovery programs is quite small, on average, but varies across states. In FY 2004, the amount recovered by all states was about 0.8% of Medicaid’s total nursing home expenditures in that year. Arizona had the highest recovery rate, at 10.4%, following by Oregon and Idaho (around 5%), while Alaska, Georgia, Michigan, and Texas collected nothing (zero), and several others showed minimal efforts. Another interesting institutional observation made in the study is that for purposes of qualifying for Medicaid, people who have home equity above the state-specified amount could use a HECM to reduce their total equity interest in the home. The income earned from this transaction is subject to repayment and is thus not countable income for Medicaid eligibility purposes in the month it is received. Any amounts retained into the following month are counted as resources and would need to be depleted (spent or perhaps even given away) to the state’s asset thresholds before the individual could qualify for Medicaid.

“Reverse Mortgage Loans: A Quantitative Analysis” by Makoto Nakajima and Irina Telyukova, FRBPhil Working Paper, July 2014

Nakajima and Telyukova use a complex stochastic simulation/empirical structural model of housing and saving/borrowing decisions in retirement to study the determinants and extent of the demand for reverse mortgages. In their model, households are able to choose between homeownership and renting, and may choose at any point to sell their house or to borrow against their home equity. Retired households face idiosyncratic uninsurable risk from uncertainty in their life span, health, medical expenses, and house prices, and bad health states may force a move into a nursing home; there is a bequest motive in the model, as well as preference for owning and staying in one’s own home. The model is estimated to match life-cycle profiles of net worth, housing, financial wealth, and home debt, based on the HRS data. Into this model, the authors introduce reverse mortgages, and calculate their value to different household types, and experiment with some policy alternatives. To make the model tractable, Nakajima and Telyukova require borrowers to spend down financial assets before taking on a HECM.

The model produces quite modest welfare benefits of reverse mortgages on average – equivalent of a lump-sum transfer of \$885 per retired homeowner at age 65, or about 5% of one year’s median after-tax income, or about 0.2% of average net worth. This modest level of ex ante welfare improvement from access to a HECM produces a modest demand (less than 2% penetration of retired households, consistent with empirical observations). According to Nakajima and Telyukova, this is caused by substantial risks that households face late in life, such as medical and long-term care risks and house price uncertainty, as well as bequest motives (which are significant here in their estimation) and costs of the contract. Note that according to this model, even when home prices fall deterministically by 4.5% per year, such that the HECM put options arrive deep into the money after relatively short durations, the authors here still find that only a small minority of homeowners take a HECM; this is in contrast to the results of Davidoff who would find a large positive net expected value for the put option. In the

opposite direction, in Nakajima and Telyukova's model, if house prices are certain to increase by 4.5% per year, welfare from and demand for a HECM increase dramatically (to \$8856 and 10%, respectively) because households want to front-load consumption by borrowing more; unlike in Davidoff's model, households are relatively unconcerned in these circumstances about the implicit cost of the put option/limited liability feature of the HECM.

Nakajima and Telyukova do find that simulated welfare improvements and HECM demand are higher among low-income and older households as well as those with the most valuable houses or with outstanding mortgages. Recall that with a HECM, borrowing constraints are relaxed with age, whereas they tighten with age for conventional recourse borrowing. The authors find that demand for HECMs is highest for the oldest low-income households – for those in their 90s, the simulated take-up rate is 17%, as financial wealth runs out and health care costs increase. This simulated increase in borrowing is a counter-factual result though.

“Reverse Mortgage Design” by Joao Cocco and Paula Lopes, LSE Working Paper, March 2015

Cocco and Lopes say that their paper is most similar to the one we summarized immediately above, by Nakajima and Telyukova. It is also a model estimated on HRS data and tries to match observed saving and housing behavior of retirees with a model of reverse mortgage demand under various estimated and assumed parameter values. In particular, Cocco and Lopes ask whether their model, given pension income and assets of retired homeowners and the risks they face, can generate the very slow decline in homeownership with age, the limited demand for reverse mortgages, and wealth increasing with age observed among HRS retired households. Cocco and Lopes claim that their model is superior, compared to Nakajima and Telyukova's, because it has a larger number of risks modeled (uncertain lifetime, health risk, medical expenditure shocks, interest rate risk and house price fluctuations), explicitly employs several features of reverse mortgage products, looks at both lump-sum and line of credit products, examines the financial position of lenders and the insurer, and studies product design.

Cocco and Lopes' model results show that even though a bequest or precautionary savings motive can cause households to remain homeowners until a later age, the simulated decline in homeownership is still too large compared with the data. This is because home equity is not an ideal stock of wealth – it is lumpy and risky. Rather, Cocco and Lopes posit that retirees value property maintenance less than potential buyers of the home, so that a reduction in maintenance expenses has a larger effect on the house's price than on the utility that retirees derive from it. Alternatively (or additionally) it is thought that retirees might particularly value living in the same house in which they raised children and retired. These two explanations both support homeownership but have different cash-flow implications – lower maintenance means having more cash available earlier on, but a smaller bequest and more risk to lenders and insurers.

Reverse mortgages allow retired homeowners to withdraw home equity without moving and to make partial withdrawals which may help them to match their desired savings level. But, according to the Cocco and Lopes, for the empirically observed distributions of housing and financial wealth, and the financial terms of reverse mortgages, including both up-front and on-going costs, the model generates

limited demand for these products, even for retirees who derive utility benefits from remaining in the same house and defer maintenance; this is because most households have a bequest motive. Only in the cases where the bequest motive is zero and there is strong preference to stay in the home is there a demand for a line of credit reverse mortgage; this effect is strengthened when financial assets are low. (Demand for lump-sum reverse mortgages is even lower, according to the model.) In these line of credit situations, however, the insurer (government) can be expected to lose money, even as, ignoring administrative costs, lenders make money; these effects are even larger for lump-sum reverse mortgages, as are defaults for failure to meet property tax and insurance payments.

Finally, Cocco and Lopes use the model to show that reducing product costs, including the mortgage insurance premium, accompanied by a reduction in borrowing limits, makes reverse mortgages more appealing than current features, while at the same time generating positive cash-flows for the government insurer and lenders.

“Reverse Mortgage Demographics and Collateral Performance,” by Thomas Davidoff, UBC Working Paper, 2014

Davidoff investigates empirically whether the fact that the limited liability feature of HECMs is uniformly priced across geographic markets and is still uniform among types of retirees (e.g. married versus single, male versus female) as well as across time (e.g. risk cycles), thereby leading to the product being overpriced in some markets at some dates and underpriced in others, implies an opportunity for adverse selection and moral hazard by borrowers. He notes, based on the professional literature, that only about 2% of eligible homeowners use HECMs, that the FHA has lost money on the HECM guarantees, that HECMs were originated disproportionately near the recent price cycle peak in metropolitan areas that experienced large subsequent price declines, and that homes backing HECM loans have appreciated at a lower rate than metropolitan averages. Davidoff speculates that, consistent with some economic theories, this experience could have occurred because borrowers in Arizona, California, Florida and Nevada in the mid-2000s knew that price declines were likely and would cause the HECM put option to be in the money (adverse selection) and they would under-maintain their homes (moral hazard).

In this empirical paper based on FHA records of HECM loans and census statistics at the zip code level, Davidoff finds that the ratio of HECM loan originations divided by estimated eligible homeowners, the sensitivity of originations to price increases, and use of lines of credit conditional on taking a HECM, are significantly larger in neighborhoods with high minority (black and Hispanic) concentrations, low property values, and high poverty rates relative to metropolitan averages. He says that this evidence suggests that the poor performance of HECM loans is driven, not by adverse selection, nor by moral hazard, but instead by a more innocuous incidental correlation through demographics. This may be caused, in turn, by minority homeowners having less income and wealth, and a higher share of home equity in wealth, that is, by liquidity-based demand. Davidoff even finds some support for effects mainly by race and not wealth; he finds that poor whites do not commonly use HECM loans.

Thus, contrary to evidence from the sale of homes, there is substantially greater absolute and marginal propensity to consume home equity extraction among lower wealth households than others. The high ratio of home equity to wealth appears to increase demand for HECM loans. Davidoff speculates that Medicaid rules may have an influence on these relationships and behaviors but he is not clear as to the exact mechanisms. The same types of neighborhoods in which HECM loans were relatively popular saw large price declines after 2006. Davidoff favors the explanation that life cycle considerations make the causality run from liquidity-based demand fed by capital gains to incidental correlation with ex-post price declines.

“Can ‘High Costs’ Justify Weak Demand for the HECM?” by Thomas Davidoff, UBC Working Paper, September 2014 and “Do Reverse Mortgage Borrowers Use Credit Ruthlessly?” by Thomas Davidoff and Jake Wetzel, UBC Working Paper, July 2014

The HECM can be viewed as the bundle of a non-defaultable line of credit and a put option that gives the borrower the right, but not the obligation, to sell their house for the credit limit at the date of termination. Under fairly conservative assumptions, Davidoff calculates option values and finds that potential borrowers who anticipated that future price changes and interest rates would look similar to those over the last quarter century should have found the put option embedded in the HECM to be fairly priced or better. Borrowers who foresaw a significant probability of a crash even half as large as the one that actually occurred should have found the HECM an excellent deal. Averaging across states, the put option offered to younger retirees had a positive expected net present value greater than 3% of home value, even with high closing costs. Arizona and Florida offer fair pricing absent a crash, and large values with a possible crash. The HECM has the most positive net present values in states in the interior of the US which have experienced low average growth and typically modest price volatility. Oklahoma and Texas, which have seen low average growth and high volatility, offer the highest put option values.

There is apparently little indication that the extent of HECM use is higher in these states. Almost no one uses the HECM as a pure put option, borrowing at the last moment if the option is in the money. This lack of ‘ruthless’ credit use is further bolstered by the results of empirical investigation that borrowers whose loans terminated with credit limits greater than their homes are worth have been no likelier to exhaust available credit than similar borrowers whose loans terminated with credit limits below collateral value.

“Reverse Mortgages: What Homeowners (Don’t) Know and How It Matters,” by Thomas Davidoff, Patrick Gerhard, and Thomas Post, November 2014, Netspar Working Paper.

The authors field their own survey of American households with heads older than 58 to learn about the extent of knowledge of, and attitudes toward, HECMs, all in order to help explain why the actual demand lower than indicated by theory and models. According to Davidoff, et al., almost all respondents claim that they have heard of reverse mortgages. On average, however, knowledge, ascertained by the authors through specific product questions in the survey, is fairly low among homeowners. Around three quarter of respondents understand that the purpose of a reverse mortgage is 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 borrower. Around half of respondents know that a reverse mortgage is actually a loan, that the loan balance grows over time, that no 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, understands the relationship between interest rates and maximum loan amounts correctly, and has realistic expectations about maximum payout amounts. It is indeed somewhat surprising that even a third of the respondents understand the product at this level of detail; this result may be an artifact of the questionnaire's method of inquiry.

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

Their regression results show that reverse mortgage product knowledge is positively related to product demand, as ascertained by a hypothetical question of desire for the product (not actual use). Because on average knowledge among respondents is fairly low, the authors claim that their 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, according to the survey answers and regression analysis. The authors say that the results in total 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 in the survey does not affect hypothetical demand for reverse mortgages. Davidoff, et al. interpret these findings to mean 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, although they do not give specific recommendations.

It is hard to know how seriously to take these results and their interpretation. The one-off survey with its extensive, detailed and intrusive questions seems overly ambitious and insufficiently randomized; there is some evidence (\$80 million homes) that some respondents were not truthful in their replies, and the authors do not tell us how they deal with the inevitable and likely ubiquitous non-responses. Also the underlying economic model in this paper is unclear – how many non-users can realistically and reasonably be expected to know product details of any financial or insurance instrument?

“Standby Reverse Mortgages: A Risk Management Tool for Retirement Distributions” by John Salter, Shaun Pfeiffer, and Harold Evensky, JFP, 2012

These professors of financial planning consider the contingent use of the HECM line of credit in conjunction with a particular retirement income and asset strategy that does not use life annuities. In particular, their proposed “mega” strategy works by only borrowing with a HECM line of credit during

bear markets in order to avoid selling financial assets at depreciated prices. This would be dictated by the so-called “cash flow reserve ‘CFR’ bucket” strategy, whereby up to two years of needs is placed in cash and the remainder of retirement assets are invested in a total return asset portfolio. The CFR is used to finance spending and is refilled when rebalancing, making investment changes or during a forced sale of the investment portfolio when the CFR bucket is down to two months of living needs. (The authors believe in mean reversion and that economies tend to rise over time, so they want to avoid locking in losses; moreover, because they are not using life annuities in their strategy, they want to avoid portfolio exhaustion for the retiree.) The use of the HECM line of credit as a risk management tool in distribution planning reduces the need to set aside such a large cash reserve (they reduce it to six months’ living needs) and helps avoid forced sales if asset portfolio values are down for an extended period. The HECM line of credit is repaid from the investment portfolio when asset values recover.

The trigger used by Salter, et al. to decide whether to borrow or to pay back on the HECM is based on the retirees’ projected asset portfolio glidepath value, determined in turn by the expected portfolio returns and the withdrawal rule being used (in their example a 5 percent real withdrawal rate). In other words, when the portfolio is above the glidepath mark, refill the CFR bucket when rebalancing; if the CFR bucket is empty, force-sell part of the investment portfolio, pay off any loan balance and then refill the CFR bucket. When the portfolio is below the glidepath mark, if the CFR bucket is empty, borrow from the HECM line of credit. Salter, et al. further discounted the glidepath mark by using 80 percent of portfolio value in order to minimize the use of the line of credit.

The authors conducted a Monte Carlo analysis of their mega strategy compared to the simple bucket strategy, assuming a house with value of half the original portfolio value. They consider continuing to borrow using the HECM up to the maximum line of credit, until the point of investment portfolio exhaustion or even past it. After thirty years of retirement (that is, age 92 when retirement occurs at age 62), Salter, et al. find that the probability of portfolio survival is only 52 percent in the simple bucket strategy, compared to 78 percent or 82 percent with the augmentation of the use of the HECM line of credit, up to or past portfolio exhaustion, respectively. After forty years of retirement (that is, age 102), the respective portfolio survival probabilities for these three specific strategies are 38, 46 and 73 percent. Alternatively, the rate of portfolio withdrawal can be increased with the use of the HECM line of credit strategies. (Of course, it is obvious that the probability of portfolio survival would be raised when the potential addition of new resources (in this case home equity) not heretofore available is introduced.)

Salter, et al. state that they prefer the use of a HECM line of credit to a home equity line of credit because the HECM is non-cancellable and gives the retiree payback control, which are critical factors in severe and protracted market downturns. The home equity line of credit requires some minimum payment and there is the real risk of the line being frozen, reduced or cancelled. Moreover, the home equity line is proportional to home value, and, in contrast to the HECM line of credit, does not automatically increase with the interest rate. Note, however, that Salter, et al. conducted their Monte Carlo analysis when the HECM line of credit had lower initial fees; it is unclear how their augmented strategies would fare under current product terms.

“HECM Reverse Mortgages: Now or Last Resort?” by Shaun Pfeiffer, C. Angus Schaal, and John Salter, JFP, 2014.

These financial planning professors and professionals consider the question whether it is better to establish the HECM line of credit at the point of retirement “now” or as a “last resort”, that is, at the time of portfolio exhaustion. In particular, Pfeiffer, et al. compare two strategies – establish a HECM line of credit at the point of retirement and do not use it until the investment portfolio which is being distributed to support spending is exhausted versus waiting until portfolio exhaustion, if ever, to then establish a HECM line of credit and subsequently use those proceeds to support income needs until the retiree dies or the line of credit is used up. The last resort strategy introduces considerable variability into the size of the line of credit available at a later time because the HECM rules determining the maximum borrowing amount consider the age of the borrower (when the portfolio is exhausted) as well as the then-prevailing level of interest rates (the maximum amount eligible for borrowing increases with age but decreases with interest rates).

Pfeiffer, et al. conduct a Monte Carlo simulation of the above two HECM strategies overlaid on a type of bucket strategy used for supporting spending during retirement. They show that there is a 30-year portfolio survival advantage for the “now” over the “last resort” strategy, although there is a reduction in mean expected wealth. This holds true, according to the authors, under various future interest rate and home appreciation scenarios and for various real withdrawal rates. The “now” early establishment portfolio survival advantage is shown to increase with the duration of home occupancy, real withdrawal needs relative to home value, higher future interest rates and lower future home appreciation. The intuition behind these results relates to the claim made by the authors that a larger line of credit is being made available at future dates when the line is established early than in a last resort strategy. It would have been helpful if the authors had more effectively demonstrated the truth of this key claim, at least through examples.

“Hacking Reverse Mortgages” by Deborah Lucas, MIT Working Paper, October 26, 2015

Lucas views reverse mortgages as complex financial instruments – borrowers are short a loan or credit line, and long a put option on their house, both with a variable maturity equal to their tenure in their current home. She develops a stochastic model of the HECM, and evaluates the purely financial costs and benefits that accrue to borrowers, the government and private lenders. She incorporates the details of the program into a formal valuation model, and generates fair value, not actuarial, estimates of costs and benefits. She only prices the risk arising from volatility of house price appreciation, modeled as a geometric random walk with drift, and uses Treasury rates for discounting, IRS tables for mortality rates and Census data for moving rates by age. Note that the insurance implicit in the HECM is more valuable because of the systematic risk in house prices – in economic downturns, when resources are scarce, there is a higher probability of house price drops, and hence the put options are highly valued.

Lucas considers five different types of borrower behavior or strategies and shows how the costs and benefits differ among them, measured by the net present value (NPV) of a HECM loan at origination.



The first type is the “ruthless borrower” posited by Davidoff above, whereby borrowers do not draw on the credit line until they move, at which point they take out the maximum amount allowed if that amount exceeds the house value. The second type of borrower “full early drawdown” extracts the maximum amount allowed in the year after taking out the mortgage. The third type takes half of the amount available in the first year and the rest in the third year. The fourth type takes half of the amount available in the first year, and keeps the rest available as a credit line but does not use it. The fifth type opens up the line of credit and never uses it. Most actual borrowers are type two, which implicitly includes tenure and term borrowers. The inclusion of tenure and term borrowers is analytically sound if payment terms are fairly priced and we ignore the potentially higher eventual loan limits in term and especially tenure payment forms.

Lucas finds that for the overall population, and for all borrower types other than ruthless borrowers, the HECM loans have a negative NPV. This indicates that the rate spreads and initial fees are high relative to the economic value of the risk transfer. As a percent of the initial line of credit, borrowers pay 19 percent in risk-adjusted NPV, the government 3 percent, and lenders earn, on a gross basis, before expenses, almost 22 percent. Even when the household never draws on the line of credit, the borrower experiences negative NPV of 7 percent, given the high fees charged. Only in the ruthless case are the results switched – borrowers benefit by 37 percent, the government loses 38 percent, and lenders only gain 1 percent. Anything that increases the loan balance early on or that increases the average life of the loan (e.g. a younger borrower, or category 2 or 3 borrowers) makes it more expensive for the borrower because of the annual fees and interest rate spread. The ruthless strategy avoids most of the annual insurance fees because balances only become large right before they are partially paid back.

Lucas estimates that reducing the annual mortgage insurance premium to 1% (from the current 1.25%) and the lender interest rate spread to 1% (from the 2.75% she assumed) would substantially lower the cost to borrowers, give the government a small positive NPV and substantially lower revenues to lenders. If ruthless strategies were eliminated through program rule changes such as charging more for an undrawn credit line or by assessing a penalty on large withdrawals in the year in which the house is sold, and lender spreads are reduced to 1%, then the mortgage insurance premium could be reduced to 0.85% without causing a loss to the government. Lucas believes that if the opacity and complexity of current HECM products and their pricing structure were removed, a larger and more competitive market would evolve that would make lower fees and spreads sustainable even to lenders. She does not, however, compare the current costs she found on the HECM with those on other financial and insurance products, whether in widespread use or not, to evaluate whether the HECM’s costs are unusually high and therefore obviously subject to lowering by government fiat or market competition.

“Incorporating Home Equity into a Retirement Income Strategy” by Wade Pfau, JFP, 2016.

Using a rather sophisticated stochastic and integrated model of variable asset returns, interest rates, inflation, and housing prices, Pfau evaluates six retirement income strategies that involve spending using a HECM. They are 1) delay opening a line of credit with a reverse mortgage until all other financial assets (in his analysis, a large IRA) are exhausted; 2) open a line of credit immediately upon retirement and use it to support retirement spending first until the line is exhausted, and then turn to other

investments; 3) open the line of credit at retirement and take from it when the investment portfolio experiences a loss; 4) the Pfeiffer, Salter, and Evensky 'coordination' strategy described above, with the cash reserve bucket removed, whereby the line of credit is taken or repaid depending on developments in the wealth glide-path compared to the plan; 5) the line of credit is opened at the beginning of retirement but it is used at the end only if and when the investment portfolio is depleted (note that is not the same, but is related to, the ruthless strategy described above); and 6) use tenure payments from the HECM with other spending needs filled in from withdrawals from the investment portfolio.

In his simulation analysis, Pfau assumes a home value of \$500,000, a HECM with an interest rate spread of 3% (higher than what we use below) and origination and closing costs of \$5,000 (lower than what we use below), a \$1 million IRA invested equally in stocks and bonds, a 25% tax rate, a 62-year old borrower and current initial interest rates. The stated goal is 4% real post-tax initial spending rate (implying 5.33% gross rate of withdrawal initially from the retirement investment portfolio, increased subsequently by the rate of realized inflation). Pfau evaluates the six strategies by the probability of meeting that spending goal, but also considers the wealth remaining for a bequest.

The fifth strategy produces the highest rate of success across retirement horizons (up to forty years) for the retirement income goal. Pfau notes that, especially when interest rates are initially low, the line of credit will almost always be larger by the time it is needed than when it is opened later (as in the first strategy, which gives the lowest rate of success among the strategies). The other four strategies lie somewhere in the middle in terms of plan success. Adding concern for the combined legacy value of the household's assets, however, produces a somewhat different ordering of optimal strategies. At a horizon of 25 years and longer, the legacy value for the tenure payment option is the highest among the strategies. Pfau states that this is a combined result of the partial home equity use preserving the portfolio longer, and that eventually tenure payments enter into the non-recourse aspect of the reverse mortgage because income continues even if the loan balance has already exceeded the line of credit. The tenure payment strategy also does well, relative to the other strategies, in the lower percentiles of outcomes. Pfau concludes his analysis with the observation that strategies which open a line of credit and leave it unused run counter to the objectives of the government and its risk concerns and therefore may be eliminated in the future by federal rule changes.

Pfau did not consider whether other strategies and products using home equity, such as HELOCs or cash-out refinancings, could accomplish the same or nearly the same things as the HECMs at the same or lower costs. He also did not consider the other needs in retirement for the use of home equity, such as long-term care.

#### Our Summary Conclusions Drawn from the Professional Literature

For some retired households, housing is a flexible service and asset; these households move frequently, rent, downsize, and so on. Hence, there is nothing special about housing assets for them, and if needed, they will sell their home. Moreover, for some households, particularly of advanced old age, their current single-family house may be detrimental to their welfare, because it is poorly designed to accommodate disabilities and frailness, because it is simply too large and requires difficult and

expensive upkeep, or because it leads to isolation, as friends, neighbors and relatives move or pass away.

For many others, however, housing is not just another asset and may be uniquely positive – it represents a relatively fixed flow of services and community and memories that retired households can and do appreciate for a considerable part of their remaining lives. For some fortunate households in this latter group, modest consumption demands and generous pensions and sufficient retirement assets obviate the need to give up housing equity, to be used for whatever purpose. But for many other households, particularly those in the lower and middle-income classes, there may be a strong need for more retirement resources to be gained from housing equity. For them, there are different ways to access funds from the home and still live there, such as home equity lines of credit, cash-out refinancing mortgages and reverse mortgages. The HELOC and refinancing strategies require, however, repayment during the lifetime of the household, and this could be difficult if resources and income in retirement are quite tight. Hence the reverse mortgage, which does not require repayment until the last member of the household leaves the home, could represent a solution to the need to increase retirement income while remaining in the home.

At the same time, many retired households do not want to give up, through a reverse mortgage, the asset value that housing equity represents, even though they can still experience the same flow of services. For many, the bequest motive is strong, and they want the actual house, or at least its value, to go to their children. For many other households, especially in the middle- and upper-middle of the income and net worth distribution, the house is being held in reserve, as a specific contingent asset to pay for uninsured LTSS expenses. For them, Medicaid insurance is (thought to be) either unavailable or undesirable because the eligibility rules and estate recovery programs may be (considered to be) enforced sufficiently strongly in many states to discourage gaming behavior. In other words, there is significant precautionary demand for savings in the form of housing, not satisfied if a HECM is used for consumption. For others, somewhat lower in the asset and income distributions, Medicaid coverage of LTSS is satisfactory and state estate recovery efforts are regarded as sufficiently weak that holding onto housing assets (and not taking out a HECM) is the better option, to leave a small bequest or for other purposes. Clearly, if effective and efficient LTCI were more widely available and used, and if the availability of Medicaid coverage for LTSS were simultaneously tightened and more effectively policed, these latter groups might find reverse mortgages more attractive, to enable them to increase their consumption in retirement while healthy.

Finally, for still others – this is a group of unknown number – Medicaid coverage or private LTCI for LTSS is available and desirable, their bequest motive is modest, their financial wealth is small but their net housing wealth is significant. This last group may find that a line of credit or tenure reverse mortgage improves their welfare, and indeed there is evidence that it is precisely this type of household who is using HECMs, although the added racial element in usage patterns is still unexplained. But the considerable up-front and on-going transaction costs reduce the value of the HECM as a way to realize home equity in the most common and simple uses, particularly for relatively small amounts. Moreover, historically, defaults have been quite high when large initial withdrawals were allowed.

Two complex stochastic simulation models of HECM demand estimated on HRS data come to the same result – HECMs are not used because of a significant bequest motive present in the retired population and the product is expensive in its initial and on-going terms. The sophisticated theoretical and personal finance analyses that justify the transaction costs (including the initial and the on-going spread and mortgage insurance premium) by the large put value of a HECM are not persuasive to us, as a way that people, particularly those of modest means, should behave, nor are they consistent with the results of empirical studies of actual borrower behavior. In particular, the ruthless borrowing strategy seems to be an abuse of the program, and is clearly undercharged because there is no on-going fee for the contingent use of the growing line of credit. The somewhat esoteric and varied uses of line-of-credit HECMs for retirement planning and asset allocation purposes would seem to necessitate the assistance of professionals, and to be most appropriate for households with significant net worth, a group for whom the public policy goals and any subsidies from the federal government of the HECM program are not designed and appropriate. In any case, the current end result of the financial planning literature (especially Pfau’s article) is that, on balance, the tenure payment option is the best overall use of the HECM; that payment plan is indeed most consistent with the retirement security policy intent of the program, and below is the one we simulate for retired households in the HRS data base.

We can also infer the implications of the essence of this professional literature on reverse mortgages in terms of the appropriate direction of public policy. Initial and on-going HECM product costs should be lowered, even if it is necessary to lower the borrowing limit to accomplish that essential goal. Moreover, demand for HECMs would increase and government spending decrease if LTCI were improved and sold more widely. Similarly, demand for HECMs would rise if the Medicaid eligibility rules were tightened and administered more effectively.

### Current Terms in the HECM and Immediate Annuity Markets

The financial product comparable, roughly speaking, to a HECM making tenure payments is a life annuity with a cash refund feature. With the latter, the individual (or couple) pays to the insurance company a lump-sum amount initially, which is dependent on gender and age, and gets a fixed lifetime flow of income in return; if the individual (or couple) dies early, the beneficiaries receive the lump-sum less annuity payments already paid. So if the individual dies relatively soon, most of the lump-sum amount will be available as a bequest. If the individual lives a long time, however, there will be no cash refund. The HECM making tenure payments is an equivalent structure, roughly speaking. When borrowing an amount with tenure payout, the individual (or couple) gets a fixed lifetime flow of income; if the individual (or couple) dies early, the home loan will be repaid and the remaining amount will go to the heirs. If the individual lives a long time, however, it is less likely that any corpus will remain.

One has to say “roughly speaking” in this comparison for several reasons. Most importantly, there is a significant fixed cost to getting a HECM, regardless of the size of the loan – fees of various types can approach \$6,000 or more. Hence, for home equity values of \$100,000 or less, such a toll may sensibly prevent the use of HECMs. By contrast, for immediate life annuities, the administrative and sales costs of the product are embedded in the pricing and do not include a fixed amount paid by the investor initially.

There are, moreover, other cost and value considerations that differ between the two approaches. The economic values of these “second order” differences go in opposite directions. On the one hand, the HECM will likely pay out for a couple of years less than the life annuity because many households must move out of the home owing to the need for assisted living or nursing home care, or for other personal and family reasons. Also, the life annuity payouts are fixed and guaranteed at the time of the lump-sum premium payment, providing certainty, whereas the amount eventually owed on a tenure HECM loan is variable and uncertain because of interest rate movements over time. Finally, there is practically no limit on the amount of life annuity that can be purchased, given assets available to the household, unlike the HECM which is limited by statutory, regulatory, and administrative constraints. These factors increase the economic value of the life annuity compared to the HECM. In the opposite direction, there is a higher likelihood of a residual being left to heirs with a HECM because the household gets the benefit of any home price appreciation, but it is protected from home price declines by the limited liability feature of the HECM.

How these real economic differences net out in terms of utility and value is unknown to us, and analytically would be complex to calculate, although our sense is that they would tend to favor the life annuity. Here we will simply do a straight-up comparison, adjusted only for HECM initial transaction costs, of the monthly incomes produced by identical amounts borrowed/annuity single-premiums paid for individuals and couples of various ages, from 65 to 85.

We did this comparison on December 15, 2015, using two tools found on the web, the reverse mortgage calculator put out by the National Reverse Mortgage Lenders Association (<http://www.reversemortgage.org/about/reversemortgagecalculator.aspx>), and an immediate annuity calculator put out by an insurance broker, Webannuities, [www.immediateannuities.com/immediate-annuities/](http://www.immediateannuities.com/immediate-annuities/). Both websites indicate that monthly income amounts shown are estimates; the former because closing costs which differ greatly by geography and lender have to be entered into the calculation; the latter because the monthly income amounts shown are based on several quotes from many large commercial insurance companies. In particular, the retiree might do somewhat better by selecting the lowest priced mortgage issuer or insurer at the time of the quotes.<sup>4</sup> For the HECM, we assumed a \$300,000 house in Montgomery County, Maryland, with typical origination and closing fees as well as insurance and administrative fees. The fee for mandatory counseling, however, is apparently not included in the calculator. Note that HECM initial fees, in particular closing costs, vary widely by state, perhaps because of special state requirements or allowances (see Appendix Figure 1) or market practices and conditions. For the life annuity, for both singles and couples, we use the cash refund feature, and for couples, the joint and 100% to survivor feature, without, however, deducting the HECM

---

<sup>4</sup> In an April 15, 2015 on-line comment on the paper by Tomlinson (2015), Tom Davison says that origination fees from one lender were lower than what is reported by the calculator. As he also notes, however, this tendency is sometimes made up by a higher interest rate spread. By contrast, in trade press accounts, origination fees are indicated to be at the regulatory maximum for the largest lenders, and only by extensive search among obscure lenders and/or sharp negotiation can borrowers get lower fees. So clearly, actual pricing and fees in the HECM market are not transparent and require further investigation. For the purposes of this paper, it seems reasonable to use the calculator put out by the relevant trade association – why would the association have an incentive to either over- or under- state the fees charged by its members on average?

fees from the single premium, which are not relevant to immediate life annuities.<sup>5</sup> See Table 3 for the results of the comparison between HECM tenure payments and life annuity payments for the same principal limit amount, that is, after the deduction of fees (as estimated by the tool) for the HECM and none for the life annuity. Stated another way, the HECM monthly payments are based on the net principal limit and the life annuity monthly income is based on the principal limit shown below.

Table 3

Comparison on December 15, 2015 of Monthly Income from HECM Tenure and Immediate Life Annuity with Cash Refund based on a \$300,000 Home Value in Montgomery County, Maryland

## Individual

Age	Principal Limit	HECM		Life Annuity	
		Net Limit	Monthly Income	Male Monthly Income	Female Monthly Income
65	\$162,600	\$150,694	\$843	\$835	\$823
70	172,800	160,894	948	973	947
75	184,200	172,294	1092	1153	1118
80	197,100	185,194	1308	1411	1338
85	209,700	197,794	1648	1754	1697

## Couple

Ages	Principal Limit	HECM		Life Annuity	
		Net Limit	Monthly Income	Joint and Full to Survivor Monthly Income	
65 – 65	\$162,600	\$150,694	\$843	\$761	
65 – 72	162,600	150,694	843	805	
70 – 70	172,800	160,894	948	883	
62 – 70	157,200	145,294	794	744	
75 – 75	184,200	172,294	1092	1048	
80 – 75	184,200	172,294	1092	1090	

Source: Authors' use of Web tools for HECMs and Immediate Annuities.

Several things are immediately apparent. The net limits and monthly income produced by tenure HECMs do not differ by individual versus couple, by gender, nor by the extent of the age span in the couple. These variables do, however, influence life annuity pricing, or its obverse, monthly income, for the same initial borrowing/single-premium amount. In general, the monthly income for individuals is lower for HECMs compared to life annuities – particularly for older individuals and males (where

<sup>5</sup> Tomlinson (2015) conducts a similar exercise, but makes the mistakes of deducting the HECM fees from the annuity premium, apparently uses a straight annuity instead of a cash refund annuity, and looks at only age 65 instead of also the older ages where HECMs are more commonly taken.

mortality considerations are likely more important than interest rates, at least at current low interest rate levels). By contrast, for couples, HECMs produce somewhat higher monthly income across all ages and age-spreads, although the income from the life annuity improves relatively when the age spread among the couple widens and as they age.

The income advantage to the tenure HECM for couples is somewhat surprising. It is our strong guess that this result may not hold when interest levels rise. It is also possible that the FHA believes that when one member of the couple gets sick and needs to move, the other member will also move, losing the independence of the tenure probabilities, and thereby it does not have to “charge” for the joint-and-survivor insurance. By contrast, insurance companies prudently do have to price on the basis of the independence of mortality probabilities. It is also possible that the FHA is not pricing tenure HECMs correctly for couples.

These results indicate broadly that, for individuals, the implementation of lifetime retirement income strategies can be more effectively and generally more cheaply done using immediate life annuities based on financial assets than by HECMs based on home equity amounts. The results for couples are more ambiguous, but they may particularly appreciate that the life annuity pays for life whereas the HECM only pays for tenure. So for households that have both significant financial and housing assets, the HECM, at least with a tenure payment feature, is not best used for retirement security for the production of lifetime regular income flows, in contrast to life annuities, which are widely recommended by standard economic analysis. Although immediate life annuities are not actually widely used by retired households currently, there are no impediments from them being so used, and hence our assessment is relevant to policy analysis and recommendations, as well as to our empirical analysis of the potential HECM market, immediately below. In particular, in the later stages of empirical analysis and simulations, we will tend to focus on the potential use of HECMs among those retired households with some financial assets, but not “too much.”

In the empirical analysis section, immediately following, we first describe the data assembly from the HRS, including cleaning, imputations, and complex variable creation, then we give summary statistics and cross-tabs of key variables, and finally we present the simulation methodology and results for potential HECM demand.

### HRS Data Assembly

The University of Michigan Health and Retirement Study (HRS), is a biennial longitudinal panel study that surveys a representative sample of about 20,000 people over the age of 50 in the United States. Since 1992, the HRS has been collecting information from various cohorts about income, pension plans, assets, employment, health insurance, and other in-depth questions about health issues and personal preferences and plans.

In this paper, we use RAND HRS datasets and RAND Enhanced Fat Files. RAND HRS is a user-friendly version of a subset of the HRS. Through the support of the National Institute on Aging and the Social Security Administration, the RAND organization further processes and cleans the HRS data. The major differences between HRS raw data and RAND HRS are consistent and intuitive naming conventions of

the variables, model-based imputations and imputation flags, and spousal counterparts of most individual-level variables. RAND HRS data also contains household and personal identifiers for easy merging with other RAND files. Not all variables, however, that we need to use in this paper are available in the RAND HRS. In particular, variables about retirement, such as personal retirement savings and defined benefit income, are not processed and available in the RAND HRS. Instead, they are available through the RAND Enhanced Fat Files, which convert raw HRS data to respondent level data, making it easier to merge with other RAND HRS datasets, and name the variables in a logical and consistent way. Unlike the RAND HRS, however, there are no model-based imputations and cleaning of the retirement plan variables, so we do some imputations ourselves. The datasets from these two sources are merged by the Household ID (HHID) and the more granular Personal ID numbers (Respondent and spouse ID).

### Creating and Cleaning the Dataset

The merged data set (RAND) used for this paper is reported at a respondent level. We use wave 11, which is the 2012 survey, with 20554 total number of observations. The full sample for wave 11 includes six retirement cohorts:

- 1) AHEAD cohort (born before 1924)
- 2) Children of Depression (CODA) (1924-1930)
- 3) Initial HRS Cohort (1931-1941)
- 4) War Baby (WB) (1942-1947)
- 5) Early Baby Boomer (EBB) (1948-1953)
- 6) Mid Baby Boom (MBB) (1954-1959).

The dataset includes the respondent's and respondent's spouse information when the respondent reports being married. Of the 20554 respondents, only 12490 (61%) reported they have spouses (or partners). In this paper we assign a household a "couple" status if the respondent is married, partnered, or if there are two respondents in the wave-specific household. Otherwise, the respondent is assigned a "single" status. The age range of the respondent or spouse in the entire sample of 20554 is 20 through 103. In this paper, we focus on respondents (or spouses) in the 62 to 74 age range, yielding 7792 observations. Specifically, if respondent is single, then the age is strictly constrained to 62 to 74. Otherwise, if the respondent is married, one of the household members has to be at the age range of 62 to 74 to be included in our dataset.

Furthermore, we constrain the data to include only retired households. We define "retired" household in multiple stages as follows:

Stage 1. If respondents between ages 62-74 consider themselves retired (i.e. self-identify), then these respondents are counted as retired in our dataset as well.

Stage 2. If respondents between ages 62-74 consider themselves partly retired, then we look at their labor force participation status (i.e. working full-time, part-time, unemployed, retired, disabled, and so on).



Labor force status of “retired” qualifies the respondents to be considered retired and included in our dataset. If the status is other than retired, we look at the working hours (weekly). The respondent is considered to be retired in our dataset if he/she reported of working 10 or fewer hours per week or total of 40 or fewer hours per month.

Stage 3. If respondents have difficulty answering to self-identifying and labor force participation questions in the above stages (that is, giving not applicable or missing value answers), but reported receiving Social Security income, then they are considered to be retired in our dataset.

Note that disabled individuals are included in our dataset.

After imposing this constraint, 5592 retired respondents between the ages of 62 and 74 comprise our dataset. Further, we excluded all the respondents who live in nursing homes, restricting the dataset to 5548 (i.e. there are only 44 respondents that live in nursing homes). Of these 5548, 36 respondents reported already having a reverse mortgage on their property (i.e. HECM). The reporting of HECM usage in the HRS clearly indicates a lower rate of population penetration than the rough estimate from the administrative data we calculated earlier in the paper.

The analyses conducted in this paper are on household level. We therefore convert respondent level data into household-level data. Members in the same household have the same household ID (HHID) and are assigned “couple” status in the dataset.<sup>6</sup> We consider family respondents as the household “heads”. All variables of interest are transformed into household-level including both members’ information. The resulting household-level dataset of 3730 observations is the foundation of analysis in this paper.

#### DC and DB Imputations

As mentioned above, the retirement plan and income information is not further processed and imputed by the RAND organization and is only available in RAND Enhanced Fat Files format. As noted by Venti (2011), despite the overall high quality of the data, retirement plan measurement is challenging in the HRS. In this paper, we impute and process the retirement account and pension income data. To construct defined contribution amount (“DC”) and defined benefit income (“DB”) variables, we use the following variables from RAND Enhanced Fat Files: amount of benefits per month (or other frequency), amount in the retirement account, and pension plan type (both high-level and more granular into specific types of plans). To separate DB and DC, we look at the pension type. According to the pension type, we then look into the monthly benefit and amount in the account to form DB and DC, respectively. In this pursuit, we found that some respondents reported the type of plan but did not specify the amount. In such cases, we use imputations for the DB and DC amounts.

The imputations carried in this paper closely followed that of the general RAND HRS approach. We used the possible variables that typically correlate with the DC or DB amounts, such as “married” status, age

---

<sup>6</sup> For example, if household members were married or partnered in Wave 9 but are separated in Wave 11, then they are assigned “single” status but have the same HHID.

of the respondent, wages, age group, financial assets, housing assets, social security income, gender, and educational degrees. The general equation specification is the following:

$$\begin{aligned}
 DC \text{ Amount (DB Income)} \\
 &= \alpha_0 + \alpha_1 \text{Married Status} + \alpha_2 \text{Age} + \alpha_3 \text{Wage} + \alpha_4 \text{Age group} \\
 &+ \alpha_5 \text{Financial Assets} + \alpha_6 \text{Housing Assets} + \alpha_7 \text{Social Security Income} \\
 &+ \alpha_8 \text{Gender} + a \text{Education Dummies} + \varepsilon_i
 \end{aligned}$$

#### DC Imputation

After running several regressions with different combinations of the above-mentioned variables, we found that only Married Status and Housing Asset are statistically significant at 1% level.<sup>7</sup> The final regression for DC imputation was as follows:<sup>8</sup>

$$\begin{aligned}
 DC \text{ Amount} &= 1,216 + 17,869 \times \text{Married Status} + 0.06114 \times \text{Housing Assets} \\
 &\quad (3667) \quad (4326) \quad \quad \quad (0.007)
 \end{aligned}$$

#### DB Imputation

After running several regressions with different combinations of the above-mentioned variables, we found that only Married Status, Wage, Gender and Housing Assets are statistically significant at 1% level.<sup>9</sup> The final regression for DB imputation was as follows:<sup>10</sup>

$$\begin{aligned}
 DB \text{ Amount} &= 2,182 + 4,149 \times \text{Married Status} + 0.0094 \times \text{Wages} \\
 &\quad + 1,571 \times \text{Gender} + 0.0092 \times \text{Housing Assets}
 \end{aligned}$$

After the imputations, we did in-sample analysis to evaluate the performance of the equations. The equation estimates were close to the actual values available in the data.

#### Defining and Selecting Complex Variables

Long-term care insurance coverage is reported on a respondent-level. We assign a household to have long-term care insurance if one of the household members has it.

There are three bequest motive variables in the RAND HRS dataset: probability of leaving bequest of \$10,000 and more, probability of leaving bequest of \$100,000 and more, and probability of leaving any bequest. Both household members reported the probability separately. In constructing the bequest motive variable for each member of the household, we used all three variables: leave 10K or 100K or any. We condense the 0-100% probability into answers of very likely, somewhat likely and very unlikely.

- Very likely: combines all the answers at 65% and above

<sup>7</sup> The other variables were not significant even at the 10% level.

<sup>8</sup> Standard errors are in parentheses.

<sup>9</sup> The other variables were not significant even at the 10% level.

<sup>10</sup> Standard errors are in parentheses

- Somewhat likely: combines all the answers at 40%-60%
- Very unlikely: combines all the answers at 0%-35%

We then use the constructed bequest variables at the respondent level to create a bequest motive variable for the household.

- Very likely: if one of the household members indicated very likely and the other mentioned somewhat likely or both responded very likely
- Somewhat likely: if one of the household members indicated very likely and the other mentioned very unlikely or both responded somewhat likely
- Very unlikely: if one of the household members indicated very unlikely and the other mentioned somewhat likely or both responded very unlikely

Each respondent is asked to self-report and rate his/her health on a basis of excellent, very good, good, fair and poor. We use this health status variable for the most part. Not everyone reports it, however, and there are many missing cases. Therefore, we use three other variables to complement the self-reported health status:

1. Health problems limit work
2. Everything is an effort
3. CESD score, which is a summary of respondent's feelings (i.e. depressed, happy, lonely) and functionality (i.e. difficult to walk).

For each household member we constructed a health status variable with three categories: healthy, average, and unhealthy. We then use the constructed health variables at respondent level to create a health status for the household.

- Excellent: if both household members are healthy
- Good: if one of the household members is healthy and other is average or both are at average health
- Poor: if one of the household members is unhealthy and the other is at average health or healthy, or both are unhealthy.

Financial assets are defined as the total sum of "Net value of stock or stock mutual funds", "Value of checking, savings, or money markets accounts", "Net value of bonds and bond funds", "Net value of CDs, government saving bonds and T-bills", and "Net value of all other savings". The value of deferred annuities is included in this last category; payments from immediate annuities, although rare, are included in income. If the value of Financial Assets > 0, then the count of Financial Assets is reported as 1 – holds financial asset, otherwise 0 – doesn't hold financial asset.

Social Security income is reported by the respondents as the amount received last month (on a monthly basis). We convert it to an annual figure and combine the social security income for both members of the household to create the variable on a household level. Only Social Security retirement benefits are included – disability, and apparently survivor, benefits are excluded in the RAND construction.

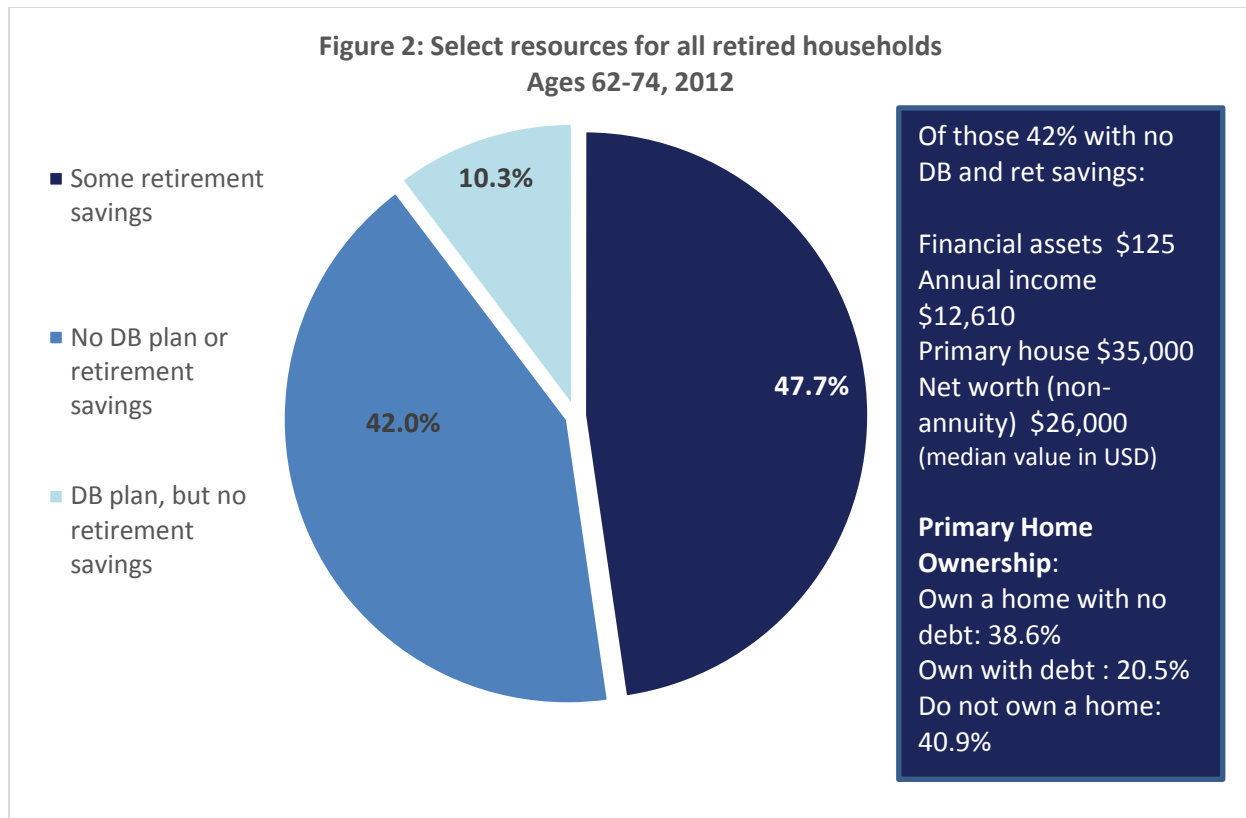
## Summary Statistics and Cross-tabs on Housing and Financial Assets among Retired Households

In our data presentation and empirical simulations, we were influenced primarily by James M. Poterba, Steven F. Venti, and David A. Wise, “The Composition and Draw-down of Wealth in Retirement,” NBER Working Paper 17536, October 2011, and secondarily by the United States Government Accountability Office, “Retirement Security: Most Households Approaching Retirement Have Low Savings,” 14-419, May 2015. These papers use the 2008 Health and Retirement Study and 2013 Survey of Consumer Finances, respectively.

Poterba, Venti and Wise (PVW) present evidence on the economic resources available to households as they enter retirement; they calculate the “potential additional annuity income” that households could purchase, given their holdings of non-annuitized financial assets at the start of retirement, whether held in formal retirement accounts or outside of them. PVW find that even if households used all of their financial assets to purchase a life annuity, only 47 percent of households between the ages of 65 and 69 could increase their life-contingent income by more than \$5,000 a year. At the upper end of the wealth distribution, however, there are a substantial number of households with the wherewithal to make large annuity purchases: 11 percent of retirement-age households could purchase at least \$50,000 per year in future life-contingent income. They also consider the role of housing equity in the retirement portfolio and find that many households treat it and non-annuitized financial assets as precautionary savings, drawing on them only in response to a shock, such as the death of a spouse or a period of substantial medical outlays. PVW emphasize the variation in housing wealth, both unconditionally and conditional on potentially annuitizable financial assets. While not as skewed as the distribution of financial assets and held more widely, housing equity also displays substantial variation. We use the formats of Tables 1 and 2 and Figures 1 through 5 of PVW (2011) in some of our tables and figures below.

The GAO found that about half of households age 55 and older have no formal retirement savings (such as a 401(k) account or IRA). Among this age-group of households, about 29 percent have neither retirement savings nor a defined benefit (DB) plan. Among those with some retirement savings, the median amount of those savings is about \$148,000 for households age 65 – 74, equivalent to an inflation-protected annuity about \$650 a month. Social Security provides most of the income for about half of households age 65 and older. We follow the formats of Figures 1 through 3 and Tables 1 through 3 of the GAO (2015) study in some of our tables and figures below.

We now begin our own compilation and analysis of the 2012 HRS data, using our sample and variable definitions and constructions.



Source: Authors.

Figure 2 gives some basic information about the resources of retired households ages 62 to 74 in 2012. About half of them have personal retirement savings (401(k) accounts and/or IRAs) and half do not. Of the latter group, about a fifth has a defined benefit plan; the rest have no formal retirement resources beyond Social Security. Of this last slice of the population, median financial assets, primary home (gross value) and net worth are all fairly low, but about 60 percent do own a home, which perhaps could be tapped through a reverse mortgage.

**Table 4: Select resources for all retired households ages 62-74 by ownership of retirement savings, 2012**

Category	Households with no retirement savings	Households with some retirement savings
% of Households age 62-74	52.3%	47.7%
Median net worth	\$38,000	\$383,900
Median non-retirement financial resources	\$400	\$35,000
Median income	\$15,276	\$32,400
Median primary home value (gross)	\$50,000	\$170,000
Primary home ownership rates	62.8%	92.6%
% who own a primary home that is paid off	39.3%	50.9%
% with a defined benefit plan	19.7%	50.3%

Source: Authors.

Table 4 gives some more detail about the resources of the retired households in our dataset, keying off whether they have any retirement savings. Clearly those with retirement savings are much better off on all essential measures, at the median: net worth (by a factor of ten), financial assets, income (double), home ownership rate and gross value (more than triple), and defined benefit plan coverage.

Table 5 gives the distribution of annuity income (composed of Social Security, pensions and wages) for all retired households. We include wages because for these retired households, it is possible that wages represent a part-time job that may extend considerably into retirement years, or will be replaced by the start of, or increase, in Social Security and pensions. There is a wide range of existing retirement income, from only \$5,000 a year to more than \$160,000, with a median of \$22,500. Clearly the need for techniques and products to enhance retirement income is more felt at the lower and middle of the income distribution than at the upper end, but, as we will see, assets, including housing, are more concentrated at the middle and upper ends.

**Table 5. Distribution of annuity income for all retired households ages 62-74 by percentiles, 2012**

Percentile	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	99%
Annuity Income	\$4,800	\$9,900	\$13,680	\$17,815	\$22,582	\$28,128	\$34,800	\$45,072	\$65,744	\$88,966	\$162,495

Source: Authors.

**Table 6. Distribution of annuity income components and retirement savings for all retired households ages 62-74 by percentiles, 2012**

Variable	20th	40th	50th	60th	70th	75th	80th	90th	95th	99th
Wage	\$0	\$0	\$0	\$0	\$0	\$0	\$3,120	\$25,778	\$51,364	\$125,000
DB Income	\$0	\$0	\$0	\$0	\$2,760	\$5,856	\$9,126	\$22,800	\$38,000	\$75,000
SS income	\$6,378	\$9,858	\$15,215	\$18,000	\$21,600	\$23,880	\$25,890	\$31,433	\$35,940	\$48,000
DC	\$0	\$0	\$0	\$0	\$0	\$3,000	\$18,000	\$39,039	\$108,000	\$500,000
PRA	\$0	\$0	\$0	\$18,320	\$45,000	\$75,000	\$121,000	\$313,300	\$533,323	\$1,306,975

Source: Authors.

In Table 6, the distribution of annuity income components and retirement savings across all retired households is given. Social Security income is the most widely distributed item, but even here there is a wide dispersion (note that the maximum benefit for an individual retiring at age 70 with high career earnings was \$3,266 monthly or \$39,192 annually, in 2012, so the \$48,000 reported for the household in the 99<sup>th</sup> percentile is certainly plausible for a two-retiree household). Recall that Social Security (and pension) disability payments are excluded here, which would affect the statistics for those disabled households younger than the normal retirement age (65 or 66), that is, these households are getting disability, not retirement, payments. Most retired households do not have wage income of any sort, but more than 20 percent do, and are still considered retired according to our definition. More than 30 percent of households have income from defined benefit pension plans. The dispersion of defined contribution (“DC”) accounts or personal retirement accounts (“PRA”) (DC accounts and IRAs together, also elsewhere in the paper called retirement savings) is quite wide, with most households at a zero value, but the upper percentiles at over a million dollars in account values. Even focusing, as in Table 7, just on those households with retirement savings, there is a wide dispersion of retirement savings

amounts, from about \$10,000 in the tenth percentile to almost \$2 million in the ninety-ninth percentile; the median is \$88,000.

**Table 7: Distribution of retirement savings amounts among retired households with some retirement savings, ages 62-74, by percentiles, 2012**

Retirement Resources	10 <sup>th</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	90 <sup>th</sup>	95 <sup>th</sup>	99 <sup>th</sup>
Retirement Savings	\$9,574	\$27,339	\$88,000	\$250,000	\$554,644	\$820,188	\$1,918,815

Source: Authors.

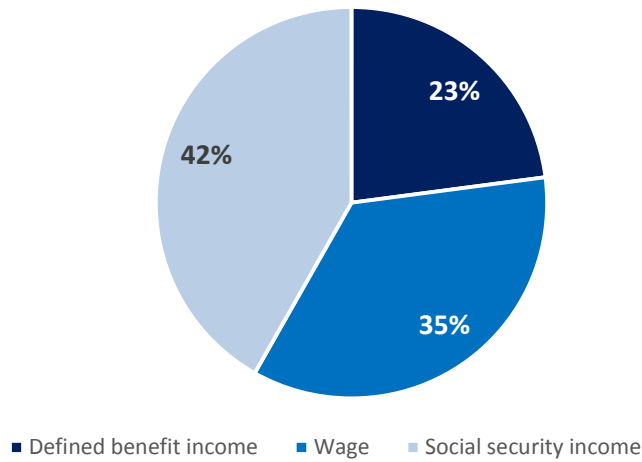
**Table 8: Select retirement resources among all retired households ages 62-74 by income quintile, 2012**

Retirement Resources	1 (bottom)	2	3	4	5 (top)
% with retirement savings	20.2%	30.3%	46.9%	64.3%	76.9%
Among those who have, median retirement savings	\$40,000	\$51,500	\$73,500	\$93,747	\$140,000
% with a defined benefit plan	5.4%	14.1%	30.4%	55.0%	67.0%
Among those who have, median defined benefit income	\$3,353	\$3,348	\$6,048	\$10,692	\$29,310
% who own a primary home that is paid off	33.8%	46.0%	53.4%	49.3%	41.8%
Among those who have, median primary home value	\$100,000	\$100,000	\$130,000	\$150,000	\$200,000
% with debt greater than twice annual income	28.8%	17.3%	20.6%	23.2%	17.6%
% with SS income	59.8%	96.6%	96.1%	95.3%	90.6%
Among those who have, median SS income	\$7,200	\$12,960	\$19,900	\$25,392	\$25,310

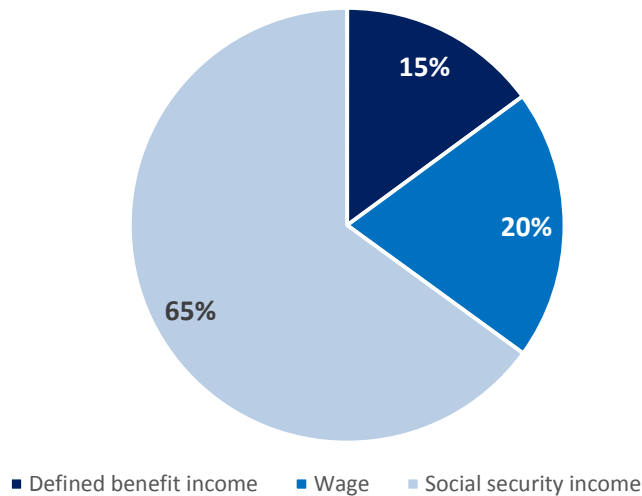
Source: Authors.

Looking at various retirement resources among all retired households by income quintile, in Table 8, we see some interesting facts. Having a defined benefit plan is even more heavily skewed toward upper income quintiles than retirement savings, while owning a home that is paid off is fairly evenly distributed across income groups, with the highest incidence of clear home ownership is in the middle quintile. Of course, Social Security income is fairly widespread, but its incidence, and its level, is lower among the lowest quintile, which may be more likely to include those not retired fully yet, disabled, or on other welfare programs. The incidence of heavy indebtedness is fairly evenly distributed across retired households, at about a fifth.

**Figure 3a: Average composition of Income for retired households age 62-74 with some retirement savings, 2012**



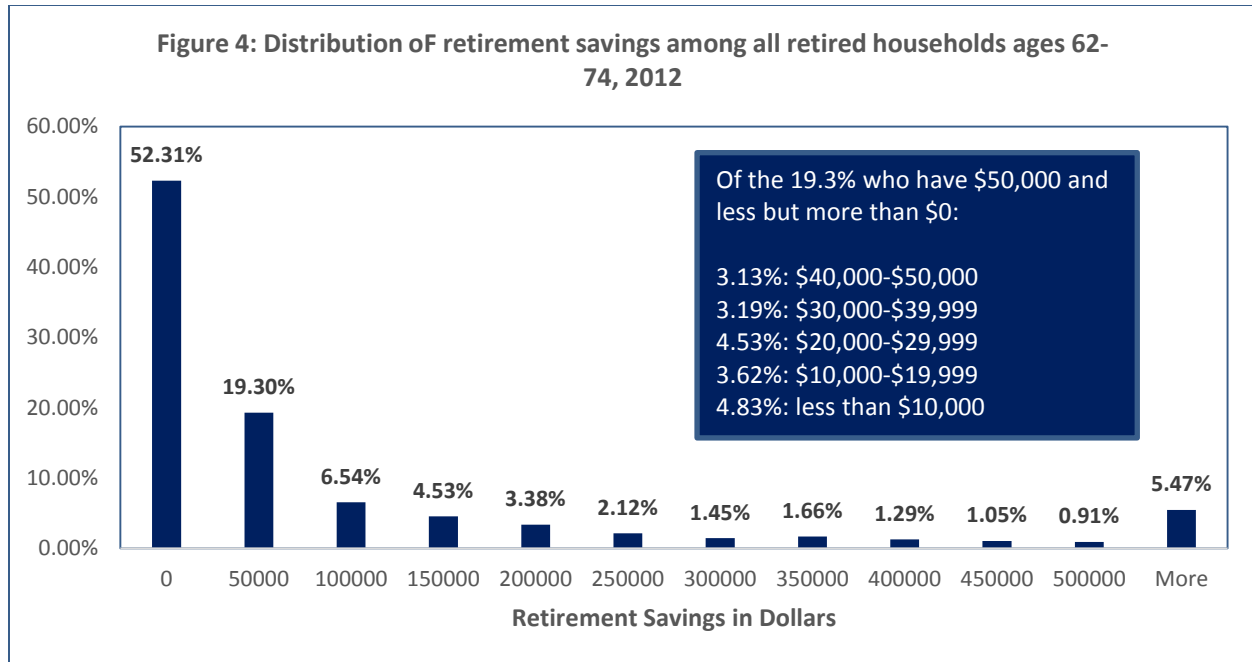
**Figure 3b: Average composition of income for retired households age 62-74 with no retirement savings, 2012**



Source: Authors.

Figures 3a and 3b give the average composition of income (defined as Social Security and defined benefit annuity income and any wages earned) among retired households with and without retirement savings, respectively. Social Security is more important for those with no retirement savings, whereas for those with retirement savings, all three sources are almost, but not quite, equally significant. Figure 4 gives the distribution of retirement savings across all retired households, again showing the skewness in amounts. Moreover, it shows that 19.3% of the households out of 47.69% who have some retirement savings have less than \$50,000.





Source: Authors.

**Table 9: Balance sheet amounts and annuity incomes for all retired households ages 62-74 in 2012**

Items	% of HH with Asset	Mean Holding	Median Holding	% of Non-Annuity Wealth	Conditional on Positive Values	
					Mean	Median
<b>All Households</b>						
Financial Assets	78.04	\$112,052	\$6,000	26.49	\$143,577	\$19,000
Non-Mortgage Debt	32.84	-\$3,340	0	-0.79	-\$10,169	-\$4,500
Primary Residence (net)	77.02	\$121,924	\$75,000	28.83	\$166,746	\$115,000
Mortgages and Other Debt	32.17	-\$33,479	0	-7.91	-\$104,065	-\$72,000
Secondary Residence (net)	14.45	\$19,308	0	4.57	\$138,682	\$60,000
Other Real Estate	11.93	\$31,988	0	7.56	\$268,226	\$100,000
Business Asset	6.86	\$36,825	0	8.71	\$536,546	\$200,000
Personal Retirement Accounts	47.69	\$104,190	0	24.63	\$218,453	\$88,000
IRA and Keoghs	34.96	\$79,226	0	18.73	\$226,619	\$110,000
401(k)s, Similar Plans	26.65	\$24,964	0	5.90	\$93,678	\$30,000
Social Security Income (Annual)	87.67	\$16,310	\$15,216		\$18,605	\$16,800
Defined Benefit Pension (Annual)	34.29	\$6,651	0		\$19,398	\$12,000
Non-Annuity Net Worth	85.09	\$422,946	\$139,350	100.00	\$498,690	\$202,279
<b>Single-Person Households</b>						
Financial Assets	70.96	\$63,567	\$1,000	29.51	\$89,579	\$8,000
Non-Mortgage Debt	31.47	-\$2,738	0	-1.27	-\$8,698	-\$3,800
Primary Residence (net)	61.67	\$76,640	\$30,000	35.58	\$131,609	\$93,000
Mortgages and Other Debt	21.22	-\$18,282	0	-8.49	-\$86,185	-\$62,000
Secondary Residence (net)	7.56	\$7,971	0	3.70	\$113,119	\$50,000
Other Real Estate	6.15	\$11,801	0	5.48	\$191,765	\$80,000
Business Asset	3.72	\$11,295	0	5.24	\$303,804	\$120,000

Personal Retirement Accounts	31.99	\$46,893	0	21.77	\$146,598	\$50,000
IRA and Keoghs	23.72	\$38,485	0	17.86	\$162,262	\$75,500
401(k)s, Similar Plans	14.23	\$8,407	0	3.90	\$59,079	\$10,846
Social Security Income (Annual)	83.33	\$11,052	\$11,388		\$13,263	\$12,708
Defined Benefit Pension (Annual)	24.81	\$3,639	0		\$14,670	\$8,988
Non-Annuity Net Worth	75.83	\$215,428	\$50,443	100.00	\$286,433	\$104,000
<b>Married Couples</b>						
Financial Assets	83.13	\$146,907	\$12,000	25.68	\$176,712	\$30,000
Non-Mortgage Debt	33.82	-\$3,773	0	-0.66	-\$11,153	-\$5,000
Primary Residence (net)	88.06	\$154,478	\$100,000	27.00	\$184,371	\$130,000
Mortgages and Other Debt	40.05	-\$44,404	0	-7.76	-\$110,883	-\$80,000
Secondary Residence (net)	19.4	\$27,458	0	4.80	\$145,817	\$70,000
Other Real Estate	16.08	\$46,501	0	8.13	\$289,258	\$100,000
Business Asset	9.12	\$55,177	0	9.64	\$604,723	\$200,000
Personal Retirement Accounts	58.99	\$145,380	\$23,364	25.41	\$246,465	\$100,654
IRA and Keoghs	43.04	\$108,513	0	18.97	\$252,114	\$125,500
401(k)s, Similar Plans	35.58	\$36,867	0	6.44	\$103,628	\$33,147
Social Security Income (Annual)	90.78	\$20,090	\$20,400		\$22,130	\$22,000
Defined Benefit Pension (Annual)	41.11	\$8,817	0		\$21,449	\$14,244
Non-Annuity Net Worth	91.75	\$572,129	\$230,906	100.00	\$624,808	\$271,182

Source: Authors.

In Table 9, median and mean balance sheet amounts and annuity income are given by item for all retired households and then separately for single-person and married households. We see a high prevalence (about 80 percent or more) of having financial assets, home ownership, and Social Security income. The conditional mean net home equity was \$166,700, while the median was \$115,000. The conditional mean Social Security income for the retired household was \$18,600 while the median was \$16,000. Not all had Social Security income, presumably because some had not yet claimed retirement benefits, and some (external estimates say about 5 percent) get none because they worked their entire careers in state and local government jobs where they had no Social Security coverage. About a third get defined benefit pension income and about a third have mortgage debt still outstanding. In terms of the components of non-annuity net worth, financial assets, housing equity (net), and retirement savings, each represent about a quarter, on average, with the last quarter composed of sundry items, including other real estate and business assets. By any measure and for all items, married couples are wealthier than single-member households, the latter made up of widows, widowers, divorced and never-married individuals. Of particular note to our paper, almost 90 percent of retired married couples own a primary residence, while only about 60 percent of singles do.

Table 1A in the Appendix shows many of the balance sheet amount (but not DC) and annuity income items (but not DB) for 2008. Most amounts and incidences were significantly lower in 2012 than in 2008, including financial assets and housing, indicating the impact of the 2008-9 Great Recession. Social Security income did increase somewhat by 2012, as did IRAs and Keoghs. Mortgage debt amounts and incidence were also somewhat higher in 2012 than in 2008.

Table 10 gives the distribution of non-annuity wealth components for all retired households, and single and married households, separately. As already noted above, there is a wide dispersion in all types of financial wealth and pension coverage and income, but less dispersion in primary housing (gross value) and Social Security. Even in the ninety-fifth percentile, the gross value of primary housing, at \$500,000, is less than the HECM limits. Again, by all measures and for all variables, married couples are wealthier than singles, presumably because of economies of scale in living arrangements, double careers, larger scope for inheritances, and better health and overall well-being arising from the coupled marital state.

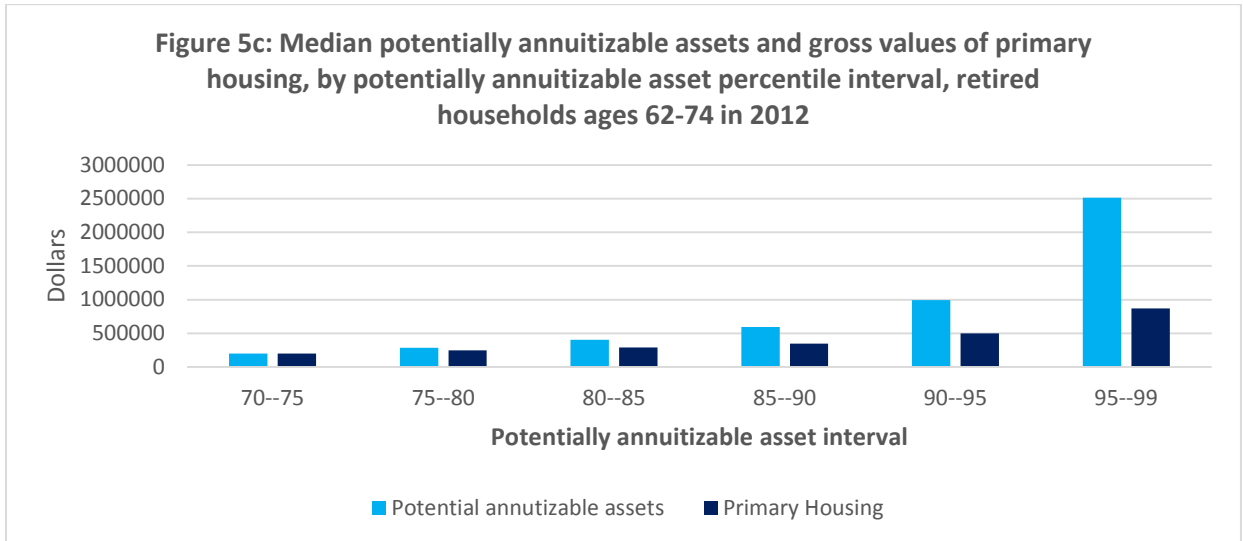
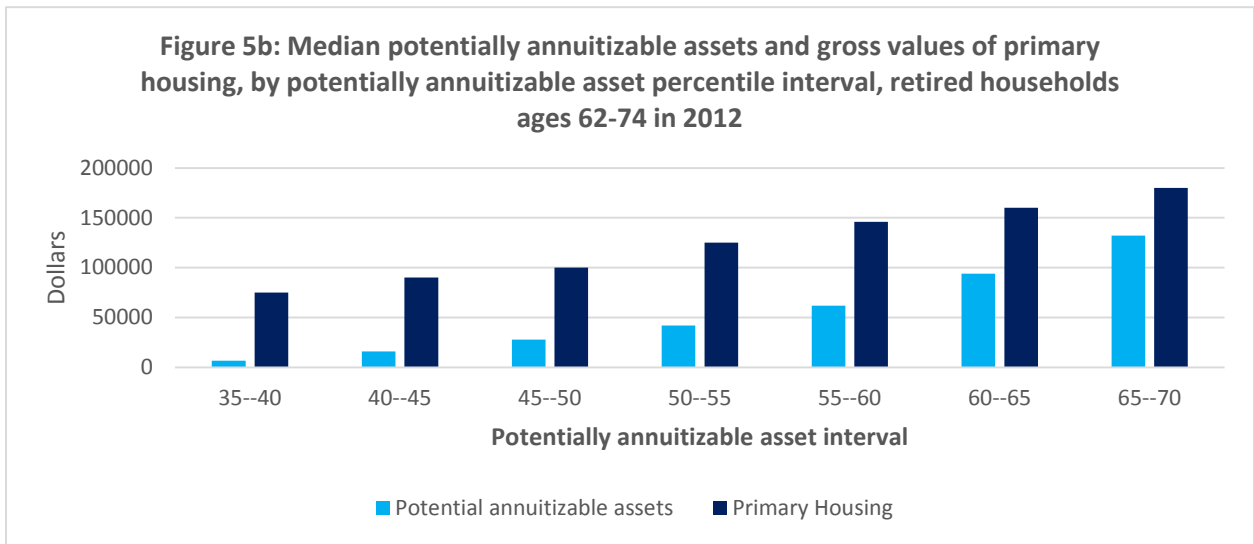
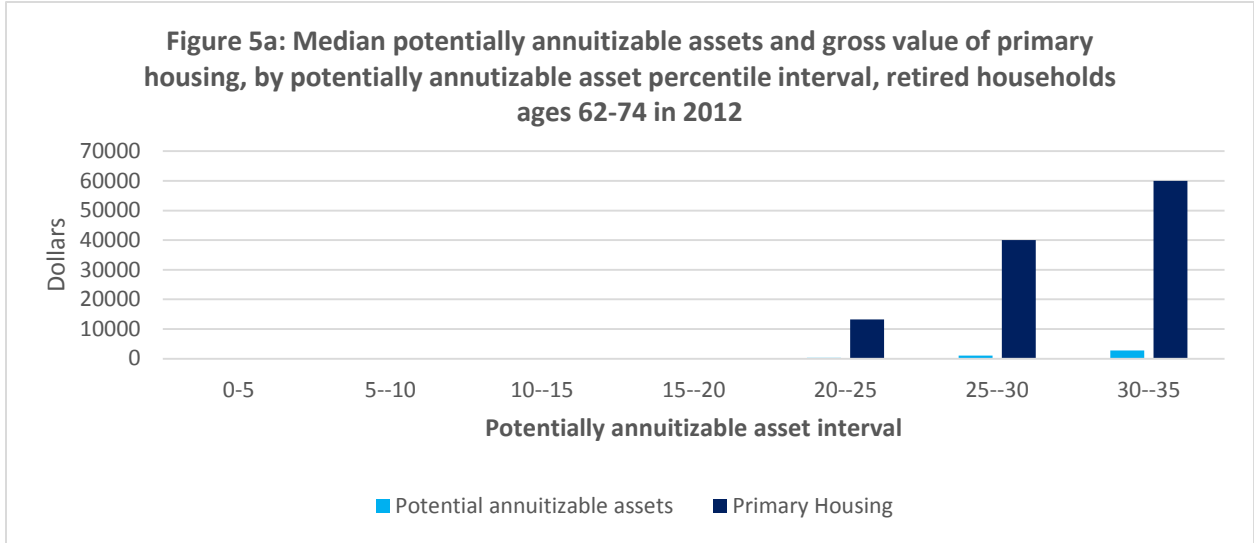
**Table 10: Distribution of non-annuity wealth components for all retired households ages 62-74 in 2012**

Percentile	Financial Assets	PRA Assets	Financial + PRA	Primary Housing (G)	Secondary Housing (G)	Social Security Income	DB Pension (Income)	Non-Annuity Net Worth
<b>All Households</b>								
10	-	-	-	-	-	-	-	-
20	-	-	\$20	-	-	\$6,378	-	\$2,000
30	\$300	-	\$1,000	\$40,000	-	\$9,858	-	\$39,370
40	\$2,000	-	\$6,508	\$75,000	-	\$12,468	-	\$82,753
50	\$6,000	-	\$27,727	\$100,000	-	\$15,216	-	\$139,350
60	\$16,000	\$18,320	\$62,008	\$146,000	-	\$18,000	-	\$226,650
70	\$43,000	\$45,000	\$132,500	\$180,000	-	\$21,600	\$2,760	\$365,538
80	\$100,000	\$121,000	\$287,994	\$250,000	-	\$25,890	\$9,126	\$584,226
90	\$270,000	\$313,300	\$596,000	\$350,000	\$31,000	\$31,433	\$22,800	\$1,029,700
95	\$494,940	\$533,323	\$999,731	\$500,000	\$130,000	\$35,940	\$38,000	\$1,660,000
99	\$1,632,000	\$1,306,975	\$2,518,200	\$880,478	\$500,000	\$48,000	\$75,000	\$4,235,000
<b>Single-Person Households</b>								
10	-	-	-	-	-	-	-	-\$400
20	-	-	-	-	-	\$3,564	-	-
30	\$5	-	\$25	-	-	\$7,702	-	\$600
40	\$200	-	\$450	\$7,000	-	\$9,600	-	\$16,250
50	\$1,000	-	\$2,197	\$50,000	-	\$11,388	-	\$50,443
60	\$4,000	-	\$11,315	\$80,000	-	\$13,087	-	\$95,700
70	\$15,000	\$1,511	\$40,000	\$120,000	-	\$14,718	-	\$175,150
80	\$45,000	\$28,500	\$105,922	\$165,000	-	\$16,800	\$3,168	\$309,694
90	\$129,667	\$122,000	\$306,000	\$250,000	-	\$19,662	\$12,222	\$583,913
95	\$306,500	\$228,000	\$552,000	\$322,500	\$26,000	\$22,866	\$22,800	\$951,220
99	\$978,000	\$750,000	\$1,479,000	\$650,000	\$250,000	\$33,001	\$49,200	\$2,422,403
<b>Married Couples</b>								
10	-	-	-	-	-	\$1,478	-	\$1,300
20	\$148	-	\$1,000	\$50,000	-	\$9,054	-	\$46,000
30	\$1,800	-	\$10,000	\$80,000	-	\$13,200	-	\$93,199
40	\$5,000	-	\$30,331	\$110,000	-	\$16,830	-	\$154,700
50	\$12,000	\$23,365	\$65,000	\$150,000	-	\$20,400	-	\$230,907
60	\$32,000	\$42,965	\$124,642	\$180,000	-	\$23,880	\$810	\$346,422
70	\$68,800	\$100,000	\$232,000	\$220,000	-	\$26,664	\$6,966	\$514,941

80	\$145,000	\$200,000	\$411,771	\$300,000	-	\$29,922	\$14,400	\$813,000
90	\$350,000	\$430,045	\$756,000	\$425,000	\$77,000	\$34,614	\$30,000	\$1,348,618
95	\$609,000	\$660,665	\$1,199,000	\$600,000	\$199,999	\$39,600	\$47,340	\$2,050,000
99	\$2,063,352	\$1,641,000	\$3,239,111	\$1,000,000	\$600,000	\$51,606	\$82,536	\$5,090,000

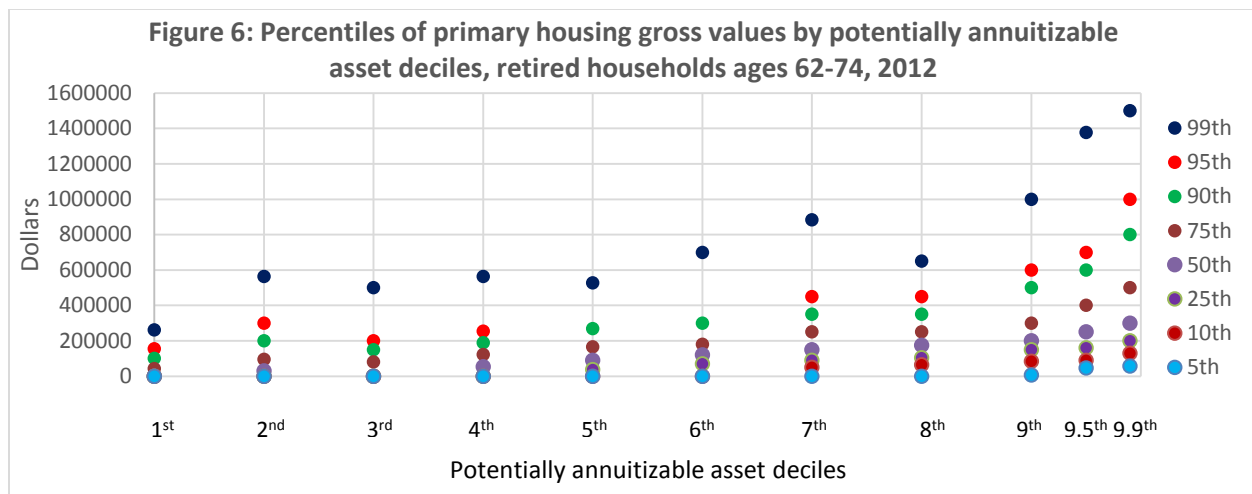
Source: Authors.

Now approaching a central point of our empirical analysis, in Figures 5a, b and c, we show the median potentially annuitizable (financial and retirement savings) assets and primary housing (gross value), by potentially annuitizable asset percentile intervals, for retired households; the three panels simply break up the percentile intervals into roughly thirds. We do see in the middle third of the distribution, the beginning of a need for HECMs, where primary housing is significant, while potentially annuitizable assets are not yet large. Still, the value of housing should exceed some minimum amount to make the fixed costs of taking a HECM worthwhile. Moreover, even if the household has no bequest motive and is willing and able to depend on Medicaid to cover expenses for long-term services and supports, it should have some minimum level of financial assets to cover emergencies and taxes and insurance and repairs on the house. On the upper end of the distribution, financial and retirement assets are available and are generally larger than housing and will be more naturally used to support consumption in retirement, including the potential use of immediate annuities.



Source: Authors.

Figure 6 gives more detail to the nexus of housing and assets in the retired population; it is something of a distributional cross-tab for these statistics, that is, the percentiles of primary housing values (gross) by potentially annuitizable asset deciles. The figure shows that in the low asset deciles, there are some households (ninetieth percentile and above) with significant primary housing value, that is, above \$100,000, with no other significant financial wealth to produce additional retirement income. Extending into the sixth and seventh asset deciles, there are even more percentiles (as low as the fiftieth) of significant primary housing value (above \$100,000). These latter households are really the best candidates for effective use of reverse mortgages.



Source: Authors.

We now show several tables of cross-tabs of homeownership status, long-term care insurance coverage, bequest motive, and health status, by each other and by potentially annuitizable assets, retirement assets, and marital status. In Table 11, we see more detail on home ownership status across all retired households – 77 percent own, 19 percent rent, and 4 percent live with relatives or have other arrangements (recall that we have already excluded those living in nursing homes). Table 12 shows that renters and those with other living arrangements are more likely to be singles (who are 42 percent of all retired households) than married couples (who are 58 percent of all retired households); the opposite is true of owners. Similarly, as seen in Table 13, those with no retirement savings are more likely to be renters and have other living arrangements, whereas those with retirement savings are more likely to be owners. A similar relationship for housing ownership and potentially annuitizable assets is illustrated in Table 14.

**Table 11. Percent of all retired households by home ownership status, ages 62-74, 2012**

Ownership status	%
Rent	18.85
Own	76.97
Other	4.18

Source: Authors.

**Table 12. Percent of all retired households by home ownership status and marital status, ages 62-74, 2012**

Ownership status	Single (%)	Married (%)
Rent	69.84	30.16
Own	33.3	66.7
Other	72.44	27.56
Total	41.82	58.18

Source: Authors.

**Table 13. Percent of all retired households by home ownership status and having personal retirement assets, 62-74, 2012**

Ownership status	Doesn't have PRA (%)	Has PRA (%)
Rent	84.78	15.22
Own	42.6	57.4
Other	84.62	15.38
Total	52.31	47.69

Source: Authors.

**Table 14. Percent of all retired households by home ownership status and having potentially annuitizable assets, 62-74, 2012**

Ownership status	Doesn't have assets (%)	Has assets (%)
Rent	40.83	59.17
Own	12.16	87.84
Other	37.18	62.82
Total	18.61	81.39

Source: Authors.

We next look at long-term care insurance (LTCI) coverage, which the literature we surveyed above has identified as an important factor in the decision whether to take a reverse mortgage, because voluntary LTCI coverage indicates a desire and perhaps a need to avoid Medicaid if there are also financial, retirement or housing assets extant. Overall, 15 percent of retired households have LTCI coverage of some sort – see Table 15. Those with coverage are more likely to be married (see Table 16) – a result perhaps largely explained by their higher wealth. This explanation is bolstered by the positive relationship between LTCI coverage and retirement savings (Table 17) and potentially annuitizable assets (Table 18). Finally, in Table 19, we see a positive relationship between LTCI coverage and home ownership. Those retired households, with some assets and moderate income levels, who are less likely

to be eligible for or interested in Medicaid to cover LTSS, who also own a primary home, would be more likely to take a HECM if they also had LTCI coverage.

**Table 15. Percent of all retired households with LTCI coverage, ages 62-74, 2012**

Coverage status	%
No Coverage	84.93
Coverage	15.07

Source: Authors.

**Table 16. Percent of all retired households with LTCI coverage status by marital status, ages 62-74, 2012**

Coverage status	Single (%)	Married (%)
No Coverage	44.29	55.71
Coverage	27.94	72.06
Total	41.82	58.18

Source: Authors.

**Table 17. Percent of all retired households with LTCI coverage status by having personal retirement assets, ages 62-74, 2012**

Coverage status	Doesn't have PRA (%)	Has PRA (%)
No Coverage	55.87	44.13
Coverage	32.21	67.79
Total	52.31	47.69

Source: Authors.

**Table 18. Percent of all retired households with LTCI coverage by potentially annuitizable assets, ages 62-74, 2012**

Coverage status	Doesn't have assets (%)	Has assets (%)
No Coverage	20.8	79.2
Coverage	6.23	93.77
Total	18.61	81.39

Source: Authors.

**Table 19. Percent of all retired households with LTCI coverage by primary home ownership, ages 62-74, 2012**

Coverage status	Doesn't have home (%)	Has home (%)
No Coverage	25.19	74.81
Coverage	10.50	89.50
Total	22.98	77.02

Source: Authors.



The next set of tables relate to the motive to leave a bequest by retired households. As shown in Table 20, about 68 percent say that they are either very likely or somewhat likely to leave a bequest of any size (which we take as an indication of motive, although for households with low resources, it also reflects their wherewithal to do so). The motive to leave a bequest is positively associated with being married (see Table 21), having retirement savings (see Table 22), having potentially annuitizable assets (see Table 23), and primary home ownership (see Table 24). The more widespread and deeper the bequest motive, the less likely reverse mortgages will be selected. In particular, note the following combination of these statistics: only about a third of retired households have no bequest motive, and of these, about half own a home. So, about a sixth of retired households would be strongly interested in a HECM, according to this way of viewing the data.

**Table 20. Percent of all retired households by bequest motive, ages 62-74, 2012**

Bequest motive	%
Very Likely	62.09
Somewhat Likely	5.71
Very Unlikely	32.20

Source: Authors.

**Table 21. Percent of all retired households by bequest motive and marital status, ages 62-74, 2012**

Bequest motive	Single (%)	Married (%)
Very Likely	33.16	66.84
Somewhat Likely	0	100
Very Unlikely	65.95	34.05
Total	41.82	58.18

Source: Authors.

**Table 22. Percent of all retired households by bequest motive and having personal retirement assets, ages 62-74, 2012**

Bequest motive	Doesn't have PRA (%)	Has PRA (%)
Very Likely	28.5	71.5
Somewhat Likely	28.99	71.01
Very Unlikely	76.52	20.23
Total	52.31	47.69

Source: Authors.

**Table 23. Percent of retired households by bequest motive and potentially annuitizable assets, ages 62-74, 2012**

Bequest motive	Doesn't have assets (%)	Has assets (%)
Very Likely	9.07	90.93
Somewhat Likely	19.25	80.75
Very Unlikely	36.89	63.11
Total	18.61	81.39

Source: Authors.

**Table 24. Percent of all retired households by bequest motive and primary house ownership, ages 62-74, 2012**

Bequest motive	Doesn't have home (%)	Has home (%)
Very Likely	9.15	90.85
Somewhat Likely	17.84	82.16
Very Unlikely	50.54	49.46
Total	22.98	77.02

Source: Authors.

Finally, we look at the self-assessed health status of retired households. About 60 percent are in excellent or good health, while more than 40 percent are in poor health (see Table 25). Presumably, the demand for reverse mortgages could relate to health status, but perhaps in countervailing ways, depending on the payment option. For tenure payments, excellent health would be positively correlated, because of the desire for continuing income flows, whereas for a lump-sum payout, poor health might be positively correlated because of the need for financial resources for personal care and other uninsured medical expenditures. Health status does not seem related to marital status (see Table 26), but good or excellent health status is positively correlated with retirement savings (see Table 27), with potentially annuitizable assets (see Table 28), and with housing (see Table 29).

**Table 25. Percent of all retired households by health status, ages 62-74, 2012**

Health status	%
Excellent	24.42
Good	33.81
Poor	41.77

Source: Authors.

**Table 26. Percent of all retired households by health status and marital status, ages 62-74, 2012**

Health status	Single (%)	Married (%)
Excellent	50.05	49.95
Good	39.1	60.9
Poor	39.22	60.78
Total	41.82	58.18

Source: Authors.

**Table 27. Percent of all retired households by health status and having personal retirement assets, ages 62-74, 2012**

Health status	Doesn't have PRA (%)	Has PRA (%)
Excellent	39.08	60.92
Good	46.63	53.37
Poor	64.63	35.37

Total	52.31	47.69
-------	-------	-------

Source: Authors.

**Table 28. Percent of all retired households by health status and having potentially annuitizable assets, ages 62-74, 2012**

Health status	Doesn't have assets (%)	Has assets (%)
Excellent	10.65	89.35
Good	13.72	86.28
Poor	27.21	72.79
Total	18.61	81.39

Source: Authors.

**Table 29. Percent of all retired households by health status and home ownership, ages 62-74, 2012**

Health status	Doesn't have home (%)	Has home (%)
Excellent	14.60	85.40
Good	18.32	81.68
Poor	31.64	68.36
Total	22.98	77.02

Source: Authors.

In the Appendix, we produce several of the earlier figures and tables separately by four age groups: 62-64, 65-67, 68-70, and 71-74. In general, the middle age groups have the most retirement assets and defined benefit plan coverage. This is likely because the oldest group has already used up some of its resources and is from an earlier cohort that earned less, while the youngest group retired early and therefore has fewer resources and is from a cohort where defined benefit plans were already being curtailed. Consistent with the earlier studies on home ownership that we summarized above, the two oldest age groups have the highest rate of paid-up primary home ownership, and therefore HECM demand and focus is best placed on them.

### Simulation Methodology and Results

In our initial empirical simulation of HECM demand and suitability, we first define a notion that we call “eligibility.” It simply means those retired households who do not already have a HECM, who own homes with any value, and who have mortgages no greater than 40 percent of the home value. This last condition is imposed because we know that principal borrowing limits are generally about 50 percent of home value (and sometimes less); with the high initial and on-going costs of a HECM, taking one when the home is already mortgaged significantly is generally not a wise move.<sup>11</sup>

We make some assumptions about certain HECM fees, based on industry standards as indicated in the HECM on-line tool: the origination fee is modeled as 2 percent of home value up to \$200,000 and 1

<sup>11</sup> Additionally, if the HECM eligible households end up having net principal limit (NPL=Initial principal limit – financing fee – PV set aside) less than 0, they are also considered ineligible.

percent above that, subject to a minimum of \$2,500 and a maximum of \$6,000. The closing fee is based on a regression on data from the HECM tool for eleven states, as follows:

$$\text{Closing Fee} = \$2021.7 + 0.0039 * (\min[\text{home value}, \$625,000])$$

The initial mortgage insurance premium is 2.5 percent if the mortgage is 33 percent or more of the home value and 0.5 percent otherwise, reflecting current HECM rules. The set-aside amount for the monthly administrative fee is based on \$35 monthly, discounted at the expected rate plus the mortgage insurance premium of 1.25 percent, assuming the youngest borrower reaches age 100.

We determine the principal borrowing limit and therefore the tenure payment for each household based on the age of the youngest member of the retired household, and the current (as of December 23, 2015) expected rate (based on the 10-year Treasury bond) of 6.02 percent.<sup>12</sup>

Initial principal limit (IPL) is calculated by multiplying the principal limit factor (or principal borrowing limit) by the minimum of eligible house value or \$625,000. Net principal limit (NPL) is then determined after all the financing fees and set-aside amount are calculated, that is  $NPL = IPL - \text{Financing fees (sum of origination, closing, and MIT fees)} - \text{PV of set aside amount}$ . Lastly, once the net borrowing amount is determined, outstanding mortgage value is subtracted to determine the actual amount available for monthly advances or for loan.

Of the total of 3730 retired households in our data base, about 55 percent are eligible for a HECM, according to the above definition. In this basic HECM eligibility group, 40 percent have no retirement savings, 14 percent have no (non-retirement) financial assets, 60 percent have no defined benefit plan income, 66 percent are a couple (compared to 58 percent overall), and 61 percent are in the two oldest age groups (compared to 56 percent of the entire sample in those age groups).

Next consider the differences in bequest motive, health and LTCI coverage status between those households who are HECM eligible and those who are not, with the additional constraint that all have gross housing values worth at least \$100,000. As seen in Table 30, retired households who are HECM-eligible are much more likely to give a high degree of importance to leaving a bequest, to be in excellent or good health, but more likely to be covered by LTCI than those who are not HECM-eligible, mainly those with relatively large mortgages remaining. This pattern of preferences, conditions, and behavior, is, on net, somewhat negative toward taking out a HECM; for example, why would a retired household who really wants to leave a significant bequest to children want to take on a reverse mortgage to increase income but reduce assets left for heirs?

---

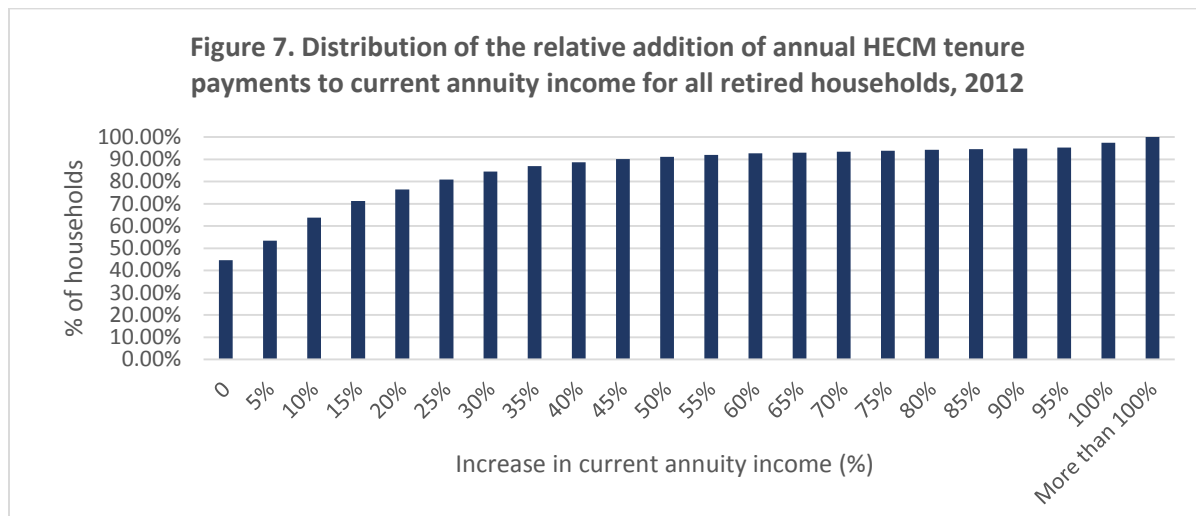
<sup>12</sup> Expected rate is the 10-year Constant Term Maturity (CTM) Treasury (as of December 23, 2015 = 2.27%) and the lender's margin (average=2.5%) which is 4.77% for adjustable HECM. MIP rate is 1.25% per annum. Thus total rate used for calculations is 4.77%+1.25%=6.02%.

**Table 30. Differences in bequest motive, health and LTCI coverage status variables by basic HECM eligibility, gross housing value at least \$100K**

	State	Eligible for HECM	Ineligible for HECM
Bequest motive	High	83.78%	47.73%
	Mid	4.35	6.42
	Low	11.87	45.85
Health	Excellent	32.44	20.34
	Good	38.1	29.69
	Poor	29.47	49.97
LTCI coverage	No	78.19	89.68
	Yes	21.81	10.32

Source: Authors' simulations.

As mentioned above and as seen in Figure 7, 45 percent of retired households are not HECM-eligible. An additional 10 percent of households would realize only 5 percent or less additional current annuity income from an annual HECM tenure payment (under the fee assumptions described above), and another 10 percent would realize only 5 to 10 percent additional income, according to our simulations. Clearly, however, some retired households could get large relative increases in their standard of living in retirement from a tenure-payment HECM; about a third of the entire retired population could realize significant increases in income, defined as at least a 10 percent increase.

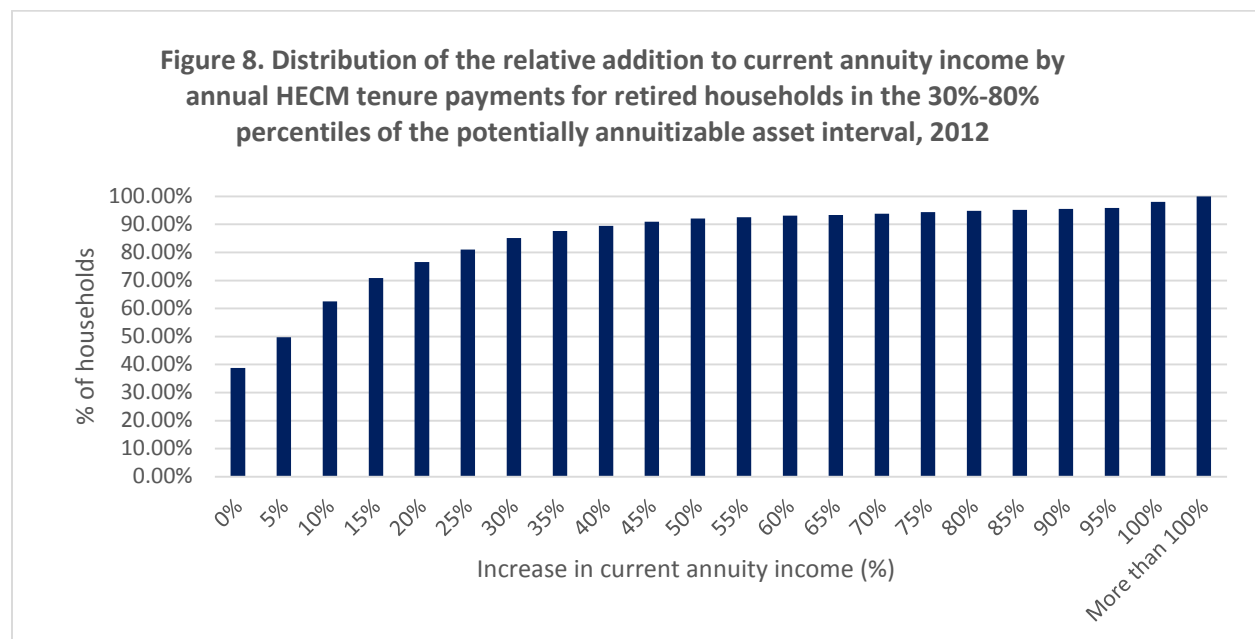


Source: Authors' simulations.

We next put on two extra filters on HECM eligibility, separately and together. In particular, we exclude those with gross home values of less than \$100,000, on the view that the large fixed and variable initial fees and the on-going costs of a HECM make taking a relatively small HECM not worthwhile. We also exclude those with assets below the 30<sup>th</sup> and above the 80<sup>th</sup> percentiles of households in terms of potentially annuitizable assets intervals. The logic here is that low-asset households, even the relatively few who are house-rich, are not the best candidates for HECMs because the house still consumes

resources for maintenance, taxes and insurance, as well as the general need of all retired households for contingency emergency funds. By contrast, those households with significant financial and retirement assets that can be annuitized (or not) other than housing assets are generally better served to avoid the HECM and to buy a commercial immediate annuity if they want or need to use their retirement savings and non-retirement financial assets; they would still have plenty of assets available for emergencies and home maintenance. Finally, we combine both filters, to identify the retired households for whom the HECM may be most indicated and appropriate.

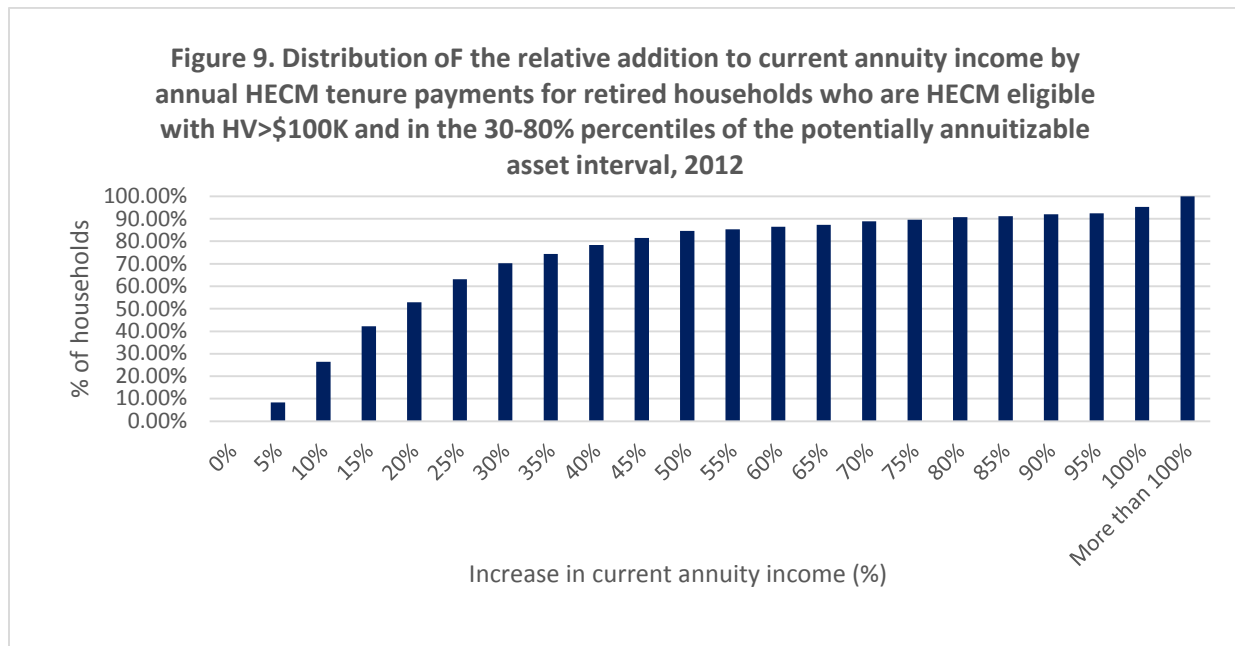
Focusing more closely on those HECM-eligible households for whom a HECM is more clearly appropriate, that is, those who have home values greater than \$100,000, only 39 percent of all retired households are in this narrower category. Another categorization is to look only at the 50 percent of all retired households who are in the 30<sup>th</sup> to 80<sup>th</sup> percentiles of potentially annuitizable assets and who are HECM-eligible (as shown in Figure 8, about 61 percent of these households are HECM-eligible), so when calculated as a share of all retired households, only about 30 percent of all retired households are in the relevant asset percentiles and are HECM-eligible. Further carving down this latter categorization, another 22.5 percent of households in these asset percentiles would realize an increase in annual income from a tenure-payment HECM of 10 percent or less, as shown in Figure 8. So all told, only about 19.25 percent ( $= (61 - 22.5) \times .5$ ) of all retired households are HECM-eligible, have sufficient but not too large financial asset holdings, and can realize at least 10 percent more income from a HECM. Some of these households, however, could increase their incomes substantially.



Source: Authors' simulations.

In a final combination of both these filters, only 19 percent of all retirement households are HECM-eligible, have home values greater than \$100,000 and are in the 30<sup>th</sup> to 80<sup>th</sup> percentiles of potentially annuitizable asset households. Moreover, about 26 percent of these latter households would get only

10 percent or less in additional income from a tenure-payment HECM (see Figure 9). Therefore, the number of households for whom the HECM is clearly indicated and potentially appropriate is relatively small, about 14 percent of the entire retired household population, even without considering the strength of their bequest desires or their LTCI coverage, as we will see further below. Removing the top income decile for this most appropriate group, shown below in Table 32, (because they probably don't need the extra income), leaves about an upper bound of about 12% of the retired household population as truly good candidates for a HECM.



Source: Authors' simulations.

Table 31a gives some basic statistics (means and medians) for those households who are eligible for a HECM according to our initial basic definition. In particular, it shows the value of the primary house, the mortgage remaining, the initial and net principal limits, the various fees, the amount eligible for monthly advances (the net principal limit less any mortgages), and the annual tenure payment. The median total initial financing fees including the set-aside for monthly fees are, according to our assumptions, \$12,000, for a \$150,000 house, and \$62,000 is eligible for monthly advances, producing about \$4,400 annually in extra annuity income. Table 31b gives the same statistics for households under the two extra filters we discussed above, applied simultaneously: home value more than \$100,000, and in the 30<sup>th</sup> to 80<sup>th</sup> percentiles of the potentially annuitizable assets interval for households. Here, at the median, total initial financing fees are \$13,800, for a \$200,000 house, and \$84,600 is eligible for monthly advances, producing about \$6,000 annually in extra income.

**Table 31a. HECM-eligible households, HECM summary statistics**

Item	Mean	Median
Household Primary Home Value	\$207,256	\$150,000
Mortgage and Loan on the Primary Home	\$12,461	\$0
Origination Fee	\$3,600	\$3,000
Closing Fee	\$2,782	\$2,607
MIP Fee	\$1,173	\$750
Total Financing Fees	\$7,555	\$6,357
PV Set Aside	\$5,968	\$5,922
Initial Principal Limit	\$108,843	\$85,350
Net Principal Limit	\$95,320	\$73,071
Eligible for Monthly Advances	\$82,859	\$61,881
Annual Tenure Payment	\$5,855	\$4,399

**Table 31b. HECM-eligible households, with gross house value (GHV)>\$100k and in 30%-80% percentile of potentially annuitizable asset interval, HECM summary statistics**

Item	Mean	Median
Household Primary Home Value	\$250,993	\$200,000
Mortgage and Loan on the Primary Home	\$16,762	\$0
Origination Fee	\$4,023	\$4,000
Closing Fee	\$2,962	\$2,802
MIP Fee	\$1,520	\$1,000
Total Financing Fees	\$8,505	\$7,802
PV Set Aside	\$5,983	\$5,985
Initial Principal Limit	\$134,106	\$107,868
Net Principal Limit	\$119,618	\$94,432
Eligible for Monthly Advances	\$102,856	\$84,602
Annual Tenure Payment	\$7,256	\$5,965

Source: Authors' simulations.

Table 32 shows the distribution of current annuity income for the retired households most likely to be interested in a HECM. Clearly, even at the lowest decile, this segment of retired households has much higher income than the general retired household population; at the median, income is \$32,400, about \$10,000 more than the general retired population. With income of \$80,000 or more, the top decile may not have a strong need for more income (from a HECM or annuity), in competition with precautionary savings and satisfying a bequest motive, as we mentioned above.

**Table 32. Distribution of annuity income for HECM eligible retired households with gross home value >\$100K at 30-80% potentially annuitizable asset interval**

Percentile	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	99%
Annuity Income	\$12,636	\$18,000	\$23,196	\$28,536	\$32,400	\$37,650	\$46,509	\$57,962	\$80,400	\$100,036	\$158,600

Source: Authors' simulations.



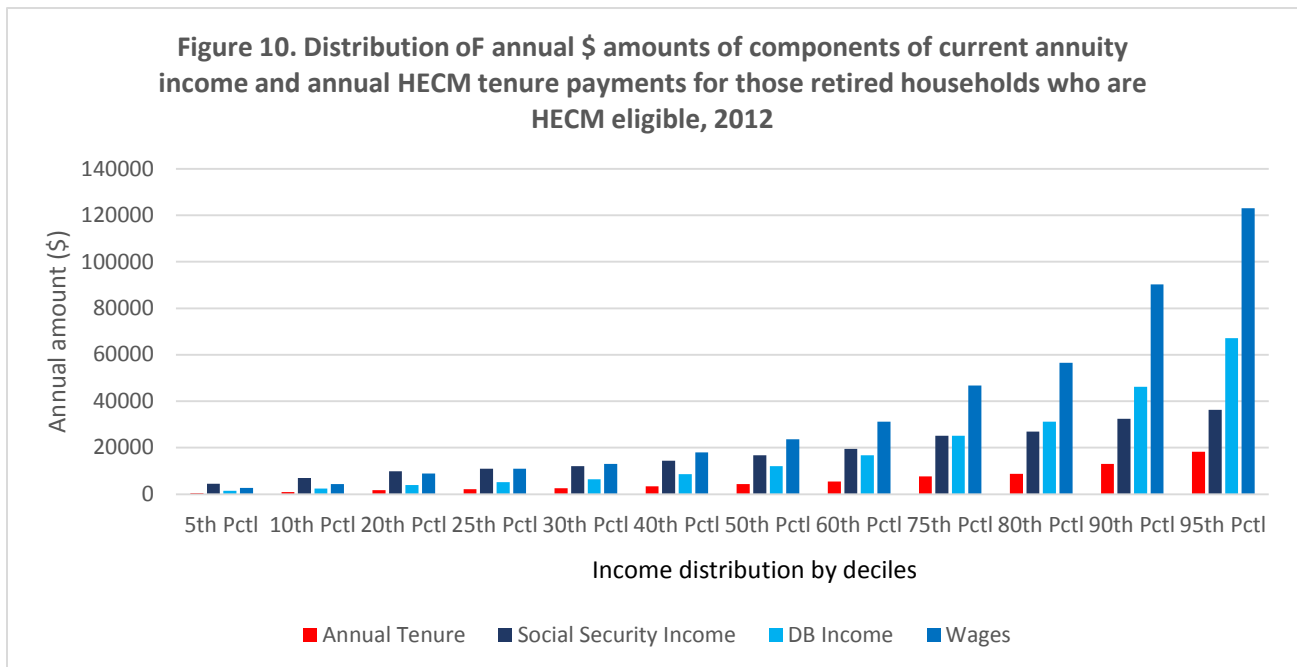
Table 33 shows the retirement resources of those households who are eligible for a HECM according to our initial definition. The mean annual HECM payment is almost \$6,000, compared to a mean Social Security amount of over \$18,000, financial assets of \$160,000, and retirement assets of \$140,000; the HECM service fee of \$6,000 and other fees of \$7,600 are significant transaction costs. On a median basis, the annual HECM tenure payment, \$4,400, is more modest than the mean, but so are the other retirement resources available; the transaction cost for the HECM, however, is still formidable.

**Table 33. Retirement Resources of Retired Households who are HECM-eligible, Mean and Median \$, 2012**

	Annual HECM Tenure	SS Income	DB Income	Wages	PRA	Financial Assets	Primary Housing	Mortgage on Primary House	HECM Finance Fees	HECM Service Fee (PV)
<b>Mean</b>	5855	18380	7720	10715	141932	162007	207256	12461	7555	5968
<b>Median</b>	4399	17436	0	0	23365	25000	150000	0	6357	5922

Source: Authors' simulations.

Figure 10 shows the percentiles of the components of annuity income, as well as the potential annual tenure payment for those households who are HECM eligible according to our basic definition. Clearly the HECM tenure payments are relatively small, both absolutely for the lower percentiles (just a few hundred dollars annually), and relative to the comparable percentiles of components of annuity income currently being received by retired households. Even at the 95<sup>th</sup> percentile, the annual HECM tenure payment is less than \$20,000, compared to almost \$40,000 in Social Security, over \$60,000 in defined benefit pension income, and almost \$125,000 in wages.



Source: Authors' simulations.

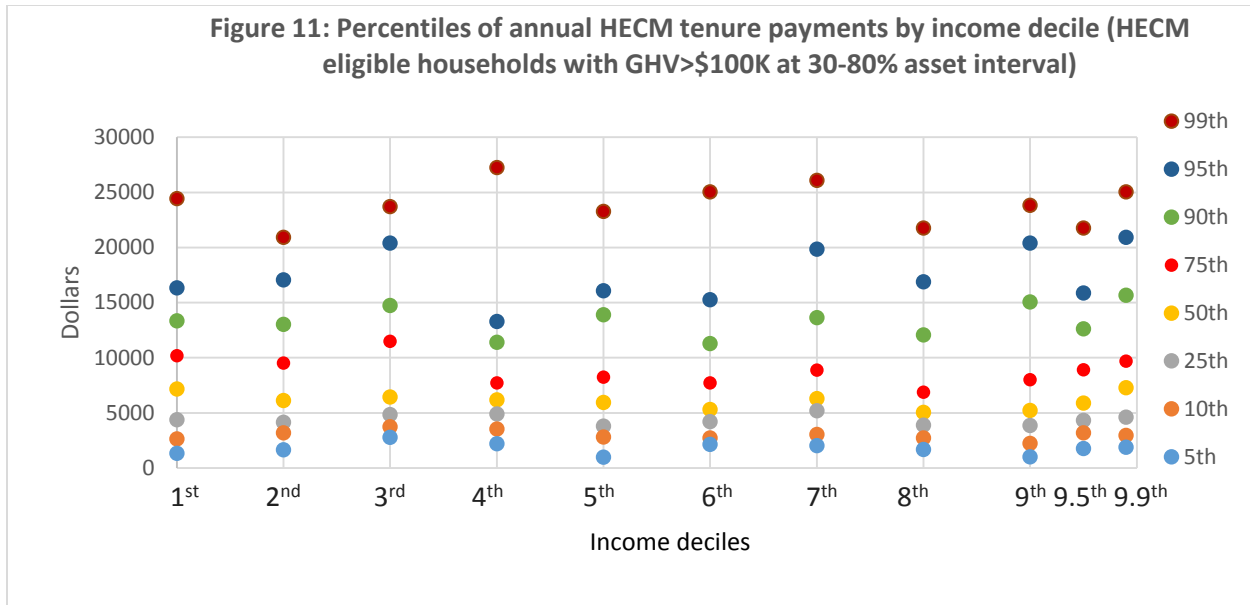
Table 34 gives the means and medians of the percentage change in annuity income due to receiving annual HECM tenure payments for the various combinations of households who are eligible and particularly suitable for HECMs. Because some high-value houses are included in these calculations, the mean changes are large, particularly when the filter of house value greater than \$100,000 is applied. Most relevant though is the median change in annuity income for the indicated group of retired households in the 30<sup>th</sup> to 80<sup>th</sup> percentile potentially annuitizable asset intervals with a house value greater than \$100,000 – the change in annual income is nearly 19 percent – a significant increase in their standard of living.

**Table 34. Mean and median percent change in annuity income due to annual HECM tenure payments for HECM-eligible retired households, 2012**

	All		30-80% Asset interval	
	No Restriction	GHV>\$100K	No Restriction	GHV>\$100K
<b>Mean</b>	37.05%	38.44%	27.27%	31.73%
<b>Median</b>	15.89%	21.84%	14.39%	18.79%

Source: Authors' simulations.

Focusing further on the last, most likely HECM using, category of households, indicates a fairly wide distribution even in this smaller group that would find a HECM helpful to improving their retirement security and standard of living. Figure 11 gives the percentiles of annual HECM tenure payments for the income deciles. Clearly, even at the lowest income decile of this group, at the fiftieth percentile of HECM income payments, more than \$7,000 in additional income can be produced by a HECM – a valuable addition for these households. But at the higher income percentiles, say at the ninth decile and above, income is probably sufficient for most households, and even the extra \$25,000 in income at the 99<sup>th</sup> percentile of HECM income payments may not add that much benefit to those households, particularly when bequest motives and contingent LTSS financing needs are considered.



Source: Authors' simulations.

Moving in the direction of reducing the likely pool of HECM users, we add two more filters to the ones we have already applied in Figures 9 and 11. In particular, we further restrict households to those with LTCI coverage and those with little or no bequest motive. We have already seen that these latter groups are relatively small groups compared to the overall retired population. When we add these screens for LTCI covered and no interest in bequests to those already indicate potentially high interest in HECMs, only 4.6 and 1.3 percent, respectively, of the entire retired population will likely get a HECM.

Finally, consider successive simulations whereby a) we cut all the initial costs of getting a HECM in half across the board, b) we cut the costs while also cutting in half the initial principal loan limit, and c) cut the costs and loan limit while also cutting our own imposition of the requirement to have housing worth at least \$100,000 to \$50,000. A cut in initial costs might happen by regulatory fiat, given the power wielded by the FHA over the HECM market. But it is also possible that such a cut, taken by itself, would harm the marketing and administrative functioning of HECM lenders, and not cover the risks to the federal government and the lenders engendered by the current structure of the product. Therefore, in the second step, we accompany the cut in initial costs with a similar cut in the initial principal loan limit, on the theory that at least some of the administrative expenses and costs of the financial and insurance risks are positively, directly and linearly related to the size of the HECM loan. In the third step, we complete the logical loop and also reduce our own imposition of a \$100,000 minimum gross value for the house, in half, to \$50,000, to be consistent with our original reasoning – the fixed initial costs do not make taking a HECM loan below a certain size a reasonable decision, and now we have reduced these costs.

Table 35, equivalent to Table 31b above, shows the effects of cutting the initial costs of getting a HECM in half. All the various fees are halved; the amount eligible for monthly advances increases by about

\$7,000 at the mean and by about \$6,000 at the median, while the annual tenure payment increases by about \$500 and \$400, respectively.

**Table 35. HECM-eligible households, with GHV>\$100K and in 30%-80% percentile of potentially annuitizable asset interval, HECM summary statistics (half initial costs)**

Variable	Mean	Median
Household Primary Home Value	\$249,587	\$200,000
Mortgage and Loan on the Primary Home	\$16,762	\$0
Origination Fee	\$2,010	\$2,000
Closing Fee	\$1,480	\$1,401
MIP Fee	\$758	\$500
Financing Fees	\$4,248	\$3,901
PV Set Aside	\$2,991	\$2,993
Initial Principal Limit	\$133,795	\$107,736
Net Principal Limit	\$126,555	\$100,898
Eligible for Monthly Advances	\$109,793	\$90,871
Annual Tenure	\$7,744	\$6,405

Source: Authors' simulations.

As seen in Table 36a, compared to Table 34 above, the cut in initial costs does show through to a larger increase in annual income from HECM tenure payments of about 2 percentage points – a significant income increase and improvement in welfare. The increase in the penetration rates, which would arise from the lower initial costs allowing some to borrow who could not before under the basic HECM eligibility conditions we initially imposed, however, is quite modest, and at the most restricted criterion for HECM demand, non-existent.

**Table 36a. Mean and median percent change in annuity income due to annual HECM tenure Payments for HECM-Eligible retired households, half initial costs, 2012**

	All		30-80% Asset Interval	
	No Restriction (57% of HHs)	GHV>\$100K (39% of HHs)	No Restriction (28% of HHs)	GHV>\$100K (19% of HHs)
<b>Mean</b>	40.50%	40.81%	30.34%	33.71%
<b>Median</b>	17.28%	23.57%	15.99%	20.37%

Source: Authors' simulations.

As shown in Table 36b below, a cut in the initial principal limit accompanying the cut in initial costs reduces both the income produced by the HECM significantly as well as lowers the penetration rate somewhat. The reason for the cut in income is obvious – fewer resources (home value) are now available to produce income. The lower penetration rate occurs because the lower initial principal limit loan amount is less likely to meet the conditions for the basic HECM eligibility which we originally established; when considering mortgages, this includes sufficient home equity as a percentage of home

value. Therefore, such a two-step adjustment, taken alone, is probably not worthwhile unless an increase in HECM penetration rates would also arise as a result.

**Table 36b. Mean and median percent change in annuity income due to annual HECM tenure payments for HECM-eligible retired households, 2012, half initial costs and half initial principal limit**

	All		30-80% Asset Interval	
	No Restriction (49% of HHs)	GHV>\$100K (34% of HHs)	No Restriction (25% of HHs)	GHV>\$100K (17% of HHs)
<b>Mean</b>	20.99%	21.16%	15.34%	17.86%
<b>Median</b>	8.32%	11.28%	7.60%	9.94%

Source: Authors' simulations

By contrast, Table 36c shows a real trade-off between lower loan limits (and therefore lower income) and lower costs, and higher penetration rates, resulting from a change in our allowance for HECM borrowing to include gross home values greater than \$50,000 rather than \$100,000. For example, focusing on the most appropriate segment of the population to be using a HECM, the penetration rate among all retired households would increase to 23 percent from 19 percent (see discussion above Figure 9), although the average increase in monthly income would decline significantly, to 8 percent at the median, from 19 percent (see Table 34). It is indeed a judgement call whether the trade-off is worth it, but some might say yes, particularly as the change would allow those in the lower distribution of housing value to participate in the HECM market (see Table 37, to \$160,000 median gross housing value from \$200,000) and if there was no longer a need for government guarantees and the market could be made more competitive and innovative.

**Table 36c. Mean and median percent change in annuity income due to annual HECM tenure payments for HECM-eligible retired households, 2012, half initial costs and half initial principal limits**

	All		30-80% interval	
	No Restriction (49% of HHs)	GHV>\$50K (46% of HHs)	No Restriction (25% of HHs)	GHV>\$50K (23% of HHs)
<b>Mean</b>	20.99%	21.36%	15.34%	15.64%
<b>Median</b>	8.32%	8.88%	7.60%	7.93%

Source: Authors' simulations.

**Table 37. HECM-eligible households, with HV>\$50K and in 30%-80% percentile of potentially annuitizable asset interval, HECM summary statistics (half initial costs and half initial principal limits)**

Variable	Mean	Median
Household Primary Home Value	\$204,073	\$160,000
Mortgage and Loan on the Primary Home	\$6,161	\$0

Origination Fee	\$1,816	\$1,600
Closing Fee	\$1,396	\$1,323
MIP Fee	\$494	\$400
Financing Fees	\$3,706	\$3,323
PV Set Aside	\$2,918	\$2,961
Initial Principal Limit	\$55,273	\$45,473
Net Principal Limit	\$48,650	\$39,502
Eligible for Monthly Advances	\$42,488	\$34,915
Annual Tenure	\$3,005	\$2,466

Source: Authors' simulations

### International Comparisons

The extended life expectancy and growing population of retirees pose challenges for personal retirement security and public fiscal sustainability not only in the US, but also in Canada, the European nations, South Korea, Australia, New Zealand, China and elsewhere. The reverse mortgage product that was initially introduced in the developed countries is also now gaining attention in developing and emerging markets with overwhelming percentage of the world's aging population. For example, the Chinese population aged 60 and over is expected to surpass 17% of that nation's total population by 2020. The Chinese government, as a means of solving the posited societal challenge, plans to pilot a reverse mortgage pension system in Beijing, Shanghai, Guangzhou, and Wuhan by March 31, 2016 (Wang and Kim, 2014).

The reverse mortgage market, however, hasn't taken off at the pace and magnitude that governments and private lending institutions expected and wanted. This is true in all the countries where the product exists now. The hefty upfront costs, high discounting of the home value, and high interest rates that double the amount a borrower owes upon sale of the house in 10 to 15 years are often considered to be the common reasons for the disappointing growth of the market. While this seems to be true for all the countries that offer reverse mortgages, each country has its own unique layers of additional challenges that hold back full growth. For example, the lack of trust in private lending institutions in many developing and emerging markets suppresses the markets there further. Despite these challenges, many nations are trying experiments and hope that some success will help the governments reduce the dependency of the aging population on overpromised and underfunded social security programs. The US HECM program, being one of the oldest reverse mortgage programs in the world, has been referenced and used as a basis by many foreign governments and lending institutions to design their own reverse mortgage programs.

This section will shed light on the reverse mortgage market in the following countries: South Korea, Australia, Canada, the U.K. and some other EU countries. Although the mechanics and specifics of reverse mortgage market in each country varies, these case studies can still provide an indication of the general direction in which international reverse mortgage products are moving.

## South Korea

In July 2007, the Korea Housing Finance Corporation (KHFC), which is a state-run financing firm, introduced Joo Taek Yeon Keum or in English - the housing pension system. The underlying model for the insurance premium structure of the Korean reverse mortgage was adopted from the US HECM program (Wang and Kim, 2014). Under this pension system, lenders provide reverse mortgage loans, which are fully guaranteed by the KHFC (Seonjin Cha, 2013). In 2012 the program was modified and the reverse mortgage loan has since become a non-recourse loan, that is, KHFC ensures that it has a “no negative equity guarantee” (Kim, 2015). The biggest lenders of reverse mortgage products are KB Financial Group Inc. (owner of Kookmin Bank), Woori Finance Holdings Co. (owner of Woori Bank), and Shinhan Financial Group Co. (Shinhan Bank) (Seonjin Cha, 2013).

Initially, the reverse mortgage product was targeted to senior citizens aged 65 and older who owned a house and resided in it. In October 2008 the age threshold was lowered to 60. Groups of Korean researchers (Cho, Park, and Ma, 2004; Lim and Cho, 1999; Cho and Ma, 2004; Cho, et al., 2004) estimated that the potential demand for reverse mortgage loans by households age 60 and older would reach half a million (Ma and Deng, 2006). It has only reached about 2-3% of that estimated number in a recent five-year period (cumulative loans as of August 2012 were 10,007) (S. Ma and Y. Deng, 2013). According to the survey of 20,000 households conducted in December 2012, houses and residential real estate accounted for 70% of the average South Korean’s assets, and for people at 60 years of age and older, the average value of houses and residential real estate accounted for even higher - 81% of all assets. These statistics together with a shift in lifestyle were some of the reasons that KHFC expects 1 million reverse mortgage loans to be originated by 2030 (Seonjin Cha, 2013).

Similar to the US HECM program, the borrower of South Korean reverse mortgage has a number of options to receive the funds, such as tenure advances (constant monthly payment, graduated monthly payment pegged to inflation, decreasing monthly payment) and tenure advances combined with line of credit. There is no lump-sum option in the Korean reverse mortgage program (Kim, 2015). Unlike the US HECM model, the borrower cannot change the payment option after the loan is closed under the Korean model.

The maximum percent of the value of the house that can be accessed by the borrower is 50-60%. Additionally, the borrower incurs up-front costs, such as the upfront insurance premium of 2% of home value and monthly mortgage insurance premium (MIP) of 0.5% of the loan’s outstanding balance (Wang and Kim, 2014). As of February 2015, the upfront insurance premium decreased to 1.5% and the monthly MIP went up to 0.75% (Kim, 2015). The interest rate of the reverse mortgage loan is regulated by the KHFC, which also imposes a guarantee fee for borrowers. The interest rate is a combination of an adjustable 3-month Certificate of Deposit (CD) rate and 1.1%, which is the spread between the average interest rate on the debt and 3-month CD rate<sup>13</sup> (Kim, 2015; Yong-Chang Heo et al, 2016; Seonjin Cha,

---

<sup>13</sup> The average interest rate on debt is 110 basis points above the 3-months certificate of deposit rate and is set by the KHFC (Seonjin Cha, 2013).

2013). The reverse mortgage loan rate as of January 2015 was 3.23% (CD yield applied to reverse mortgage of 2.13% and 1.1%) (Kim, 2015).

The Korean reverse mortgage program started out with 515 borrowers in 2007 and increased over five fold in four years, reaching 2,936 borrowers in 2011. Of these borrowers, about 61.3% preferred tenure payments, of which 76.5% chose constant tenure payment. Over 50% of the houses used for reverse mortgage loans had a value of 100M-300M Korean won (\$89,375-\$268,126 USD equivalent)<sup>14</sup>. About 41% of the borrowers received monthly payments of 500K-1000K won (\$447-\$894 USD equivalent). As a follow-on program, the government of South Korea launched a farm-version of reverse mortgage in January 1, 2011. The idea behind it was to help not only home-rich and cash-poor senior citizens in urban areas, but also farm-rich, cash-poor elderly citizens (Ma and Deng, 2013).

### Australia

The Australian reverse mortgage market has been around since 2004 (Flavia Coda Moscarola, 2013).

There are several home equity release schemes, including the reverse mortgage, available in Australia.

- **Reverse Mortgages** – the same reverse mortgage found in other countries for retired households to use. The reverse mortgage loan in Australia is provided on residential properties for personal purpose and for refinancing the existing loan where the original purpose was for personal use only. The eligibility criteria for the reverse mortgage are that the applicant has to be at least 60 years of age (or 65 – different lenders have different policies) and in case of multiple joint applicants, some lenders require that all applicants be age 65 or older. All the applicants should either be joint tenants or tenants in common in the property that's being offered as a security, and at least one applicant has to reside in the property (Flavia Coda Moscarola, 2013).
- **Home Reversion Schemes** – Under this scheme, a borrower sells the entire or part of his/her home to the reversion company. The borrower is able to receive a maximum of 65% of the fair market value of the home. The discount factor varies based on the age and life expectancy of the borrower. This scheme also does not allow the borrower to benefit from the future home price appreciation because it is essentially a sale rather than a loan contract (Australian Securities and Investments Commission (ASIC)).
- **Shared Appreciation Mortgages (SAMs)** – the lender agrees to provide a reverse mortgage loan at lower interest rate for the right to claim some part of the capital gain on the property (Flavia Coda Moscarola, 2013).

There are limits on the amount applicants can receive in the reverse mortgage process. The minimum amount can be as low as \$10,000 and the maximum as high as \$425,000 (dependent on the applicant's age and lender). (All dollar amounts in this section refer to Australian dollars; on May 5, 2016, one US dollar equaled 1.34 Australian dollars.) There are also limits on the maximum loan amounts as a percent of appraised equity value (loan-to-value): 15% to 50%. For example, the youngest borrowers (65 years old) are eligible for loan of 15% of the home value. Older borrowers, on the other hand, can take up to

---

<sup>14</sup> The January 2011 exchange rate of Korean Won for 1 US Dollars was 0.000894 (<http://www.x-rates.com/average/?from=KRW&to=USD&amount=1&year=2011>)



50%. For example, an applicant 85 years old will be able to access to 40% of their home equity value and a 95 year-old borrower can access 50% of the home equity value for reverse mortgage loan (Commonwealth Bank of Australia (CBA), ASIC). The maximum loan-to-value as well as reverse mortgage fees and age eligibility for loan varies by different lenders (e.g., some only provide up to 45% while others provide loans up to 50% of the home equity value).

The interest rate can be either variable or fixed depending on the lender originating the reverse mortgage. There are some mandatory fees that the borrower has to incur: a \$950 upfront establishment fee and \$12 monthly loan service fee (CBA, ASIC). Additionally, there can be a legal fee of \$300-\$500, a valuation fee, settlement fee (\$495), mortgage registration fee, mortgage discharge fee (\$395), advising fee and a series of other fees for various loan options (ASIC, Heritage Bank).

Senior Australian Equity Release (SEQUAL), established in 2004 as the industry association for equity release products providers, says that the interest rate for reverse mortgage is only about 1-2% higher than that for conventional mortgage. Heritage Bank, one of the reverse mortgage lenders, provides two types of loan options: standard reverse mortgage and aged care option. The aged care option is a loan for a maximum term of 5 years. The minimum home value to be considered for the aged care option is \$200,000. The borrower of both standard reverse mortgage and aged care option loans is subject to 6.5% minimum variable rate, which changes based on the loan terms and home value.

The reverse mortgage borrower can choose to receive the funds either through lump sum, a regular income stream (also known as drawdowns), a line of credit or a combination of all the main choices. Loan will be called for repayment if the last surviving borrower dies, sells or transfers the property, fails to reside in the property for a continuous 12 month period, or the property is materially damaged. There is also a “no negative equity guarantee”, which is a relatively new protection statutory clause introduced by the government on September 18, 2012 (that is, the borrower is not responsible for the additional share of payments in case the total payments exceed the equity value over time) (F. Burns, 2013, SEQUAL website). Today all reverse mortgages written in Australia must be non-recourse loans, that is all of them have to include the no-negative equity guarantee (Christine Brownfield, 2014), but Barrett’ Lending Solutions reports that not all lenders provide nor are all reverse mortgages non-recourse loans. Additionally, the reverse mortgage loans in Australia are not backed or guaranteed by the government, although there are some proponents for it (CPSA, 2015).

Initially, the market was largely uncoordinated and unregulated and very few players were offering the product. It has changed over the years. Just before the global financial crisis in 2008, there were 15 reverse mortgage lenders, but only five remain today (Scheule, 2015). Unlike the US, large banks including CBA, St. George, BankWest and Macquarie Bank offer reverse mortgage products to Australian households. Although the Australian reverse mortgage market is gaining traction with the average loan size growth rate of about 3% (at \$92,000, up from \$86,000 in 2013), it remains a small fraction of potential funds Australians can access (3400 new borrowers in 2014 and 40,000 total reverse mortgage cases). Of these 12% of the borrowers voluntarily repaid their reverse mortgages in 2014, a trend that is mainly driven by the main motive of borrowers to use the funds for temporary outstanding debt

repayment before they downsize. Many borrowers in Australia prefer lump sum draw down type, 47% of the borrowers are couples, whereas 36% are single women and many of the borrowers are at ages 70-79 (49%) (Deloitte Report, 2015).

Figure 12 shows that initially only 60% of reverse mortgage applicants who were approved for the loans used or drew down the loan. Over time, the gap between borrowers who received an approval and who actually used the loan narrowed reaching less than 10% in 2014. Additionally, Table 38 shows that the average loan size has increased in the past nine years from about \$54,000 to approximately \$92,000. At the end of 2014 the market has grown to reach a total of \$3.7 billion reverse mortgage loans outstanding. Historically, only stand-alone dwellings were eligible for the reverse mortgages, but now more and more lenders accept other types of properties, such as apartment units and others.

During the early stages of reverse mortgage market, the total amount of approved loans was nearly 30% more than the actual amount advanced to and used by borrowers (see Figure 12). However, the total amount of loans (facility) decreased from \$714m to \$307m in the 9-year period (about 60% decrease). Although the amount of loans actually used and advanced declined as well, it only decreased by about 48% (from \$502m in Dec 06 to \$272m in Dec 14). Consequently, the gap between loan amount approved and loan amount actually used by borrowers narrowed down as well. As of December 2014, of \$307m in reverse mortgage loans approved, \$272m was used by and advanced to borrowers (Deloitte Report, 2015).

**Table 38. Key statistics on Australian reverse mortgage market, 2006-2014**

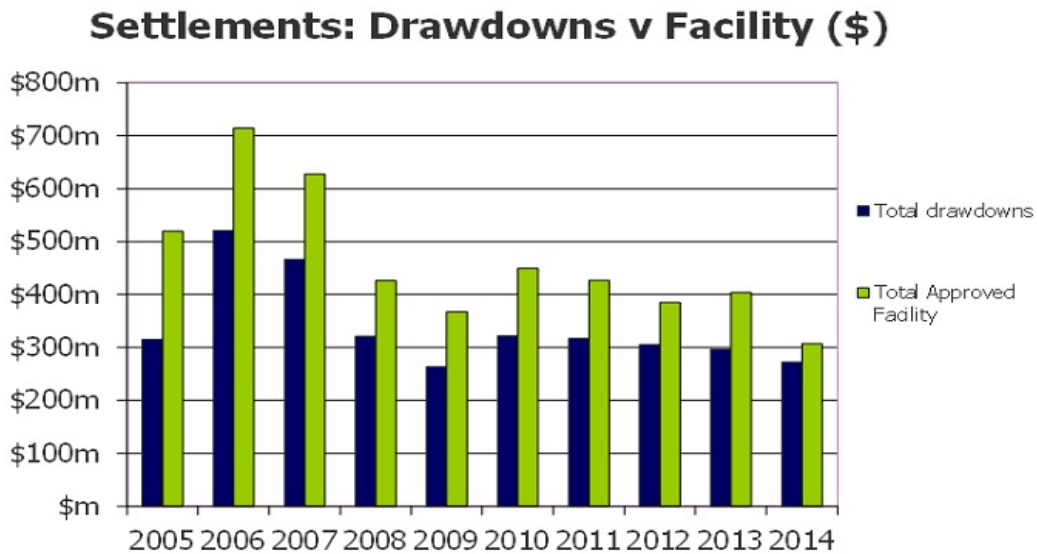
	Dec 06	Dec 07	Dec 08	Dec 09	Dec 10	Dec 11	Dec 12	Dec 13	Dec 14
<b>Outstanding market size</b>	\$1.51b	\$2.02b	\$2.48b	\$2.71b	\$3.01b	\$3.32b	\$3.56b	\$3.56b	\$3.66b
<b>Number of loans</b>	27,898	33,741	37,530	38,788	41,640	42,410	42,455	41,435	39,867
<b>Average loan size</b>	\$54,233	\$60,000	\$66,150	\$69,896	\$72,474	\$78,249	\$83,840	\$85,881	\$91,740
<b>Settlements</b>	\$520m	\$466m	\$321m	\$264m	\$322m	\$317m	\$305m	\$302m	\$272m
<b>Facility</b>	\$714m	\$627m	\$426m	\$367m	\$449m	\$426m	\$385m	\$404m	\$307m

Source: Deloitte's Annual Reverse Mortgage Report, 2015

\* Settlements is defined as the reverse mortgage loan that has been approved and advanced (when the mortgagee is registered and funds are advanced)

\* Facility is the total reverse mortgage loan approved by the reverse mortgage lender but not yet used by the borrower

**Figure 12. Total reverse mortgage loans issued vs. drawdown, Australia, 2005-2014**



Source: Deloitte's Annual Reverse Mortgage Report, 2015

## Canada

The reverse mortgage market has been around for about 28 years to help Canadian homeowners supplement their retirement income. There are very few reverse mortgage providers and the major lender is the HomeEquity Bank with its Canadian Home Income Plan (CHIP) Reverse Mortgage. There is no government guarantee on the product.

Homeowners of 55 years or older who have home equity with little or no mortgage outstanding and reside in the home are eligible to take out a reverse mortgage loan. They can choose between a few payment options: a lump-sum payment, a loan to set up planned advances that provide regular income or the combination of the two (CHIP website). The borrowers can access from 25% to 55% of their home equity (Rob Carrick, 2010 and CHIP). There is also a minimum and maximum limit on the amount that can be received - \$20,000 minimum and \$750,000 maximum (Senior's Lending Centre). (All dollar amounts in this section are in Canadian dollars; on May 5, 2016, one US dollar equaled 1.29 Canadian dollars.)

Similar to the US reverse mortgage program fee structure, the Canadian reverse mortgage also mandates a home appraisal fee \$175-\$400, independent legal advice at a fee of \$400-\$600, closing and administrative costs of \$1,495, and an application fee. Additionally, the borrower will be subject to additional costs and penalties in case of early settlement of the loan (such as 4-11 months of interest payments, potential interest-rate differential, and other costs). Interest rates for reverse mortgage are substantially higher than the conventional ones (5.9% for fixed reverse mortgage (4.75% for variable) versus 3.5% for fixed conventional mortgage, in 2010. (Rob Carrick, 2010, Financial Consumer Agency of

Canada). (Note that a fixed mortgage in the Canadian market is similar to a five-year adjustable rate mortgage in the US market.)

U.K.

The reverse mortgage market has existed in the U.K. since the early 1980s. Retired people, who took out variable rate reverse mortgages, used the lump-sum or drawdown amount to invest in bonds and stocks for additional income. However, because of the poor market performance, they lost a lot of money and their debt rose sharply. Many of them were evicted from their homes. This prompted the emergence of a self-regulatory body for equity release products, Safe Home Insurance Plans (SHIP), in 1991. Later, in 2004, UK's Financial Services Authority (FSA) started regulating conventional and reverse mortgages (Flavia Coda Moscarola, 2013).

The overall UK home equity release scheme includes several different products, mainly the home reversion plan and a lifetime mortgage.

1. The **home reversion plan** involves the sale of an entire or part of home equity at the time of reversion plan origination. The elderly person, who is over 65 and owns a home, using this plan and continues to live in the house without paying any rent (until he/she dies). The sales proceeds that the elderly receives are typically 20% to 60% of the market value of the home, depending on the age and health factors. The cash proceeds from the sale can be distributed to the elderly in three forms: tax-free lump sum, regular income, or a combination of both. Although the ownership of the home is transferred to the company offering reversion plan, the elderly is still responsible for home maintenance and insurance. One of the major drawbacks of the plan is that the income or lump sum amount received from the reversion plan (i.e. sale of the home) will affect the government benefits the elderly receive if benefit eligibility is income-dependent (the Money Advice Service).
2. The **lifetime mortgage** is the equity release product that is very similar to reverse mortgage available in other countries. The borrower retains the ownership of the home throughout the lifetime mortgage. The only time sale of the property happens is by the wish of the owner (when to sell) or by death (FindLaw UK). Lifetime mortgages are available to borrowers at ages 55 to 60 (depending on the lender) and older, who own a home of minimum value of 75,000 Great Britain Pounds ("GBP") with minimum to no outstanding mortgage, reside in it (not residing for 6 consecutive months disqualifies), and need to borrow at least 15,000 GBP. The borrower keeps the ownership of the home and thus the potential benefits of appreciation when it is sold. The borrower has a choice between two types of lifetime mortgages (Equity Release Centre):
  - A. A **roll-up lifetime mortgage** – under this option, the borrower can choose a lump-sum payment or a drawdown lifetime mortgages, in which case the interest rate is applied to the amount actually borrowed and not the amount in reserve. Currently, about two-thirds of the reverse mortgages in the UK are of drawdown type and only one-third lump-sum type (Jano Cocco and Paula Lopes, 2015).
  - B. **Interest only lifetime mortgage** – under this option, the borrower pays monthly interest to avoid future debt increases. This option is becoming quite important especially for borrowers with some leftover conventional mortgage.

The Lifetime Mortgage allows a borrower to choose inheritance guarantee (a percentage of the home value for the heirs). They can also commit and use the voluntary partial repayment clause, which will allow the borrower to make annual partial repayments without any penalty. Given the fact that it is a lifetime mortgage, it involves substantial penalties when a borrower decides to sell the home early.

Unlike the US, where all the reverse mortgages products are non-recourse loans and the “no negative equity” guarantee is inherent within the reverse mortgage product, the products in the U.K. do not automatically come with the “no negative equity” feature. Instead, the borrower has to pay an extra fee so that his/her loan includes a “no negative equity” guarantee to prevent repaying more than the market value of his/her home (Aviva, Jonathan Bush, 2016). Moreover, unlike the U.S. reverse mortgage market, the U.K. reverse mortgage market is not guaranteed by the government. The UK lifetime mortgages also provide much lower loan-to-value (amount that can be borrowed), lower initial cost but much higher interest rate than the US reverse mortgage products (Jano Cocco and Paula Lopes, 2015). The interest rate for lifetime mortgage mortgages is quite high relative to the conventional mortgage rates (around 6.5% in 2013 – nearly double of the conventional mortgage loan) (Uren, 2013). In addition, the interest rate varies by the type of reverse mortgage payment plan: drawdown and lump-sum. The summary of the fees and interest rates differences between the US and UK reverse mortgage products for lump-sum and drawdown is presented in Table 39. Note that all the costs and amounts are converted into US dollars for ease of comparison. All the data and calculations reflect April 2014 conditions (Jano Cocco and Paula Lopes, 2015).

**Table 39. Summary of US and UK reverse mortgage products: costs and interest rates**

<b>Initial Reverse Mortgage Costs in USD</b>				
	<b>Initial amount ≤ 60% x Max</b>		<b>Initial amount &gt; 60% x Max</b>	
<b>Description</b>	<b>US</b>	<b>UK</b>	<b>US</b>	<b>UK</b>
Loan origination fee	\$1,500	\$925	\$1,500	\$925
Mortgage insurance (if value=70,000)	\$350		\$1,750	
Other closing costs	\$2,000	\$964	\$2,000	\$964
<b>Total initial costs</b>	<b>\$3,850</b>	<b>\$1,889</b>	<b>\$5,250</b>	<b>\$1,889</b>
<b>Reverse mortgage rates</b>				
	<b>Drawdown</b>		<b>Lump-sum</b>	
<b>Description</b>	<b>US</b>	<b>UK</b>	<b>US</b>	<b>UK</b>
Interest rate index (1 month LIBOR)	0.16%			
Lender's margin	2.50%			
<b>Loan rate</b>	<b>2.66%</b>	<b>6.19%</b>	<b>5.06%</b>	<b>7.39%</b>
Mortgage insurance	1.25%		1.25%	
<b>Initial total loan</b>	<b>3.91%</b>	<b>6.19%</b>	<b>6.31%</b>	<b>7.39%</b>

<b>rate</b>				
Diff to standard mortgage rate	1.47%	3.38%	1.98%	3.70%
Expected loan rate	5.35%		5.06%	

Source: Jano Cocco and Paula Lopes, 2015

Major banks, including Santander, are planning to offer interest-only lifetime mortgages. The reason is that many older homeowners are having difficulty paying off their conventional mortgages. Using this as an opportunity to reduce their losses, banks are trying to swap the conventional mortgage into lifetime mortgage essentially taking the full ownership of the home (after the death of the owner) (Louise Eccles, 2014). Analysts expect this action of banks to intensify the equity release market even further (for the first half of 2013, the equity releases were 473M GBP compared to 423.9M GBP in the same period of 2012) (Uren, 2013). Alternatively stated, in 2013 alone, total lending for equity release products was 1.07B GBP (Jano Cocco and Paula Lopes, 2015).

The EU (excluding U.K.)

The financial crisis of 2008-2009 in Europe impacted the general population in many ways. The average retirement age has since increased due to losses in financial assets and value of pensions. However, ownership of the housing equity asset (mainly the residential property) has remained at its traditional high level. The average home ownership rates in many European countries are around 70% according to INSEE. For example, over 80% of senior citizens in Spain, other Southern and Eastern European countries own homes/primary residences (D. Bogataj et al, 2015). In Europe, the median home value of homeowners aged 50 or older is around 170,000 EUR compared to about 150,000 EUR in the U.S. (Christelis et al., 2013).

The reverse mortgage is offered in at least 10 EU countries: the UK, Germany, Malta, Italy, Sweden, the Netherlands, Romania, Spain, France and Hungary (I. Kuchciak, 2011). Including the sale-model (home reversion scheme), there are about 13 EU counties offering equity release schemes: the UK, Germany, Ireland, Spain, Italy, Hungary, Finland, Austria, Bulgaria, France, Netherlands, Romania, Sweden, and Poland (Jerzy Gwizdala, 2015). Reverse mortgages account less than 1% of the overall mortgage market and has significantly different adoption rates in each of the EU countries due to varying degrees of financial education and regulatory framework (I. Kuchciak, 2011).

A study by E. Fornero and colleagues indicates that the target customers for the reverse mortgage in Italy (typically women, elderly and house-rich-cash-poor) do not view the product as an ordinary financial instrument for a better lifestyle. Rather, they view it as a last-resort option for getting out of a poor financial state (Elsa Fornero, et al., 2015). Moreover, the deep-rooted tradition of passing properties to children or relatives in Italy and lack of understanding of the product are also cited as hindering the growth of the reverse mortgage market. On the other hand, senior citizens (people

surveyed were age 45 and above) in Netherlands view the product more positively as a means to improve their life, live comfortably and pursue their hobbies (Rik Dilingh et al., 2013).

The examples of Poland and Spain will lay out some of the commonalities and differences of the reverse mortgage product in two European countries.

## Poland

Since 2008, Poland has had equity release schemes. At one time, seven loan providers offered the home reversion product, which is based on the sale of the house in exchange for annuity payments. The home reversion scheme was not regulated (although there are intentions by the Ministry of Finance to do so). Many of the seven lenders have intentionally lured customers into a “reverse mortgage” product without explicitly specifying the sales model. Because of the lack of regulations, many of the providers canceled contracts, forced additional charges and in general, took advantage of the missing regulations and naïve customers (Leqicka Beata, 2014).

Only very recently reverse mortgage products (i.e. lifetime mortgages) were allowed by law in Poland, on December 15, 2014. Although the new financial product is primarily targeted to senior citizens, the law does not specify a minimum age for product eligibility (Reverse Mortgage Daily, 2014). Under the Polish reverse mortgage scheme, senior citizens expect to receive a lifetime annuity from the fund or bank. The law protects borrower rights, giving them 30 days to cancel the agreement. The law also mandates banks or lending institutions to follow strict rules: no false marketing, change or cancellation of the agreement (with very few exceptions), and so on. Although banks and credit organizations are now allowed to offer reverse mortgage loans, only one bank has expressed interest to explore the new loan product (Łukasz Szymański and Laura Piórkowska, 2014). The reasons could range from lack of government guarantee, recent shakeup of the mortgage market, and follow-on tendency of financial institutions to carry safer products. Researchers are skeptical that reverse mortgages will attract consumers for many reasons, including the lack of trust in regulations and institutions, demographic situation, social and cultural detriments and the current economic conditions (Jerzy Gwizdala, 2015).

## Spain

Reverse mortgage products in Spain were first marketed in 2006. The aging population, rising life expectancy, high home ownership rates, and inadequate pension system were motivations for launching equity release products. The reverse mortgage market is not government-backed and the emergence of it has been the initiative of private lenders and banks (BBVA, 2013). This is offered as non-recourse loan by some reverse mortgage providers. About 20 credit unions and non-banking institutions offer these products to pensioners or senior citizens. Specifically, they offer the following two products:

1. Lifetime mortgage (reverse mortgage) which is essentially a loan
2. Equity reversion scheme (based on a sale model), regulated under Civil Code.

Requirements for reverse mortgages are:

- borrower has to be at least 65 (in some cases 70) or be suffering severe or high degree of dependency,
- property must be insured,
- property must be owned by the borrower,
- property must be the borrower's primary residence (although Carmen Carcia Carnica ,2011 indicates the possibility of granting reverse mortgage loan on borrower's other properties as well).

Borrower can repay the loan earlier without incurring large penalties (maximum of 0.5% of the loan value) (Jerzy Gwizdala, 2015). The amount available to borrowers depends on the age of the borrower and property value, although there is no minimum threshold specified. Unlike other countries' reverse mortgage market, the borrower can possibly lease his/her home and or change residence (e.g. move to assisted living residence) (BBVA, 2013). Additionally, Spain allows heirs to reclaim the rights to the property to repay the loan, sell the rest in exchange for cash, or convert the outstanding liability on the house to a long-term mortgage loan (Jerzy Gwizdala, 2015).

The reverse mortgage is typically paid out either through periodic payments or a lump sum (Del Pozo, 2011). The periodic payments are not necessarily life annuities. That is, when the borrower reaches to the maximum amount of available funds he/she borrowed, the payments stop but interest expenses continue to incur. The borrower, however, has an option to add a feature to continue receiving annuity payments until death at additional cost (Carmen Carcia Carnica, 2011). The accrued interest rate is generally Euribor mortgage interest rate plus a 2% spread, but the applicable interest rate is normally fixed (BBVA, 2013).

As mentioned above, Spaniards have a very high rate of home ownership, particularly the owner-occupied residential units that reach to about 85% of total residential units. Moreover, current monthly proceeds from equity release program in Spain are often 3-4 times higher than monthly pensions (460-2290 EUR). The amount available to the borrower is typically 70-80% of home equity value (Jerzy Gwizdala, 2015). All these critical factors give researchers reasons to believe that reverse mortgages market will grow in Spain despite the deep-rooted inheritance tradition and its cultural significance.

### Public Policy Ideas

We have implied in our analysis above that in its current structure, with its high initial and on-going costs, the HECM program is not well-suited to use by retired households with modest amounts of home equity and very low assets. There is certainly a segment of households who are house-rich but with modest assets and incomes, particularly among the oldest age groups, but this segment is relatively small, according to our empirical analysis. When one considers the bequest motives and contingent LTSS financing needs (that is, those without LTCI coverage) that are clearly present even in this segment, the potential demand for HECMs is reduced even more.

The high initial and on-going costs of the HECM seem to be justified by the need to cover the marketing costs of the "no-name" lenders, with the big players out because of the limited market and the



restriction on cross-selling. One might be satisfied with this outcome, indeed reflecting current conditions, relegating the HECM to a relatively small player in the retiree financing marketplace. But one must consider the likely consequences of such an outcome – many households who could benefit from reverse mortgages will not, the federal government, with its large risk exposure, will continue its experimentation with the product in a futile search for success, and “no-name” lenders, with their marketing challenges, will be the main private sector conduits – a second-best scenario.

Clearly the ruthless borrowing strategy mentioned in the professional literature is an abuse of the program and there should be an appropriate and significant charge for the put option value that presents the largest risk to the federal government. In this way, it is likely that the initial and on-going insurance premiums could be reduced. Moreover, if the program were redesigned to lower the borrowing limits but with lower costs so as to increase its appeal to the retired population, risk to the federal government and lenders could be further reduced, thereby further lowering the needed insurance premiums. Although it is hard to see exactly how the various mortgage closing fees could be reduced in a mortgage product, at least the origination fee can be reduced, without allowing an increase in the interest-rate spread. With lower fees and a somewhat simpler menu of possible uses, perhaps the HECM product could gain more hold of the marketplace, without the need for expensive advertising, thereby existing in a virtuous and sustainable cycle of lower costs and greater use.

Indeed, one has to ask, along with George Mason University finance Professor Sanders in his 2012 Congressional testimony on the HECM program, whether it is appropriate for the Federal government to guarantee and subsidize reverse mortgages for seniors. Has the regulatory stranglehold that the government has on the reverse mortgage market put an end to market experimentation and competition? For example, larger institutions in the private sector might offer reverse mortgages with lower principal limit factors than HECMs that could be underwritten by the private sector within its tolerance for risk, and competition would keep costs low. Indeed, as we saw in the international section of this paper, most reverse mortgage programs abroad do not have government backing.

The current reverse mortgage industry, essentially HECM marketers, has grown dependent on the government subsidies and guarantees. Consider the following statement made in Congressional testimony in 2012 by Jeffrey M. Lewis, then CEO of Generation Mortgage, then a significant issuer of HECMs.

“I would like to briefly address the question of whether or not it is healthy for the government to be so dominant in this market – after all, the federal government currently insures more than 99% of all new Reverse Mortgage originations. In the traditional mortgage space the economic difference between a government loan and a jumbo is marginal. In the Reverse Mortgage space, the difference between a government loan and a private loan is immense. This difference is not a reflection of increased risk on the part of the government. Rather, it is a function of the fact that the government’s cost of capital is dramatically less than the private sector’s.”

Of course, Mr. Lewis was wrong – the economic difference between a government-insured reverse mortgage loan and a jumbo loan *is* a reflection of increased risk on the part of the government. This is partly confirmed by the large losses experienced by FHA in this market, but it is mainly a statement of basic financial logic. The real question is what is the policy justification for taxpayer subsidization of reverse mortgages to seniors who have considerable housing equity? Certainly there is no justification for subsidies for sophisticated wealthy investors who use HECM in complex asset management strategies.

Putting aside this fundamental policy question, what other public policy changes could be made that would increase the utility of the HECM? In our opinion, they mainly deal with removing the need to keep the house as a contingent asset to pay for long-term services and supports. Some inkling of this policy connection has been already recognized. Indeed, according to Ahlstrom, et al., there was apparently some legislation in 2000 and some regulatory activity in 2004 to have the FHA waive the initial premium for HECM mortgage insurance if all of the proceeds of the loan were used to pay for LTC insurance. Why such a strict tie would be thought attractive to potential HECM borrowers is not clear. Indeed, after a proposed rule submitted for public comment in November 2004 that would have allowed for a waiver of the HECM upfront mortgage insurance premium if the proceeds were used to purchase long-term care insurance, this waiver provision didn't make it into final rulemaking. Ultimately it was determined by HUD that this policy would be of little benefit to the average HECM borrower because long-term care insurance is designed to protect one's financial assets, and most HECM borrowers do not have many, if any, financial assets to protect. Therefore, the use of home equity to pay for long term care insurance without financial assets to protect was determined not to be in the best interest of the HECM borrower.<sup>15</sup>

The underlying policy logic appropriately tying the HECM with LTCI, however, does indicate that improvements in the LTCI product and marketplace would have positive spillover effects on the extent and quality of HECM activity. That is, among those middle-income and modest-asset retired households who do not want to rely on Medicaid for LTSS, who are not so concerned about a bequest, but are on the edge of using a HECM to improve their standard of living in retirement, better and cheaper LTCI would help. Of course, in recent years we have gone in the opposite direction – the private LTCI market has shrunk, Medicaid coverage has expanded, and the remaining private LTCI product has become less effective as insurance against large spending risks. Perhaps renewed attention should be given to product innovations, such as proposed by Brown and Warshawsky (2013), to give some tax advantage to a combined long-term care insurance – life annuity policy, called a life care annuity, which would need little underwriting (unlike traditional LTCI) and could be offered more cheaply than the two segments of the product sold separately.

Some have proposed that the federal government should step into the primary market and originate reverse mortgages directly, including its marketing and administration, just as it recently did with student loans, in order to lower costs. Whatever the justification for the federal take-over of student loans, the two loan programs are fundamentally different. Student loans are a widely used instrument

---

<sup>15</sup> Email communication from Josephine Huang, HUD, November 24, 2015.

and are marketed effectively by higher education institutions which have a direct interest in increasing demand for their service and raising tuition prices. By contrast, HECMs are a somewhat of a specialty product, and need some marketing direct to retirees as well as good administration; the federal government has not recently proven to be good at either marketing or administration, as seen in the recent experience with the federal health insurance exchange.

## Summary and Conclusions

According to the FHA, the HECM, a government-sponsored reverse mortgage, is designed to enable elderly homeowners to convert the equity in their homes to monthly streams of income and/or lines of credit. Loan proceeds are paid out according to a payment plan selected by the borrower. Unlike a traditional "forward" residential mortgage, which is repaid in periodic payments, a reverse mortgage is repaid in one payment, after the death of the borrower, or when the borrower no longer occupies the property as a principal residence. The HECM is a "non-recourse" loan. This means that the HECM borrower (or his or her estate) will never owe more than the loan balance or the value of the property, whichever is less; and no assets other than the home must be used to repay the debt. The HECM has neither a fixed maturity date nor a fixed mortgage amount.

Eligible borrowers are persons 62 years of age or older. Eligible properties are one unit dwellings, including units in condominiums. Eligible borrowers should own their homes free and clear or with liens not exceeding the principal limit. The amount that the borrower can receive from a reverse mortgage is determined by calculating the principal limit. The figure increases monthly and represents the maximum payment that a borrower may receive. The principal limit at origination is based on the age of the youngest borrower, the expected average mortgage interest rate, and the maximum claim amount. The maximum claim amount is the lesser of the appraised value of the property or the maximum mortgage amount for a one-family residence that HUD will insure in an area under Section 203(b)(2) of the National Housing Act.

The borrower has the choice of receiving the mortgage proceeds through five basic payment plans: A.Tenure. B.Term. C.Line of Credit. D.Modified Tenure. E.Modified Term. The borrower will be able to change the type of payment plan throughout the life of the loan. The borrower may change the term of payments, may receive an unscheduled payment, may suspend payments, may establish or terminate a line of credit, or may receive the entire net principal limit (i.e., the difference between the current principal limit and the outstanding balance) in a lump sum payment.

Interest may accrue at a fixed or adjustable rate, as negotiated between the borrower and the lender. The borrower will not be able to change from a fixed to an adjustable rate and vice versa after closing. The borrower is required to receive counseling before the HECM application is processed. Counseling will be provided by HUD-approved housing counseling agencies and will focus on the different types of home equity conversion mortgages available, the suitability of a home equity conversion mortgage for the borrower, and the alternatives to a home equity conversion mortgage.

The borrower will be charged mortgage insurance premiums (MIP) to reduce the risk of loss in the event that the outstanding balance, including accrued interest, MIP, and fees, exceeds the value of the

property at the time that the mortgage is due and payable. A one-time non-refundable initial MIP equal to 2.5% of the maximum claim amount will be assessed at closing (if more than 60 percent of available funds are accessed in the first year; 0.50 percent, otherwise). It may be paid in cash by the borrower or may be added to the outstanding balance. It must be remitted by the lender to HUD before the loan can be endorsed. A monthly MIP equal to one-twelfth (1/12) of the annual rate of 1.25% of the outstanding balance will be assessed throughout the life of the loan. The MIP will be added to the outstanding balance and remitted to HUD monthly by the lender.

Based on our comprehensive review of a large empirical and theoretical economic and practitioner literature, we asked how reverse mortgages might be used during retirement, and explore the possible reasons given there why they are not used much now. The current penetration rate is less than 2 percent of all retired households, which is quite small given that nearly 80 percent of retired households own a home, compared to only about 50 percent with retirement assets, and retirement security for many households is considered to be quite precarious. We concluded the following: For some retired households, housing is a flexible service and asset; these households move frequently, rent, downsize, and so on. Hence, there is nothing special about housing assets for them, and if needed, they will sell their home. Moreover, for some households, particularly of advanced old age, living in their current single-family house may be detrimental to their welfare, because it is poorly designed to accommodate disabilities and frailness, because it is simply too large and requires difficult and expensive upkeep, or because it leads to social isolation, as friends, neighbors and relatives move or pass away.

For many others, however, housing is not just another asset and may be uniquely positive – it represents a relatively fixed and stable flow of services, and community and memories that retired households can and do appreciate for a considerable part of their remaining lives. For some fortunate households in this latter group, modest consumption demands and generous pensions and sufficient retirement assets obviate the need to give up housing equity, to be used for whatever purpose. But for many other households, particularly those in the lower and middle-income classes, there may be a strong need for more retirement resources to be gained from housing equity. For them, there are different ways to access funds from the home and still live there, such as home equity lines of credit, cash-out refinancing mortgages and reverse mortgages. The HELOC and refinancing strategies require, however, repayment during the lifetime of the household, and this could be difficult if resources and income in retirement are quite tight. Hence the reverse mortgage, which does not require repayment until the last member of the household leaves the home, could represent a solution to the need to increase retirement income while remaining in the home.

At the same time, many retired households do not want to give up, through a reverse mortgage, the asset value that housing equity represents, even though they can still experience the same flow of services. For many, the bequest motive is strong. For many other households, especially in the middle- and upper-middle of the income and net worth distribution, the house is being held in reserve, as a specific contingent asset to pay for uninsured LTSS expenses. For them, Medicaid insurance is (thought to be) either unavailable or undesirable (and the eligibility rules and estate recovery programs may be (considered to be) enforced sufficiently strongly in many states to discourage gaming behavior). In other words, there is significant precautionary demand for savings in the form of housing, not satisfied if a

HECM is used. For others, somewhat lower in the asset and income distributions, Medicaid coverage of LTSS is satisfactory and state estate recovery efforts are regarded as sufficiently weak that holding onto housing assets (and not taking out a HECM) is the better option, to leave a small bequest or for other purposes. Clearly, if effective and efficient LTCI were more widely available and used, and if the availability of Medicaid coverage for LTSS were simultaneously tightened and more effectively policed, these latter groups might find reverse mortgages more attractive, to enable them to increase their consumption in retirement while healthy.

Finally, for still others – this is a group of unknown number – Medicaid coverage or private LTCI for LTSS is available and desirable, their bequest motive is modest, their financial wealth is small but their net housing wealth is significant. This last group may find that a line of credit or tenure reverse mortgage improves their welfare, and indeed there is evidence that it is precisely this type of household who is using HECMs, although the added racial element in usage patterns is still unexplained. But the considerable up-front and on-going transaction costs reduce the value of the HECM as a way to realize home equity in the most common and simple uses, particularly for relatively modest amounts. Moreover, historically, defaults have been quite high when large initial withdrawals were allowed.

Two complex stochastic simulation models of HECM demand conclude that HECMs are not used commonly because of a significant bequest motive present in the retired population and the product is expensive in its initial and on-going terms. The sophisticated theoretical and personal finance analyses that justify the transaction costs (including the initial and the on-going spread and mortgage insurance premium) by the large put value of a HECM are not persuasive to us, as a way that people, particularly those of modest means, should behave, nor are they consistent with the results of empirical studies of actual borrower behavior. In particular, the ruthless borrowing strategy seems to be an abuse of the program, and is clearly undercharged because there is no on-going fee for the contingent use of the growing line of credit. The other somewhat esoteric and varied uses of line-of-credit HECMs for retirement planning and asset allocation purposes would seem to necessitate the assistance of professionals, and to be most appropriate for households with significant net worth, a group for whom the public policy goals and any subsidies from the federal government of the HECM program are not designed and appropriate. In any case, the current end result of the give and take in the financial planning literature is that, on balance, the tenure payment option is the best overall use of the HECM. That payment plan is indeed most consistent with the retirement security policy intent of the program, and below is the one we simulate for retired households in the HRS data base.

A tenure payment HECM, even with high fees, might be appropriate for retired households with both housing and financial assets if the terms for HECM payments were better than those for life annuities in the commercial market. Several things are immediately apparent from a comparison of current terms for HECMs and life annuities. The net limits and monthly income produced by tenure HECMs do not differ by individual versus couple, by gender, nor by the extent of the age span in the couple. These variables do, however, influence life annuity pricing, or its obverse, monthly income, for the same initial borrowing/single-premium amount. In general, the monthly income for individuals is lower for HECMs compared to life annuities – particularly for older individuals and males (where mortality considerations are likely more important than interest rates, at least at current low interest rate levels). By contrast,

for couples, HECMs produce somewhat higher monthly income across all ages and age-spreads, although the income from the life annuity improves relatively when the age spread among the couple widens and as they age.

These results indicate broadly that, for individuals, the implementation of lifetime retirement income strategies can be more effectively and generally more cheaply done using immediate life annuities based on financial assets than by HECMs based on home equity amounts. The results for couples are more ambiguous, but they may particularly appreciate that the life annuity pays for life whereas the HECM only pays for tenure. So for households that have both significant financial and housing assets, the HECM with a tenure payment feature is not best used for retirement security for the production of lifetime regular income flows, in contrast to life annuities, which are widely recommended by standard economic analysis. Although immediate life annuities are not actually widely used by retired households currently, there are no impediments from them being so used, and hence our assessment is relevant to policy analysis and recommendations, as well as to our empirical analysis of the potential HECM market, immediately below. In particular, in the later stages of empirical analysis and simulations, we will mainly focus on the potential use of HECMs among those retired households with some financial assets, but not “too much.”

The longest section of this monograph shows the results of our simulation exercise analyzing which older households, according to survey data in the 2012 Health and Retirement Study, are minimally appropriate to, that is, “eligible for,” and then for whom it might be most sensible to use, reverse mortgages, given the high initial and on-going costs of such mortgages. In the course of this empirical analysis we report extensive statistics and cross-tabs on the balance sheets and incomes of retired households, with an emphasis on the levels of their housing assets and relationships with other asset and insurance holdings, income, and preferences. The main goal of all this data work is to estimate what percent of retired households with sufficient home value and significant but not too large financial asset holdings that can best use a reverse mortgage to generate significant extra retirement income. In particular, despite the widespread ownership of housing among the retired population, it is clear that retired households with low financial assets and modest housing assets should not take a HECM given its high costs and the need to maintain the home. Similarly, as we discussed above, retired households with significant financial assets will not take a HECM.

The bottom line is that from 12 to 14 percent of all retired households are eligible for, and might sensibly use, HECMs. If coverage by long-term care insurance or a low bequest motivation are added to the use criteria, then the percent of retired households who can reasonably be expected to get a HECM falls further, to 4.6 percent or even as low as 1.3 percent. A 12 percent rate of penetration would increase the current size of the reverse mortgage market almost seven times over, and the retirement welfare of these elderly households could be significantly improved; at the median, annual income would be increased by about \$6,000, or around 19 percent. Moreover, the welfare improvement, although not necessarily the penetration rate, could be made even larger (income increased by 2 percentage points) if the initial and on-going costs of the HECM were reduced in half. If, however, the reduction in costs could only be accomplished by a comparable reduction in the principal loan limit, then the resulting loss in income (halving) is not counterbalanced by an increase in the penetration rate. But

if lower value homes are now considered to be sensibly eligible because of the decrease in the costs of the HECM, there becomes a legitimate trade-off between the lower average improvement in consumer welfare of retired elderly households (8 percent of income at the median) and a higher penetration rate among households (as high as 23 percent). Moreover, with a lower principal loan limit, there is no longer much of a need for government backing to the product because the default risk to lenders is lowered; the mortgage insurance premium would naturally be lowered. This reduction in overall costs and fees, accompanied by less regulation, could also possibly lead to a sustainable and innovative and competitive market, including large financial organizations with significant marketing capabilities, to help retired households of modest means.

We conducted a brief review of reverse mortgages in other countries, which are mostly not government insured and have had varying degrees of success. In our public policy section, we suggest that initial and on-going HECM product costs should be lowered, even if it is necessary to lower the borrowing limit to accomplish that essential goal. Moreover, demand for HECMs would increase and government spending decrease if LTCI were improved and sold more widely. Similarly, demand for HECMs would rise if the Medicaid eligibility rules were tightened and administered more effectively.

## References

1. Institutional Facts, Theoretical Discussions and Empirical Findings
  - a. US Department of Housing and Urban Development, Office of Evaluation, Reporting and Analysis Division, Office of Risk Management and Regulatory Affairs, "FHA Production Report, August 2015".
  - b. Thomas Davidoff, "Can 'High Costs' Justify Weak Demand for the Home Equity Conversion Mortgage?" September 23, 2014, University of British Columbia Working Paper.
  - c. Integrated Financial Engineering, "Actuarial Review of the Federal Housing Administration Mutual Mortgage Insurance Fund HECM Loans for Fiscal Year 2014," November 17, 2014, prepared for Department of Housing and Urban Development.
  - d. David W. Johnson and Zamira S. Simkins, "Retirement Trends, Current Monetary Policy, and the Reverse Mortgage Market," *Journal of Financial Planning*, 2014, 27(3), 52 – 59.
  - e. Alicia H. Munnell and Steven A. Sass, "The Government's Redesigned Reverse Mortgage Program," Boston College Center for Retirement Research, January 2014, Issue in Brief Number 14 – 1.
  - f. Stephanie Moulton, Donald R. Haurin and Wei Shi, "An analysis of default risk in the Home Equity Conversion Mortgage (HECM) program," *Journal of Urban Economics*, 90 (2015), 17 – 34.

- g. General Accountability Office, "Medicaid Long-Term Care: Information Obtained by States about Applicants' Assets Varies and May Be Insufficient," July 2012, GAO-12-749.
- h. Julie Stone, "Medicaid Coverage for Long-Term Care: Eligibility, Asset Transfers, and Estate Recovery," Congressional Research Service, January 31, 2008, RL33593.
- i. Hui Shan, "Reversing the Trend: The Recent Expansion of the Reverse Mortgage Market," Federal Reserve Board Working Paper Number 2009-42.
- j. Makoto Nakajima and Irina A. Telyukova, "Reverse Mortgage Loans: A Quantitative Analysis," July 31, 2014, Federal Reserve Bank of Philadelphia Working Paper.
- k. Thomas Davidoff and Jack Wetzel, "Do Reverse Mortgage Borrowers Use Credit Ruthlessly?" July 22, 2014, University of British Columbia Working Paper.
- l. Makoto Nakajima and Irina Telyukova, "Housing and Saving in Retirement Across Countries" Forthcoming, Proceedings of International Economic Association's 2014 World Congress, J. Stiglitz, ed.
- m. Thomas Davidoff, "Reverse Mortgage Demographics and Collateral Performance," February 25, 2014, University of British Columbia Working Paper.
- n. Shaun Pfeiffer, C. Angus Schaal, and John Salter, "HECM Reverse Mortgages: Now or Last Resort?" *Journal of Financial Planning*, 2014, 27(5), 44 – 51.
- o. John Salter, Shaun Pfeiffer, and Harold Evensky, "Standby Reverse Mortgages: A Risk Management Tool for Retirement Distributions," *Journal of Financial Planning*, 2012, 25(8), 40 – 48.
- p. Nadia Greenhalgh-Stanley, "Medicaid and the housing and asset decisions of the elderly: Evidence from estate recovery programs," *Journal of Urban Economics*, 2012, 72, 210 – 224.
- q. Thomas Davidoff, "Home equity commitment and long-term care insurance demand," *Journal of Public Economics*, 2010, 94, 44 – 49.
- r. James Banks, Richard Blundell, Zoe Oldfield, and James P. Smith, "Housing Price Volatility and Downsizing in Later Life," in David Wise, editor, *Research Findings in the Economics of Aging*, February 2010, University of Chicago Press for the NBER, 337 – 379.
- s. Jonathan S. Skinner, "Is Housing Wealth a Sideshow?" in David Wise, editor, *Advances in the Economics of Aging*, January 1996, University of Chicago Press for the NBER, 241 – 272.
- t. Edward C. Norton, "Elderly Assets, Medicaid Policy, and Spend-down in Nursing Homes," *Review of Income and Wealth*, September 1995, 41(3), 309 – 329.



- u. Joao F. Cocco and Paula Lopes, "Reverse Mortgage Design," London Business School Working Paper, March 2015.
  - v. Thomas Davidoff, Patrick Gerhard, and Thomas Post, "Reverse Mortgages: What Homeowners (Don't) Know and How It Matters," Netspar Working Paper, November 27, 2014.
  - w. Barbara Stucki, "New Directions for Policy and Research on Reverse Mortgages," *Public Policy and Aging Report*, 23(1), 9 – 13.
  - x. Barry H. Sacks, Nicholas Maningas, Sr., Stephen R. Sacks, and Francis Vitagliano, "Recovering a Lost Deduction," 2016, *Journal of Taxation*, forthcoming.
  - y. Joe Tomlinson, "New Research: Reverse Mortgages, SPIAs and Retirement Income," April 14, 2015, *Advisor Perspectives*.
  - z. Thomas C. B. Davison, "Delay Social Security: Funding the Income Gap with a Reverse Mortgage," June 23, 2014, Retirement Planning Toolkit: Reverse Mortgages.
  - aa. Deborah Lucas, "Hacking Reverse Mortgages," October 26, 2015, MIT Sloan Working Paper.
  - bb. Wade D. Pfau, "Incorporating Home Equity into a Retirement Income Strategy," *Journal of Financial Planning*, April 2016.
2. Data Strategies
- a. General Accountability Office, "Retirement Security: Most Households Approaching Retirement Have Low Savings," May 2015, GAO-15-419.
  - b. Alicia Munnell, Natalia Orlova, and Anthony Webb, "How Important is Asset Allocation in Retirement?" Boston College Center for Retirement Research Working Paper Number 2012-13.
  - c. James M. Poterba, Steven F. Venti, and David A. Wise, "The Composition and Draw-down of Wealth in Retirement," NBER Working Paper Number 17536, October 2011.
  - d. Steven Venti, "Economic Measurement in the Health and Retirement Study," *Forum for Health Economics and Policy*, 2011, 14(3), article 2.
3. International Comparisons
- a. Adam Uren, 24 September 2013, "How Paying Just 75GBP-a-month Interest on Lifetime Mortgage Can Leave an Extra 50,000 GBP for Your Family to Inherit", Daily Mail, <http://www.dailymail.co.uk/money/mortgageshome/article-2429967/Paying-lifetime-mortgage-save-50-000-inheritance.html>

- b. Australian Securities and Investments Commission website, accessed on February 3, 2016; <https://www.moneysmart.gov.au/superannuation-and-retirement/income-sources-in-retirement/home-equity-release/reverse-mortgages>
- c. Aviva, Accessed February 11, 2016, "A Simple Guide to Getting More from Your Future with Aviva Equity Release" <http://www.aviva.co.uk/adviser/product-literature/files/pf/pf011120c.pdf>
- d. Barrett Lending Solutions, "Reverse Mortgages", <http://www.lendingsolutions.com.au/reverse-mortgages.html>
- e. BBVA, "Potentiality of Reverse Mortgages to Supplement Pension: the Case of Chile," 5 February 2013, Research-Economic Analysis Working Paper, Madrid, Spain
- f. Calculator for reverse mortgage by the Australian Securities and Investment Commission is under [www.moneysmart.gov.au](http://www.moneysmart.gov.au)
- g. Carmen Carcia Carnica, "The Regulation of Reverse Mortgages in Spain as a Financial Instrument to Contribute to the Support of Dependent Persons" January-July 2011, International Journal of Land Law and Agricultural Science, No 5.
- h. CHIP Reverse Mortgage, HomEquity Bank, Accessed January 31, 2016, "How A Reverse Mortgage Works", <https://www.chip.ca/chip-reverse-mortgage/>
- i. Chistelis, D., Georganakos, D., Haliassos, M., "Differences in Portfolios Across Countries: Economic Environment vs. Household Characteristics" 2013. Review of Economics and Statistics, 95(1), 220-236.
- j. Cho, D. H., C. K. Park, and S. R. Ma (2004), A Study on Introduction of Reverse Mortgage System, Korea Financial Supervisory Service.
- k. Cho, D. H., Ma, S. R., 2004. Economic feasibility of reverse mortgage annuity for the elderly housing welfare. Korea Housing Studies Review 12(1), 175-199.
- l. CommonwealthBank website, accessed on February 1, 2016; <https://www.commbank.com.au/personal/home-loans/reverse-mortgage.html>
- m. CPSA (Combined Pensioners and Superannuants Association), "Can a Reverse Mortgage Pension Scheme Save \$14.5 Billion Per Year? Tell 'em They're Dreamin'", May 1, 2015 <http://www.cpsa.org.au/income/1269-can-a-reverse-mortgage-pension-scheme-save-14-5-billion-per-year-tell-em-they-re-dreamin>

- n. Christine Brownfield, FIAA, "The Fourth Pillar – The Role of Home Equity Release in Retirement Funding", May 6, 2014, Sydney, Working Paper presented in Financial Services Forum
- o. D. Bogataj et al., (J.A. Londono et al.) 2015. "Reverse Mortgage Schemes Financing Urban Dynamics Using the Multiple Decrement Approach," Actuarial Sciences and Quantitative Finance, Springer Proceedings in Mathematics and Statistics, Vol. 135, pp. 27-47.
- p. Deloitte Annual Reverse Mortgage Report, September 7, 2015 "More Sources Emerging for Retiring Australians to Fund Retirement"
- q. Elsa Fornero, Mariacristina Rossi and Maria Cesira Urzi Brancati, "Explaining Why, Right or Wrong, (Italian) Households Do Not Like Reverse Mortgages" March 13, 2015, Journal of Pension Economics and Finance.
- r. Equity Release Centre, Accessed February 10, 2016, "Lifetime Mortgages", <http://www.equity-release-centre.co.uk/322--lifetime-mortgages.htm>
- s. Eva Del Pozo García, Zuleyka Díaz Martínez, and Lidia Fernández Sevilla, "Reverse Mortgage: A Comparison Study to Other Countries of the European Union and EEUU", April 2011, Revista Universitaria Europea No 15, Working paper, 85-106
- t. Exchange rate data between USD and Korean Won was extracted for January 1, 2011. Accessed January 15, 2016 <http://www.x-rates.com/average/?from=KRW&to=USD&amount=1&year=2011>
- u. Financial Consumer Agency of Canada, Accessed January 30, 2016, "Understanding Reverse Mortgage", <http://www.fcac-acfc.gc.ca/eng/forConsumers/topics/mortgages/Pages/Understa-Comprend.aspx>
- v. FindLaw UK, Accessed February 7, 2016, "What Do I Need to Know about Reverse Mortgages?" [http://findlaw.co.uk/law/property/mortgages\\_and\\_finance/500261.html](http://findlaw.co.uk/law/property/mortgages_and_finance/500261.html)
- w. Fiona Burns, 2013, "The Evolving Statutory Regulation of Reverse Mortgages in Australia's 'Risk Society'," Monash University Law Review, Vol 39, No 3
- x. Flavia Coda Moscarola, Mariacristina Rossi and Dario Sansone, "Reverse Mortgage: Making Assets a Tool Against Poverty" March 2013, CeRp Working Paper, Center for Research on Pensions and Welfare Policies, Turin, Italy

- y. Gyu Dong Kim, "Crossover Risks and Their Interconnectedness in the Korean Reverse Mortgage Program: Evidence from VAR and VARX Analysis," July 30, 2015, Working paper, Fox School of Business, Temple University
- z. Harry Scheule, March 31, 2015. "Aging Population Calls for More Reverse Mortgages," The Conversation, <http://theconversation.com/ageing-population-calls-for-more-reverse-mortgages-39428>
- aa. Heritage Bank, "Reverse Mortgage", Rate Comparison and Fee Schedule Pdf <https://www.heritage.com.au/home-loans/reverse-mortgages>
- bb. I. Kuchciak, 2011. "The Reverse Mortgage – a Response to Aging Polish Society," 2011 International Conference on Financial Management and Economics (IPEDR vol 11).
- cc. Jano F. Cocco and Paula Lopes, "Reverse Mortgage Design", September 2015, CeRP Working Paper, Center for Research on Pensions and Welfare Policies, Turin, Italy
- dd. Jerzy Gwizdala, "Equity Release Schemes on a Selected Housing Loan Markets Across the World," December 2, 2015, University of Gdansk, Working Paper
- ee. Jonathan Bush, "Lifetime Mortgages: A Retirement Solution, but Not Without Risk", February 12, 2016, Willis Towers Watson Wire <http://blog.willis.com/2016/02/lifetime-mortgages-a-retirement-solution-but-not-without-risk/>
- ff. Lewicka Beata, "Implementation of Good Practice Among the Equity Release Providers in Poland," 2014, Marie Curie-Skłodowska's University, Working Paper
- gg. Lim, K. S., Cho, D. H., "A feasibility of the reverse mortgage system for the residential stabilization of the elderly", 1997, Journal of the Korea Gerontological Society 19(1), 1-13.
- hh. Louise Eccles, 28 October, 2014. "The Lifetime Mortgage: Banks Will Let You Pay Interest Only Until You Die (But Then Take the House)," Daily Mail
- ii. Łukasz Szymański and Laura Piórkowska, "What is Reverse Mortgage and Whom Does It Benefit?" September 25, 2014, Banking & Finance Practice, Wardyński & Partners
- jj. P. Wang and JP Kim, 2014 "The Value of Reverse Mortgage Loans: Case Study of the Chinese Market", The Journal of Asian Finance, Economics and Business, Vol 1, No 4, pp 5-13

- kk. Reverse Mortgage Daily, "Poland Paves the Way for Reverse Mortgages with New Law", December 15, 2014 <http://reversemortgagedaily.com/2014/12/15/poland-paves-the-way-for-reverse-mortgages-with-new-law/>
- ll. Rik Dilingh, Henriette Prast, Mariacristina Rossi, and Cesira Urzi Brancati, "The Psychology and Economics of Reverse Mortgage Attitudes: Evidence from the Netherlands" 2013, CeRP Working Paper 135/13, Center for Research on Pensions and Welfare Policies, Turin, Italy
- mm. Rob Carrick (31 October 2010). "The Reverse Mortgage Quandary". The Globe and Mail. Retrieved 12 September 2012
- nn. Senior Australian Equity Release (SEQUAL), "Equity Release FAQs", <http://www.sequal.com.au/help/equity-release-faqs/>
- oo. Seniors' Lending Centre, Accessed January 29, 2016, "How Does a Canadian Reverse Mortgage Work", <http://seniorslendingcentre.com/home-equity-plan-reverse-mortgage-canada/reverse-mortgage-canada-how-does-it-work>
- pp. Seonjin Cha, "Koreas Tapping Inheritances With Reverse Loans: Mortgage," January 30, 2013, Bloomberg.com <http://www.bloomberg.com/news/articles/2013-01-29/korean-tapping-inheritances-with-reverse-loans-mortgages>
- qq. Seungryul Ma and Yongheng Deng, "Insurance Premium Structure of Reverse Mortgage Loans in Korea," September 2006, Working Paper, School of Policy, Planning, and Development, University of Southern California
- rr. Seungryul Ma and Yongheng Deng, June 2013. "Evaluation of Reverse Mortgage Programs in Korea", Seoul Journal of Business, Vol 19, N 1, 137-160
- ss. The Money Advice Service, "Using a Home Reversion Plan to Pay for Your Care", <https://www.moneyadviceservice.org.uk/en/articles/using-a-home-reversion-plan-to-pay-for-your-care>
- tt. Yong-Chang Heo, Seungjae An and Baeg Eui Hong, "Reverse Mortgage as an Income Stabilizer for the Elderly in Korea," 2016. Asian Social Work and Policy Review 10(1), 103-112.

## 4. Policy Ideas

- a. Anthony Sanders, "Oversight of the Federal Housing Administration's Reverse Mortgage Program for Seniors," Testimony before the House Committee on Financial Services, Subcommittee on Housing, Insurance and Community Opportunity, May 9, 2012.
- b. Jeffrey M. Lewis, "Testimony" before the House Committee on Financial Services Subcommittee on Insurance, Housing and Community Opportunity, May 9, 2012.
- c. Alexis Ahlstrom, Anne Tomlinson, and Jeanne Lambrew, "Primer: Linking Reverse Mortgages and Long-Term Care Insurance," Brookings Institution Retirement Security Project, no date, likely around 2004.
- d. Mark Warshawsky, "The Retirement Crisis Controversy," *Tax Notes*, May 11, 2015, pp. 10 – 13.
- e. Gaobo Pang and Mark Warshawsky, "Retirement Savings Adequacy of U.S. Workers," *Benefits Quarterly*, First Quarter 2014, pp. 29 – 38.
- f. Jason Brown and Mark Warshawsky, "The Life Care Annuity: A New Empirical Examination of an Insurance Innovation That Addresses Problems in the Markets for Life Annuities and Long-Term Care Insurance," *Journal of Risk and Insurance*, 2013, 80(3), 677 – 703.

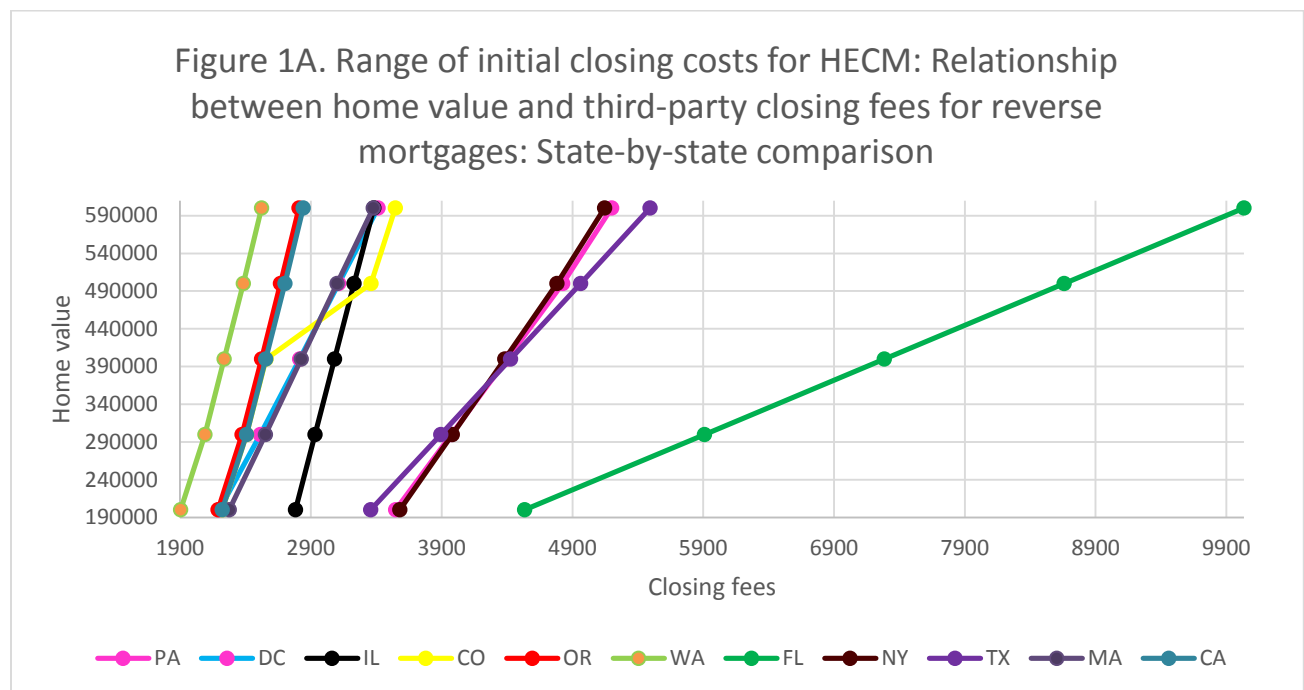
## Appendix

Table 1A: Balance sheet amounts and annuity incomes for all retired households ages 62-74 in 2008

Items	% of HH with Asset	Mean Holding	Median Holding	Conditional on Positive Values	
				Mean	Median
<b>All Households</b>					
Financial Assets	84.45	\$137,020	\$12,000	\$162,256	\$25,000
Non-Mortgage Debt	30.38	-\$3,416	0	-\$11,243	-\$4,000
Primary Residence	79.41	\$158,405	\$95,600	\$205,142	\$140,000
Mortgages and Other Debt	31.88	-\$29,807	0	-\$93,498	-\$60,000
Secondary Residence	14.71	\$22,382	0	\$155,181	\$70,000
Other Real Estate	13.81	\$50,199	0	\$363,533	\$120,000
Business Assets	7.08	\$43,521	0	\$614,812	\$232,500
IRA and Keoghs	39.21	\$75,151	0	\$191,919	\$90,000
Social Security Income (Annual)	90.95	\$14,916	\$14,304	\$16,400	\$15,132
<b>Single-Person Households</b>					
Financial Assets	77.62	\$77,651	\$2,000	\$100,040	\$9,900
Non-Mortgage Debt	29.84	-\$2,459	0	-\$8,241	-\$3,000
Primary Residency	62.46	\$93,243	\$40,000	\$155,107	\$110,000
Mortgages and Other Debt	22.2	-\$16,079	0	-\$72,421	-\$60,000

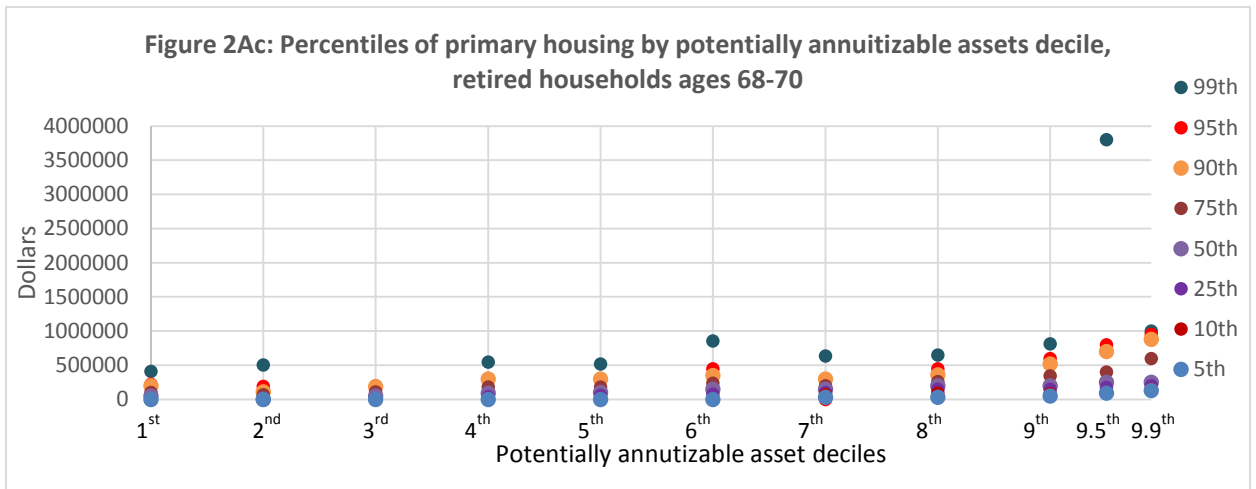
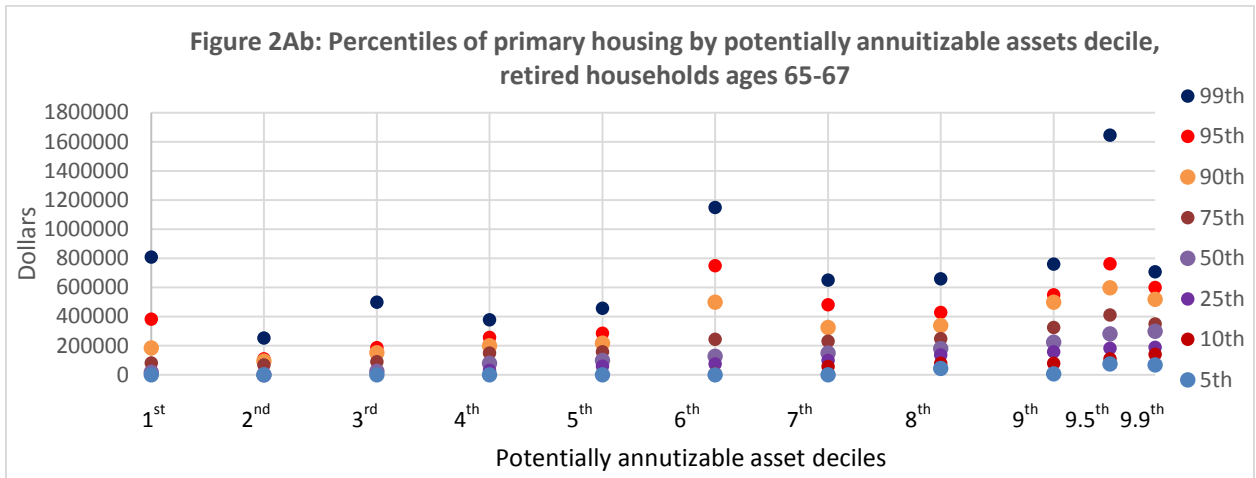
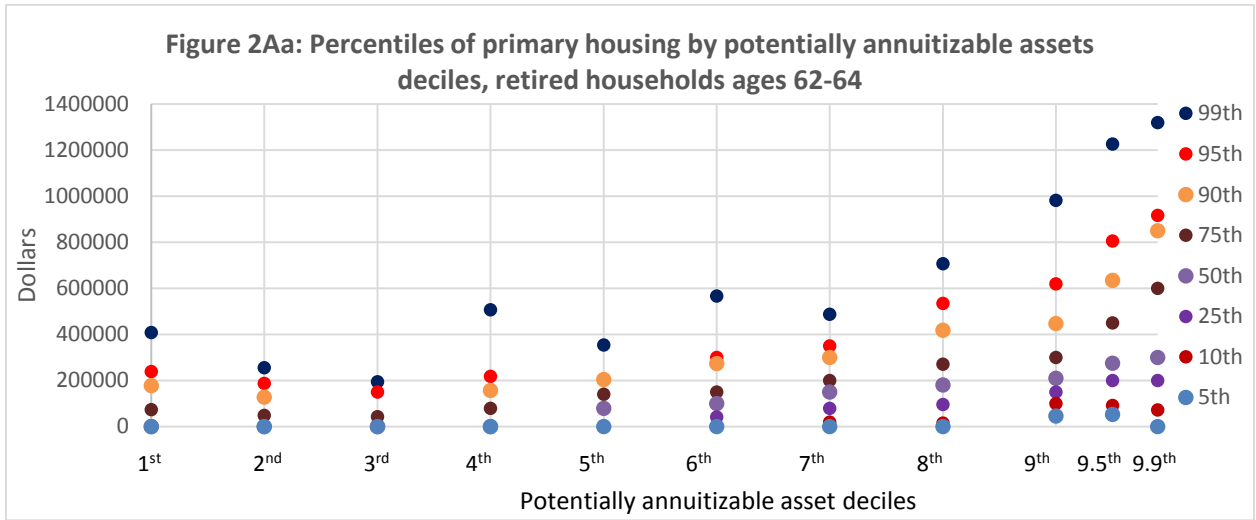
Secondary Residency	7.46	\$8,937	0	\$122,115	\$60,000
Other Real Estate	7.82	\$21,697	0	\$277,620	\$100,000
Business Assets	3.37	\$21,511	0	\$637,412	\$200,000
IRA and Keoghs	25.4	\$34,117	0	\$134,323	\$60,000
Social Security Income (Annual)	87.98	\$10,190	\$10,680	\$11,582	\$11,556
<b>Married Couples</b>					
Financial Assets	89.41	\$180,185	\$30,000	\$201,526	\$44,000
Non-Mortgage Debt	30.74	-\$4,112	0	-\$13,359	-\$5,000
Primary Residency	91.73	\$205,782	\$135,000	\$229,609	\$150,000
Mortgages and Other Debt	38.92	-\$39,787	0	-\$102,241	-\$65,000
Secondary Residency	19.97	\$32,157	0	\$164,154	\$75,000
Other Real Estate	18.17	\$70,922	0	\$390,406	\$125,000
Business Assets	9.77	\$59,524	0	\$609,137	\$240,000
IRA and Keoghs	49.16	\$104,985	0	\$213,556	\$100,000
Social Security Income (Annual)	93.11	\$18,353	\$18,840	\$19,710	\$19,505

Source: Authors.

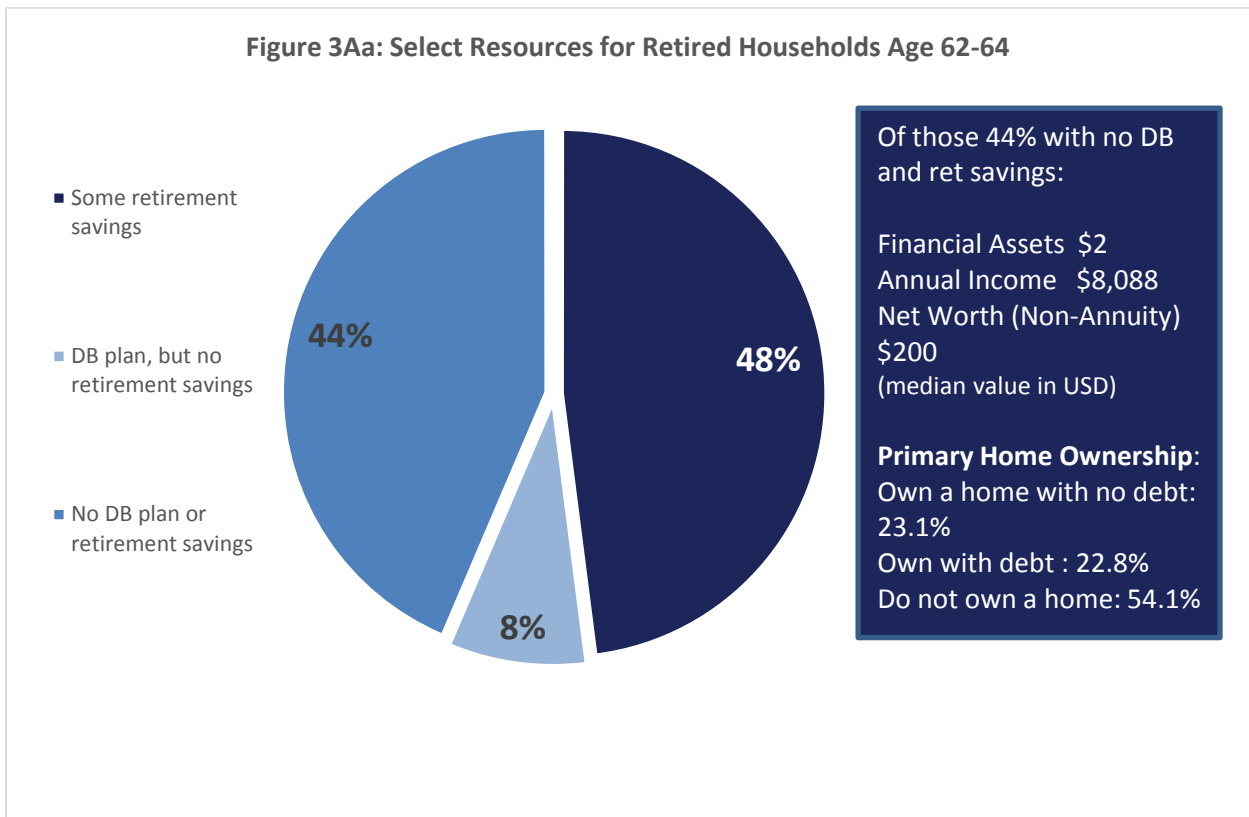
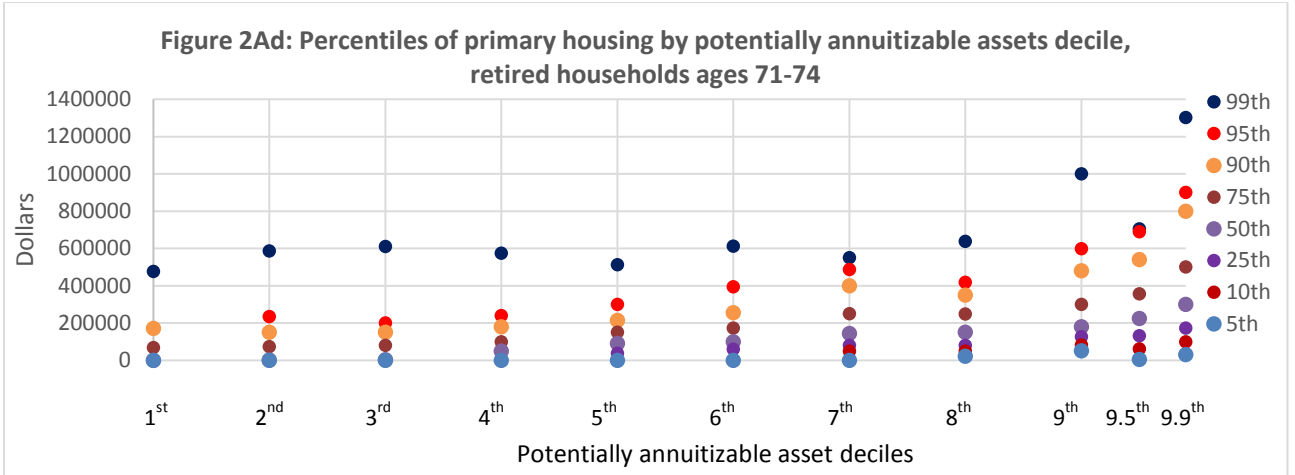


Source: Authors, based on December 22, 2015 use of reverse mortgage internet tool.

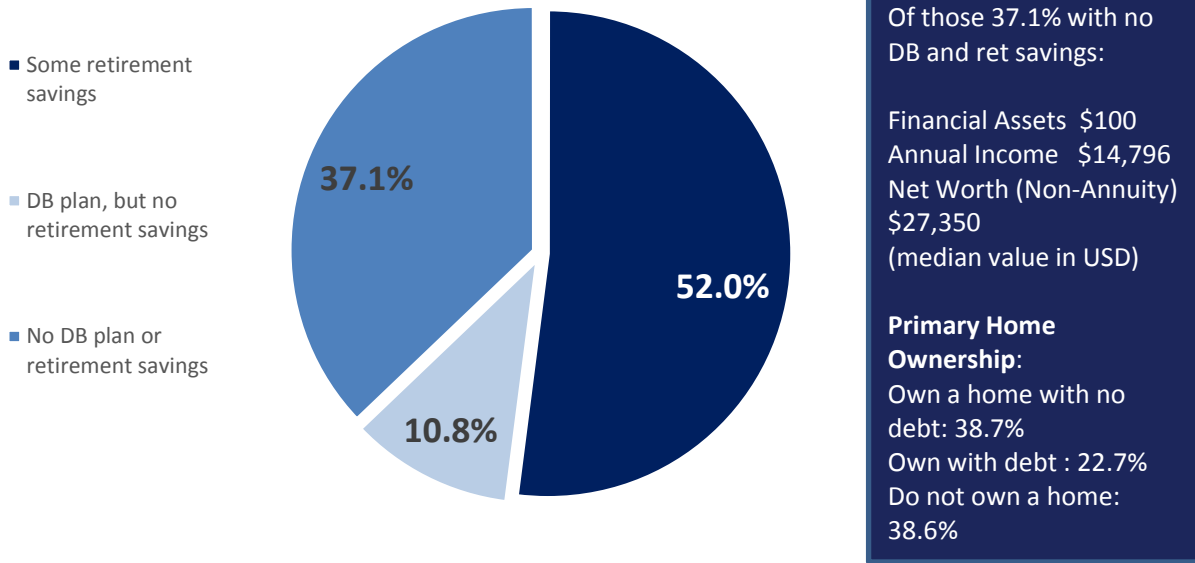
Empirical Analysis by Age Group for 2012







**Figure 3Ab: Select Resources for Retired Households Age 65-67**



**Figure 3Ac: Select Resources for Retired Households Age 68-70**

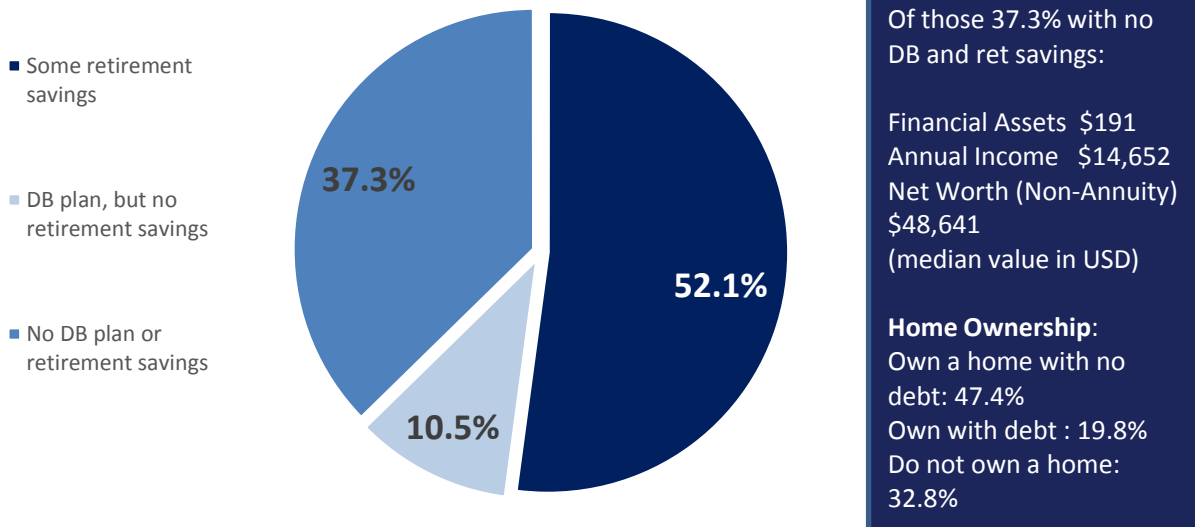


Figure 3Ad: Select Resources for Retired Households Age 71-74

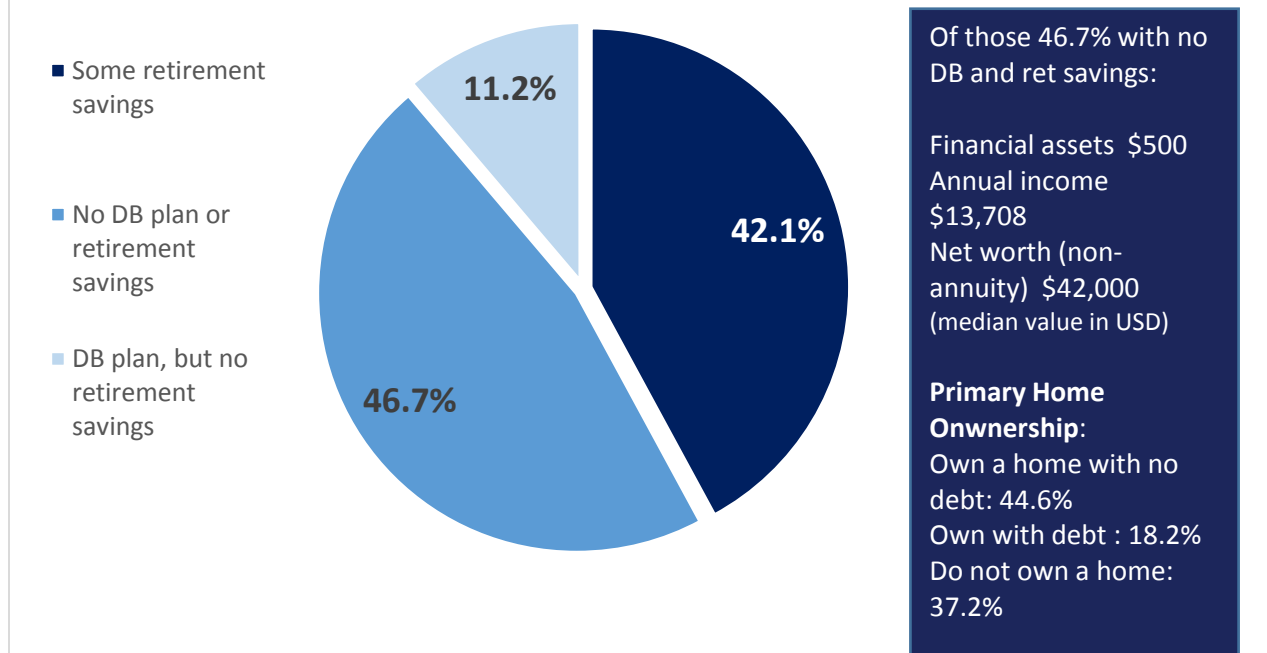


Table 2Aa: Select resources for retired households age 62-64 by ownership of retirement savings

Category	Households age 62-64 with no retirement savings	Households age 62-64 with some retirement savings
% of Households age 62-64	52.0%	48.0%
Median Net Worth	\$1,500	\$370,436
Median Non-Retirement Financial Resources	\$30	\$25,000
Median Income	\$9,468	\$34,758
Median Primary House Value	\$5,000	\$180,000
Primary Home Ownership Rates	59.4%	88.9%
% who Own a Home that is Paid Off	24.7%	41.2%
% with a Defined Benefit Plan	16.3%	45.5%

Table 2Ab: Select resources for retired households age 65-67 by ownership of retirement savings

Category	Households age 65-67 with no retirement savings	Households age 65-67 with some retirement savings
% of Households age 65-67	48.0%	52.0%
Median Net Worth	\$40,000	\$386,000
Median Non-Retirement Financial Resources	\$450	\$33,500
Median Income	\$19,680	\$36,288
Median Primary House Value	\$60,000	\$177,500

Primary Home Ownership Rates	66.6%	93.5%
% who Own a Home that is Paid Off	37.0%	48.6%
% with a Defined Benefit Plan	22.6%	54.6%

**Table 2Ac: Select resources for retired households age 68-70 by ownership of retirement savings**

Category	Households age 68-70 with no retirement savings	Households age 68-70 with some retirement savings
% of Households age 68-70	47.9%	52.1%
Median Net Worth	\$50,010	\$417,154
Median Non-Retirement Financial Resources	\$489	\$50,000
Median Income	\$16,800	\$35,358
Median Primary House Value	\$70,000	\$170,000
Primary Home Ownership Rates	69.6%	93.9%
% who Own a Home that is Paid Off	46.6%	53.0%
% with a Defined Benefit Plan	22.0%	55.3%

**Table 2Ad: Select resources for retired households age 71-74 by ownership of retirement savings**

Category	Households age 71-74 with no retirement savings	Households age 71-74 with some retirement savings
% of Households age 71-74	57.9%	42.1%
Median Net Worth	\$51,000	\$377,000
Median Non-Retirement Financial Resources	\$900	\$41,000
Median Income	\$15,912	\$27,336
Median Primary House Value	\$60,000	\$150,000
Primary Home Ownership Rates	65.0%	94.2%
% who Own a Home that is Paid Off	46.2%	59.1%
% with a Defined Benefit Plan	19.3%	47.3%

Source: Authors' simulations.