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Keywords

Reverse mortgage, home equity, borrowers, older adults, retirement

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The Wharton School, University of Pennsylvania
3620 Locust Walk, 3302 SH-DH
Philadelphia, PA 19104-6302
Tel.: 215.573.3414 Fax: 215.573.3418
Email: prc@wharton.upenn.edu
http://www.pensionresearchcouncil.org

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This paper examines the usage of reverse mortgages among mortgage borrowers, as well as rejected applicants for new mortgage credit who are age 62+. We find that 17-27 percent of actual and rejected borrowers would have qualified for a HECM reverse mortgage, or nine to 14 times the size of the actual HECM market. The existence of a large number of seniors with an existing mortgage or taking out a new mortgage with quite high LTVs (57-65%, depending on the product) suggests that many seniors do, in fact utilize home equity in order to fund their retirement. Yet they choose products that require monthly payments lasting decades into retirement and rising as a share of (declining) income as they age. We consider a number of possible explanations for why seniors in the US do not spend home equity and rely on loans with high payments, including precautionary savings for health shocks, bequest motives, high costs of reverse mortgages, and the lack of brand name institutions in the reverse mortgage business.

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Christopher Mayer
Columbia Business School and NBER
3022 Broadway, Uris 805
New York, NY 10027
cm301@gsb.columbia.edu

Stephanie Moulton
Ohio State University
John Glenn College of Public Affairs
310A Page Hall, 1810 College Road
Columbus, OH 43210
moulton.23@osu.edu

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Introduction

Reverse mortgages have long been viewed with skepticism by some retirees, financial planners, and financial institutions. Potential concerns are many, including high costs, dicey sales practices, and the potential of retirees to lose their home if things go badly. Interestingly, the same concerns about reverse mortgages or similar products ('equity release' options) seem to persist in many countries with very different institutions and financial systems.

Yet the need to access additional retirement assets like home equity has never been stronger. Academics and researchers lament the lack of adequate retirement savings and growing debt among older Americans. Media headlines such as 'Over 60 with Decades Left on the Mortgage: The New Retirement Math' in the *Wall Street Journal* (Rexrode 2020) are common. Recent studies by the Urban Institute, the Federal Reserve Bank of New York, and a number of academics point to the increase in the number of American households entering retirement age with a mortgage and growing average mortgage balances, both in real dollars and as a share of home equity.[1] For example, the proportion of older adults entering retirement with mortgage debt has more than doubled from 20 percent in 1992, to more than 40 percent in 2016.[2] This is occurring even as ever fewer households have a traditional pension and retirees have shrinking 401(k) and other retirement savings. The economic and financial shrinkage associated with COVID-19 will only make this problem worse.

Yet the growth in housing debt in the US can also be seen in a different light—as evidence that older households are effectively consuming home equity in retirement. Many older households use traditional mortgage instruments like a Home Equity Line of Credit (HELOC), second lien, or cash-out refinancing to draw down home equity during retirement years.[3] Similarly, by leaving

existing debt in place for longer, retirees are avoiding the increase in home equity that used to take place in previous generations, effectively further reducing savings.

Of course, the problem with using traditional mortgage debt to fund retirement is that such debt must be paid back at the same time as many households are retiring and facing sharp drops in their income. Research by Englehardt and Eriksen (2019) shows that elderly homeowners with a mortgage face housing expense burdens that mirror those of renters, with a growing share of retirees spending 30 to 50 percent or more of their income on housing expenses. One in four older adults engages in expensive credit card behaviors, including paying only the minimum balance, paying over the limit fees, and using credit cards for cash advance (Lusardi et al. 2020). Rates of personal bankruptcy are increasing more quickly for older adults than any other age group in the US (Fisher 2019; Li and White 2020). It is perhaps not surprising that a higher level of debt—particularly non-housing consumer debt—is associated with increased stress among older adults (Haurin et al. 2019). While many workers report an offsetting desire to retire later, data shows that few elderly retire as late as they planned to at younger ages.[4]

For most retirees, home equity is the largest single asset they bring into retirement, even after subtracting mortgage debt. Nearly 80 percent of adults age 65+ own their homes, and most still own those free and clear. Using data from the 2016 Survey of Consumer Finances, Moulton and Haurin (2019) estimated that the median homeowner age 62 and older held more wealth in the form of home equity than in financial assets: $139,000 in home equity, compared to $101,800 in financial assets.

Finding a way to responsibly use home equity would seem to be a priority. Yet it has also been an elusive goal. One exception is the United Kingdom, where Equity Release options have been growing rapidly in recent years. By one estimate, about one-in-three mortgages taken out by

borrowers over age 55 is an equity release product. Relative to the population of retirees, the effective market in the UK is nearly five times the size of the US. Similarly, Canada has seen a sharp rise in the use of reverse mortgages. One reason for the growth in equity release products in the UK is that mortgage originators are asked to ensure older borrowers are able to afford mortgage payments using retirement income, not just current income at the time of the mortgage. This has pushed mortgage originators to raise the option of equity release products with older borrowers, and is likely an important factor behind their increasing use. As well, UK financial planners do not face some of the regulatory restrictions in place in the US and often discuss equity release and other options to use home equity. Also, unlike the US, they can also earn a commission from the sale of such products.

In this paper we explore the US reverse mortgage market and the reasons behind its apparent failure to help fund retirement. We do so while also exploring how older borrowers use home equity and various types of mortgages to finance their retirement. To do this, we access data from the 2018 Home Mortgage Disclosure Act (HMDA), which, for the first time, includes significantly expanded data such as the type of mortgage, age of borrowers, interest rate and costs for each loan, and the lender. Lenders must also provide information on rejected applicants. We can separately identify reverse mortgages and compare them to other types of cash-out borrowing. We also explore other types of mortgages taken out by seniors, including traditional refinancing and purchase mortgages.

The results show that Americans age 62+ access a wide variety of sources to borrow against their principal residence. In 2018, only 33,000 originated reverse mortgages were reported in HMDA, versus 609,000 originated equity extraction loans such as HELOCs, cash-out refinancing, first liens not for refinance or purchase, and second liens, all of which require traditional mortgage

payments, typically for 15 to 30 years. An additional 688,000 older Americans originated a mortgage for home purchase or a refinancing, many of which will require payments beyond age 90. Our analysis focuses on the HECM program, a US government-insured reverse mortgage that represents 94 percent of all reported reverse mortgage originations.

After documenting the extent to which home equity borrowing is important for many retirees, we examine the barriers to accessing home equity for older adults and find that denial due to excessive debt payments is a bigger problem for the elderly than for younger potential borrowers. Our data show that more than 50 percent of older adults denied HELOC or second liens in 2018 were denied because they could not afford the monthly mortgage payment, compared to 41 percent who were denied for credit reasons. An estimated 70 percent of older adults denied HELOC and second liens had debt to income ratios in excess of 41 percent. By contrast, for homeowners under the age of 46, only 35 percent were denied a HELOC or second lien due to affordability (nearly half being denied due to poor credit). At an age where retirement (and thus a loss of income) is increasingly likely, the large amount of existing debt appears to be a problem for a large number of older homeowners.

Given that high debt payments are a barrier to affordability for the elderly, we consider reasons that no-payment loans like a reverse mortgage represent such as small share of total borrowing. For example, simulations show that between 26 and 36 percent of rejected HELOC and second lien applicants likely could have accessed a reverse mortgage (n=54,000 to 74,000). Similarly, between 28 and 40 percent of approved HELOC and second lien borrowers could have used a reverse mortgage (n=77,000 to 108,000). Maybe not surprising, given the large amount of borrower for many older applicants, is that the principal reason that reverse mortgages couldn't help more HELOC and second lien applicants is that these applicants did not qualify for a reverse

mortgage because they needed to borrow *too much* money to qualify. Initial loan-to-value ratios for reverse mortgages are much lower than for traditional mortgages because of the negative amortization of the balance when a borrower is not making mortgage payments.

Next, we explore various reasons why reverse mortgages may not be used more frequently. Our analysis considers four potential reasons that older borrowers already considering home equity borrowing do not choose a reverse mortgage, including product reputation, higher costs, bequest motives, and regulatory barriers. We also discuss other motives for not using home equity among those who don't explore a new mortgage, including precautionary savings and the more general puzzle of why many retirees fail to spend down other assets in retirement (Poterba, et. al. 2011, for example). We conclude that while high product costs may be a barrier for some potential borrowers, the poor product reputation and regulatory barriers also play an important role, particularly in discouraging the participation of mainstream financial institutions which might be able to bring distribution efficiencies, lower costs, and retirement advice that incorporates home equity into financial plans.

The Market for Reverse Mortgages and Equity Release Products

Equity release options in the US and abroad. A reverse mortgage is a loan that allows an older borrower to borrow against the value of the home without required payments. In most countries including the US, a borrower can take some up-front cash and the balance of the loan either as a line of credit (LOC or 'drawdown') or with fixed monthly payments (tenure payments). A recent survey of selected global equity release originators by Ernst & Young Global Limited (EY 2020) summarizes products available across the world. According to the survey, most borrowers take a combination of a fixed up-front payment plus a LOC when the LOC is available. The LOC allows

borrowers to access additional funds as they desire, similar to a HELOC. In the US, borrowers can make optional payments and can deduct the portion of the payment that is applied to interest in the same way as a traditional (forward) mortgage. Since the loan balance is expected to grow over time as interest accrues, the origination loan-to-value ratio (LTV) of a reverse mortgage is typically much lower than for a traditional mortgage, and the product is restricted to older borrowers who have a shorter expected time in the property. Common minimum age ranges between 55 (UK and Canada) to 62 (most often in the US) or 65 (Germany). The amount of proceeds available typically rises for older borrowers.

Reverse mortgages are not the only product that allows borrowers to use home equity in retirement. They fit inside a larger category of 'equity release' products. In some countries, particularly Italy, Germany, and France, there is an active market in home reversions (or viagers), in which the owner 'sells' some or all of the future sale proceeds of the home in return for an up-front lump sum or annuity payment and the right to live in the home as long as he/she lives.

Equity release products have a number of insurance features that should be appealing for retirees and allow them to hedge risks that might otherwise materially impact their financial position in retirement. This is because the lender/purchaser is giving up-front cash, in return for a future uncertain payoff from the sale of the home. In the vast majority of countries (exceptions include Spain and Germany), the borrower or his/her estate is never liable for more than the home is worth. Thus, if the borrower lives longer than expected or home prices fall, the lender/purchaser bears the risk that the present value of eventual proceeds will be below the amount of money advanced to the borrower at the underwritten cost of capital. Few other products exist that allow a homeowner to otherwise hedge home price and longevity risk.

Who can benefit from home equity release? The most obvious beneficiaries of using home equity in retirement are those for whom few other options exist. For example, Cocco and Lopes (2019) have simulations that suggest that reverse mortgage demand should be the highest among those with low levels of non-housing wealth relative to home equity, who have a weak bequest motive, and who have high levels of other pre-existing debt. The importance of pre-existing debt is consistent with prior empirical research finding that a large proportion of RM borrowers use RMs to pay off debt.

Some studies look to calculate the share of borrowers with a relatively large amount of home equity relative to total assets or income, finding an appreciable minority of seniors have little income or financial assets and a comparably large amount of home equity. For example, Goodman et al. (2017) estimated that as many as 2.5 million to 4.5 million senior households (10 to 17 percent of the 26 million senior homeowners) could benefit from a vehicle to tap into home equity, including a reverse mortgage. Mayer (2017) showed that almost one-quarter of senior households have at least $50,000 in home equity and less than $50,000 in financial assets in 2012. Moulton and Haurin (2016) estimated that nearly one in five of older homeowners held less than $10,000 in financial assets, but had at least $40,000 in home equity. As we show below, originations of reverse mortgages represent a relatively small share of such potential demand.

An alternative approach to access home equity is through home sale, yet most older adults express strong attachment to their homes. In a 2018 survey, 76 percent of respondents age 50+ indicated a desire to remain in their current home as long as possible (Binette and Vasold 2018). These preferences are consistent with data: for example, from 2012 to 2014, only 1.8 percent of homeowners age 65+ extracted equity by selling their homes (Goodman, Kaul, and Zhu 2017). Of older adults who sold their homes between 1998 and 2014, only about one in four purchased a

home of lesser value, allowing for liquidation of home equity (Begley and Chan 2019). Those who did sell their homes tended to have higher incomes and more non-housing financial wealth (Englehardt and Eriksen 2019).

An important reason that homeowners do not sell their homes is that their retirement consumption is tied to the home's value, and owning a home provides a hedge against outliving their assets. That is, the home is not simply a financial asset that can be tapped at will, but it is also an asset that pays a 'dividend' in the form of imputed rent. Thus, selling the home creates a challenge: how to invest the proceeds from a sale to ensure sufficient returns to pay rent over the remaining lifetime. Seniors who rent bear the risk of running out of money if they live a long time or financial returns are not what they expect. This might explain why homeownership rates across most developed countries peak at age 65-74 around 75 to 90 percent, regardless of the mortgage finance or pension systems (Goodman and Mayer 2018).

Accordingly, there appears to be an appreciable number of older borrowers who fit into categories that might benefit from taking an equity release product like a reverse mortgage. Some are the traditional 'house rich, cash poor' households or those who want to eliminate mortgage payments. Others might want to access liquidity from home equity rather than selling financial assets, effectively ending up with a portfolio that becomes increasingly concentrated in home equity with age.

Market size and growth of equity release in the US, UK, and Canada. In the aggregate, the total value of home equity for seniors is quite large. In the US, home equity seniors aged 62 had a total of $7.54 trillion in Q1 2020 (National Reverse Mortgage Lenders Association (NRMLA) 2020). Home equity for seniors in large European countries exceeded eight trillion euros in 2013

according to Haurin and Moulton (2017). By comparison, the aggregate value of equity release products is much smaller.

While aggregate data on equity release products in many countries is difficult to obtain, we can summarize the reverse mortgage market in US and compare to two growing markets including Canada and the UK.[5] The number of reverse mortgages in the US is small and sensitive to market and policy dynamics affecting who can borrow and the proceeds available. In the UK and Canada, equity release markets are much larger as a share of the elderly population.

For the US, we examine the market for HECM reverse mortgages, or loans insured by the FHA, an agency of the US Department of Housing and Urban Development. While there is also a small private-label reverse mortgage program, over this time period, it is estimated that 96 to 100 percent of all reverse mortgages were HECMs, and systematic data were not available prior to 2018.[6]

Figure 1 charts the volume of HECM reverse mortgages since the program became permanent in 1998. As is apparent, the growth in the number of reverse mortgages (LHS axis, white bars) in the US has been hump-shaped and has suffered an appreciable decline in the last decade. Right before and after the Global Financial Crisis of 2008, reverse mortgage production peaked at nearly 115,000 reverse mortgages, accounting for under 0.5 percent of older homeowners. With about 10,000 people turning 65 every day in the US, the share taking out a reverse mortgage is still well under one percent of the eligible population during most years of the sample. The growth during the financial crisis is not surprising; seniors who watched their stock portfolios collapse seemed ever more willing to turn to their homes to help finance retirement, even as home prices were falling. As well, there was a large increase in traditional mortgage debt

during the mid-2000s, leaving many older borrowers with relatively big mortgage payments that they could eliminate with a reverse mortgage.

Figure 1 here

After the 2008 peak, reverse mortgage originations plummeted over more than a decade, with tighter underwriting, lower borrowing proceeds, and the exit of many brand name originators. Until 2014, the FHA did not require financial underwriting for borrowers. While there are no required mortgage payments for a reverse mortgage, borrowers must still pay property taxes and insurance to be in compliance, and an appreciable number of borrowers from 2009-2012 took out full draws and were left with no money to cover these costs. This led to a sharp increase in defaults and FHA-required foreclosures on borrowers unable to make property tax and homeowner's insurance (T&I) payments, with attendant poor publicity. With these and other challenges, larger financial institutions such as Wells Fargo, Bank of America, and MetLife exited the reverse mortgage business.

The increase in defaults and foreclosures and sharp declines in home values led the FHA to re-assess its underwriting and curtail available proceeds for borrowers as a share of home value. The maximum amount of proceeds for a HECM is called the 'Principal Limit' or the share of home value that can be used as a borrowing base. To protect itself, the FHA lowered the principal limit factor (PLF)—the proportion of home equity that can be borrowed, similar to an LTV—substantially between 2012 and 2017. While the average home value for HECM borrowers (called Maximum Claim Amount, or MCA) grew 30 percent between 2009 and 2019, the Principal Limit did not grow at all.[7] In addition, in 2015, the FHA limited the amount of money that a borrower could get to 60 percent of the PLF, unless the borrower had a mortgage or other required property or federal tax liens with an amount above the 60 percent limit, in which case the borrower could

cover these 'mandatory obligations' plus an additional 10 percent (capped at 100% of the PL). The effective reduction in proceeds available to borrowers, combined with the exit of brand-name financial institutions, led to a sharp decline in the number of HECM mortgages originated.

By comparison, originations of equity release products in Canada and the UK followed a very different pattern, more than doubling since 2013. In the UK, equity release offerings increased from £1 bn in 2013 to £3bn in 2017, with a further 32 percent growth to more than £4 bn by 2019.[8] As well, equity release mortgages represent an estimated 36 percent of all mortgages for borrowers over age 55 in 2018, doubling their share from the previous decade. A total of 46,000 equity release plans were originated in 2018 versus fewer than 42,000 in the US, despite the US having almost five times the number of retirees. While total volume in 2019 was flat with 2018, the membership in the Equity Release Council almost doubled and, prior to COVID-19, the industry expected continued growth in 2020.

In Canada, HomeEquity Bank, the sole seller of reverse mortgages until recently, reported a record $820 mm (CAD) up from $309 mm (CAD) five years earlier. As in the UK, mortgages are available for borrowers aged 55 and above, although the bulk of originations are for those over age 65. In both the UK and Canada, lenders advertise widely in the media. In the UK, equity release products are offered by some of the largest life insurance companies.

Home Equity and the Market for Reverse Mortgages

Reverse mortgage originations in the US. The current number of outstanding reverse mortgages in the US is small, estimated to be below two percent of older homeowners.[9] In general, it is difficult to measure the home equity market for older adults. Surveys such as the Health and Retirement Study (HRS) lack details about mortgage types and terms, and they rely on self-

reported data on loan balances. These data are good for tracking trends in the stock of mortgage debt held by older homeowners, but they are less useful for examining new originations and, in particular, the share of reverse mortgages versus other mortgage products. Researchers also use consumer credit panel datasets to track trends in home equity borrowing among older adults over time (Moulton et al. 2019; Brown et. al. 2020). Yet credit data do not include borrower-specific information on home values and do not include important information about loan terms and costs. Further, reverse mortgages are not reported in credit data because they do not require borrowers to make payments.

Below, we examine data on the vast majority of new mortgages originated in the US using the 2018 Home Mortgage Disclosure Act (HMDA) Loan Application Register (LAR). Under HMDA, lenders are required to collect and report specific information about mortgage applications acted upon and loans purchased during the prior calendar year. Beginning in 2018, new reporting requirements went into effect that required most lenders to report on mortgages structured as open-ended lines of credit, such as HELOCs and reverse mortgages that were previously only voluntarily reported (CFPB 2019).[10] Importantly, the 2018 HMDA data includes new information on both federally insured HECMs and proprietary reverse mortgages, as well as the age of borrower, so we can compare various types of borrowing done by seniors.

The 2018 HMDA data allows us to compare the characteristics of applicants and borrowers of reverse mortgages to the characteristics of mortgage applicants and borrowers for other types of loans. The goal is twofold: first, to understand the characteristics of reverse mortgage borrowers; and second, to compare reverse mortgage borrowers to applicants for all other mortgage debt taken out by potential borrowers aged 62 and older who might otherwise have been eligible to take out a reverse mortgage.[11]

Data Description. We begin by restricting the HMDA database to those observations where the applicant or co-applicant is age 62+, as we wish to focus on older adults who would otherwise be eligible for a reverse mortgage. To avoid double counting, we exclude loans that were simply purchased by another institution during the reporting period. We further restrict the sample to loans for single family, owner-occupied properties, excluding investment properties and second homes. These restrictions result in a sample of 2,510,080 loan applications, of which 1,329,505 resulted in loan originations during the 2018 period.

Table 1 provides a breakdown of observations by loan type and loan outcome. We separate loan observations into seven different mortgage types. The first three mortgage types are reverse mortgages, including 'traditional HECMs', HECMs used to purchase a property ('HECMs for Purchase'), and non-HECM proprietary reverse mortgages ('Other Reverse Mortgages'). Prior to the 2008 housing crisis, there was a nascent market for proprietary reverse mortgages, but this market more or less disappeared after 2008. In the last several years, a small proprietary reverse mortgage market developed, but it became more substantial in 2018 when several lenders began offering the product. Proprietary reverse mortgages are mostly concentrated among higher value homes that exceed the property value limits for a HECM[12] or for condominiums that do not qualify for the FHA's HECM program.

Table 1 here

The other four categories represent different types of traditional (or forward) mortgages; that is, mortgages that require a monthly payment and must be paid off over a fixed term. Two categories involve the ability for a borrower to take out cash. The first category includes home equity lines of credit and loans. HELOCs include new loans structured as a line of credit, where the borrower typically pays interest-only at an adjustable rate on borrowings up to the approved

credit line for 10 years, followed by a payback period, usually 15 years, where the borrower must pay back the outstanding proceeds. The cost of originating a HELOC is quite low and HELOC borrowers tend to have very good credit. 'Second liens' are loans that are defined as second liens excluding lines of credit and loans with a purpose of refinancing. These loans typically have a fixed rate and payoff period and are often given to borrowers with riskier credit and have higher-than-average interest rates. The second category of equity extraction loans includes first mortgages. 'Cash-out refinancing' is defined to include loans originated for the purpose of cash-out refinancing that are not structured as a line of credit and are typically paid back over 15-30 years. 'First liens not for purchase' are closed liens in first position that are not for the purpose of refinancing or for home purchase.

The remaining two types of mortgages do not involve the borrower obtaining additional cash. 'Refinance no cash' loans are defined to include both closed and open lines of credit for the stated purpose of refinancing without cash-out, excluding loans for the purchase of a home. Finally, 'Purchase mortgages' are closed-end loans with the stated purpose of home purchase. In both cases, the bulk of such mortgages involved fixed rates (although some are also hybrid ARMs) and a payback period that is usually 30-years, although some traditional mortgages may have a shorter 15-year payback period.

Of the modes of extracting home equity, HELOC and second liens are slightly more common in 2008 than cash-out refinancing or first liens not for purchase. Both options are quite a bit more prevalent than HECMs

Reasons for loan denial: Older versus younger borrowers. Table 1 also compares the proportion of applications denied or approved by the lender, as well as those considered incomplete or withdrawn by the applicant. Rates of denial were highest for HELOCs and second liens, with

more than one-third of older applicants in 2018 being denied. About one-fourth of cash-out refinancing and first lien mortgages were denied. Notably, having a weak credit history or high debt to income (DTI) ratio were the top reasons for denial among these applicants, with more than half of HELOC denials due to an inability to afford the monthly payments (e.g., high DTI). By contrast, reverse mortgage applications were less likely to be denied, with primary reasons being related to the collateral value of the property or insufficient cash to cover required costs.

These differences in reasons for loan denial make sense, given that reverse mortgages carry different criteria for underwriting than forward mortgages. There is no required monthly repayment of a reverse mortgage, and thus there is no additional debt to income burden from a reverse mortgage. Beginning in 2015, HECM borrowers must demonstrate the ability to pay ongoing property tax and insurance payments or have sufficient home equity to set aside funds to pay these expenses in an escrow-type account at the time of loan closing (Moulton and Haurin 2019). The primary barrier to obtaining a reverse mortgage is not poor credit or lack of income, but lack of sufficient home equity (Moulton et al. 2017). Any existing mortgage debt on a home at the time of application for a reverse mortgage must be paid off with the proceeds of the reverse mortgage or in cash at closing.

To give additional perspective on the reasons that seniors are turned down for mortgage credit, Figure 2 compares reasons for denial of mortgage applications by applicant age, including applicants age 45 and younger, age 46 to 61, and age 62 and older. Here, it is clear that inability to afford the monthly payment is a more substantial barrier to originating a mortgage for older adults than it is for younger cohorts. For example, more than 50 percent of older adults denied HELOC and second loans were denied due to inability to afford monthly payments, compared with

only 35 percent of those age 45 and younger. For younger applicants, poor credit is a more common reason for denial across all loan types.

Figure 2 here.

We next consider the proportion of mortgage applicants with DTI ratios greater than 41 percent, which is a typical maximum DTI for underwriting. Figure 3 compares older and younger applicants by loan type, including both those with originated loans and those with loans that were denied. The proportion of older applicants with high DTI ratios is striking—70 percent of older applicants denied HELOC or second liens had DTIs greater than 41 percent. Across all loan types, a higher share of older applicants—both originated and denied—have high DTIs compared to younger applicants. High debt incurred at younger ages appears to be an appreciable barrier to additional borrowing or consumer home equity at older ages. At an age where income will eventually fall as applicants start to retire, debt burdens remain quite high.

Figure 3 here.

Characteristics of older borrowers. Table 2 summarizes the loan and borrower characteristics for originated reverse mortgage loans reported in the 2018 HMDA data, compared to loan and borrower characteristics for traditional mortgage originations to borrowers age 62+ in the 2018 HMDA data. These data include information for 30,898 HECM loan originations, of which 28,946 were structured as traditional HECMs and 1,952 as HECMs to purchase a home.[13] An additional 1,952 non-HECM proprietary reverse mortgages are reported in the 2018 HMDA data.

Table 2 here

The loan amount reported in the HMDA data for a reverse mortgage is the initial principal limit (IPL), or the maximum amount of home equity available to a borrower based on the borrower's age, expected interest rate, and home value. For HECMs, HUD establishes a principal

limit factor (PLF), which is the maximum LTV ratio at origination. The PLF is multiplied by the value of the property or the limit set by FHA, whichever is lower, to determine the initial principal limit (IPL).[14] In 2018, the property value limit was $679,650. Borrowers with homes worth more than the limit may have access to a larger share of their home equity from a proprietary reverse mortgage.

The average loan amounts for traditional HECMs ($165,751) and HECMs for purchase ($174,918) are much lower than the average loan amount of $703,735 for proprietary reverse mortgages. This is not surprising, given that the average property value of proprietary reverse mortgage borrowers in 2018 was $1.66 million, compared with an average home value of $358,011 for traditional HECMs and $362,701 for HECMs used to purchase a home. The average HECM borrower had a slightly higher loan to value ratio of 0.48, compared to 0.44 for proprietary reverse mortgage borrowers. In 2018, the average interest rate for HECM borrowers was about two percentage points lower than the rate for proprietary reverse mortgage borrowers.

With regard to demographic characteristics, traditional HECM borrowers were more likely to be Black or Hispanic, compared to HECM for purchase or other proprietary reverse mortgage borrowers. They were also more likely to be single, to have lower income to underwrite the loan, and be located in lower income census tracts—although still slightly above the median income for the MSA. Compared to either type of HECM borrower, proprietary reverse mortgage borrowers tend to be older and from higher income census tracts as a percent of the MSA median income.

Next we compare reverse mortgage borrowers to those who take other types of mortgages. The average property value of $433,561 for HELOCs and second liens and $393,734 for cash-out refinancing or new first liens not for purchase is higher than the average traditional HECM property value of $358,011. The average loan amount for HELOC and second lien borrowers of

$108,918 is smaller than the average loan amount of HECM borrowers. It is important to note that an appreciable share of the HELOC and second loan borrowers held existing first mortgages, as the combined LTV for all mortgages on the property of 0.55 is considerably higher than the LTV of 0.30 for the HELOC or second loan by itself.

The average interest rate of HELOC and second loans of 5.93 percent is a bit *higher* than the 4.8 percent interest rate on HECM loans, which becomes 5.3 percent when we add the 0.5 percent Mortgage Insurance Premium (MIP) that must also be paid on an FHA-insured HECM. This insurance fee also exists for traditional FHA loans, where the MIP is also unreported, but also for traditional Fannie Mae and Freddie Mac loans with an LTV above 80 percent where there is a required private mortgage insurance (PMI) policy. Loan costs are not reported in HMDA for reverse mortgages or HELOCs, but they are reported for closed-end forward mortgages, with average up-front costs of about $4,500 for cash-out refinancing and purchase mortgages, or about two percent of loan proceeds.

Notably, the average combined loan-to-value ratio for the cash-out loan types ranges between 55 (HELOC and second loans) and 63 percent (cash-out refinancing and non-purchase first mortgages). This is striking, given the size of mortgage debt owed over a repayment period of 25 to 30 years, extending into their 90s and beyond. Such borrowers are taking on mortgage payments as a share of home value that are nearly as large as much younger borrowers who have a much longer expected working period.

Consistent with the perception of having strong credit requirements, HELOC borrowers also appear to have higher income characteristics than do reverse mortgage or other cash out borrowers. HECM borrowers live in lower income Census tracts (107% of MSA median) versus cash-out refinancing or non-purchase first liens (112%) or HELOCs and second liens (120%).

HELOC and second lien borrowers are less likely to be Black or Hispanic (10.5%) than cash-out first lien borrowers (15.8%), who are closer to the traditional HECM minority share of 15 percent. Strikingly, HECM borrowers are almost twice as likely to be single female (40%) vs approximately 22 percent of HELOC and second lien borrowers.

When we examine traditional purchase or refinance mortgages, HECM borrowers have a similar share of Black or Hispanic borrowers (13-15%) and also almost double the share of single female borrowers. As well, the neighborhoods for refinancing and purchase mortgages have higher incomes relative to their MSA compared to HECM Census tracts.

HECM simulations using 2018 HMDA data. Next, we leverage the HMDA data to estimate a series of counterfactual simulations to determine whether applicants in the HMDA data could have obtained HECMs instead of the mortgages actually chosen. The simulations focus on the size of the loan requested without taking credit into account. In part, this is because we do not observe borrower credit indicators across all loan types. Nevertheless, relatively few HECM borrowers are rejected due to low credit for two reasons. First, since HECMs do not have required principal and interest payments, borrowers must only show the ability to pay property taxes and insurance (T&I), a much lower income standard. Second, HECM borrowers with poor credit or low income can always choose to take a lower Initial Principal Limit and set aside borrowing proceeds to pay future T&I.[15] Thus, HECM borrowers can have poor credit or low income and still qualify for the loan.

To examine eligibility for a HECM, we determine the amount of money a borrower could qualify for using the initial Principal Limit Factor (PLF) tables from the HECM program in 2018. Inputs to the IPL tables include the age of the youngest borrower and the property value, estimates of which are reported in HMDA. For the expected interest rate on a HECM loan, another input required for the PLF table, we use two different values as described below. We compare the loan

size requested through a forward mortgage with what we estimate the borrower could have obtained with a HECM.

We run the simulation with two different sets of assumptions regarding the HECM expected interest rate and loan costs. The first scenario is a conservative estimate, with the maximum permissible loan origination fee and an expected interest rate of 4.75 percent (the median rate in 2018). The second scenario relaxes some of these assumptions, waiving the lender origination fee and using an expected interest rate of three percent.

The lower interest rate in the second scenario is important, as borrowers are able to obtain the maximum possible proceeds in the PLF table by gaining access to a lower interest rate loan. In practice, borrowers who shop around are often able to obtain more preferable terms on a HECM, including lower rates and thus higher loan proceeds. As well, lenders are often willing to offer borrowers a lower interest rate on their HECMs if the borrowers take more proceeds. This is especially true where the lower rate allows a borrower to obtain a HECM when, at a higher rate, that borrower would not obtain sufficient proceeds to pay off a previous lien. The second scenario would be particularly relevant in times when the 10-year Treasury rate falls below that in 2019, when rates peaked above three percent, compared to average rates that were 0.5 to 1.0 percent lower in the other years between 2016 and 2019. In 2020, with COVID-19 and recent Fed moves, many reverse mortgages are being originated at or near the three percent rate that obtains a maximum PLF. Recent experience, along with the data in this paper, suggest that demand for reverse mortgages may be quite sensitive to interest rates due to the much larger proceeds available in lower interest rate economic environments.

We conduct the simulations for both originated forward mortgages and for applications for forward mortgages that were denied—the latter being a group of older adults with an expressed

preference for borrowing from home equity who were unable to do so through the mortgage type selected. The results for originated forward mortgages and for denied applications in Table 3.

Table 3 here

To illustrate our approach, consider the case of HELOC and second lien originations in Table 3. Based on the age of the youngest borrower and an expected interest rate of 4.75, the estimated average PLF is 0.457 (top section of Table). Multiplying this factor by the borrower's property value or the loan limit of $679,650 (whichever is less) results in an average maximum HECM loan amount (IPL) of $158,258. Note that reducing the expected interest rate to 3.0 (bottom section of table) increases the PLF by nearly 10 percentage points, raising the maximum loan amount to $192,299.

We then calculate the borrower specific up-front costs associated with a HECM, comprised of lender origination fees, an up-front mortgage insurance premium charged by HUD, and standard closing costs (e.g., appraisal and closing fees). For the simulation at the top of Table 3, we assume that the maximum origination fee is assessed by a lender at an average of $4,711 for HELOC and second lien borrowers in our sample.[16] We waive the origination fee in the bottom of Table 3, as this fee is assessed at a lender's discretion and lenders might choose not to charge it for borrowers who take large proceeds and also comparison shop on prices. The up-front mortgage insurance premium is currently set by HUD at two percent of the home value, amounting to $6,951 for the average HELOC or second lien borrower in our sample. We also include an estimated $2,500 for standard closing costs,[17] resulting in total estimated up-front costs of $14,162 for the average HELOC borrower (top section), or $9,451 with the origination fee waived (bottom section).

It is important to note that the mortgage insurance premium for a HECM buys some protections not available for other types of mortgages, especially HELOCs. All HECM are non-

recourse, which means that borrowers, their heirs, and lenders are not responsible for anything owed on the HECM balance beyond the value of the home. By contrast, for HELOCs, borrowers in most states bear personal liability for any negative equity. Personal liability is a feature of almost all second liens and some first lien mortgages, depending on the state. As well, HELOCs are subject to being suspended in an environment of falling home prices, whereas the HECM LOC will not be cut if home prices decline (although the LOC can be suspended if a borrower fails to meet other reverse mortgage obligations such as making timely payment of property taxes and insurance, adequately maintaining the home, and living in the home as the borrower's primary residence.)

To estimate the total loan amount from the HECM, we add together the borrower's requested loan amount for the forward mortgage, any existing mortgage debt held by the borrower in addition to the new loan being requested (e.g., the balance on a first mortgage for borrowers requesting a second lien or HELOC), and the estimated HECM closing costs. We then divide this amount by the borrower's property value or the MCA (whichever is lower) to get the estimated LTV if the borrower were to obtain a HECM. If the estimated LTV is less than the estimated PLF, the borrower could obtain a HECM. For HELOC and second lien borrowers, the ratio averages 0.643 (top panel) or 0.627 (bottom panel), which exceeds the estimated maximum PLF by an average of 0.186 (top panel) or 0.072 (bottom panel). At an expected interest rate of 4.75 percent and with the full origination fee, we estimate that 28 percent of HELOC and second lien borrowers could have obtained a HECM. At an expected rate of three percent with no origination fee, this proportion increases to about 40 percent of HELOC and second lien originations.

Across all loan types, we estimate that about 17 to 27 percent of older adults originating mortgages in 2018 could have obtained a HECM for the same loan amount obtained through a

forward mortgage, corresponding to a total of 225,000 to 350,000 older adults. A key reason that a majority of borrowers may be choosing a traditional mortgage is simply that they are borrowing too much money to choose a HECM. In other words, the large required debt means that a HECM is not an option for at least three quarters of older mortgage borrowers in 2018.

Equally interesting is that roughly the same proportion of *rejected borrowers* may have qualified for a HECM as for actual borrowers. The simulations in the right-hand columns of Table 3 indicate that 17 to 25 percent of denied forward mortgage borrowers would have sufficient home equity to originate a HECM at their requested loan amount, corresponding to 98,000 to 147,000 older adults. For the rejected borrowers, a HECM would have made the difference between getting a mortgage and not, while at the same time eliminating the required mortgage payment.

Next, we examine the characteristics of forward mortgage applicants who originated or were rejected for loans, but who had sufficient home equity to obtain a HECM for the requested loan amount at an expected interest rate of 3.0 percent and no origination fee.[18] Table 4 reports summary statistics for originated loans (left-hand columns) and rejected borrowers (right-hand columns). Both groups had relatively lower LTVs than average for the loan type, which is not surprising given that the HECM LTVs are lower than those of other mortgages that require principal and interest payments.

Nonetheless, a HECM could have helped many of the borrowers and rejected applicants. For rejected borrowers, nearly half were denied the loan because the resulting debt to income ratio from having a monthly mortgage payment would be too high. Based on HMDA characteristics, 56 to 66 percent of the rejected applicants would have a DTI of 41 percent or more if they obtained a forward mortgage. Even among those who took out a new mortgage, 28 to 32 percent had DTIs greater than 41 percent, leverage ratios that are very high for borrowers at retirement age and in a

position to have reductions in income as they get older and may be unable to work. Aside from having very high debt to income ratios, rejected applicants were also older, more likely to be Black or Hispanic, and from lower-income census tracts compared to the full population of forward mortgage borrowers.

Table 4 here

Summary of Findings

In sum, five key findings are worth noting: 1) Older (forward) mortgage borrowers tend to be taking on quite a bit of debt, with average loan-to-value ratio of 55 (HELOC or second liens) to 78 percent (Purchase mortgage). 2) Mortgage rates are similar for HECMs relative to other cash-out refinancing and traditional mortgage types, almost all averaging 4.8 to 5.9 percent, although reverse mortgages are much more likely to be adjustable vs fixed rate. 3) Reverse mortgage borrowers are almost twice as likely to be single women (40%) compared to other older mortgage borrowers, have a similar share of minority borrowers, and live in slightly higher income communities relative to the MSA median. 4) Only 17 to 27 percent of actual and rejected borrowers would have qualified for a HECM, depending on the interest rate and closing costs of the HECM, though this would represent 301,000 to 460,000 borrowers, it is still nine to 14 times the size of the actual HECM market. Even the number of rejected traditional mortgage borrowers who might have obtained a HECM was 2.6 to 3.9 times the actual number of reverse mortgage borrowers. 5) A large share of actual and rejected borrowers had very high DTI ratios, with 71 percent of rejected borrowers and 40 percent of actual borrowers having a DTI over 36 percent. A HECM could have substantially lowered debt payments for this group.

What about older borrowers with an existing mortgage? In other work, Moulton and Haurin (2019) examined the potential size of the HECM market among older Americans with a mortgage. They found that in 2016, at least half of existing older homeowners with a mortgage would have been able to take out a HECM, at least five million households in total. This much larger group was still making mortgage payments, although only a minority appeared to have a DTI as high as the new mortgage borrowers in our sample, above.

Why Older People Do Not Use Reverse Mortgages

The large proportion of older adults for whom home equity is their primary source of wealth, combined with growing levels of consumer and mortgage debt held by older adults—and resulting increases in their debt to income burden—presents a puzzle: why do older adults in the US not turn to reverse mortgages more often? In this section, we consider several reasons for why this may be the case, including those that make people reluctant to spend down home equity generally in retirement, as well as those that are specific to the institutional features of the American reverse mortgage market.

Reluctance to consume home equity in retirement. It is well established that people tend to not spend down their wealth in retirement as would be predicted by a simple life-cycle hypothesis (Modigliani and Brumberg 1954; De Nardi et al. 2010, 2016b; Lockwood 2018). Housing wealth is no exception, and in fact it tends to be the last asset consumed, typically only near the end of life following a major health event or the death of a spouse (Englehardt and Eriksen 2019; Mayer 2017; Poterba, Venti and Wise 2011, 2017; Venti and Wise 1990, 2004). Financial wealth is more liquid and accessible than housing wealth, without the transaction costs of selling the home or taking out a loan. There are also numerous financial and tax incentives to spend down financial

wealth before housing wealth, including housing wealth being treated more favorably by tax policy when left as a bequest.

The economics literature generally suggests two interrelated reasons for holding on to wealth in retirement: (1) precautionary savings for uncertain health costs, including long-term care; and (2) bequest motives. Importantly, these motivations do not necessarily preclude borrowing from home equity in retirement. For example, retaining home equity as precautionary savings for major health expenses suggests that homeowners anticipate being able to liquidate home equity when a health shock occurs. Nevertheless, such motivations may help explain the timing and nature of home equity consumption in retirement.

Health costs in retirement can be considerable. While the majority of older adults receive Medicare, nearly 20 percent of health expenditures are paid for as out-of-pocket costs (De Nardi et al. 2016a). Recent estimates indicate that the average 65-year old man or woman needs $72,000 or $93,000 (respectively) to have a 50 percent chance of being able to cover necessary health expenses in retirement; for those who experience major health shocks, this could exceed $350,000 (Fronstin and VanDerhei 2017). Further, more than half of older adults will require long term care in a nursing home or at home prior to death (Favreault and Dey 2015; Hurd, Michaud, and Rohwedder 2014), with average lifetime costs of $133,700 in 2015 dollars (Favreault and Dey 2015).

Despite these risks, few households purchase long-term care insurance; instead viewing home equity as precautionary saving to cover such costs if they do arise (Costa-Font et al. 2018; Davidoff 2010). Indeed, evidence indicates that home equity is one of the main resources used to pay for long term care in the US (Costa-Font et al. 2018), with Medicaid covering costs for 60 percent of nursing home residents (Borella et al. 2018). Medicaid policy further incentivizes older

homeowners to hold assets in the form of home equity rather than as liquid wealth. To qualify for Medicaid, households must spend down their financial assets to a minimum set by states, typically around $2,000, but home equity is typically exempt from eligibility thresholds (Ricks 2018). Therefore, older adults with a high probability of needing long-term care (and potentially to rely on Medicaid to pay for such services) may have a strategic incentive to spend down or transfer financial wealth, and to save remaining wealth in the form of home equity.

In line with a precautionary savings motive, recent studies document a decline in home equity after a health shock (Gilligan et al. 2018; Gupta et al. 2018; Poterba et al. 2018), with home equity being second only to formal health insurance for financing health related consumption after a health shock in later life (Dalton and LaFave 2017). The ability to access home equity is also linked to better health outcomes. In an analysis of cancer patients, Gupta et al. (2018) found that cancer patients who borrowed from home equity were 23 percent more likely to perform necessary treatments and had lower rates of mortality than did cancer patients that did not borrow from home equity.

In addition, a desire to leave a bequest to heirs may prevent spending from home equity in retirement; in fact, this need not be a separate motivation and can actually reinforce precautionary savings. For example, adults who intend to leave a bequest but are uncertain of their future health risks may prefer to self-insure through precautionary savings rather than purchase long-term care insurance or spend down their financial assets to qualify for Medicaid (Lockwood 2018).

Whether intended or unintended, a large proportion of older adults do leave home equity to their heirs when they die: bequests from home equity totaled an estimated $90 to $100 billion per year from 1992 to 2014 (Englehardt and Erikson 2019). Several economists have estimated structural models to parse out the importance of an intentional bequest motive, relative to other

factors that might lead older adults to retain wealth in retirement (Ameriks et al. 2011; De Nardi et al. 2010, 2016; Lockwood 2018; Nakajima and Telyukova 2020). These models generally indicate that, while bequests are certainly an important factor in explaining wealth holding, they do not explain everything. For instance, Nakajima and Telyukova (2020) estimated that bequest motives explained about seven to 28 percent of median net worth in retirement, depending on the individual's age, well below the amount of home equity left to heirs at death.

Structural models estimating demand for reverse mortgages predict higher home equity use for those with weaker bequest motives, elders who have low levels of financial wealth relative to housing wealth, and for those with relatively high levels of pre-existing debt (Cocco and Lopes 2019; Nakajima and Telyukova 2017). Health expenditures are complicated: on one hand, those with high uncertainty regarding future health costs are predicted to retain home equity as precautionary savings. Yet those with high health expenditures due to underlying health conditions or the onset of a health shock may have a higher demand for borrowing through a reverse mortgage to help pay for health-related expenses (Nakajima and Telyukova 2017).

Despite a general tendency to hold more wealth than would be predicted following a life-cycle model, as demonstrated above, older adults can and do extract equity in retirement—they just use other debt instruments more commonly to do so rather than reverse mortgages. As we discussed earlier, this is not the case in some countries like the UK or Canada, where equity release products are much more widely used by older borrowers. As well, these countries saw sharp rises in the use of equity release through 2019, a pattern similar to the large growth of reverse mortgages in the US through 2009, except that the growth in Canada and the UK occurred in an economic boom, versus the strong growth in the downturn in the US. The uneven economic pattern combined with sharp increases and decreases in equity release usage over a few years is inconsistent with a

bequest motive or precautionary savings as the main explanation for why US retirees do not choose equity release more often. This raises questions about the institutional features of reverse mortgages and the market in the US that may impede their use.

Institutional features of reverse mortgages in the US. One longstanding claim is that high costs limit demand for reverse mortgages; in particular, there are substantial costs associated with taking out these loans (Lucas 2015; Nakajima and Telyukova 2017). Traditional reverse mortgages do carry up-front costs that are larger than up-front costs associated with other home equity borrowing options. For HECMs, this is primarily due to the up-front mortgage insurance premium charged by HUD, which is currently set at two percent of the value of the home.[19] Yet it is not clear that the mortgage insurance premium is excessive, or that it is driving down demand for HECMs.

In an analysis of reverse mortgage costs, Davidoff (2012) found that the ability of a borrower to walk away from negative equity (the 'put option' embedded in the HECM) was worth more than the cost of the mortgage insurance, if borrowers used the product to the maximum. It could be that borrowers do not value the embedded put option, as they typically do not extract all remaining equity and default on the loan when house prices fall (Davidoff and Wetzel 2014). If this were the case, then one would expect demand to rise if the mortgage insurance premium were reduced or eliminated. Yet from 2010 through 2013, there was little demand for a 'Saver' version of the HECM product with a negligible up-front mortgage insurance premium. This does not imply that high up-front costs might not be part of the equation for low demand, but it certainly does not seem to be the driving factor. In a survey of older homeowners who considered but did not originate a reverse mortgage, 26 percent indicated high costs being a factor behind their decision: the same proportion that indicated a desire to leave their home as a bequest as a reason for not taking a reverse mortgage (Moulton et al. 2017).

Another possibility is that the interest rate charged to borrowers is too high, with the spread between the cost of credit to the lender ranging between one and three percent (Lucas 2015). But as noted in the previous section, interest rates on reverse mortgages, including the ongoing mortgage insurance premium, were quite similar to those on other more commonly used traditional mortgage products, including HELOCs, cash-out or straight refinancings, and purchase mortgages. As well, borrowers in in traditional mortgages paid closing costs that ranged from zero (HELOC) to two percent (cash-out refi) of total proceeds. Reverse mortgage origination costs are much higher, especially because they include an up-front mortgage insurance premium charged by the FHA equal to two percent of the maximum claim amount (home value) plus an origination fee that is capped at $2,500 to $6,000, depending on home value.

To do an apples-to-apples comparison of the impact of higher up-front charges on the total cost of the mortgage, we added the up-front cost to the mortgage balance and then computed the increase in the imputed interest rate required to pay those costs over the life of the loan (assumed to be 12 years). A similar calculation is often presented to borrowers at closing, called the TALC (total annual loan cost). While HMDA does not report the actual value of the closing costs and the origination fee charged, we ran two scenarios, one with a higher rate (4.75%) plus maximum charges for the origination fee, and a second scenario with a lower rate (3.0%) and no origination fee. In both cases, the mortgage borrower would also pay a 0.5 percent annual mortgage insurance premium. In the case of the high rate loan, the cost increased from 5.3 to 6.6 percent, an increase of 1.3 percentage points. For the low-cost loan, the rate increased from about 3.5 to 4.1 percent, about 0.6 percentage points per year.

By comparison, in the UK, where in 2019 equity release mortgages represented about 36 percent of total mortgage originations for borrowers age 55+, the quoted mortgage rate was 5.21

percent versus a rate of 2.66 percent on a 75 percent LTV 10-year fixed rate mortgage, an annual spread of almost 2.6 percent (before considering any difference in origination costs for an equity release mortgage). From 2017 to 2019, that spread was nearly constant, even as the equity release market grew 32 percent. So higher costs of equity release, at least in the UK, were not an appreciable impairment to much faster growth than in the US.

Aside from the costs of reverse mortgages, other barriers to demand include lack of accurate information about how reverse mortgages work, combined with generally negative product perceptions. In a survey of a random sample of older adults in the US population, Davidoff, Gerhard, and Post (2017) found older adults were generally aware of reverse mortgages but had inaccurate information about how they worked. For example, only 56 percent answered correctly that the borrower can stay in the home if the loan balance exceeds the value of the home. Their results also indicated a significant and positive relationship between having accurate knowledge of the product and the stated intention to use a reverse mortgage in the future.

According to a Fannie Mae National Housing Survey (2016), 49 percent of homeowners age 55+ were familiar with reverse mortgages, and only six percent of homeowners indicated preferring reverse mortgages to extract equity. Twenty percent of the homeowners who were familiar with reverse mortgages reported that the risk of being scammed was their biggest concern about reverse mortgages.

Further, lending to an aging population where death is often the way that the mortgage resolves, creates the potential for headline risk, exacerbating negative public perceptions and discouraging larger institutional actors from participating in the market. A 2018 industry survey of lending institutions indicated that reputational risk was the leading reason that certain banks did not originate reverse mortgages (Cameron 2018). Headline risks can be lowered by reducing the

threat of evicting a borrower while alive, such as for failure to pay property taxes (preventative servicing), good communication with heirs, etc.

Of course, there is also one other appreciable common factor in the UK growth after 2012 and in the US up to 2011: the impact of large brand-name financial institutions selling reverse mortgages. In the US, during the growth and in peak years, banks such as Wells Fargo, Bank of America, and BNY Mellon, as well as the insurance company MetLife, were in the reverse mortgage business. In the UK, large, brand-name insurers and asset managers such as Aviva, Legal and General, and Canada Life, sell equity release products. In addition, in the UK, financial planners may also sell (and earn commissions from) reverse mortgages as long as they have an appropriate license, which American financial planners almost never obtain. In the US, the exit from the market of brand-name financial services firms was followed by an appreciable decline in originations of the HECM product.

Conclusion

This paper has examined the usage of reverse mortgages among mortgage borrowers age 62+, as well as rejected applicants for new mortgage credit, of the same age. We find that 17 to 27 percent of actual and rejected borrowers would likely have qualified for a HECM, depending on the interest rate and closing costs. This group of 301,000 to 460,000 borrowers is nine to 14 times the size of the actual HECM market. These potential borrowers chose another product (or were rejected from their preferred product) despite having very high debt-to-income ratios of 36 to more than 50 percent for half or more of the sample. Among seniors with an existing mortgage, at least five million could have used a reverse mortgage to eliminate mortgage payments.

The existence of a large number of seniors with an existing mortgage or taking out new mortgages with quite high LTVs (an average of 55 to 78% combined LTV, depending on the product) suggests that many seniors do, in fact, utilize home equity in order to fund their retirement. However, they choose products that require monthly payments that last decades into retirement and rise as a share of (falling) income as they get older. Of course, the puzzle remains for home equity as for other savings, as to why seniors enter retirement with fewer assets than the life cycle model would predict and spend less in retirement than the model implies would be optimal.

We consider a number of possible explanations for why American seniors do not use reverse mortgages to spend home equity and instead rely on loans with high required monthly payments, including precautionary savings for health shocks, bequest motives, high costs of reverse mortgages, and the lack of brand name institutions in the reverse mortgage business. We show that equity release products have exhibited enormous growth in the last decade in Canada and the UK, the latter of which has an active market that includes large insurance companies. In the US, the reverse mortgage market hit its peak at a time when brand name financial institutions sold the product to the public. Thus, it appears that institutional barriers that discourage entry by brand name companies may be an important factor limiting the distribution of reverse mortgages in the US.

Of course, this then raises the question as to why these companies do not enter the reverse mortgage business. One possibility is the negative reputation of reverse mortgages, which may discourage companies sensitive to their brands. Policies by the US government in the HECM program that require foreclosures as a way to resolve the failure to pay taxes and insurance suggest the potential for appreciable headline risk. By comparison, in the UK, foreclosures to resolve T&I

defaults are nearly non-existent. In the US, regulation also restricts financial planners or insurers from selling reverse mortgages without obtaining a mortgage origination license. Such licensing is time consuming, expensive, and has potential legal risks associated with cross-selling different products. In the future, the continued rise of fee-based planners who are paid for advice rather than product sales could spur planners to consider home equity as part of the planning process. Finally, the adoption of a fiduciary or 'best interest' standard might also move planners to consider housing in the planning process.

References

Ameriks, J., A. Caplin, S. Laufer, and S. Van Nieuwerburgh. (2011). 'The Joy of Giving or Assisted Living? Using Strategic Surveys to Separate Public Care Aversion from Bequest Motives.' Journal of Finance, 66: 519–61.

Begley, J. and S. Chan (2019). 'Understanding Older Adult Mobility Decisions: The Role of Children.' Working Paper. New York, NY: NYU Furman Center for Real Estate and Urban Policy.

Binette, J. and K. Vasold (2018). 'Home and Community Preferences: A National Survey of Adults Age 18-Plus.' Washington, DC: AARP. August: https://doi.org/10.26419/res.00231.001.

Borella, M., M. De Nardi, and E. French (2018). 'Who Receives Medicaid in Old Age? Rules and Reality.' *Fiscal Studies*, 39(1): 65-93.

Brown, J. and A. Finkelstein (2008). 'The Interaction of Public and Private Insurance: Medicaidand the Long-term Care Insurance Market.' *American Economic Review,*98(5): 837–80.

Brown, M., D. Lee, J. Scally, and W. van der Klaauw (2020). 'The Graying of American Debt.' In O.S. Mitchell and A. Lusardi, eds., *Remaking Retirement: Debt in an Aging Economy*. Oxford, UK: Oxford University Press, pp. xxx-xxx.

Cameron, J. (2018). 'Moving Forward in Reverse.' Stratmor Group Insight Report. February: https://www.stratmorgroup.com/insights_article/moving-forward-in-reverse/.

Cocco, J. F. and P. Lopes (2019). 'Aging in Place, Housing Maintenance, and Reverse Mortgages.' *The Review of Economic Studies*, 87(4): 1799-836. https://doi.org/10.1093/restud/rdz047.

Consumer Financial Protection Bureau (CFPB) (2019). 'Introducing New and Revised Data Points in HMDA.' Washington, DC: OIG. August 30: https://www.consumerfinance.gov/data-research/research-reports/introducing-new-revised-data-points-hmda/.

Costa-Font, J., R.G. Frank, and K. Swartz (2018). 'Access to Long Term Care after a Wealth Shock: Evidence from the Housing Bubble and Burst.' NBER Working Paper No. 23781. Cambridge, MA: National Bureau of Economic Research.

Dalton, M. and D. LaFave (2017). 'Mitigating the Consequences of a Health Condition: The Role of Intra-and Interhousehold Assistance.' *Journal of Health Economics*, 53: 38-52.

Davidoff, T. (2010). 'Home Equity Commitment and Long-term Care Insurance Demand.' *Journal of Public Economics*, 94(1): 44-49.

Davidoff, T., P. Gerhard, and T. Post (2017). 'Reverse Mortgages: What Homeowners (Don't) Know and How it Matters.' *Journal of Economic Behavior and Organization*, 133: 151–71.

De Nardi, M., E. French, and J. B. Jones (2010). 'Why Do the Elderly Save? The Role of Medical Expenses.' *Journal of Political Economy,* 118: 38-75.

De Nardi, M., E. French, J.B. Jones, and J. McCauley. (2016a). 'Medical Spending of the US Elderly.' *Fiscal Studies*, 37(3-4): 717-747.

De Nardi, M., E. French, and J.B. Jones (2016b). 'Savings After Retirement: A Survey.' *Annual Review of Economics*, 8: 177-204.

Employee Benefit Research Institute (EBRI) (2019). *2019 Retirement Confidence Survey Summary Report*. Washington, DC: EBRI.

Englehardt, G. and M. Eriksen (2019). 'Homeownership in Old Age and at the End of Life.' Presented at the Symposium for Housing Tenure and Financial Security. Fannie Mae and the Joint Center for Housing Studies, Harvard University: March.

Ernst and Young Global Limited (EY) (2020). *2020 Global Equity Release Roundtable Survey.*

Fannie Mae (2016). 'Older Homeowners: Accessing Home Equity in Retirement.' National Housing Survey, Topic Analysis, Q2. http://www.fanniemae.com/resources/file/research/housingsurvey/pdf/Q2-2016-accessing-home-equity-in-retirement.pdf.

Favreault, M. and J. Dey (2015). 'Long-Term Services and Supports for Older Americans: Risks and Financing Research Brief.' Washington, DC: Office of the Assistant Secretary for Planning and Evaluation, US Department of Health and Human Services. https://aspe.hhs.gov/basic-report/ong-term-services-and-supports-older-americans-risksand-financing-research-brief.

Fronstin, P. and J. Van Derhei (2017). 'Savings Medicare Beneficiaries Need for Health Expenses: Some Couples Could Need as Much as $350,000.' *EBRI Notes*, 38:1

Gilligan, A.M., D.S. Alberts, D.J. Roe, and G.H. Skrepnek (2018). 'Death or Debt? National Estimates of Financial Toxicity in Persons with Newly-diagnosed Cancer.' *The American Journal of Medicine*, 131(10): 1187-95.

Goodman, L., K. Kaul, and J. Zhu (2017). 'What the 2016 Survey of Consumer Finances Tells Us about Senior Homeowners.' Urban Institute Research Report: November. https://www.urban.org/sites/default/files/publication/94526/what-the-2016-survey-of-consumer-finances-tells-us-about-senior-homeowners.pdf.

Goodman, L. and C. Mayer (2018). 'Homeownership and the American Dream.' *Journal of Economic Perspectives,* 32(1) Winter: 31-58.

Haurin, D.R. and S. Moulton (2017). 'International Perspectives on Homeownership and Home Equity Extraction by Senior Households.' Ohio State University Working Paper. June 5: https://ssrn.com/abstract=2985917.

Haurin, D., C. Loibl, and S. Moulton (2019). 'Debt Stress and Mortgage Borrowing in Older Age: Implications for Economic Security in Retirement.' Working Paper prepared for the Retirement Disability Research Consortium. Madison, WI: University of Wisconsin.

Lockwood, L.M. (2018). 'Incidental Bequests and the Choice to Self-insure Late-life Risks.' *American Economic Review*, 108(9), 2513-50.

Lucas, D. (2015). 'Hacking Reverse Mortgages.' MIT Center for Financial Policy Working Paper. Cambridge, MA: Massachusetts Institute of Technology. http://gcfp.mit.edu/wp-content/uploads/2013/08/ReverseMortgagesV10.pdf.

Lusardi, A., O.S. Mitchell, and N. Oggero (2017). 'Debt and Financial Vulnerability on the Verge of Retirement.' NBER Working Paper No. w23664. Cambridge, MA: National Bureau of Economic Research.

Lusardi, A., O.S. Mitchell, and N. Oggero (2020). 'Debt Close to Retirement and its Implications for Retirement Wellbeing.' In O.S. Mitchell and A. Lusardi, eds., *Remaking Retirement: Debt in an Aging Economy*. Oxford, UK: Oxford University Press, pp. xxx-xxx.

Mayer, C. (2017). 'Housing, Mortgages, and Retirement.' In L. Fennell and B. Keys, eds., *Evidence and Innovation in Housing Law and Policy*. New York: Cambridge University Press.

Modigliani, F., and R.H. Brumberg (1954). 'Utility analysis and the consumption function: an interpretation of cross-section data.' In K. Kurihara, ed., *Post-Keynesian Economics* (New Brunswick, NJ. Rutgers University Press), pp. 388–436.

Moulton, S., S. Dodini, D.R. Haurin, and M.D. Schmeiser (2019). 'Seniors' Home Equity Extraction: Credit Constraints and Borrowing Channels.' Ohio State University Working Paper. June 25: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2727204.

Moulton, S. and D. Haurin (2019). 'Unlocking Housing Wealth for Older Americans: Strategies to Improve Reverse Mortgages.' Brookings Economic Studies Working Paper. October: https://www.brookings.edu/wp-content/uploads/2019/10/ES_20191016_MoultonHaurin_ReverseMortgages.pdf.

Nakajima, M. and I.A. Telyukova, (2017). 'Reverse Mortgage Loans: A Quantitative Analysis.' *The Journal of Finance*, 72(2), 911-950.

Nakajima, M. and T. Irina (2020) 'Home Equity in Retirement.' International Economic Review. Forthcoming.

National Reverse Mortgage Lenders Association (NRMLA) (2020). 'Senior Housing Wealth Reaches Record $7.23 Trillion.' April 3: https://www.nrmlaonline.org/about/press-releases/senior-housing-wealth-reaches-record-7-23-trillion.

Poterba, J. and S. Venti (2017). 'Financial Well-being in Late Life: Understanding the Impact of Adverse Health Shocks and Spousal Deaths.' Prepared for the 19th Annual Joint Meeting of the Retirement Research Consortium, August 3-4. Washington, DC. crr.bc.edu/wp-content/uploads/2017/08/4a.-James-Poterba.pdf.

Poterba, J., S. Venti, and D. Wise (2011). 'The Composition and Drawdown of Wealth in Retirement.' *Journal of Economic Perspectives*, 25(4) Fall: 95-118.

Poterba, J., S. Venti, and D. Wise (2017). 'What Determines End-of-life Assets: A Retrospective View.' In: D. Wise, ed., *Insights in the Economics of Aging*. Chicago, IL: University of Chicago Press, pp. 127–157.

Poterba, J., S. Venti, and D. Wise (2018). 'Longitudinal Determinants of End-of-life Wealth Inequality.' *Journal of Public Economics*, 162: 78-88.

Rexrode, C. (2020). 'Over 60 With Decades Left on the Mortgage: The New Retirement Math' *Wall Street Journal.* April 11. https://www.wsj.com/articles/over-60-with-decades-left-on-the-mortgage-the-new-retirement-math-11586556588.

Venti, S. and D. Wise (1990). 'But They Don't Want to Reduce Housing Equity'. In D. Wise, ed., *Issues in the Economics of Aging*. Chicago, IL: University of Chicago Press, pp. 13-29.

Venti, S. and D. Wise (2004). 'Aging and Housing Equity: Another Look. In D. Wise, ed., Pers*pectives on the Economics of Aging*. Chicago. IL: University of Chicago Press, pp. 127-181.

Endnotes

[1] See, for example, Brown et al. (2020); Goodman et. al. (2017); Lusardi et al. (2017, 2020); and Mayer (2017).

[2] Authors' calculations using the 1992-2016 Survey of Consumer Finances in 2016 dollars (Goodman et al. 2017).

[3] See Haurin et al. (2019) and Goodman et al. (2017).

[4] In one survey (EBRI 2019), eight in 10 workers reported that they expected to work in retirement, but only 28 percent of retirees actually work for pay.

[5] While we do not have formal data, equity release issuance in Australia has declined in recent years as some larger banks exited the market. Germany, Ireland, Italy, Portugal, and Spain have small markets with fewer than five lenders. Norway has between five and 10 lenders (Ernst and Young (EY) 2020).

[6] We report some data on private-label reverse mortgages in the empirical work that follows for 2018.

[7] The Maximum Claim Amount is subject to a cap, which was $679,650 in 2018, but lower in previous years.

[8] Data on the UK from Equity Release Council, 2018 and 2019 market reports.

[9] Approximately 600,000 HECMs are outstanding today out of approximately 26 m elderly homeowners age 65+. Adding in those 62-64 likely lowers the number by about 10 percent.

[10] These new reporting requirements were added by the Consumer Financial Protection Bureau through a 2015 HMDA Rule that amended Regulation C (HMDA's implementing legislation). The new reporting requirements first went into effect with the 2018 HMDA data release. Not all

lenders are required to report under HMDA, with exemptions for smaller institutions and those originating a small number of loans in the prior two years (CFPB 2019).

[11] A small number of proprietary reverse mortgages are offered to borrowers age 60+, but these private-label products were quite rate in 2018 and available in at most a handful of states.

[12] An estimated eight percent of all homes in 2019 according authors calculations using data from Zillow.

[13] While the FHA data indicates that 41,690 HECM loans were endorsed by HUD in 2018, the number originated in 2018 is smaller (endorsements typically occur one to two months after closing). Based on a one-month lag between loan closing and endorsement, we estimate that about 37,000 HECM loans closed during the 2018 calendar year. The 2018 HMDA data thus represents about 85 percent of HECM loans closed.

[14] To correct for HMDA reporting errors, we merged in the PLF from HUD data using the borrower's age and interest rate in HMDA. If the lender reported loan amount/(property value or loan limit) was 0.10 percentage points smaller or larger than the PLF, we replaced the lender reported loan amount with an estimated IPL using the HUD PLF. This resulted in the replacement of about 26 percent of reported HECM loan amounts in the 2018 HMDA data. Most of the replaced loan amounts were much smaller than the IPL, and likely reflected misreporting the loan amount as the initial draw amount rather than the IPL.

[15] This is called a Life Expectancy Set Aside (LESA) and is used by between five and 10 percent of HECM borrowers.

[16] HUD sets the maximum lender origination fee to be two percent of the first $200,000 of property value or $2,500 (whichever is greater), plus one percent of additional property value above $200,000, with a maximum of $6,000.

[17] Closing costs vary widely by state and mortgage amount and can be higher in states with a mortgage recording tax, for example, in Florida.

[18] The characteristics are quite similar for those who would have qualified at the 3.0 and 4.75 rate groups, so we presented the former group to economize on tables. Results available for the 4.75 group upon request.

[19] The lender origination fee of $2,500 to $6,000 is another potential up-front cost. However, this is negotiable, and can be reduced or eliminated depending on the market and the circumstances of the borrower.

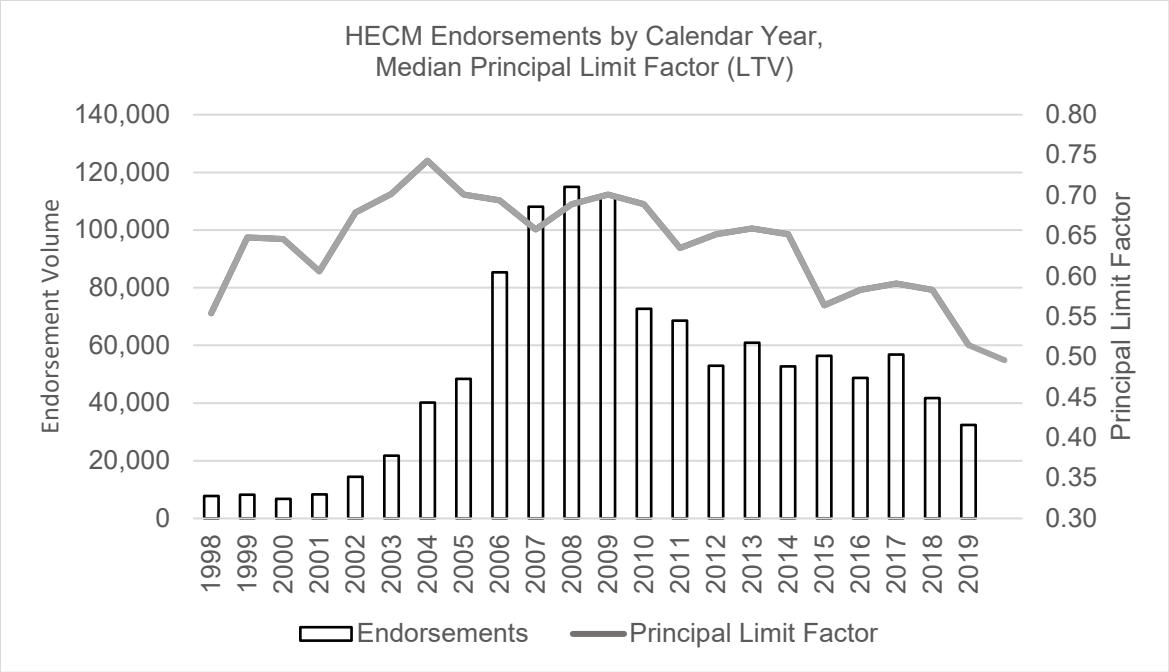

Figure 1. HECM Endorsements by Calendar Year, Median Principal Limit Factor (LTV)

Source: Authors' calculations.

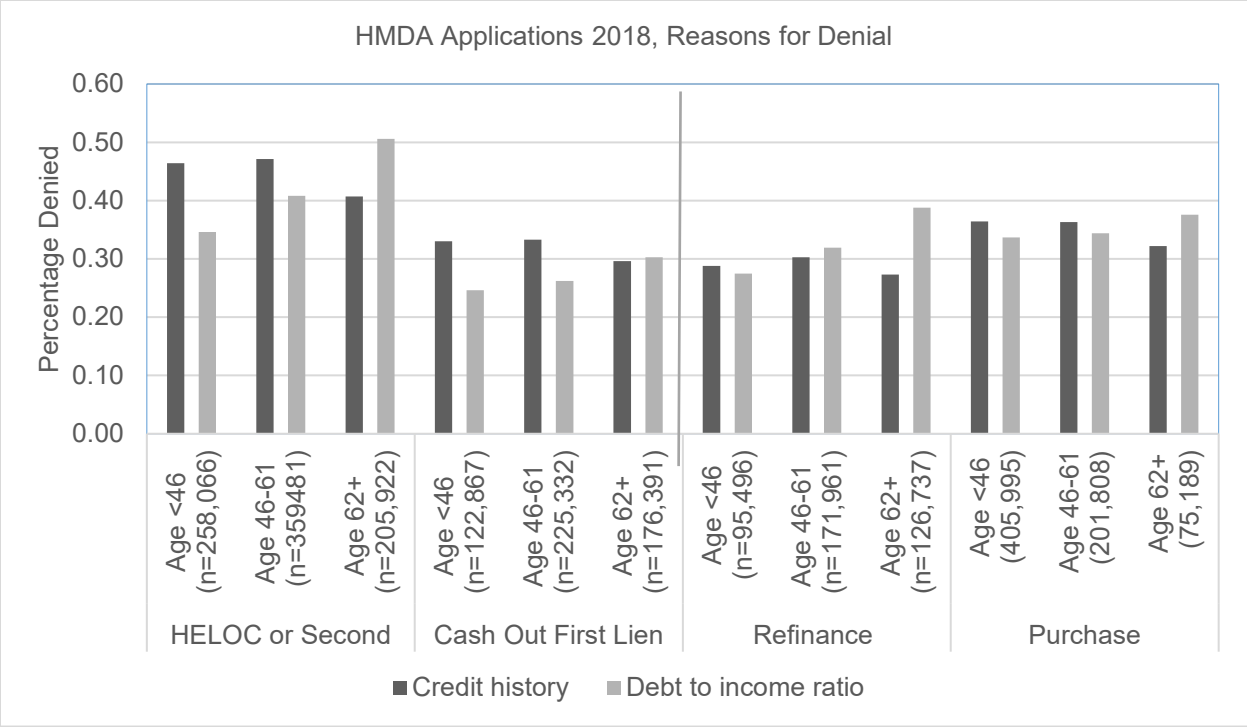

Figure 2: 2018 Denied HMDA Applications by Age Loan Type, Reason for Denial

Source: Author's calculations from 2018 HMDA data.

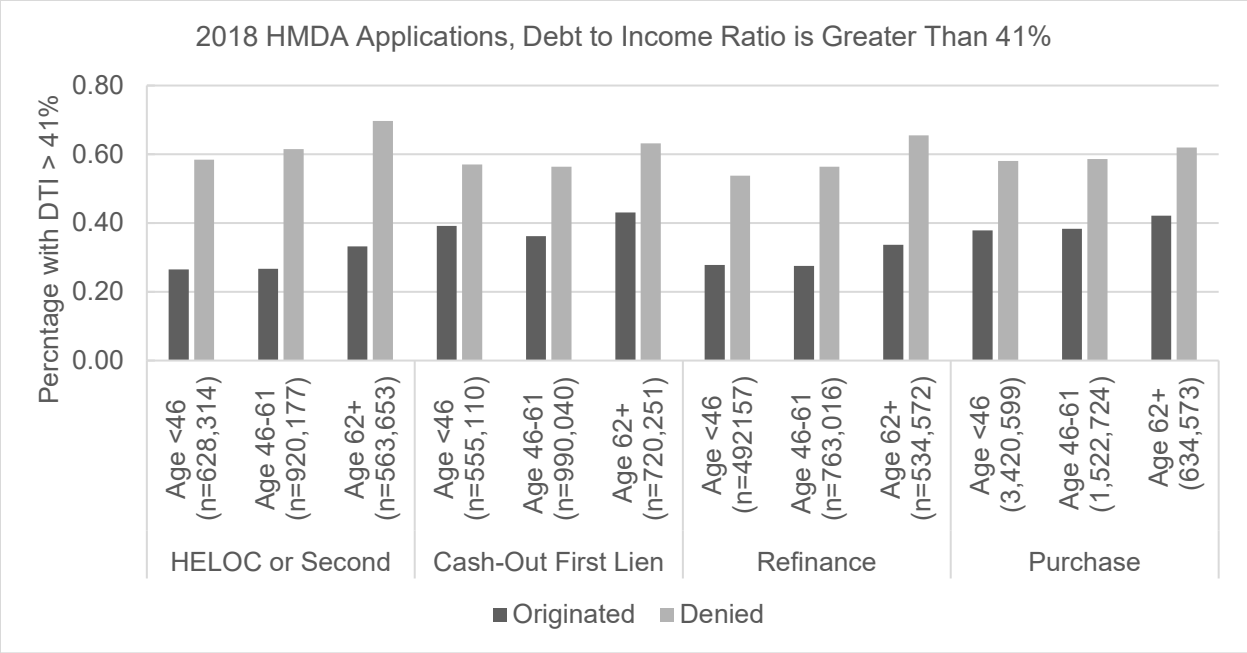

Figure 3: 2018 Denied HMDA Applications by Age and Loan Type, % with Debt to Income Ratio > 41%

Source: Author's calculations from 2018 HMDA data.

Table 1: Mortgage Applications Reported in 2018 HMDA for Applicants or Co-Applicants Age 62+

	HECM Traditional	HECM for Purchase	Other Reverse Mortgage	HELOC or Second	Cash Out First Lien	Refinance No Cash	Purchase Mortgage	Total
Application Status								
Originated	0.562	0.776	0.646	0.487	0.465	0.502	0.661	0.530
Number of Originated Loans	28,946	1,952	1,952	274,388	334,791	268,210	419,266	1,330,342
Denied	0.167	0.075	0.128	0.365	0.245	0.237	0.118	0.236
Withdrawn or Incomplete	0.271	0.15	0.18	0.148	0.29	0.261	0.221	0.234
N	51,493	2,517	3,021	563,653	720,251	534,572	634,573	2,510,080
Reason for Denial								
Credit history	0.088	0.074	0.062	0.407	0.296	0.273	0.322	0.33
Debt to income ratio	0.05	0.048	0.026	0.506	0.303	0.388	0.376	0.397
Collateral	0.394	0.207	0.474	0.186	0.186	0.172	0.124	0.178
Insufficient cash	0.262	0.112	0.171	0.012	0.022	0.026	0.077	0.03
Credit application incomplete	0.218	0.362	0.073	0.037	0.173	0.13	0.109	0.109
Other reasons	0.157	0.223	0.334	0.164	0.173	0.191	0.227	0.18
N	8,574	188	386	205,922	176,391	126,737	75,189	593,387

Notes: Sample is restricted to loans for single family, owner-occupied properties where the applicant or co-applicant is age 62 or older, excluding investment properties and second homes.

Source: Authors' calculations from 2018 HMDA data, excluding purchased loans.

Table 2: Summary Characteristics Reported in 2018 HMDA (means)

	HECM Traditional	HECM for Purchase	Other Reverse Mortgage	HELOC or Second	Cash Out First Lien	Refinance No Cash	Purchase Mortgage
Loan amount (IPL for reverse mortgage)	165,751	174,918	703,735	108,915	206,545	179,065	228,399
Property value	358,011	362,701	1,655,046	433,561	393,734	426,760	342,161
Combined loan to value ratio	0.478	0.486	0.437	0.55	0.63	0.565	0.78
Loan to value ratio for this loan	0.479	0.486	0.437	0.304	0.625	0.509	0.774
Interest rate	4.789	4.603	6.513	5.93	5.07	5.335	5.346
Interest rate spread	.	.	.	0.398	0.634	0.236	0.624
Total loan costs	.	.	.	322	4,762	3,335	4,513
Percent reporting total loan costs	.	.	.	7.1%	93.2%	57.4%	91.8%
Origination charges	.	.	.	77	2,276	1,708	1,529
Discount points if non-zero	.	.	.	246	2,361	2,189	1,509
Percent reporting non-zero discount points	.	.	.	0.4%	52.8%	38.2%	31.7%
Lender credits if non-zero	.	.	.	386	738	835	821
Percent reporting lender credits	.	.	.	27.7%	34.7%	38.4%	38.3%
Loan term (months)	.	.	.	304	305	298	340
Percent with loan term 360+ months				59.0%	70.5%	57.9%	88.3%
FHA or VA	100.0%	100.0%	0.0%	0.1%	25.9%	9.5%	25.4%
Black or Hispanic	15.0%	10.2%	10.2%	10.5%	15.8%	12.7%	15.3%
Missing race and ethnicity	5.3%	2.9%	5.4%	7.6%	13.3%	9.4%	8.2%
Borrower gender: single female	39.6%	33.1%	40.8%	22.1%	22.8%	22.4%	23.5%
Borrower gender: single male	23.7%	16.4%	37.4%	19.1%	22.7%	20.2%	22.3%
Borrower gender: joint female and male	35.8%	48.9%	20.1%	53.1%	44.8%	50.4%	48.2%
Borrower gender: missing	1.0%	1.6%	1.6%	5.7%	9.6%	7.1%	6.0%
Percent with co-applicant	38.8%	54.8%	42.4%	59.7%	53.6%	57.9%	58.9%
DTI<36%	.	.	.	46.3%	35.7%	47.1%	36.2%
DTI 36-41%	.	.	.	20.5%	21.2%	19.2%	21.6%
DTI >41%	.	.	.	33.2%	43.1%	33.7%	42.1%
Income used for underwriting	29.352	42.268	42.021	118.844	113.332	127.145	173.91
Census tract % minority	34.16	25.803	35.768	24.407	30.886	26.432	27.085
MSA median family income	74,384	71,966	93,472	76,089	74,257	75,282	71,573
Census tract income to MSA income %	107.391	115.877	158.244	120.203	112.34	117.008	113.559
Observations	28,946	1,952	1,952	274,388	334,791	268,210	419,266

Notes: The summary statistics are based on lender reported values, where values not reported are treated as missing. An exception is the loan amount (IPL) and LTV, where we estimate an age and interest rate adjusted PLF and replace values where the loan amount/maximum claim amount is not within 0.10 of the PLF, this resulting in replacement of 26% of the values. The sample sizes are smaller for particular variables with missing data or outliers.

Source: Authors' calculations from 2018 HMDA data, excluding purchased loans.

Table 3: Counterfactual Simulations, HECM Feasibility by Loan Type, 2018 HMDA Applicants Age 62+

	Originated				Denied			
	HELOC or Second	Cash Out First Lien	Refinance No Cash	Purchase Mortgage	HELOC or Second	Cash Out First Lien	Refinance No Cash	Purchase Mortgage
Simulation 1: 4.75 Interest Rate and Origination Fee								
Estimated HECM PLF	0.457	0.457	0.457	0.443	0.459	0.462	0.461	0.438
Estimated HECM IPL	158,258	144,783	148,158	127,795	156,563	130,180	144,288	92,721
Estimated HECM Origination Fee	4,711	4,533	4,498	4,338	4,586	4,177	4,322	3,314
Estimated HECM Initial Mortgage Insurance Premium	6,951	6,371	6,510	5,801	6,834	5,644	6,268	4,260
Estimated HECM Total Up Front Costs	14,162	13,405	13,508	12,639	13,920	12,321	13,090	10,074
Existing Mortgage Debt to be Paid off with HECM	112,196	14,379	36,936	22,018	122,386	8,735	40,108	19,223
Estimated Total Loan Amount with HECM	236,684	237,411	231,172	268,110	240,377	228,244	245,778	255,167
Estimated HECM loan to value or MCA	0.643	0.715	0.665	0.859	0.68	0.798	0.748	0.952
Could Obtain HECM	0.282	0.161	0.252	0.064	0.259	0.112	0.177	0.029
HECM PLF less Estimated HECM LTV	-0.186	-0.259	-0.208	-0.416	-0.221	-0.335	-0.287	-0.514
Shortfall for HECM	-0.324	-0.335	-0.327	-0.453	-0.36	-0.397	-0.38	-0.533
Simulation 2: 3.0 Interest Rate and No Origination Fee								
Estimated HECM PLF	0.555	0.555	0.555	0.542	0.557	0.56	0.559	0.538
Estimated HECM IPL	192,299	175,992	180,052	156,499	190,044	157,779	174,970	113,917
Estimated HECM Initial Mortgage Insurance Premium	6,951	6,371	6,510	5,801	6,834	5,644	6,268	4,260
Estimated HECM Total Up Front Costs	9,451	8,871	9,010	8,301	9,334	8,144	8,768	6,760
Existing Mortgage Debt to be Paid off with HECM	112,196	14,379	36,936	22,018	122,386	8,735	40,108	19,223
Estimated Total Loan Amount with HECM	231,969	232,877	226,666	263,717	235,761	224,038	241,414	251,354
Estimated HECM loan to value or MCA	0.627	0.699	0.649	0.843	0.664	0.781	0.732	0.935
Could Obtain HECM	0.395	0.268	0.38	0.12	0.356	0.189	0.282	0.058
HECM PLF less Estimated HECM LTV	-0.072	-0.144	-0.094	-0.301	-0.107	-0.221	-0.173	-0.397
Shortfall for HECM	-0.26	-0.261	-0.267	-0.362	-0.292	-0.313	-0.313	-0.43
N	274,388	334,791	268,210	419,266	205,922	176,391	126,737	75,189

Source: Authors' calculations from 2018 HMDA data

Table 4: Summary Characteristics of 2018 HMDA Applicants, Would Qualify for HECM at 3.0 Rate

	Originated				Denied			
Estimated HECM Loan Characteristics	HELOC or Second	Cash Out First Lien	Refinance No Cash	Purchase Mortgage	HELOC or Second	Cash Out First Lien	Refinance No Cash	Purchase Mortgage
Estimated HECM Total Up Front Costs	14,367	14,367	14,043	14,614	9,443	9,056	9,705	9,292
Mortgage Debt to be Paid off with HECM	28,151	2,886	9,426	1,199	29,820	2,840	12,106	2,074
Estimated Loan Amount with HECM	121,877	137,240	126,119	146,099	116,158	127,654	136,829	140,483
Estimated HECM loan to value or MCA	0.352	0.393	0.378	0.416	0.341	0.394	0.391	0.419
Reasons for Denial								
Reason for Denial: Credit History					0.453	0.31	0.279	0.18
Reason for Denial: Debt to Income					0.489	0.33	0.448	0.391
Select HMDA Characteristics								
Loan amount (or IPL for reverse mortgage)	84,159	124,789	107,360	135,290	76,895	115,757	115,018	129,116
Property value	392,938	387,937	378,220	366,373	411,596	362,212	414,666	367,910
Combined loan to value ratio	0.303	0.346	0.33	0.375	0.291	0.345	0.341	0.373
Loan to value ratio for this loan	0.243	0.345	0.313	0.379	0.229	0.345	0.321	0.377
Interest rate	4.933	4.596	4.402	4.548	.	.	.	.
Interest rate spread	0.212	0.593	0.157	0.361	.	.	.	.
Total loan costs	266	2,916	2,151	3,259	.	.	.	.
Percent reporting total loan costs	0.048	0.954	0.488	0.973	0	0	0	0
Black or Hispanic	0.101	0.141	0.099	0.079	0.262	0.219	0.192	0.143
Borrower gender: single female	0.273	0.294	0.264	0.262	0.366	0.323	0.339	0.307
Borrower gender: single male	0.186	0.201	0.178	0.146	0.289	0.319	0.273	0.214
Borrower gender: joint female and male	0.489	0.424	0.499	0.537	0.299	0.268	0.313	0.389
DTI <36%	0.528	0.476	0.545	0.536	0.259	0.318	0.26	0.308
DTI 36-41%	0.178	0.201	0.167	0.183	0.08	0.116	0.087	0.106
DTI >41%	0.294	0.323	0.288	0.281	0.66	0.566	0.653	0.586
Income used for underwriting	85.339	95.983	81.46	172.578	63.702	57.666	58.215	65.481
Census tract % minority	24.953	30.44	24.762	22.963	37.041	35.772	33.29	24.814
MSA median family income	76,359	75,855	76,507	73,423	75,945	73,784	77,235	66,359
Census tract income to MSA income %	118.7	114.5	118.2	121.3	110.9	107.6	113.2	105.7
Observations	106,016	84,555	93,595	46,277	66,973	29,539	30,927	2,869

Source: Authors' calculations from 2018 HMDA data