

Donald Haurin
Department of
Economics, The Ohio
State University

Căzilia Loibl
Department of Human
Sciences, The Ohio State
University

Stephanie Moulton
John Glenn College of
Public Affairs, The Ohio
State University

Debt Stress and Mortgage Borrowing in Older Age: Implications for Economic Security in Retirement

The research reported herein was performed pursuant to a grant from the U.S. Social Security Administration (SSA) funded as part of the Retirement and Disability Consortium. The opinions and conclusions expressed are solely those of the author(s) and do not represent the opinions or policy of SSA or any agency of the Federal Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of the contents of this report. Reference herein to any specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply endorsement, recommendation or favoring by the United States Government or any agency thereof.

The work that provided the basis for this research was also supported by funding under a grant with the MacArthur Foundation: "Aging in Place: Analyzing the Use of Reverse Mortgages to Preserve Independent Living," 2012-14, and a grant with the U.S. Department of Housing and Urban Development "Aging in Place: Managing the Use of Reverse Mortgages to Enable Housing Stability," 2013-2015, Stephanie Moulton, PI. The substance and findings of the work are dedicated to the public. The author and publisher are solely responsible for the accuracy of the statements and interpretations contained in this publication. Such interpretations do not necessarily reflect the view of the Government.

Center for Financial Security

University of
Wisconsin-Madison

1300 Linden Drive
Madison, WI 53706

608-890-0229

cfs@mailplus.wisc.edu

cfs.wisc.edu

Abstract

The amount of financial debt held by older adults in the U.S. has grown substantially over the past two decades. It is important to understand how debt levels contribute to overall well-being and their implications for retirement decisions. In this study, we focus on the relationship between mortgage debt, financial stress, and early claiming of Social Security retirement benefits using data from the Health and Retirement Study and our own national survey of reverse mortgage borrowers. We first provide a detailed assessment of mortgage debt, finding that higher levels of both first and second mortgages are associated with higher financial stress. However, the amount of stress from mortgage debt is less than that from unsecured forms of borrowing. We next identify the financial stress associated with reverse mortgages, a type of mortgage debt available only to older adults. Per dollar of debt, reverse mortgages result in lower financial stress compared to traditional mortgages or credit cards. However, the total stress of a reverse mortgage may exceed that of a standard mortgage over time, as its balance grows while standard mortgage balances decrease. We conclude our analysis by exploring the relationship between financial stress and the decision to claim Social Security Retirement Income early at age 62. We find that an increase in financial stress is associated with a lower likelihood of claiming Social Security early. These findings offer important insights about the relationship between mortgage debt and financial stress, and its consequences in older age.

Keywords: Financial Stress, Mortgage Debt, Consumer Debt, Social Security Claims

JEL Codes: D12, J26, H55, G21, G40,

1. Introduction

The amount of financial debt held by older adults in the U.S. has grown substantially over the past two decades, both in dollar terms and as a proportion carrying debt into retirement. The median total consumer debt of older adults in 2016 was \$31,300, an increase of 250 percent from 2001 levels (National Council on Aging 2018). Prior research links higher levels of debt to increased psychological stress and decreased physical health (Drentea & Reynolds 2015; Dunn & Mirzaie 2016). For older adults, these effects may be exacerbated by fixed incomes and limited ability to offset higher monthly debt obligations through increased labor supply. Prior research finds that mortgage debt is associated with increased probability of working and delayed probability of claiming Social Security benefits (Butrica & Karamcheva 2018; Mann 2011). Our study examines the stress associated with different forms of debt held by older adults—including reverse mortgages, a type of debt available only to homeowners age 60 and older, and documents the relationships between mortgage debt and decisions regarding early claiming of Social Security benefits.

While there is a small body of literature that examines the relationship between financial debt and stress, ours is the first study to focus on financial stress among older adults. We pay particular attention to how mortgage debt contributes to financial stress for this population given that housing wealth is the primary asset in the retirement wealth portfolio for a majority of older adult households—particularly those with lower incomes. In 2016, equity from a primary home comprised 69 percent of net wealth for older homeowners in the bottom 40 percent of the income distribution, compared to 24 percent of net wealth for those in the top 20 percent.¹ Most older adults do not liquidate housing wealth through home sale until immediately prior to death or upon entry into nursing home care (Mayer 2017; Poterba et al. 2011). Borrowing through a mortgage is the predominant mode by which older adults liquefy housing wealth. Mortgage debt held by older homeowners has doubled over the past two decades (Goodman, Kaul, and Zhu 2017; Mayer 2017; Moulton et al. 2016a).

Borrowing through a mortgage allows older adults to liquefy an otherwise illiquid asset, smoothing consumption in the presence of an income or expense shock. However, mortgage debt can also create financial stress. The repayment of mortgage debt can strain household budgets,

¹ Authors calculations from the 2016 Survey of Consumer Finances

particularly for lower income older adults. Mortgage payments are often the largest recurring monthly expenditure for older homeowners (Alley et al. 2011; Allin, Masseria, and Mossialos 2009; Crystal & Shea 1990). In 2014, nearly one third of older homeowners with a mortgage spent more than half of their income on monthly housing costs (JCHS 2014). Our first research question asks whether or not mortgage debt increases psychological stress for older adults, and how this compares to the stress created by other types of consumer debt. For this analysis we compare adults age 62 and older to a younger cohort age 50 to 61.

In the U.S., adults age 62 and older have access to a unique type of mortgage debt – the federally insured Home Equity Conversion Mortgage (HECM). As a reverse mortgage, the HECM allows older adults to consume from the equity in their homes without monthly repayment. Our second research question examines whether the amount of stress created by HECM debt is similar to that for standard mortgages. Obtaining a HECM may lower a borrower’s level of stress by eliminating monthly debt payments and converting forward mortgages or other consumer debt into debt that is not typically repaid until the death of the last borrower. However, HECMs require a nontrivial origination fee, and the loan balance rises due to compounding interest, which may increase stress. Our study is the first to test whether reverse mortgage debt causes stress similar to that of standard mortgages.

Our third research question explores the consequences of financial stress for retirement decisions—specifically, early claiming of Social Security retirement benefits. Prior research has found that financial debt is associated with increased probability of working and delayed probability of claiming Social Security benefits (Butrica & Karamcheva 2013, 2018; Mann 2011). It is thus expected that financial stress may also delay claiming of retirement benefits. However, the stress response also is idiosyncratic, with individuals responding to the same levels of financial wealth, income, and debt in different ways. We test whether this idiosyncratic component adds to the explanation of why some adults elect to claim Social Security Retirement Income early, at age 62.

For this study, we complement data from the Health and Retirement Study (HRS) with our own survey data on reverse mortgage borrowers (Haurin, Moulton, and Shi 2018; Loibl et al. in press; Moulton, Haurin, and Shi 2015; Moulton et al. 2017). Using these data, we perform three distinct analyses. First, we estimate the relationship between debt—including different types of mortgage debt—and indicators of financial stress for older adults. Second, we identify

the relationship between reverse mortgages and financial stress. Finally, we consider how debt-related stress is associated with the decision to claim Social Security Retirement Income early at age 62.

2. Literature Review

Our research is informed by several bodies of literature. First, we draw from the literature on consumer and mortgage debt among older adults, as well as an emerging body of literature on financial stress. Next, we review the literature on reverse mortgages and provide our expectations for how reverse mortgages may affect financial stress. Finally, we review the literature on the timing of claiming Social Security retirement benefits, and consider financial stress as a unique explanatory factor that may influence the decision to delay claiming Social Security retirement benefits.

2.1 Debt and Financial Stress in Older Age

Numerous studies document an increasing share of older adults holding financial debt, and an increasing amount of financial debt held by this population over the past two decades (Collins, Hembre, and Urban 2018; Fichtner 2019; Lusardi, Mitchell, and Oggero 2018). While mortgage debt is the predominant form of debt held by older adults and is responsible for the largest increase in debt, credit card and other forms of debt have also increased for older consumers since the mid to late 1990s (Butricia and Karamcheva 2019). In fact, the use of credit card debt increases with age, with 85 percent of adults age 65 and older holding a credit card (Fulford & Schuh 2015). This increase in debt use is not inherently good or bad—debt is a form of liquidity and is often used to finance consumption by U.S. households (Fulford 2015). In fact, 45 percent of older adults with a credit card do not pay off their balance in full each month, indicating a need for liquidity that is met through borrowing on credit cards (Fulford 2015). For older people, the use of debt can be part of a strategy to decumulate assets in retirement, including otherwise illiquid home equity. Historically, older adults have not deleveraged wealth—including housing wealth—in retirement as might be expected following a life cycle model (Poterba, Venti, and Wise 2011). An increasing trend towards use of debt in retirement may simply reflect rational behavior.

On the other hand, financial debt may be associated with financial stress. Financial stress is often conceptualized as having two aspects, a resource-related, material-deprivation aspect and an emotional, life-satisfaction-related aspect (for a literature review, see Tay et al. 2017). The resource-related, material-deprivation aspect of financial stress reflects difficulty meeting monthly expenses, difficulty accumulating sufficient savings for emergencies or retirement, and accumulating debt (de Souza et al. 2014; Yabroff et al. 2016). This perspective is well-established in the material deprivation literature (Whelan & Maître 2013) and has been associated with a number of poor health outcomes (Pearlin et al. 1981; Charles 2010). The emotional, non-material aspect of financial stress due to debt has been shown to impact individuals' sense of mastery and coping abilities and, in turn, to increase feelings of hopelessness, frustration, and anxiety (Cohen, Salonen, and Kaplan 1999; Drentea & Reynolds 2015; Gallo & Matthews 2003).

Most of the literature exploring the relationship between debt and financial stress has focused on the general population rather than older adults. Across these studies, financial stress is highest for non-collateralized debt. Individuals report the highest levels of financial stress from payday loans. Credit card debt ranks second, followed by student loans, informal loans from family and friends, and bank loans (Dunn & Mirzaie 2016; Hojman, Miranda, and Ruiz-Tagle 2016). Collateralized debt is perceived as less stressful, and financial stress tends to be lower for installment loans for cars, appliances, furniture, and lowest for mortgage debt (Dunn & Mirzaie 2016; Shen, Sam, and Jones 2014). Among types of mortgage debt, Dunn and Mirzaie (2016) find that debt from a home equity line of credit (HELOC) was associated with slightly greater financial stress compared to debt from a first mortgage.

Lower levels of financial stress have been associated with older age (Shen, Sam, and Jones 2014) due to lower pressure from financial stressors such as jobs, children, marriage and divorce, which tend to be resolved to a greater extent in middle and older age compared to younger age (Drentea 2000). However, research has also suggested that older people can experience higher levels of financial stress because they are later in their life cycle with less time for debt repayment, which may make them feel more constrained by their debt and intensify feelings of financial stress (Lusardi 2012). For example, Pool et al. (2017) identified for an HRS sample of older adults increased odds of elevated depressive symptoms as a result of negative wealth shocks during the recent recession, defined as a loss of 75 percent of net worth. In

contrast, examining the economic recovery of the follow-up period, Hamoudi and Dowd (2014) found, also for an HRS sample of older adults, that greater housing appreciation was associated with a significantly lower risk of anxiety, especially for women. Except for this small number of studies on financial shocks or windfalls, there is a lack of understanding of how the types of home loans carried into older age are associated with the components of subjective well-being in older age.

Based on prior studies of the general population, we expect non-collateralized consumer debt to be associated with higher levels of financial stress compared to collateralized mortgage debt. Of mortgage debt types, we expect home loans and secondary mortgage debt to be associated with higher levels of stress than first mortgage debt in the general population, as documented by Dunn and Mirzaie (2016). Further, we include indicators of both material and emotional financial stress to better understand the pathways of the debt-to-stress relationship.

Unique to our study, we consider whether “old” mortgage debt carried into older age is more or less stressful than new mortgage borrowing in older age. It is possible that new mortgage borrowing after age 62 is related to higher levels of financial stress because it adds or increases the monthly mortgage payment and reduces the discretionary income available, thus reflecting findings of the material deprivation literature (Whelan et al. 2001). It is also possible that new mortgage borrowing in older age can have little relation to financial stress. For example, new mortgage debt can be an instrument for achieving specific goals that have positive long-run outcomes, such as assisting children with education costs or home purchase (Dwyer, McCloud, and Hodson 2011; Tay et al. 2017). On the other hand, we expect that reducing one’s mortgage balance in older age is associated with reduced levels of financial stress, mirroring findings from the economic recovery period of the past recession (Hamoudi & Dowd 2014).

2.2 Reverse Mortgages and Financial Stress

In addition to traditional types of mortgage debt, our study considers the stress associated with a unique type of mortgage debt available only to older adults. Reverse mortgages allow older homeowners to extract equity from their homes in a lump sum, on a line of credit, or as a monthly annuity distribution, with no monthly repayment required. Unlike typical forward mortgages, the balance on a reverse mortgage grows over time (“in reverse”), with repayment due when the loan is terminated, typically when the last borrower dies or moves out of the

property (HUD 2017). We study the most popular form of reverse mortgage in the U.S., the Home Equity Conversion Mortgage (HECM). HECMs are federally regulated and insured by the Federal Housing Administration (FHA). The federal insurance protects borrowers and lenders from negative equity, with borrowers and their heirs never owing more than the house is worth at the time of loan termination.

The HECM program was authorized as a pilot by Congress in 1987 but did not become a permanent program until 1998. As of July 2019, just over 1.1 million HECM loans have been originated, with 93 percent having originated since 2004 (NRMLA 2019). Despite early projections of demand for the product (Mayer & Simons 1994; Rasmussen, Megbolugbe, and Morgan 1995), only about 2 percent of the eligible population of older homeowners currently holds a reverse mortgage (Moulton et al. 2017). Homeowners who obtain reverse mortgages tend to have lower incomes than the general population, but also have higher-valued homes and higher amounts of home equity than other older homeowners (Redfoot, Scholen, and Brown 2007; Moulton et al. 2017). Empirical studies of the take-up of reverse mortgages find that rates are higher in areas with a higher proportion of Black and Hispanic residents and in areas with lower credit scores, median incomes, and higher levels of home equity (Shah 2012; Moulton et al. 2019; Haurin et al. 2016).

A limited body of literature focuses on the outcomes of borrowers with reverse mortgages. Survey data generally finds that reverse mortgage borrowers report high levels of satisfaction with the product and with their financial well-being three to five years after obtaining a reverse mortgage (Loibl et al. in press; Moulton, Loibl, and Haurin 2017; Redfoot, Scholen, and Brown 2007). Most relevant to our current study, Moulton et al. (2016) compared the credit outcomes of reverse mortgage borrowers to older homeowners in the general population. Using consumer credit panel data with a differences-in-differences specification, they found that reverse mortgage borrowers are much more likely to experience a credit shock in the two years prior to originating a reverse mortgage than older adults in the general population, including those who borrow through forward mortgages. After matching on the pre-treatment credit shock, they found that the reverse mortgage is associated with a short-term reduction in credit card debt and rates of filing bankruptcy, and a small increase in credit score for homeowners who had high levels of debt prior to originating the reverse mortgage.

In this paper, we consider the relationship between obtaining a federally insured Home Equity Conversion Mortgage (HECM) and future debt stress. Obtaining a HECM may affect an older adult's level of debt stress in multiple ways. The origination of a HECM requires repayment of forward mortgage debt thereby eliminating mortgage payments, likely reducing stress. In fact, 60 percent of reverse mortgage borrowers utilize at least a portion of their proceeds to pay off a forward mortgage (Moulton et al. 2017). Further, a HECM converts illiquid home equity into a liquid asset and these funds can be used to pay down credit card and installment debts, again likely reducing financial stress. HECMs are non-recourse loans, thus protecting homeowners against house price declines, this insurance aspect perhaps reducing stress. However, HECMs require nontrivial up-front mortgage insurance and origination fees, which are typically added to the loan balance. The loan balance rises over time due to compounding interest and ongoing mortgage insurance payments. This increasing debt likely causes additional stress as it reduces the bequest to borrowers' heirs and the amount of home equity that can be accessed by the borrowers. Thus, it is not clear whether reverse mortgage stress is greater, smaller, or the same as that for an equally sized standard mortgage or compared to a scenario without a reverse mortgage. We are the first to estimate the relationship between reverse mortgage borrowing and financial stress.

2.3 Financial Stress and Early Claiming of Social Security Benefits

For older adults, debt and financial stress may have critical consequences for retirement decisions, including when to claim Social Security retirement benefits. Older adults have a choice of when to first claim retirement benefits. The age of initial receipt of Social Security benefits varies across individuals with the typical range being 62 to 70.² The percentage claiming Social Security retirement benefits at age 62 for men and women has declined over time from 50.2 percent and 54.3 percent in 2005, to 29.0 percent and 32.9 percent in 2017 (Social Security Administration, 2018, Annual Statistical Supplement Table 6.B5). Understanding the factors associated with early claiming is important, as claiming early reduces an individual's amount of future monthly benefits. The reduction in benefits depends on the full retirement age (FRA) and the age when benefits are claimed. The total reduction in monthly benefit if the claim is at age 62

² In 2010, 5.8% of new Social Security claims were by individuals greater than age 70 (Social Security Administration, 2018) with recent immigrants being a substantial share of this group.

rather than 67 (the FRA) is substantial, equaling 30%.³ Further, this reduction persists after the individual's death if there is a survivor that claims the survivor benefit.

Several prior studies estimate the decision to claim Social Security retirement benefits. Factors found to significantly increase early benefit claiming include a shorter reported life expectancy (Hurd et al. 2004), receiving employer-sponsored pensions (Li et al. 2008), owning stocks (Hurd et al 2004), health problems (Haaga and Johnson 2012), holding more physically demanding blue collar jobs (Glickman and Hermes 2015), and macro factors such as unemployment rates (Haaga and Johnson 2012; Card, Maestas, and Purcell 2014). Higher levels of education are consistently associated with delayed claiming of Social Security retirement benefits (Hurd et al 2004; Sass, Sun, and Webb 2007; Haaga and Johnson 2012).

Most related to our present study, Butrica and Karamcheva (2013; 2018; 2019) estimated the relationship between financial debt and retirement decisions, including labor supply and claiming of retirement benefits. They hypothesized that servicing debts may increase the incentive to remain at work and delay claiming benefits. If working is not feasible (e.g. due to health) or is not sufficiently remunerative, they suggest that older adults may claim early to generate income. Using HRS data (2013), they found that holding debt increases the probability of working by 8 percentage points and delays claiming retirement benefits by 2 percentage points. They found that the extensive margin of having a mortgage has a larger effect on labor supply and Social Security claiming than other forms of debt. However, estimates measuring the *amount of debt* indicate that credit card debt has a larger dollar for dollar effect on continuing to work and delayed claiming than mortgage debt does—with a \$10,000 increase in credit card debt associated with a 12 percentage point decrease in the probability of claiming benefits.

While prior studies indicate a relationship between financial indicators-including debt-and retirement decisions, no prior research has estimated the relationship between financial stress and retirement decisions. In this study, we examine the relationship between financial stress and Social Security retirement benefit claiming, holding constant financial variables, including the level of debt held by households. We are thus measuring the idiosyncratic component of financial stress that cannot be fully explained by financial variables typically included in

³ The full retirement age is 65 for individuals born 1937 and earlier, rising to 66 for those born 1943 to 1954, and to 67 for those born in 1960 and later. According to the Social Security Administration “In the case of early retirement, a benefit is reduced 5/9 of one percent for each month before normal retirement age, up to 36 months (maximum 20 percent). If the number of months exceeds 36, then the benefit is further reduced 5/12 of one percent per month (maximum of an additional 10 percent).” (Social Security Administration 2019).

estimates of early claiming. Similar to Butricia and Karamcheva (2013; 2018) who found that higher levels of consumer debt were associated with delayed claiming, we expect that an individual who is financially stressed has an incentive to defer claiming Social Security and to continue working. This individual may seek alternatives to an early claim of benefits such as drawing on assets, increasing debt, or continuing full or part-time work.

We expect that the decision to delay claiming benefits in response to financial stress may be moderated by the extent to which the individual has earned income in the prior period—this being an indicator of labor force attachment and being more likely to continue working rather than claim Social Security benefits to offset financial stress. We expect those not in the labor force in the prior period to be more likely to claim early. The interaction with financial stress is theoretically unclear; they may choose to re-enter the labor force and delay claiming, re-enter the labor force part time and claim benefits early, or claim benefits early without working.

3. Data and Descriptive Trends

3.1 Data: Health and Retirement Study

The primary source of data for our analysis is the Health and Retirement Study (HRS), a long-standing and well-regarded survey of American adults over the age of 50 with a response rate above 80 percent. Respondents are surveyed every two years, with new birth cohorts added to the existing sample every three waves. Each wave has around 20,000 respondents (for data set description, Fisher & Ryan 2018; Sonnega et al. 2014). We use the HRS data from 2004 to 2014 for our first and third research questions. The financial stress questions we use in our analysis are part of the supplementary Psychosocial and Lifestyle Questionnaire of the HRS, which is administered as a paper-based questionnaire that HRS participants complete by themselves after the face-to-face interview and mail back to the HRS offices. This “leave-behind” questionnaire has been given to half of the HRS core panel respondents since 2006. The first half of respondents answered the leave-behind questionnaire in 2006, 2010, and 2014. The second half answered the leave-behind questionnaire in 2008 and 2012 (for documentation about the leave behind questionnaire, Smith et al. 2017).

We measure financial stress with two indicators from the HRS, corresponding to subjective and objective components of prolonged financial stress. The measure of objective financial stress examines a person’s bill-paying behavior, a common and widely used measure in material deprivation literature (de Souza et al. 2014; Whelan et al. 2001). Respondents were asked, “How difficult is it for you to meet monthly payments on your bills?” Response options ranged from *not at all* (=1) to *completely difficult* (=5) (Smith et al. 2017). Following previous HRS-based studies (e.g., Marshall & Tucker-Seeley 2018), a dichotomous exposure variable is coded as 0 if the respondent reported that paying bills was *not at all difficult* (=1) or *not very difficult* (=2) and 1 if they reported that paying bills was *somewhat difficult*, *very difficult*, or *completely difficult* (=3, 4, and 5)

The measure of the subjective component of financial stress inquires, “Please read the list below and indicate whether or not any of these are current and ongoing problems that have lasted twelve months or longer. If the problem is happening to you, indicate how upsetting it has been. ...Ongoing financial strain” (this is one of eight areas of life on the list). Response options include *no, didn’t happen* (=1), *yes, but not upsetting* (=2), *yes, somewhat upsetting* (=3), and

yes, very upsetting (=4) (Smith et al. 2017). Following previous studies (Birditt et al. 2016; Marshall et al. 2018; Marshall & Tucker-Seeley 2018), a dichotomous exposure variable is coded as 0 if no strain occurred (=1) and 1 if strain occurred but wasn't upsetting, was somewhat upsetting, or very upsetting (=2, 3, and 4).

The HRS includes indicators for both housing and non-housing debt. Housing debt balances include both the primary and secondary residence mortgages. Total mortgage debt of the primary residence mortgage consists of three types: first mortgage, home equity lines of credit (HELOC), and a combined measure of second mortgage/other home loans. Secondary residence mortgage balance is a total measure of all mortgages for the secondary residence. We use two measures to capture non-housing debt. First, we subtract credit card debt from the total debt reported to calculate the credit card debt balance that respondents carried over from the last month to the current one. Second, we use a measure for the remaining debt balances, which include medical debts, loans from life insurance policies, loans from relatives, and obligations labeled "other consumer debts." The HRS started to collect credit card balance data only in 2008. For the 2004 and 2006 waves, we use the value as of 2008.

Financial characteristics include respondent and spouse income from Social Security retirement and disability income, earned income, and other income (calculated as subtracting SSRI, SSDI and earned income from total income). Assets include net cash assets (including cash in checking accounts and CDs), net investment assets (including assets held in IRAs, stocks, bonds, and trust accounts), and net other assets (including other savings, non-housing real estate, transportation, and business assets). The home value of the primary and secondary residences is based on the HRS respondent's estimates. We exclude observations from our sample with values at the 99th percentile or higher for one or more of the financial variables, reducing the influence of extreme outliers in the HRS data (Fitchner 2019).

3.2 Data: Reverse Mortgage

To estimate the relationship between reverse mortgages and debt stress, our primary data are from a sample of older adults who attended mandatory reverse mortgage counseling for a Home Equity Conversion Mortgage (HECM) in 2010 or 2011 and who responded to a follow-up survey in 2014 or 2015. These data were collected by the research team as part of a multi-year study of

reverse mortgage borrowers (Moulton et al., 2016b).⁴ The initial population for the survey included 19,391 households who had been counseled for a reverse mortgage by Clearpoint Credit Counseling Solutions, a national, HUD-approved 501(c)(3) nonprofit housing counseling agency who provides the required pre-HECM counseling. Of the 19,391 households, viable contact information (including a working telephone number) was available for 11,792 households at the time of survey administration. These households were contacted by mail, phone, and email (when available) with an invitation to complete the survey. A total of 1,338 people consented to participate in the survey, for a response rate of 11.3 percent. We limit our sample for the analysis to the 1,088 respondents who completed at least the first set of questions on reverse mortgage status and had not terminated the reverse mortgage at the time of the survey. We further drop observations with missing values for debt stress or who have extreme values for financial variables, resulting in a final sample size of 1,026. About 70 percent of respondents in the survey sample originated a HECM.

The follow-up survey consisted of six sections, including questions about their experiences with counseling and the reverse mortgage loan, as well as their housing, financial, health, and socio-economic characteristics. The survey includes a question on debt stress from the Consumer Finance Monthly survey, a cross-sectional survey administered by the Center for Human Resource Research, The Ohio State University from 2005 to 2013 (Dunn & Mirzaie 2016; Shen, Sam, and Jones 2014). The item states, “Now, we’d like to know how much stress you feel from your total debt. Would you say that the total debt you are carrying causes you a great deal of stress, quite a bit of stress, some stress, not very much stress, or no stress at all?” Responses also include *not applicable*, *don’t know*, and *refuse to answer*. Responses are coded on a 1 to 5 scale with 5 being “a great deal of stress”.⁵

We supplement the survey data with data on the same individuals from administrative data sets, including socio-economic characteristics collected at the time of counseling in 2010 or 2011, credit attribute data, and HECM loan data provided by the U.S. Department of Housing and Urban Development (HUD). Indicators for amounts of housing and non-housing debt as of

⁴ We are not aware of any other survey data with a substantial number of reverse mortgage borrowers, and with detailed financial data including detailed information about financial debts and financial stress. The Health and Retirement Study began collecting information about reverse mortgage loans in 2010 (Question H024M1) and there are about 100 respondents reporting they hold one (Chatterjee, 2016).

⁵ Our single item debt attitude measure was chosen to reduce survey length, repetition, and respondent burden. Findings based on single-item measures tend to replicate findings based on multi-item measures (Bergkvist & Rossiter, 2007; Wanous, et al., 1997).

the time of counseling are constructed using the counseling, credit, and loan data. Similar indicators are constructed using the survey data as of 2014 or 2015, three to five years later.

3.3 Descriptive Trends: Health and Retirement Study

Before estimating multivariate models, we document the trends in financial debt, stress, and Social Security retirement benefits claiming among older adults using data from six waves of the HRS spanning ten years, from 2004 through 2014. Figure 1 plots the proportion of HRS respondents reporting holding any debt from 2004 to 2014, and of those with debt, median debt amounts (in \$10,000s, constant 2016 dollars) over time.

Since 2004, the proportion of people with any financial debt has been increasing steadily among those age 62 or older, while remaining relatively flat among those ages 50 to 61. Among those age 62 to 71, the proportion holding any debt increased by 8 percentage points, from 47 percent in 2004 to 55 percent in 2014. The proportion of adults age 71 and older carrying any debt also increased by 8 percentage points, from 22 percent in 2004 to 30 percent in 2014. Of those holding any debt, the median amount of debt has remained relatively flat from 2004 through 2014. It is important to note that our trends begin in 2004; prior studies documenting significant increases in debt levels among older adults often begin in the early 1990s, with the steeper increases occurring prior to 2004, and then increasing at a slower rate post-2004 (Butricia and Karamcheva 2013; 2019).

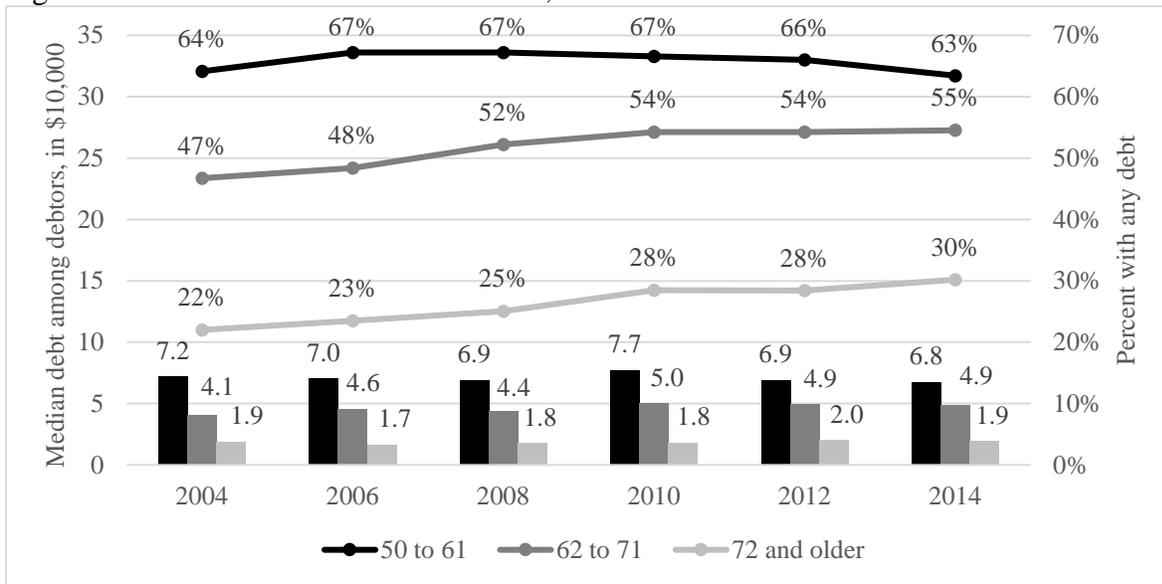
We next consider trends in mortgage debt over time. Figure 2 plots the proportion of homeowners in the HRS holding mortgage debt between 2004 and 2014, and of those with mortgage debt, the median debt amount (in \$10,000s, constant 2016 dollars). Similar to the trends for any financial debt, increases in mortgage debt over time are larger for respondents age 62 and older as of a given survey wave, with the proportion of adults age 50 to 61 holding mortgage debt remaining relatively flat from 2004 to 2014. Of those with mortgage debt, the median amount of debt held is also increasing over time for the older cohort. In 2004, the median respondent age 62 to 71 held \$69,000 in mortgage debt, compared to \$83,000 in 2014.

Figure 3 graphs financial strain over time from 2006 through 2014, including the proportion of respondents experiencing any financial strain as well as the mean level of financial strain reported by respondents. The trends indicate an increase in the proportion of respondents across all age groups experiencing financial strain from 2006 to 2008, corresponding to the onset

of the financial crisis, and remaining relatively flat thereafter. Perhaps not surprisingly, younger HRS respondents (age 50-61) report the highest levels of strain, followed by those age 62 to 71, with those ages 72 and older reporting the lowest levels of financial strain.

Figure 4 plots the proportion of adults age 62 to 64 who report receiving retirement income from Social Security in a given survey wave, or who report receiving earned income in a given survey wave, from 2004 to 2014. In our sample, the proportion of adults claiming Social Security retirement benefits prior to age 65 has declined over time from 46 percent in 2004 to 34 percent in 2014, similar to trends reported elsewhere (e.g. Social Security Administration, 2018). By contrast, the proportion of adults age 62 to 64 reporting any earnings from work has remained relatively constant over time, at around 50 percent.

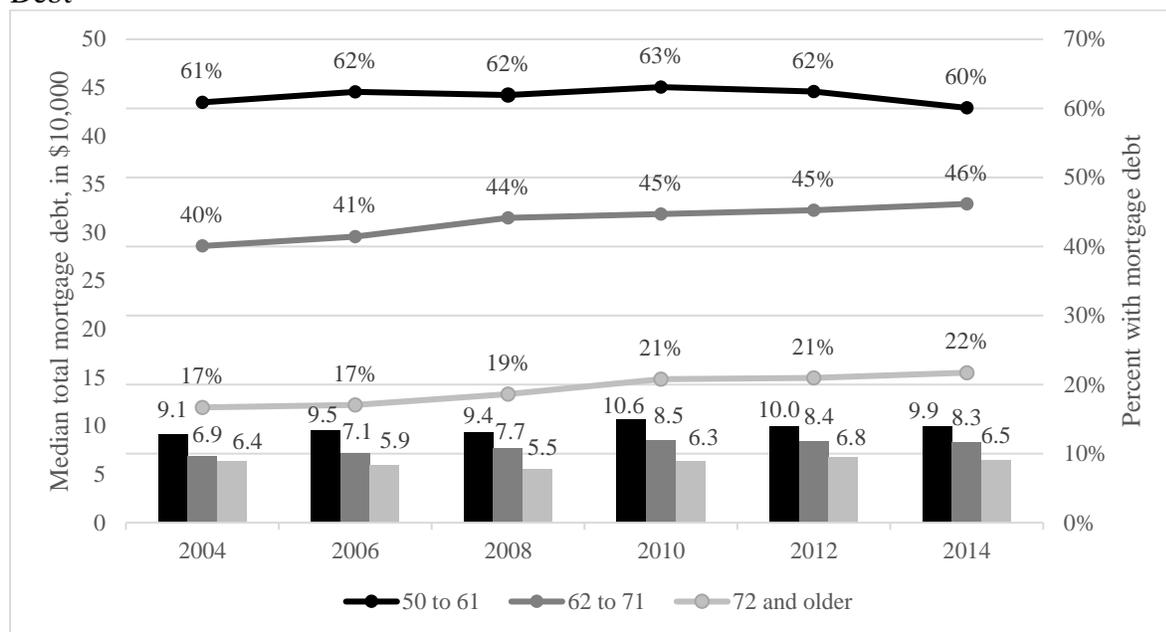
Figure 1: Share of Older Adults with Debt, Median Values of Debt for Those with Debt



Source: Author’s calculations using the 2004-2014 Health and Retirement Study data

Notes: Median debt amounts among those reporting any consumer debt are measured in \$10,000s, expressed in 2016 real dollars.

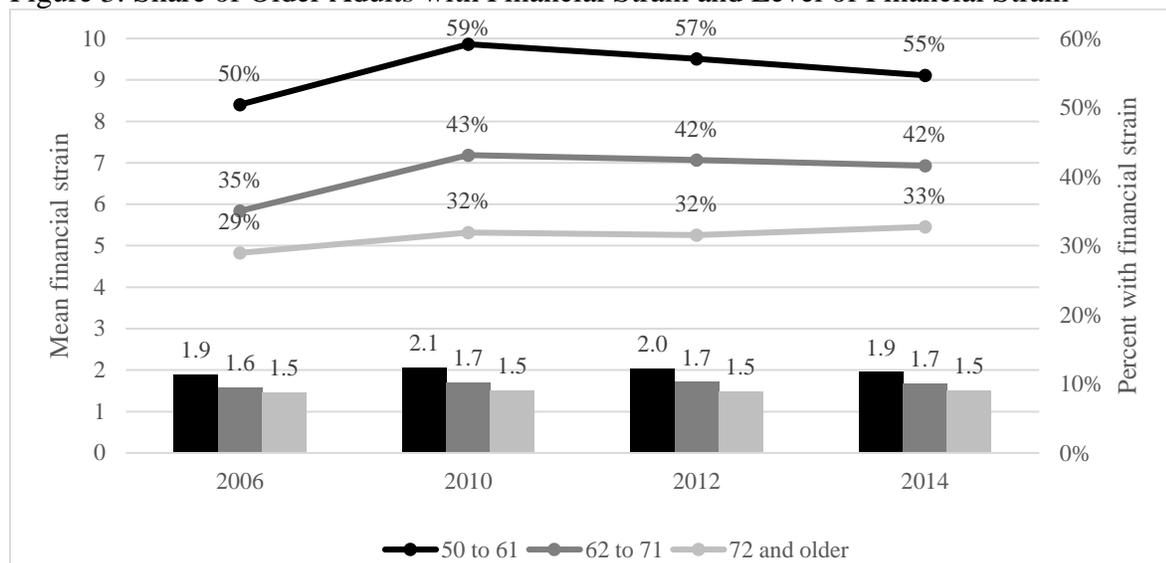
Figure 2: Share of Older Adults with Mortgage Debt, Median Values for Those with Mortgage Debt



Source: Author’s calculations using the 2004-2014 Health and Retirement Study data

Notes: Median mortgage amounts among those reporting any mortgage debt are measured in \$10,000s, expressed in 2016 real dollars.

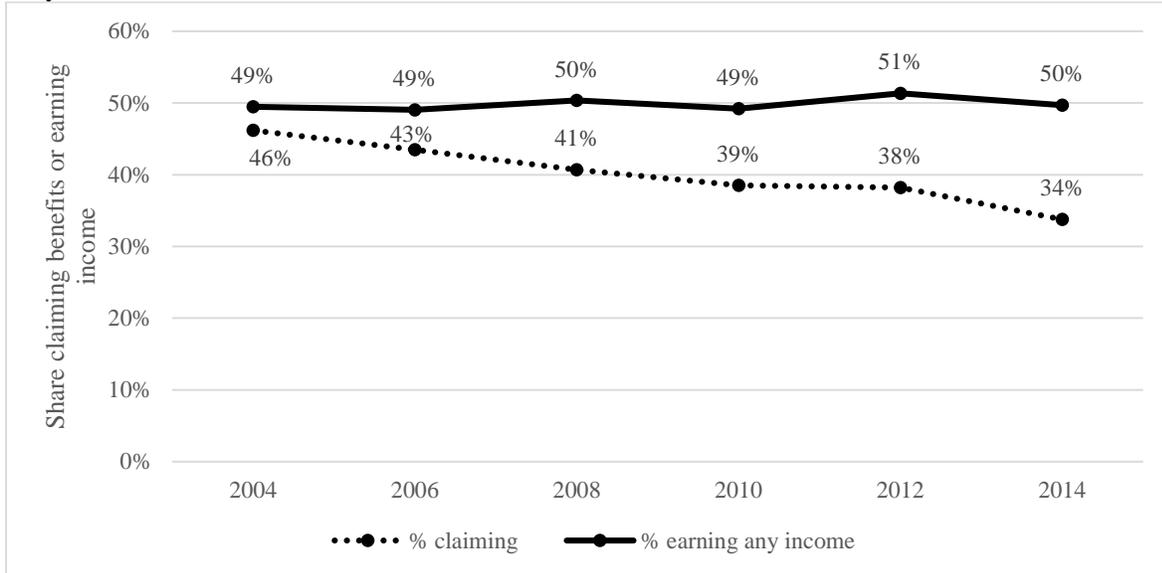
Figure 3: Share of Older Adults with Financial Strain and Level of Financial Strain



Source: Author’s calculations using the 2004-2014 Health and Retirement Study data

Notes: Financial strain is measured in the supplemental HRS Psychosocial and Lifestyle Questionnaire. Response options include no, didn’t happen (=1), yes, but not upsetting (=2), yes, somewhat upsetting (=3), and yes, very upsetting (=4).

Figure 4: Share of Adults Age 62-64 Claiming Social Security Retirement Benefits or Reporting Any Earned Income



Source: Author's calculations using the 2004-2014 Health and Retirement Study data

Notes: Respondents are coded as claiming Social Security retirement benefits (or having earned income) if they reported receiving any income from Social Security retirement benefits (or any income from earnings) in a given survey wave.

4. Debt and Financial Stress in Older Age

Our first multivariate analysis explores the relationship between financial debt and financial stress, identifying differences between younger and older cohorts of adults in the HRS. We differentiate mortgage debt by type, and differentiate mortgage debt originated by households prior to age 62 from changes in mortgage debt at age 62 and afterward due to additional borrowing or repayment.

4.1 Sample & Empirical Strategy

For this analysis, we constructed a panel of HRS participants who responded to the HRS psychosocial leave-behind supplement about financial strain and difficulty paying bills in 2006, 2010, 2012, or 2014.⁶ On average, respondents in our final samples participated in 1.8 leave-behind survey waves. We divide the sample into two groups based on the age of the respondent as of 2006 (for those first administered the leave-behind supplement in 2006) or 2008 (for those first administered the leave-behind supplement in 2008). The older cohort includes 5,034 respondents who were aged 62 and older in 2006 or 2008, corresponding to 9,189 respondent-year observations. The younger cohort includes 2,569 respondents who were aged 50 to 61 in 2006 or 2008, corresponding to 4,571 respondent-year observations.

Our primary regression specification models the two continuous measures of financial stress, using random-effects linear panel regression models.⁷ All explanatory financial variables are lagged to break the potential simultaneity between stress and financial variables in the same period (e.g., higher levels of financial stress lead to contemporaneous changes in income, savings, or debt). We estimate each outcome for each cohort separately. Our estimating equation is:

$$S_{it} = \beta_0 + \beta_1 D_{it-1} + \beta_2 H_{it-1} + \beta_3 I_{it-1} + \beta_4 A_{it-1} + \beta_5 X_{it-1} + \eta_{it} \quad (1)$$

⁶ The leave-behind supplement was administered to half of the respondents in our panel in 2006, 2010, and 2014, while it was administered to the other half of respondents in 2008 and 2012. However, financial strain was not included on the supplement in 2008 and thus only 2012 responses are included for the second half of respondents.

⁷ For the continuous measures of financial stress, we use STATA's xtreg command with random effects.

In (1), S is a continuous variable indicating the amount of financial stress (if any) reported by individual i . Financial stress is measured by the difficulty of paying bills or the perception of financial strain. Non-housing debt balances are represented by D , which includes lagged variables for the amounts of credit card debt and other consumer debt (separately). Both homeowners and renters are included in the sample, with 83 percent being homeowners.⁸ Housing debt balances are represented by H , which includes a set of lagged variables for the amount of mortgage debt on the principal residence (first mortgage debt and home equity or subordinate home loans measured separately), and mortgage debt on second residences. For renters, we include the lagged amount of annual rent payments. The vector I represents lagged household income including annual income from Social Security benefits (including disability and retirement benefits of all household members), earnings, and other income (measured separately). Financial assets are A , and include the amounts of lagged net cash, net investments, and net other assets. X represents a large set of household and respondent control variables described below. We estimate (1) using a panel regression specification. All dollar amounts are in 2016 real dollars, adjusted using the consumer price index. Because both a husband and wife may be in our sample, we cluster standard errors at the household level.

In an alternative set of specifications, we estimate the relationship between new mortgage debt obtained after the age 62 separately from mortgage debt held by an individual as of age 62. To do this, we limit the sample to HRS respondents who turned age 62 between the 1996 and the 2006 or 2008 survey waves. This allows us to measure the respondent's mortgage debt at the age of 62 and to observe changes in mortgage debt through the wave in which we observe a respondent's debt stress. The sample for this alternative specification includes 2,593 unique respondents, corresponding to 4,732 observations. We re-estimate equation (1) adding a measure of the difference between the respondent's current mortgage balance and their balance at age 62, as well as a splined version of the difference allowing for different effects for positive and negative changes in the mortgage balance.

As a robustness test, we replace the continuous measures of financial stress with the binary measures, which reflect older adults' exposure to financial stress. Using random-effects

⁸ Mortgage balance and home value variables take the value of \$0 for renters and annual rent takes the value of \$0 for homeowners.

logistic regression, we regress the two binary measures of stress exposure, bill-paying difficulty and financial strain, on the explanatory variables in equation (1).

All of our models control for a vector of respondent and household characteristics. Respondent characteristics include age (both linear and quadratic), gender, race, Hispanic origin, immigrant status, educational attainment, marital status, number of living children of the respondent (continuous), any health insurance (including government, employer, or other health insurance), self-rated health, and general memory status ranging from poor (=1) to excellent (=5). We account for social support network with a dummy variable that indicates that the respondent has friends or relatives to provide help if needed. Household characteristics include the number of household members, location of residence (urban, suburban or rural), and nine regional indicators (New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, Pacific). We also include year dummy indicators to account for macroeconomic conditions that can vary by survey year.

Appendix A1 provides summary statistics for all model variables by age cohort. Overall, 36 percent of respondents age 62 and older report some level of ongoing financial strain with an average score of 1.6, while 49 percent of respondents in the younger cohort report experiencing financial strain with an average score of 1.8. With regard to difficulty paying bills, 25 percent of respondents in the older cohort report difficulty and appraise it with an average score of 1.9, while 34 percent report of respondents in the younger cohort report difficulty paying bills, with average difficulty of 2.09.

Table 1 compares means for model variables, by whether or not a respondent experienced financial strain. For both age cohorts, respondents experiencing financial strain have significantly higher levels of credit card debt, other financial debt, and first mortgage debt. Respondents age 62 and older experiencing financial strain also report significantly higher HELOC and subordinate loan balances and indicate significantly lower levels of financial assets and lower home values. Respondents experiencing financial strain in the younger cohort report significantly lower earnings, while those in the older cohort report significantly lower income from Social Security. Those experiencing financial strain are more likely to be black, less likely to be married, less likely to have a college degree, are more likely to report difficulty with activities of daily living (ADLs), and have lower self-rated health and self-rated memory.

Table 1: Comparison of Means by Experiencing Financial Strain (Yes or No)

	(1) Age 50-61			(2) Age 62+		
	Yes Mean	No Mean		Yes Mean	No Mean	
Bill-paying difficulty (continuous)	2.74	1.45	***	2.65	1.44	***
Bill-paying difficulty (binary)	0.62	0.06	***	0.58	0.07	***
Financial strain (continuous)	2.70	1.00	***	2.57	1.00	***
Credit card balance (0,000)	0.35	0.15	***	0.19	0.06	***
Other financial debt (0,000)	0.34	0.12	***	0.12	0.06	***
First mortgage balance (1st home) (0,000)	4.31	3.85	*	2.31	1.30	***
HELOC balance (1st home) (0,000)	0.45	0.47		0.28	0.22	*
Second mortgage balance (1st home) (0,000)	0.17	0.05	***	0.10	0.04	***
Total mortgage balance (2nd home) (0,000)	0.18	0.25		0.18	0.14	
Annual Rent (0,000)	0.14	0.06	***	0.12	0.08	***
Net cash assets (0,000)	1.44	4.33	***	2.20	5.21	***
Net investment assets (0,000)	4.96	14.59	***	4.21	13.97	***
Other assets (0,000)	4.38	9.19	***	4.11	7.71	***
House value (1st home) (0,000)	14.30	20.07	***	13.50	18.00	***
House value (2nd home) (0,000)	1.05	1.68	***	0.90	1.39	***
Household Social Security income (0,000)	0.82	0.91	**	1.78	1.91	***
Household earned income (0,000)	3.51	4.76	***	0.72	0.81	
Household other income (0,000)	1.73	3.05	***	1.47	2.67	***
Number of household members	2.44	2.28	***	2.09	1.96	***
Male	0.35	0.38	*	0.37	0.42	***
Age of respondent	60.23	60.77	***	73.47	74.48	***
Black	0.18	0.10	***	0.16	0.10	***
Other race	0.06	0.05		0.03	0.03	
Hispanic	0.09	0.09	*	0.07	0.06	*
Not born in US	0.08	0.08		0.08	0.07	
Less than high school	0.14	0.10	***	0.23	0.19	***
GED	0.08	0.04	***	0.07	0.05	***
Some college	0.29	0.27	*	0.22	0.20	*
College or more	0.17	0.28	***	0.12	0.18	***
Separated, divorced, or widowed	0.27	0.16	***	0.38	0.31	***
Never married	0.04	0.03	*	0.03	0.02	
Number of living children	2.91	2.71	***	3.45	3.27	***
Have health insurance	0.72	0.71		0.96	0.96	
ADL of respondent	0.28	0.12	***	0.31	0.15	***
Self-rated health	3.00	3.49	***	2.94	3.32	***
Self-rated memory	2.99	3.18	***	2.84	3.00	***
Family or friends nearby	0.60	0.63		0.55	0.58	**
Number observations	2,259	2,312		3,279	5,910	

*** p<0.001, ** p<0.01, * p<0.05

Source: Author's calculations using the 2004-2014 Health and Retirement Study data

Note: All financial variables are measured in \$10,000s, expressed in 2016 real dollars. Mortgage balance and home value variables take the value of \$0 for renters and annual rent takes the value of \$0 for homeowners. Model variables not shown include region indicators, year of survey indicators, and indicators for geography (rural, urban or suburban).

4.2 Results

The results of the panel linear regression models predicting appraisal of financial stress are reported in Table 2. Columns (1) and (2) present coefficients and standard errors for the difficulty paying bills and financial strain, respectively, for the younger cohort of respondents while Columns (3) and (4) present the results for the cohort age 62+.

Table 2: Panel Linear Regression Results for Continuous Indicators of Financial Stress

	Age 50-61		Age 62+	
	Difficulty Paying Bills Coeff. (Std. Err.)	Financial Strain Coeff. (Std. Err.)	Difficulty Paying Bills Coeff. (Std. Err.)	Financial Strain Coeff. (Std. Err.)
Credit card balance (0,000)	0.130*** (0.022)	0.144*** (0.021)	0.195*** (0.029)	0.188*** (0.028)
Other financial debt (0,000)	0.033* (0.013)	0.037* (0.017)	0.082*** (0.021)	0.058** (0.022)
First mortgage balance (1st home) (0,000)	0.012*** (0.002)	0.013*** (0.002)	0.013*** (0.003)	0.012*** (0.003)
HELOC balance (1st home) (0,000)	0.014* (0.006)	0.017* (0.007)	0.019* (0.007)	0.009 (0.006)
Second mortgage balance (1st home) (0,000)	0.054*** (0.015)	0.031* (0.014)	0.031* (0.014)	0.033* (0.013)
Total mortgage balance (2nd home) (0,000)	0.004 (0.009)	-0.012 (0.009)	-0.002 (0.002)	0.000 (0.002)
Annual Rent (0,000)	0.168** (0.064)	0.108+ (0.059)	0.037 (0.026)	0.026 (0.018)
Net cash assets (0,000)	-0.006** (0.002)	-0.007*** (0.002)	-0.008*** (0.001)	-0.006*** (0.001)
Net investment assets (0,000)	-0.004*** (0.001)	-0.003*** (0.001)	-0.004*** (0.000)	-0.003*** (0.000)
Other assets (0,000)	-0.001** (0.000)	-0.001* (0.000)	-0.001+ (0.000)	-0.000+ (0.000)
House value (1st home) (0,000)	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
House value (2nd home) (0,000)	-0.006* (0.003)	-0.001 (0.003)	0.001 (0.002)	-0.001 (0.001)
Household Social Security income (0,000)	-0.021 (0.014)	-0.011 (0.015)	-0.014 (0.012)	-0.011 (0.011)
Household earned income (0,000)	-0.021*** (0.003)	-0.019*** (0.003)	-0.014*** (0.004)	-0.010** (0.003)
Household other income (0,000)	-0.002 (0.002)	-0.002 (0.002)	-0.006*** (0.002)	-0.004** (0.001)
Number of household members	0.063*** (0.015)	0.059*** (0.014)	0.027* (0.013)	0.035** (0.012)

Male	-0.041 (0.034)	-0.108** (0.034)	-0.081*** (0.023)	-0.083*** (0.021)
Age of respondent	-0.026*** (0.006)	-0.026*** (0.006)	-0.016*** (0.002)	-0.014*** (0.002)
Black	0.161** (0.053)	0.042 (0.053)	0.128** (0.040)	-0.010 (0.036)
Other race	0.086 (0.082)	0.018 (0.078)	0.033 (0.078)	-0.055 (0.067)
Hispanic	-0.075 (0.080)	-0.172* (0.074)	0.018 (0.056)	-0.075 (0.054)
Not born in US	0.119 (0.075)	0.002 (0.071)	0.040 (0.048)	0.030 (0.044)
Less than high school	0.119+ (0.065)	0.019 (0.064)	0.105** (0.033)	0.021 (0.030)
GED	0.146+ (0.078)	0.171* (0.070)	0.095+ (0.055)	0.078 (0.048)
Some college	0.012 (0.042)	0.087* (0.041)	0.032 (0.029)	0.072** (0.028)
College or more	-0.124** (0.046)	-0.014 (0.044)	-0.044 (0.032)	0.008 (0.029)
Separated, divorced, or widowed	0.141** (0.047)	0.188*** (0.045)	0.078** (0.029)	0.049+ (0.026)
Never married	0.085 (0.105)	0.174+ (0.092)	0.008 (0.070)	0.031 (0.067)
Number of living children	0.010 (0.009)	0.001 (0.009)	0.006 (0.006)	0.002 (0.005)
Have health insurance	0.019 (0.032)	-0.001 (0.031)	0.015 (0.044)	-0.003 (0.040)
ADL of respondent	0.111*** (0.031)	0.043 (0.027)	0.078*** (0.017)	0.060*** (0.018)
Self-rated health	-0.134*** (0.017)	-0.137*** (0.016)	-0.098*** (0.010)	-0.086*** (0.010)
Self-rated memory	-0.041* (0.018)	-0.044* (0.017)	-0.038** (0.012)	-0.024* (0.011)
Family or friends nearby	-0.098** (0.033)	-0.042 (0.031)	-0.038+ (0.020)	-0.038* (0.019)
Observations	4,571	4,571	9,189	9,189
Number of unique individuals	2,569	2,569	5,034	5,034

*** p<0.001, ** p<0.01, * p<0.05

Source: Author's calculations using the 2004-2014 Health and Retirement Study data

Note: All financial variables are measured in \$10,000s, expressed in 2016 real dollars. Model variables not shown include region indicators, year of survey indicators, and indicators for geography (rural, urban or suburban).

For both cohorts, of the various types of debt, lagged credit card debt is associated with the largest increase in financial stress. For respondents age 62 and older, a \$10,000 increase in credit card debt is associated with a 0.19 unit increase in bill-paying difficulty and financial strain. This is a sizeable effect, as the mean bill -paying difficulty score in this sample is only 1.6 and mean financial stress is 1.8. For the younger cohort, the magnitude of the effects is smaller,

but the relative size compared to other types of debt is similar. Other non-housing consumer debt, including medical debt, is the second most stressful type of debt. For the older cohort, a \$10,000 increase in other consumer debt is associated with a 0.08 unit increase in difficulty paying bills and a 0.06 unit increase in financial strain.

Among the various types of mortgage debt, second mortgages and other home loans are associated with a larger increase in both indicators of stress than first mortgages or HELOCs. However, the difference between the coefficients is only statistically significant for the younger cohort (age 50-61) and for difficulty paying bills. In both the older and younger cohorts, a \$10,000 increase in first mortgage debt is related to a 0.01 unit increase in bill-paying difficulty, whereas second home loans increase bill paying difficulty by 0.03 units (younger cohort: 0.05 units). Mortgage debt on second homes is not significantly associated with financial stress.

Other financial variables are also significantly associated with financial stress. For both cohorts, higher levels of cash assets and investment assets are associated with lower financial stress, with cash assets being associated with the largest reduction in financial stress. Higher house values are associated with lower financial strain for both cohorts. With regard to income, earned income is associated with a significant increase in the appraisal of both types of financial stress for both cohorts. Other income, which includes pension income, is associated with reduced difficulty paying bills for the older cohort. Social Security income is not significantly associated with either indicator of financial stress.

All models include controls for a vector of demographic and household characteristics. A larger household size is associated with higher financial stress. Among respondent characteristics, those who are younger, no longer married (separated, divorced, or widowed), black, with a greater number of ADL difficulties, and lower self-rated health have higher self-reported bill-paying difficulties and financial strain. Female gender is associated with higher difficulty paying bills, and significantly associated with financial strain in the older cohort. Having friends or family nearby is associated with lower financial stress. Unrelated to both measures of financial stress are immigrant status, number of living children, and health insurance.

In an alternative set of specifications, we limit the sample to those age 62 and older and add indicators (splined) for the amount of an increase or decrease in mortgage debt since the age of 62, in addition to the amount of mortgage debt held as of age 62. The average amount of

change in the mortgage balance since age 62 is -\$21,479 (SD=\$154,921) with new mortgage borrowing corresponding to an average increase in mortgage debt of \$9,179 (SD=\$36,110) and mortgage repayment to an average decrease in mortgage debt of \$30,658 (SD=\$148,773). Table 3 presents the coefficients of interest from this specification.

Table 3: Panel Regression Results for Financial Stress, Change in Mortgage Debt Since Age 62

	Difficulty Paying Bills Coeff. (Std. Err.)	Financial Strain Coeff. (Std. Err.)
Credit card balance (0,000)	0.195*** (0.035)	0.164*** (0.033)
Other financial debt (0,000)	0.081*** (0.025)	0.087*** (0.024)
Total mortgage balance (1st home) at age 62 (0,000)	0.018*** (0.004)	0.022*** (0.004)
Mortgage balance increase (1st home) since age 62 (0,000)	0.014** (0.005)	0.008+ (0.004)
Mortgage balance decrease (1st home) since age 62 (0,000)	-0.018*** (0.004)	-0.022*** (0.004)
Total mortgage balance (2nd home) at age 62 (0,000)	-0.005** (0.002)	-0.003+ (0.002)
Observations	4,732	4,732
Number of unique individuals	2,593	2,593

*** p<0.001, ** p<0.01, * p<0.05; robust standard errors in parentheses, clustered by household

Source: Author's calculations using the 2004-2014 Health and Retirement Study data

Note: All financial variables are measured in \$10,000s, expressed in 2016 real dollars. Both models include all explanatory variables in Table 2 (not shown in output), lagged one wave.

As shown in Table 3, a \$10,000 increase in the mortgage balance after age 62 is associated with a 0.014 unit increase in reported bill-paying difficulties, but is not significantly associated with the level of financial strain. By contrast, a \$10,000 decrease in the mortgage balance since age 62 (due to repayment) is associated with a 0.018 unit decrease in bill paying difficulties and a 0.022 unit decrease in financial strain.⁹ The difference in the coefficients for mortgage increase and decrease since age 62 is statistically significant (p<0.05), indicating an asymmetric relationship between financial strain and the change in mortgage debt after age 62. While mortgage repayment reduces financial strain, taking out additional mortgage debt after age 62 does not significantly increase financial strain. Similarly, the coefficients for new mortgage

⁹Mortgage debt is splined with both increases and decreases measured as positive values.

debt obtained after age 62 and mortgage debt held as of the age of 62 are statistically different for financial strain ($p < 0.05$), indicating that mortgage debt carried into retirement is associated with a significant increase in financial strain while new mortgage debt after age 62 is not.

Taken together and confirming previous literature (Dunn & Mirzaie 2016; Shen, Sam, and Jones 2014), credit card debt is the strongest predictor of exposure to financial stress among people age 62 and older. Increases in the mortgage balance after age 62 are associated with increases in bill-paying difficulties, but they are not related to financial strain. It could be that new mortgage debt originated after age 62 allows for additional liquidity (in the form of cash for consumption) or is used for discretionary purchases, and thus may not be associated with the same levels of stress as debt carried into retirement (Marino 2017). However, because new mortgage debt still needs to be repaid, it makes sense that it is associated with an increase in difficulty paying bills. In contrast, a reduction in mortgage debt since age 62 is associated with less difficulty paying bills and lower levels of financial strain.

5. Reverse Mortgages and Debt Stress

Our second analysis estimates the relationship between reverse mortgages and debt stress. We model debt stress as a function of consumer debt, forward mortgage debt, and reverse mortgage debt, including an extensive set of controls and treating the decision to obtain a reverse mortgage and associated financial variables as endogenous. We compare the stress associated with reverse mortgage debt to stress associated with forward mortgage and other consumer debt.

5.1 Sample and Methods

For this analysis, we use our own administrative and survey data of 1,026 older adults counseled for a reverse mortgage in 2010 or 2011, who responded to a follow-up survey in 2014 or 2015, of whom 728 obtained a reverse mortgage. Our empirical strategy treats the decision to obtain a HECM as endogenous.¹⁰ We also treat financial variables as of the 2014 or 2015 survey wave as endogenous, as they are likely affected by the decision to obtain a HECM. Our empirical specification is as follows:

$$S_{it} = \beta_0 + \beta_1 T_{it-1} + \beta_2 H_{it} * T_{it-1} + V_{it} \beta_3 + X_{it} \beta_4 + \varepsilon_{it} \quad (2)$$

$$T_{it-1} = \alpha_0 + Z_{iy-1} \alpha_1 + V_{it-1} \alpha_2 + X_{it-1} \alpha_3 + \mu_{it-1} \quad (3)$$

$$H_{it} = \gamma_0 + \gamma_1 H_{it-1} + V_{it-1} \gamma_2 + X_{it-1} \gamma_3 + \eta_{it-1} \quad (4)$$

$$V_{it} = \delta_0 + \delta_1 H_{it-1} + V_{it-1} \delta_2 + X_{it-1} \delta_3 + \lambda_{it-1} \quad (5)$$

In (2), S is a continuous variable indicating the level of debt stress experienced by a respondent as of the 2014 or 2015 survey. T is a treatment indicator for obtaining a HECM in the prior period (2010 or 2011), this treated as an endogenous choice. H is mortgage debt as of the 2014 or 2015 survey wave, treated as endogenous. The interaction coefficient, β_2 allows the amount of debt stress from mortgage debt for HECM borrowers ($T=1$) to differ from that of non-HECM borrowers ($T=0$). V is a vector of financial variables including non-housing consumer debt, financial assets, available revolving credit, credit score, and amount of funds remaining on a HECM line of credit. We expect that the levels of H and V as time t (2014 or 2015) may be

¹⁰ We use STATA's command "eregress" which allows us to include an endogenous treatment indicator, as well as endogenous explanatory variables, with an outcome that is treated as binary (probit). The estimators implemented in eregress are maximum likelihood estimators. <https://www.stata.com/manuals/erm.pdf>

affected by the prior decision to obtain a HECM. To account for this, we model each of the financial variables in V as of time t as endogenous, using as instruments lagged values of financial variables as of the period prior to obtaining a HECM (2010 or 2011). This approach has been advocated by Reed (2015) compared to including lagged values of the explanatory variables directly in the regression.¹¹

Instruments for the HECM treatment, Z , are measured as of the time of counseling (2010 or 2011) and include policy variables expected to influence the HECM treatment but to have no direct independent effect on debt stress. The first instrument is the estimated “initial principal limit”. The initial principal limit is the amount of home equity that a prospective borrower might obtain from a HECM, which is a function of a factor variable (the principal limit factor), multiplied by the estimated value of the property or the maximum claim amount. Both the principal limit factor and the maximum claim amount are exogenous to debt stress as they are set by HUD. Our second instrument is the amount of mortgage debt held by a borrower prior to obtaining a HECM, divided by the estimated principal limit. We allow for nonlinearity, including an indicator for whether or not the ratio is greater than 1, this occurring if forward mortgage at the time of counseling exceeds the initial principal limit. Existing forward mortgage debt must be repaid prior to originating a HECM. A higher ratio of mortgage balance to the limit is associated with less cash to the borrower, and is expected to reduce the likelihood of originating a HECM. Because the limit is set by HUD, we expect that the ratio is exogenous to financial stress after directly accounting for mortgage balance in the debt stress equation. Our third policy instrument is an indicator for whether or not the estimated value of the property exceeds the maximum claim amount, as this indicates the presence of home equity that cannot be accessed through a HECM. Finally, as a fourth instrument, we include a ZIP code indicator for the presence of a bank branch from one of the two largest HECM originators in 2010 and 2011, Wells Fargo or Bank of America, representing a supply of HECMs that is independent of an individuals’ debt stress.

All of our models control for a vector of explanatory variables, X , measured as of the outcome year in equation (2), or as of the baseline year in equations (3), (4), and (5). Household control variables include household income, age of the oldest household member, and self-

¹¹ The validity of this approach depends on 1) the lagged value being correlated with the contemporaneous value, and 2) the lagged value not directly influencing current debt stress. This assumption is reasonable as it is unlikely that older adults’ current debt stress is directly related to three to five year prior financial variables’ values.

reported house value.¹² Respondent controls include gender, marital status, race, ethnicity, highest level of education, and self-rated health. Spatial and intertemporal variation in unobservable factors is captured by a set of state dummy variables and a dummy for the year of counseling being 2011. For all variables, if the value is missing we include a dummy variable so indicating, thus preserving sample size. The means and standard deviations for these variables in 2014, separated by HECM status, are listed in Table 4 (values at the time of counseling in 2010 or 2011 are reported in Appendix B1). Statistically significant differences are indicated. All dollar amounts are in 2016 real dollars, adjusted using the consumer price index.

In our regression sample, the mean debt stress score for HECM borrowers is 2.36 (N=728) and for counseled non-borrowers is 2.64 (N=298), a statistically significant difference. The mean debt stress in the general population as measured by the Consumer Financial Monthly survey from 2005 to 2013 was 2.37,¹³ similar to the value for HECM borrowers. The distributions are also similar; in our sample 9.1 percent of respondents reported having “a great deal of stress” while 8.1 percent reported having “a great deal of stress” in the general population.

HECM borrowers have statistically significantly greater house values and credit scores and more have credit cards. In 2014, HECM borrowers’ mortgage amount is more than twice that amount of mortgages held by others, although their mortgage amounts in 2010 or 2011 are similar (Appendix B). The percentage who are black is significantly lower in the borrower sample.

Table 4: Descriptive Statistics for HECM Debt Stress Analysis, 2014 Values

	HECM Borrower		HECM Non-Borrower		
	Mean	Std. Dev.	Mean	Std. Dev.	
Debt stress (continuous)	2.36	**	1.19	2.64	1.23
HECM debt (00,000)	1.41		1.09		
Forward mortgage debt (00,000)			0.56		0.76
Home value (00,000)	2.53	***	2.08	1.62	1.42
Financial assets (00,000)	0.64		1.56	0.69	1.79
Annual income (00,000)	0.31		0.19	0.30	0.19
Consumer debt (00,000)	0.10		0.16	0.11	0.19
Unused revolving credit (00,000)	0.24		0.29	0.22	0.34
No revolving credit card	0.06	***	0.24	0.16	0.37

¹² Self-reported house value is excluded from the HECM treatment equation (3), as we include the initial principal limit instead as an exogenous instrument.

¹³ Authors’ calculation using data from the Consumer Finance Monthly.

Credit score (00)	7.26	***	0.81	6.88	0.93
Unused HECM funds (00,000)	0.17	***	0.43	0.00	0.00
Year (2010)	0.53	*	0.50	0.46	0.50
Age oldest in household	73.74		11.61	72.52	9.99
Married	0.50		0.50	0.45	0.50
Unmarried Male	0.15		0.36	0.20	0.40
Race - Black	0.12	***	0.33	0.29	0.45
Hispanic	0.04		0.19	0.04	0.20
High school/some college	0.62		0.49	0.56	0.50
Four-year college degree	0.21		0.41	0.19	0.39
Post-graduate degree	0.09		0.29	0.11	0.31
Good health	0.70		0.46	0.68	0.47
Estimated IPL (00,000)	1.42	**	0.90	1.22	1.01
Mortgage/IPL	0.51	***	0.60	0.66	0.58
Negative IPL (dummy)	0.12		0.33	0.14	0.35
No excess house value (dummy)	0.95	***	0.21	0.99	0.08
Wells/BoA branch (dummy)	0.54		0.50	0.50	0.50
Change in HPI	1.52		17.69	2.49	16.77
Observations	728			298	

*** p<0.001, ** p<0.01, * p<0.05

Source: Author's calculations using HECM administrative and survey data

Note: All values are for 2014 or 2015, in 2014 constant dollars. Means are reported for samples excluding missing values. The difference between reverse mortgage debt and forward mortgage debt is significant with p<0.01.

5.2 Results

Table 5 reports the regression results for debt stress, estimated by equation (2). Results for the first-stage probit estimation of HECM choice are in Appendix B2. In that first-stage regression the probability of choosing a HECM increases if subjects have a credit card, if their unused credit is small, and if the ratio of 2010 or 2011 mortgage to IPL is small (thus more funds are available for immediate withdrawal after paying off the mortgage). Demographic factors significantly increasing the probability of selecting a HECM include being older, non-black, and having at least a high school degree. Results for the estimations of the six endogenous financial variables are available in Appendix B3. As expected, the most significant set of variables in the first-stage regressions are the lagged financial variables.

Table 5: Instrumental Variables Estimation of Debt Stress including HECM Treatment

	Coeff.		Std. Err.
HECM Borrower	-0.383		(0.252)
Forward mortgage debt (00,000)	0.364	**	(0.140)
HECM debt (00,000)	0.219	*	(0.089)
Consumer debt (00,000)	0.938	*	(0.432)
Unused HECM funds (00,000)	-0.676		(0.519)
Financial assets (00,000)	-0.022		(0.096)
Home value (00,000)	-0.002		(0.037)
Annual income (00,000)	-0.694	**	(0.253)
Unused revolving credit (00,000)	0.080		(0.206)
No revolving credit card	-0.108		(0.152)
Credit score (00)	-0.308	***	(0.061)
Age of oldest HH member - 2014	-0.003		(0.003)
Unmarried Male	-0.499	***	(0.105)
Married	-0.162		(0.091)
Black	-0.244		(0.126)
Hispanic	-0.091		(0.217)
High school/some college	0.002		(0.130)
Four-year college degree	-0.099		(0.163)
Post-graduate degree	0.015		(0.185)
Good health	-0.357	***	(0.080)
Year (2010)	0.026		(0.086)
Change in HPI	-0.001		(0.004)
Observations	1,026		
Log likelihood	-6326.3		

*** p<0.001, ** p<0.01, * p<0.05; Robust standard errors in parentheses

Source: Author's calculations using HECM administrative and survey data

Note: Includes state fixed effects. All explanatory variables are measured as of 2014 or 2015, in 2014 constant dollars. Coefficients of the indicators of variables representing missing values are not reported.

The results in Table 5 indicate that both mortgage and consumer debt is associated with increased stress, while additional income reduces stress. Forward mortgages increase stress by 0.36 units per \$100,000 of loan balance, a sizeable impact as mean debt stress is about 2.5. The coefficient of HECM debt stress balance variable is smaller at 0.22; however, the difference between it and forward mortgage debt is not statistically significant. After allowing the mortgage balance to differ for HECM and non-HECM borrowers, the treatment indicator for obtaining a HECM is not statistically significant. Non-housing consumer debt is much more stressful per dollar of debt (0.94) compared with mortgage debt, consistent with our findings in Section 4.1 and prior findings in the literature. The average consumer debt in our sample is about \$10,000, which increases debt stress by 0.10 points on a Likert scale from 1 to 5.

An increase in annual income by \$10,000 reduces debt stress by 0.07 units. However, the measures of liquid and illiquid assets are not statistically significant. An increase in credit score is associated with lower debt stress (0.31 units per 100 points), but the size of the unused consumer credit line has no effect. Regarding controls, good health reduces debt stress by 0.36 units, and unmarried males report lower stress (-0.50 units) compared with married couples.

The treatment effect is the difference in debt stress that would occur when a borrower obtains a HECM compared with the debt stress that would occur when the same person decides not to select a HECM. In this model, the estimated average treatment effect over the complete sample is -0.57 ($p=0.07$), representing a substantial reduction in debt stress for HECM borrowers compared to non-borrowers, as measured about four years after HECM origination. For those who chose a HECM, the predicted debt stress is 2.31 and the counterfactual value is higher at 2.9 (a difference of 0.59 units). For those who did not obtain a HECM, the predicted debt stress is 2.76 while the predicted level counterfactual level with a HECM is 2.30 (a difference of 0.44 units). Thus, as expected, the reduction in stress from obtaining a HECM is larger for the group that selected a HECM. Further, the positive difference for the untreated suggests that, on average, the non-borrower group would have reduced debt stress if they had obtained a HECM.

5.3 Interpretation

Our findings suggest a complex response of homeowners' stress levels after obtaining a HECM. Examples help to clarify the findings. Consider an older adult in 2010 who owns a \$200,000 house and is deciding between two scenarios. In one, the homeowner maintains a \$100,000 forward mortgage debt and \$10,000 consumer debt between 2010 and 2014. In the other scenario, this person obtains a HECM in 2010 for \$116,000, which includes an origination fee of \$6,000. The remaining funds are used to repay the mortgage and consumer debts. No forward mortgage debt can be placed on the home after 2010, and for simplicity, assume the consumer debt remains at 0. The HECM loan balance grows between 2010 and 2014 (assume 7% annually) to about \$152,000. Thus, in 2014 the comparative levels of stress contributed by these variables are as follows, using the coefficients of mortgage debt and HECM dummy variables in Table 5.

No HECM: $0.364 \times \$1 + 0.94 \times \$0.1 = +0.458$ units of stress contribution

HECM: $-0.384 + 0.219 \times \$1.52 = -0.05$ units of stress contribution

In this example, the homeowner's choice of a HECM reduces debt stress. However, in our sample most older adults had consumer debt less than \$10,000 and, upon obtaining a HECM, a homeowner may choose not to eliminate consumer debt. Assuming our results are applicable to HECM holding periods longer than four years, then the continued growth of the HECM balance would create additional stress. For example, after 15 years the HECM loan balance would grow to about \$320,000, which would result in +0.32 units of stress contribution.

Another simple example is where a homeowner obtains a HECM, but has no existing forward mortgage or consumer debt. Assume the available HECM funds are withdrawn and invested in financial assets. Our results suggest that the reduction in debt stress from financial assets is smaller than the additional stress created by the HECM debt. In this case, total debt stress would likely rise as a result of the HECM.

The implication is that the effect of HECMs on debt stress depends on homeowners' choices of the allocation of HECM funds. If the goal is to reduce debt stress, the characteristics of homeowners most likely to obtain a HECM would be those with a relatively high mortgage and high levels of consumer debt. In the 2014 survey providing the data for this study, questions were asked about the uses of HECM funds (Moulton et al. 2016). About 37 percent of homeowners who chose a HECM indicated "pay off mortgage" and 31 percent indicated "pay off nonmortgage debt", these being the second and third most frequently mentioned uses ("pay everyday expenses" was mentioned most often). In terms of actual experiences, our data show that HECM borrowers' consumer debt fell by \$2,882 more than nonborrowers consumer debt from 2010/11 to 2014/15. Among older adults not obtaining a HECM, the most common reason for this choice was "You liked knowing that you own your home completely free of any mortgages", this response is consistent with our result that HECM debt is associated with stress.

6. Financial Stress and Early Social Security Benefit Claiming

Our third analysis estimates the relationship between financial stress and early claiming of Social Security retirement benefits using data from the HRS. Specifically, we predict the probability of early claiming for respondents when they turn 62.

6.1 Sample and Methods

For this analysis, we construct a cross-sectional sample as of the survey wave when an HRS respondent turns 62, if the respondent turns 62 in the 2008, 2010, 2012 or 2014 survey waves. We limit our sample to these waves to include our indicators of financial stress in the wave prior to a respondent turning age 62. Our measures of financial stress were first collected in the HRS in 2006. Our sample size differs for the two measures of financial stress because the financial strain question was not asked in 2008. Some adults do not participate in the Social Security retirement program, including public sector employees in 15 states.¹⁴ We drop these individuals from the sample by utilizing the response to a question about whether an individual expects to receive Social Security retirement income in the future. If the response is “never” and they do not claim Social Security retirement benefits in a future year, we drop the respondent from the sample. We also drop respondents with extreme values (above the 99th percentile) on our key financial variables.¹⁵ The resulting sample sizes are 720 (financial strain) and 836 (difficulty paying bills).

The age when Social Security retirement income is first claimed is closely tied to the labor force retirement decision.¹⁶ We adopt a reduced form approach in that we do not separately model retirement from the labor force. In our approach, the impact of exogenous factors that affect retirement are combined with their direct impact on claiming age, as moderated by the retirement-claiming association. We address the obvious simultaneity of initial claiming age with many other decisions and outcomes (e.g., health, labor force participation, levels of assets and debts) by lagging the set of explanatory variables by one wave (two years). This temporal

¹⁴ Alaska, California, Colorado, Connecticut, Georgia (certain local governments), Illinois, Kentucky (certain local governments), Louisiana, Maine, Massachusetts, Missouri, Nevada, Ohio, Rhode Island (certain local governments), and Texas.

¹⁵ Financial variables used to trim the sample include house value, home equity, financial assets, other assets, credit card and other debts, respondent earnings, spouse earnings, and respondent pension income.

¹⁶ Another reason for our approach of modeling only the claiming decision is that claiming Social Security is essentially a one-time irrevocable decision while “retirement” is reversible and not well-defined.

difference between the presence or absence of claiming Social Security at age 62 and the explanatory variables helps to break the strong simultaneity among these choices. However, because it is likely there are omitted factors that affect both the claiming age and lagged explanatory variables, we do not claim to fully identify causal effects. We estimate the following equation using a probit specification:

$$C_{it} = \beta_0 + \beta_1 S_{it-1} + \beta_2 I_{it-1} + \beta_3 A_{it-1} + \beta_4 D_{it-1} + \beta_5 H_{it-1} + \beta_6 X_{it-1} + \eta_{it} \quad (6)$$

In (6), C is a dummy variable indicating whether individual i claimed Social Security retirement benefits at age 62. Financial stress is represented by S , measured by either the indicator of financial strain or the indicator for difficulty of paying bills (estimated separately as alternative specifications). I represents income, separated into respondent and spouse lagged labor market earnings and lagged pension income. We also include an indicator for a respondent reporting 0 earnings in the prior period (at age 60). Financial assets are represented by A and include separate variables for cash assets, investment assets, and other assets. Debts are D , both lagged. Housing is represented by H , which includes a set of lagged variables: house value (primary and secondary residence), mortgage debt (primary and secondary residence), and annual rental housing costs (for renters).

X represents a large set of control variables. Demographic characteristics include gender, race, Hispanic origin, immigrant status, educational attainment, marital status, number of living children of the respondent and spouse (continuous), any health insurance, including government, employer, or other health insurance, self-rated health, and the respondent's and spouse's difficulty with activities of daily living (ADL).¹⁷ We account for social support network with a dummy variable that indicates that the respondent has friends or relatives to provide help if needed. Household characteristics include the number of household members, location of residence (urban, suburban or rural), and nine regional indicators (New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, Pacific). All dollar amounts are in 2016 real dollars, adjusted using the

¹⁷ Difficulty with ADLs is measured by a five item scale that measures difficulty walking across a room, dressing, getting out of bed, bathing, and eating (Capistrant et al., 2014). Higher values indicate greater difficulty.

consumer price index. All models include year fixed effects. Because both a husband and wife may be in our sample, we cluster standard errors at the household level.

As an alternative specification, we estimate equation (6) interacting our indicators of financial stress with the respondent's earned income. The hypothesis here is that responsiveness to early claiming due to stress will be greater for those who worked in the prior period and thus are more likely to remain in the labor force in response to financial stress. As robustness tests, we interact financial stress with various of our indicators for financial debt. The hypothesis is that stress may moderate the relationship between debt and early claiming, as higher levels of debt delay claiming to the extent that a respondent experiences more stress from the debt.

Table 6 reports the means for the full sample, those who claim early (N=368), and those who delay (N=468) using the larger sample where stress is measured by the variable "degree of difficulty paying bills". The unconditional means for bill-paying difficulty and financial strain are not statistically different from one another for those who claim Social Security retirement benefits at age 62 compared to those who do not. Early claimers have lower home values, lower mortgage balances, lower respondent earnings, and somewhat lower spousal earnings (marriage rates are similar), but in contrast they have almost three times as much pension income. In addition, those who claim early were more likely to report no earnings at age 60. Regarding other characteristics, early claimants are much less likely to be college educated, and have lower self-rated health.

Table 6: Descriptive Statistics for Claiming Social Security at Age 62

	Full Sample		Claim SS		Not Claim SS	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Receive SS at age 62 or 63	0.44	0.50	1.00	0.00	0.00	0.00
Bill-paying difficulty (continuous)	2.13	1.03	2.14	1.02	2.13	1.05
Bill-paying difficulty (binary)	0.09	0.29	0.08	0.27	0.10	0.30
Financial strain (continuous)	1.88	1.00	1.93	1.05	1.84	0.96
Financial strain (binary)	0.52	0.50	0.52	0.50	0.52	0.50
Total mortgage balance (1st home) (0,000)	5.25	7.50	4.40	6.96	5.93	** 7.84
House value (1st home) (0,000)	20.29	18.08	17.33	16.22	22.66	*** 19.13
Annual Rent (0,000)	0.10	0.28	0.12	0.30	0.09	0.26
House value (2nd home) (0,000)	1.55	6.03	1.26	4.61	1.78	6.96
Total mortgage balance (2nd home) (0,000)	0.26	1.90	0.26	1.85	0.26	1.95
Net cash assets (0,000)	2.73	5.27	2.62	5.18	2.81	5.35
Net investment assets (0,000)	10.93	20.90	11.12	21.23	10.79	20.65
Other assets (0,000)	6.80	14.05	6.43	12.10	7.11	15.45
Credit card balance (0,000)	0.26	0.65	0.26	0.61	0.25	0.68
Other financial debt (0,000)	0.19	0.77	0.19	0.81	0.19	0.74
Respondent annual earnings (0,000)	3.05	3.48	1.69	2.75	4.13	*** 3.62
Spouse annual earnings (0,000)	1.91	3.14	1.62	2.83	2.14	* 3.34
Respondent earning=0 at 60 (binary)	0.33	0.47	0.50	0.50	0.20	*** 0.40
Spouse earning=0 at 60 (binary)	0.56	0.50	0.61	0.49	0.51	** 0.50
Respondent pension income (0,000)	0.27	0.84	0.39	1.00	0.17	*** 0.68
Spouse pension income (0,000)	0.26	0.83	0.39	0.98	0.15	*** 0.66
Male	0.39	0.49	0.38	0.49	0.40	0.49
Hispanic	0.10	0.30	0.11	0.32	0.09	0.28
Black	0.14	0.35	0.13	0.34	0.15	0.35
Other race	0.07	0.25	0.06	0.24	0.07	0.25
Not born in US	0.09	0.29	0.08	0.28	0.10	0.30
Less than high school	0.10	0.30	0.12	0.32	0.08	0.28
GED	0.05	0.22	0.06	0.24	0.04	0.19
Some College	0.29	0.45	0.29	0.46	0.28	0.45
College or more	0.26	0.44	0.19	0.39	0.31	*** 0.46
Separated, divorced, widowed	0.20	0.40	0.20	0.40	0.21	0.41
Never married	0.03	0.17	0.03	0.17	0.03	0.17
Respondent ADL	0.12	0.50	0.16	0.60	0.08	* 0.40
Spouse ADL	0.14	0.54	0.19	0.65	0.10	* 0.42
Self-rated health	3.39	0.99	3.28	1.01	3.48	** 0.96
Number of household residents	2.36	1.16	2.32	1.10	2.40	1.20
Number of living children	2.81	1.95	2.94	1.95	2.71	1.95
Have health insurance	0.69	0.46	0.61	0.49	0.76	*** 0.43
Positive self-rated memory	3.21	0.88	3.14	0.90	3.26	0.87
Family or friends nearby	0.64	0.48	0.61	0.49	0.65	0.48
Observations	857		381		476	

*** p<0.001, ** p<0.01, * p<0.05

Source: Author's calculations using the 2004-2014 Health and Retirement Study data

Note: All financial variables are measured in \$10,000s, expressed in 2016 real dollars. Model variables not shown include region indicators, year of survey indicators, and indicators for geography (rural, urban or suburban).

6.2 Results

Results (marginal effects) are reported in Table 7 based on the binary versions of the two stress measures (Appendix C1 and C2 reports the results for the continuous indicators). Experiencing financial strain at age 60 is associated with a marginally significant ($p < 0.10$) reduced probability of claiming of benefits at age 62 by 6.7 percentage points. Reporting difficulty paying bills at age 60 significantly reduces the likelihood of claiming at age 62 by 12.3 percentage points.

Indicators for mortgage debt, credit card debt, and other debt are not significantly associated with early claiming. The measures of debt amounts remain insignificant in an alternative specification (not shown) where we omit the financial stress indicators, indicating that the lack of relationship is not driven by collinearity.

Aside from indicators of financial stress, income at age 60 is significantly associated with early claiming of Social Security. Specifically, having no earned income in the prior period increases the probability of claiming Social Security benefits at age 62, as does the receipt of pension income (self or spouse) in the prior period. By contrast, an increase in respondents' earned income in the prior period is associated with a reduced probability of claiming benefits. Other statistically significant factors associated with positive likelihood of early claiming include higher levels of investment assets (model 2), and a spouse who reports having difficulties with ADLs (model 1). Significant factors negatively associated with early claiming include higher house values (model 2) and higher educational attainment (a college degree or more).

Table 7: Probit Results for Probability of Claiming Social Security Retirement at Age 62

	Marginal Effects	Std. Err.	Marginal Effects	Std. Err.
Financial Strain (binary)	-0.067+	(0.037)		
Bill-paying difficulty (binary)			-0.123*	(0.050)
Total mortgage balance (1st home) (0,000)	0.001	(0.003)	0.002	(0.002)
House value (1st home) (0,000)	-0.002	(0.002)	-0.004*	(0.002)
Annual Rent (0,000)	0.039	(0.068)	0.040	(0.063)
House value (2nd home) (0,000)	-0.006	(0.004)	-0.001	(0.003)
Total mortgage balance (2nd home) (0,000)	0.011	(0.009)	0.002	(0.009)
Net cash assets (0,000)	-0.001	(0.005)	-0.002	(0.004)
Net investment assets (0,000)	0.001	(0.001)	0.002*	(0.001)
Other assets (0,000)	0.000	(0.002)	0.000	(0.001)
Credit card balance (0,000)	-0.005	(0.023)	-0.019	(0.020)
Other financial debt (0,000)	0.008	(0.026)	0.032	(0.025)
Respondent annual earnings (0,000)	-0.030***	(0.008)	-0.030***	(0.007)
Spouse annual earnings (0,000)	-0.000	(0.008)	-0.002	(0.007)
Respondent earning=0 at 60 (binary)	0.133*	(0.055)	0.127**	(0.048)
Spouse earning=0 at 60 (binary)	0.007	(0.054)	0.036	(0.048)
Respondent pension income (0,000)	0.054*	(0.027)	0.048*	(0.022)
Spouse pension income (0,000)	0.078*	(0.031)	0.065**	(0.021)
Male	0.028	(0.037)	0.052	(0.034)
Hispanic	0.165+	(0.087)	0.087	(0.079)
Black	-0.027	(0.055)	-0.045	(0.049)
Other race	-0.105	(0.070)	-0.004	(0.069)
Not born in US	-0.111	(0.072)	-0.079	(0.069)
Less than high school	-0.027	(0.062)	-0.042	(0.058)
GED	0.152+	(0.086)	0.066	(0.080)
Some College	-0.024	(0.044)	-0.004	(0.039)
College or more	-0.150**	(0.052)	-0.078+	(0.047)
Separated, divorced, widowed	0.050	(0.054)	0.009	(0.049)
Never married	0.065	(0.100)	0.104	(0.101)
Respondent ADL	0.047	(0.036)	0.010	(0.033)
Spouse ADL	0.067*	(0.030)	0.051+	(0.029)
Self-rated health	-0.001	(0.019)	-0.015	(0.017)
Number of household residents	-0.021	(0.016)	-0.011	(0.015)
Number of living children	0.005	(0.009)	0.008	(0.009)
Have health insurance	-0.058	(0.042)	-0.058	(0.037)
Positive self-rated memory	0.007	(0.020)	-0.011	(0.018)
Family or friends nearby	-0.036	(0.039)	-0.029	(0.035)
Observations	649		857	
Log likelihood	-351.48		-485.20	

*** p<0.001, ** p<0.01, * p<0.05, +p<0.10; robust standard errors in parentheses

Source: Author's calculations using the 2004-2014 Health and Retirement Study data

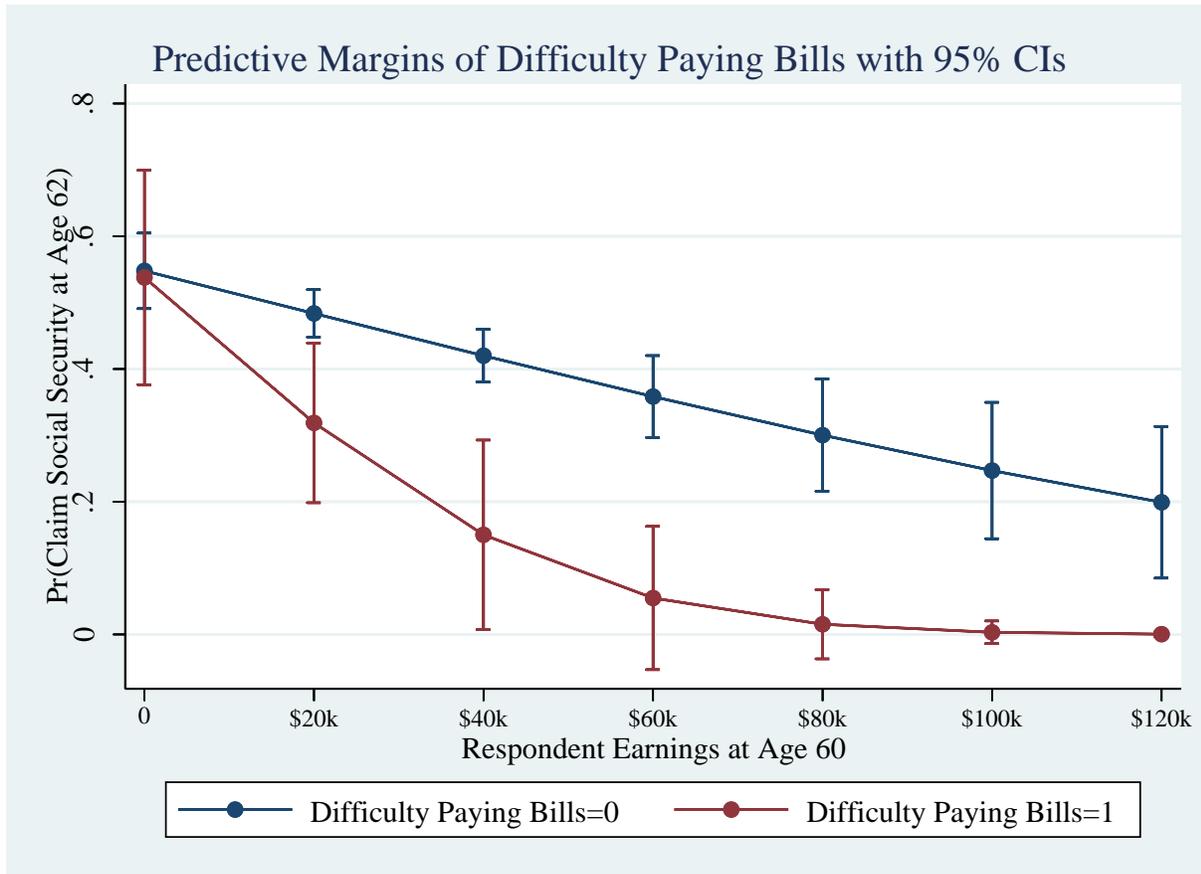
Note: All financial variables are measured in \$10,000s, expressed in 2016 real dollars. Model variables not shown include region indicators, indicators for geography (rural, urban or suburban), and year dummies.

Much of the intertemporal variation in early claiming rates is captured by the set of year dummy variables (results shown in Appendix C). In the specification using the difficulty of paying bills to measure financial stress (model 2), compared with 2014, the likelihood of an early claim was greater by 9 percentage points in 2008, 9.6 percentage points in 2010, and 11 percentage points in 2012. These marginal effects reflect many factors, including the changing macroeconomy, unemployment rates and current and expected future changes in Social Security policy.

In an alternative specification, we include an interaction between financial stress and respondents' earnings. Our results indicate a statistically significant ($p < 0.05$) and negative interaction between both indicators of financial stress and respondent earnings. For ease of interpretation, we graph the predicted probabilities of early claiming from the models with the interaction terms. Figure 5 graphs the change in the probability of early claiming at different respondent earned income levels, by whether or not a respondent reported experiencing difficulty paying bills. Figure 6 repeats this exercise by illustrating whether or not a respondent reported experiencing financial strain.

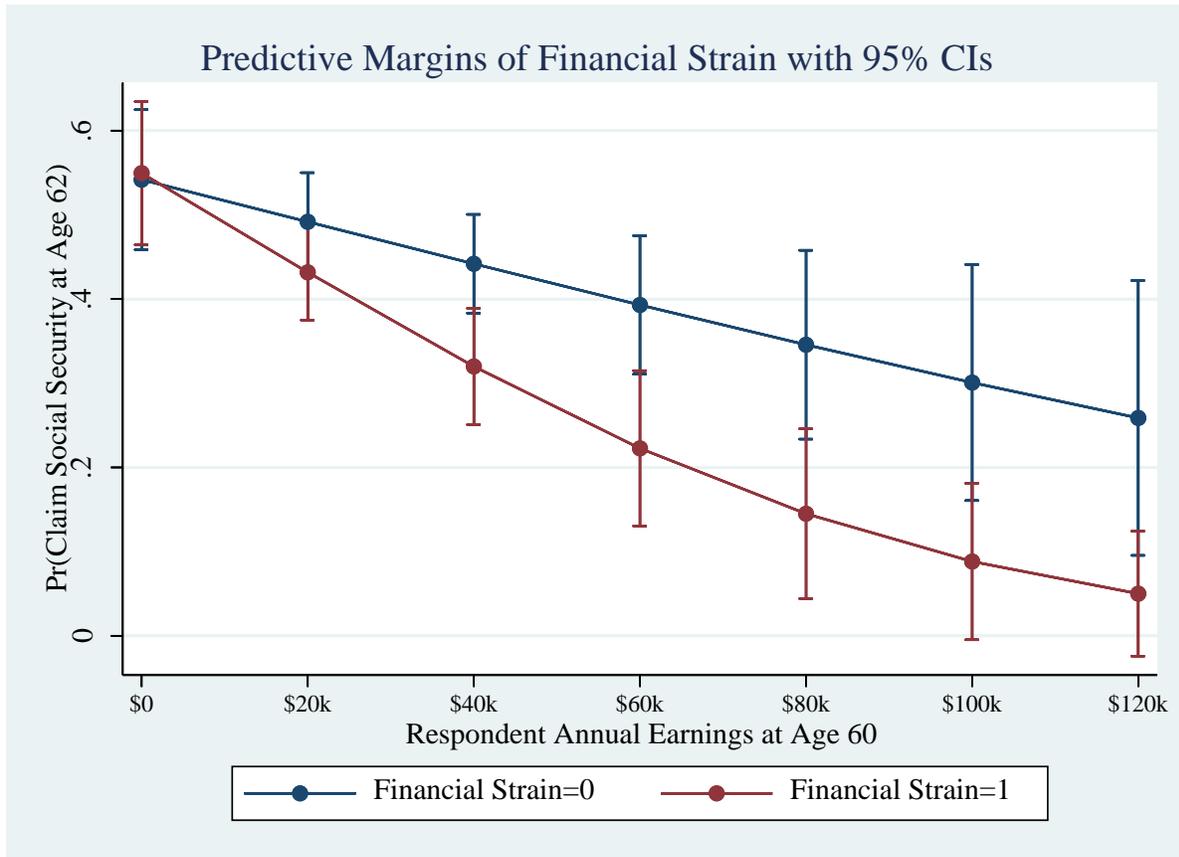
The results indicate that those with difficulty paying bills are less likely to claim early as their earned income increases, where those earning \$20,000 per year experiencing difficulty paying bills have a 25 percent probability of early claiming, compared to an 8 percent probability of early claiming for those earning \$60,000 per year who report difficulty paying bills. By contrast, at the same income levels, those not experiencing difficulty paying bills are more likely to claim early—with a nearly 50 percent probability of early claiming for those earning \$20,000 per year, and a 35 percent probability of early claiming for those earning \$60,000 per year. The general direction of the results are similar for financial strain, but with smaller differences by income level.

Figure 5: Probability of Early Claiming by Difficulty Paying Bills*Respondent Earnings



Source: Author's calculations using the 2004-2014 Health and Retirement Study data

Figure 6: Probability of Early Claiming by Financial Strain*Respondent Earnings



Source: Author's calculations using the 2004-2014 Health and Retirement Study data

7. Discussion

In the U.S., there is growing concern about increases in financial debt held by people as they enter their retirement years, and implications for behaviors such as the timing of claiming Social Security benefits. Yet financial debt is not inherently good or bad—it is a common form of liquidity available to households (Fulford 2015) and increases in the use of debt may simply reflect rational behavior to decumulate wealth (particularly housing wealth) in retirement. In this study, we first consider the extent to which different types of debt are associated with financial stress. While prior research finds a relationship between debt and financial stress in the general population (Dunn & Mirzaie, 2016; Shen et al., 2014), we are the first to examine this relationship among older adults, and to differentiate between “old” and “new” mortgage debt obtained prior to or after entering retirement years. Unique to our study, we also consider two types of financial stress that may result from debt, corresponding to both material and psychological hardship.

Similar to literature on the general population (Dunn & Mirzaie, 2016; Shen et al., 2014), we find that credit card debt has the largest association with financial stress among adults age 62 and older. A \$10,000 or higher amount of credit card debt is related to 57.7 percent higher odds of reporting bill-paying difficulty and doubles the odds of reporting financial strain (100.7 percent). The same dollar increase in mortgage debt is associated with an increase in the odds of experiencing financial stress by only 6 percent. Among types of mortgage debt, second mortgages are associated with the greatest financial stress. When analyzing old and new mortgage debt, we find that an increase in the mortgage balance after age 62 is associated with an increase in difficulty paying bills, but is not significantly associated with experiencing financial strain. In contrast, smaller amounts of mortgage repayment since age 62 increase the odds of both bill-paying difficulties and financial strain. These results indicate that the relationship between mortgage debt and stress is nuanced, and depends on both the type and timing of the debt.

Our second analysis considers the stress associated with a specific type of mortgage debt available only to older adults—the federally insured reverse mortgage (HECM). There is little research examining longer term outcomes for reverse mortgage borrowers, and our study is the first to consider the relationship between reverse mortgages and subsequent financial stress. We find that obtaining a reverse mortgage affects stress in multiple ways. One finding is that, per

dollar, HECM debt creates less stress than forward mortgage debt and much less than consumer debt, where stress is measured four years after HECM origination. When a HECM is originated, all existing mortgage debt is replaced with HECM debt, which lowers debt stress. If an older adult also replaces consumer debt with HECM debt, stress is further reduced. However, if neither debt replacement behavior occurs and HECM funds are spent or invested, our results indicate that debt stress rises. Over time, HECM balances grow due to interest and mortgage insurance costs while forward mortgages are repaid. Thus, even though debt stress is lower per dollar for HECMs, the total stress of the HECM mortgage may eventually exceed that of a forward mortgage.

Our third analysis considers the implications of debt stress for retirement behaviors, and in particular, the decision to claim Social Security when first eligible, at age 62. While prior studies have found some evidence of a negative relationship between holding debt and early claiming of Social Security retirement benefits (Butricia and Karamcheva 2013; 2019), we offer a new hypothesis; specifically, that experiencing financial stress reduces early claiming, particularly for those who were in the labor force in the prior period. In our regression analysis, we account for many details of an individual's financial situation, including assets (financial and housing), debts (mortgage, credit card, other), work earnings, and pension income. Thus, our stress measure reflects the relationship of an individual's idiosyncratic stress response to his or her financial situation with the likelihood of claiming Social Security retirement income at age 62. For example, compare two individuals with identical socio-demographic characteristics and financial situations. One responds to this situation with a high level of stress, the other reports a low level of stress. We find that a stressed individual is about 7 to 12 percentage points less likely to claim Social Security retirement benefits early. A possible explanation for this finding has two components. One occurs in the short run; financially stressed individuals select to continue working rather than receive reduced income from Social Security. The other explanation occurs over a longer time span: individuals reporting a high level of financial stress delay claiming Social Security benefits so that they receive an increased monthly benefit.

Taken together, the results of our analyses push researchers and policymakers to think about debt in retirement in more nuanced ways. Our findings indicate that the relationship between debt and financial stress is contingent on the types—and timing—of debt held by older adults. The largest increase in financial debt held by older adults over the past two decades is in

the form of mortgage debt, and our results indicate that this is the least stressful form of debt for older adults—particularly new mortgage debt that is extracted after the homeowner turns 62. For lower income homeowners with little or no retirement savings, many of whom depend on Social Security as their only source of income, borrowing from home equity can provide access to liquidity with less stress than other higher cost forms of borrowing. This highlights the importance of financial products that provide affordable access to housing wealth in retirement, such as the FHA's HECM program. Future research is needed that examines how borrowing from home equity in retirement may positively or negatively affect other indicators of retirement well-being, including physical health and mortality.

Further, our results indicate that it is not simply holding higher levels of financial debt that affect retirement decisions (specifically, early claiming), but rather the idiosyncratic financial stress experienced by the individual. Experiencing financial stress is associated with delayed claiming of benefits, but primarily among those who were in the labor force in the prior period and who likely have the option of continuing to work. This raises questions about the consequences of financial stress for those who have voluntarily or involuntarily left the labor force. It is possible that these households may be more likely to seek alternatives to supplement their incomes before full retirement age, such as applying for Social Security Disability Income (Duggan, Singleton, and Song 2007). Our current analysis excludes respondents who received SSDI at age 60 or 62; however, future research could model the decision to apply for or receive disability benefits as a function, in part, of debt and financial stress.

This present study adds to a growing body of literature that documents trends in financial debt of older households (e.g., Butrica Karamcheva 2018; 2019; Fitchner 2019; Lusardi, Mitchell, & Oggero 2018; NCOA 2018). A universal finding across studies is the rise in mortgage debt over time. This is notable given decades of research documenting seniors' reluctance to liquidate home equity (e.g., Poterba, Venti, and Wise 2011). It is unclear if this changing trend represents a persistent shift in older adults' willingness to leverage home equity, or if it is simply an artifact of the recent boom and bust in the U.S. mortgage market. Either way, understanding the role and consequences of debt in retirement is a critical area of inquiry for policymakers and scholars concerned with the financial well-being of older adults.

References

- Alley, D. E., Lloyd, J., Paga, J. A., Pollack, C. E., Shardell, M., & Cannuscio, C. (2011). Mortgage Delinquency and Changes in Access to Health Resources and Depressive Symptoms in a Nationally Representative Cohort of Americans Older Than 50 Years. *American Journal of Public Health, 101*(12), 2293-2298.
- Allin, S., Masseria, C., & Mossialos, E. (2009). Measuring Socioeconomic Differences in Use of Health Care Services by Wealth Versus by Income. *American Journal of Public Health, 99*(10), 1849-1855.
- Birditt, K. S., Newton, N. J., Cranford, J. A., & Ryan, L. H. (2016). Stress and Negative Relationship Quality among Older Couples: Implications for Blood Pressure. *The Journals of Gerontology: Series B, 71*(5), 775-785.
- Boen, C., & Yang, Y. C. (2016). The Physiological Impacts of Wealth Shocks in Late Life: Evidence from the Great Recession. *Social Science & Medicine, 150*, 221-230.
- Butrica, B. A., & Karamcheva, N. S. (2013). *Does Household Debt Influence the Labor Supply and Benefit Claiming Decisions of Older Americans?* Chestnut Hill: Center for Retirement Research at Boston College.
- Butrica, B. A., & Karamcheva, N. S. (2018). In Debt and Approaching Retirement: Claim Social Security or Work Longer? *AEA Papers and Proceedings, 108*(May), 401-406.
- Butrica, B. A., & Karamcheva, N. S. (2019). Is Rising Household Debt Affecting Retirement Decisions? Prepared for presentation at the *Pension Research Council Symposium, "Remaking Retirement? Debt in an Aging Economy"*.
- Card, D., Maestas, N. & Purcell, P.J. (2014). *Labor market shocks and early Social Security benefit claiming*. Working Paper WP 2014-317. Michigan Retirement Research Center: University of Michigan.
- Charles, S. T. (2010). Strength and Vulnerability Integration: A Model of Emotional Well-Being across Adulthood. *Psychological Bulletin, 136*(6), 1068-1091.
- Chatterjee, S. (2016). Reverse Mortgage Participation in the United States: Evidence from a National Study. *International Journal of Financial Studies, 4*(5), 1-10.
- Cohen, S., Salonen, J. T., & Kaplan, G. A. (1999). The Role of Psychological Characteristics in the Relation between Socioeconomic Status and Perceived Health. *Journal of Applied Social Psychology, 29*(3), 445-468.
- Collins, J. M., Hembre, E., & Urban, C. (2018). *Exploring the Rise of Mortgage Borrowing among Older Americans*. Chestnut Hill: Center for Retirement Research at Boston College.
- Crystal, S., & Shea, D. (1990). The Economic Well-Being of the Elderly. *Review of Income and Wealth, 36*(3), 227-247.
- de Baca, T. s. C., Peña, M. S. B., Slopen, N., Williams, D., Buring, J., & Albert, M. A. (2019). Financial Strain and Ideal Cardiovascular Health in Middle-Aged and Older Women: Data from the Women's Health Study. *American Heart Journal, 215*, 129-138.
- de Souza, J. A., Yap, B. J., & J., H. F. (2014). The Development of a Financial Toxicity Patient-Reported Outcome in Cancer: The Cost Measure. *Cancer, 120*, 3245-3253.
- Drentea, P. (2000). Age, Debt and Anxiety. *Journal of Health and Social Behavior, 41*(4), 437-450.
- Drentea, P., & Reynolds, J. R. (2015). Where Does Debt Fit in the Stress Process Model? *Society and Mental Health, 5*(1), 16-32.

- Duggan, M., Singleton, P., & Song, J. (2007). Aching to retire? The Rise in the Full Retirement Age and its Impact on the Social Security Disability Rolls. *Journal of Public Economics*, 91(7-8), 1327-1350.
- Dunn, L. F., & Mirzaie, I. A. (2016). Consumer Debt Stress, Changes in Household Debt and the Great Recession. *Economic Inquiry*, 54(1), 201-214.
- Dwyer, R. E., McCloud, L., & Hodson, R. (2011). Youth Debt, Mastery, and Self Esteem: Class Stratified Effects of Indebtedness on Self Concept. *Social Science Research*, 40(3), 727-741.
- Fichtner, J. J. (2019). *Household Debt and Financial Well-Being in Retirement*. Madison: Center for Financial Security, University of Wisconsin-Madison.
- Fisher, G. G., & Ryan, L. H. (2018). Overview of the Health and Retirement Study and Introduction to the Special Issue. *Work, Aging and Retirement*, 4(1), 1-9.
- Fulford, S. L. (2015). How Important Is Variability in Consumer Credit Limits? *Journal of Monetary Economics*, 72, 42-63.
- Fulford, S. L., & Schuh, S. (2015). *Consumer Revolving Credit and Debt over the Life-Cycle and Business Cycle*. Boston: Federal Reserve Bank of Boston.
- Gallo, L. C., & Matthews, K. A. (2003). Understanding the Association between Socioeconomic Status and Physical Health: Do Negative Emotions Play a Role? *Psychological Bulletin*, 129(1), 10-51.
- Glickman, M. & Hermes, S. (2015). "Why Retirees Claim Social Security at 62 and How It Affects Their Retirement Income: Evidence from the Health and Retirement Study." *The Journal of Retirement* 2(3): 25-39.
- Goodman, L., Kaul, K., & Zhu, J. (2017). *What the 2016 Survey of Consumer Finances Tells Us About Senior Homeowners*. Washington, DC: Housing Policy Finance Center, Urban Institute.
- Haaga, O & Johnson, R. W. (2012). *Social Security Claiming: Trends and Business Cycle Effects*. Working Paper 2012-5. Chestnut Hill, MA: Center for Retirement Research at Boston College.
- Hamoudi, A., & Dowd, J. B. (2014). Housing Wealth, Psychological Well-Being, and Cognitive Functioning of Older Americans. *Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 69(2), 253-262.
- Haurin, D., Ma, C., Moulton, S., Schmeiser, M., Seligman, J., & Shi, W. (2016). Spatial variation in reverse mortgages usage: House price dynamics and consumer selection. *The Journal of Real Estate Finance and Economics*, 53(3), 392-417.
- Haurin, D., Moulton, S., & Shi, W. (2018). The Accuracy of Senior Households' Estimates of Home Values: Application to the Reverse Mortgage Decision. *Real Estate Economics*, 46(3), 655-697.
- Haushofer, J., & Fehr, E. (2014). On the Psychology of Poverty. *Science*, 344(6186), 862-867.
- Hojman, D. A., Miranda, A., & Ruiz-Tagle, J. (2016). Debt Trajectories and Mental Health *Social Science and Medicine*, 167, 54-62.
- HUD. U.S. Department of Housing and Urban Development. (2017). Top ten things to know if you're interested in a reverse mortgage. Frequently asked questions about HUD's reverse mortgages. Washington, DC: U.S. Department of Housing and Urban Development.
- Hurd, M. D., Smith J. P., & Zissimopoulos, J. M. (2004). "The Effects of Subjective Survival on Retirement and Social Security Claiming." *Journal of Applied Econometrics* 19(6): 761-775.
- JCHS. (2014). *Housing America's Older Adults—Meeting the Needs of an Aging Population*. Cambridge: Harvard University.

- Keene, D. E., Cowan, S. K., & Baker, A. C. (2015). "When You're in a Crisis Like That, You Don't Want People to Know": Mortgage Strain, Stigma, and Mental Health. *American Journal of Public Health, 105*(5), 1008-1012.
- Keese, M. (2012). Who Feels Constrained by High Debt Burdens? Subjective Vs. Objective Measures of Household Debt. *Journal of Economic Psychology, 33*, 125-141.
- Li, X., Hurd, M., & Loughran, D. S. (2008). The characteristics of social security beneficiaries who claim benefits at the early entitlement age (Vol. 19). Washington, DC: AARP, Public Policy Institute.
- Loibl, C., Haurin, D., Brown, J., & Moulton, S. (In press). Reverse Mortgage Borrowing, Domain and Life Satisfaction. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, DOI: 10.1093/geronb/gby096*.
- Lusardi, A., Mitchell, O., & Oggero, N. (2018). The Changing Face of Debt and Financial Fragility at Older Ages. *AEA Paper and Proceedings, 108*, 407-411.
- MacLeod, S., Musich, S., Kraemer, S., & Wicker, E. (2018). Practical Non-Pharmacological Intervention Approaches for Sleep Problems among Older Adults. *Geriatric Nursing, 39*(5), 506-512.
- Mani, A., Mullainathan, S., Shafir, E., & Zhao, J. (2013). Poverty Impedes Cognitive Function. *Science, 341*(6149), 976-980.
- Mann, A. (2011). The Effect of Late-Life Debt Use on Retirement Decisions. *Social Science Research, 40*, 1623-1637.
- Marshall, G. L., Baker, T. A., Song, C., & Miller, D. B. (2018). Pain and Hardship among Older Men: Examining the Buffering Effect of Medicare Insurance Coverage. *American Journal of Men's Health, 12*(5), 1439-1449.
- Marshall, G. L., & Tucker-Seeley, R. (2018). The Association between Hardship and Self-Rated Health: Does the Choice of Indicator Matter? *Annals of Epidemiology, 28*(7), 462-467.
- Mayer, C. J. (2017). Housing, Mortgages, and Retirement. In L. A. Fennell & B. J. Keys (Eds.), *Evidence and Innovation in Housing Law and Policy* (pp. 203-230). Cambridge: Cambridge University Press.
- Mayer, C. J., & Simons, K. V. (1994). Reverse Mortgages and the Liquidity of Housing Wealth. *Journal of the American Real Estate and Urban Economics Association, 22*(2), 235-255.
- McCormack, K. (2014). Credit and Credibility: Homeownership and Identity Management in the Midst of the Foreclosure Crisis. *Sociological Quarterly, 55*(2), 261-281.
- Moulton, S., Dodini, S., Haurin, D. & Schmeiser, M. D. (2015). *How House Price Dynamics and Credit Constraints Affect the Equity Extraction of Senior Homeowners*. Michigan Retirement Research Center: University of Michigan.
- Moulton, S., Haurin, D., Dodini, S., & Schmeiser, M. D. (2016a). *How Home Equity Extraction and Reverse Mortgages Affect the Credit Outcomes of Senior Households*. Michigan Retirement Research Center: University of Michigan.
- Moulton, S., Haurin, D., & Shi, W. (2015). An Analysis of Default Risk in the Home Equity Conversion Mortgage (Hecm) Program. *Journal of Urban Economics, 90*(November), 17-34.
- Moulton, S., Loibl, C., & Haurin, D. (2017). Reverse Mortgage Motivations and Outcomes: Insights from Survey Data. *CityScape, 19*(1), 73-98.
- Moulton, S., Loibl, C., Haurin, D., Collins, J. M., Roll, S., Kondratjeva, O., & Shi, W. (2016b). *Aging in Place: Analyzing the Use of Reverse Mortgages to Preserve Independent Living*: Social Sciences Research Network

- National Council on Aging. (2018). *Older Adults and Debt: Trends, Trade-Offs, and Tools to Help*. Washington.
- NRMLA. (2019). *Annual Hecm Endorsement Chart*. Washington: National Reverse Mortgage Lenders Association.
- Pool, L. R., Needham, B. L., Burgard, S. A., Elliott, M. R., & Mendes de Leon, C. F. (2017). Negative Wealth Shock and Short-Term Changes in Depressive Symptoms and Medication Adherence among Late Middle-Aged Adults. *Journal of epidemiology and Community Health, 71*, 758-763.
- Poterba, J., Venti, S., & Wise, D. (2011). The Composition and Drawdown of Wealth in Retirement. *Journal of Economic Perspectives, 25*(4), 95-118.
- Rasmussen, D., Megbolugbe, I. F., & Morgan, B. A. (1995). Using the 1990 Public Use Microdata Sample to Estimate Potential Demand for Reverse Mortgage Products. *Journal of Housing Research, 6*(1).
- Redfoot, D. L., Scholen, K., & Brown, S. K. (2007). *Reverse Mortgages: Niche Product or Mainstream Solution? Report on the 2006 Aarp National Survey of Reverse Mortgage Shoppers*. Washington: AARP Public Policy Institute.
- Reed, William. (2015). On the Practice of Lagging Variables to Avoid Simultaneity. *Oxford Bulletin of Economics and Statistics, 77*(6), 897-905.
- Sass, S., Sun, W., & Webb, A. (2007). *Why Do Married Men Claim Social Security Benefit So Early? Ignorance or Caddishness?* Working Paper No. 2007-17. Chestnut Hill, MA: Center for Retirement Research at Boston College.
- Shah, A. K., Mullainathan, S., & Shafir, E. (2012). Some Consequences of Having Too Little. *Science, 338*(November 02), 682-685.
- Shen, S., Sam, A. G., & Jones, E. (2014). Credit Card Indebtedness and Psychological Well-Being over Time: Empirical Evidence from a Household Survey. *Journal of Consumer Affairs, 48*(3), 431-4546.
- Smith, J., Ryan, L., Fisher, G. G., Sonnega, A., & Weil, D. (2017). *Psychosocial and Lifestyle Questionnaire 2006 - 2016* Ann Arbor: Survey Research Center, Institute for Social Research, University of Michigan.
- Social Security Administration. (2018). *Old-Age, Survivors, and Disability Insurance: Benefits Awarded*. Annual Statistical Supplement. Washington: Social Security Administration, Office of Retirement and Disability Policy.
- Social Security Administration. (2019). *Social Security Benefits: Early or Late Retirement*. Washington: Social Security Administration.
- Sonnega, A., Faul, J. D., Ofstedal, M. B., Langa, K. M., Phillips, J. W. R., & Weir, D. R. (2014). Cohort Profile: The Health and Retirement Study (Hrs). *International Journal of Epidemiology, 43*(2), 576-585.
- Whelan, C. T., Layte, R., Maitre, B., & Nolan, B. (2001). Income, Deprivation, and Economic Strain. *European Sociological Review, 17*(4), 357-372.
- Yabroff, K. R., Dowling, E. C., Jr., G. P. G., Banegas, M. P., Davidoff, A., Han, X., . . . Ekwueme, D. U. (2016). Financial Hardship Associated with Cancer in the United States: Findings from a Population-Based Sample of Adult Cancer Survivors. *Journal of Clinical Oncology, 34*(3), 259-267.

Appendix A

Appendix A1: Descriptive Statistics for "Debt and Financial Stress in Older Age"

	Age 50-61				Age 62+			
	mean	sd	min	max	mean	sd	min	max
Bill-paying difficulty (continuous)	2.09	1.04	1.00	5.00	1.87	0.95	1.00	5.00
Bill-paying difficulty (binary)	0.34	0.47	0.00	1.00	0.25	0.43	0.00	1.00
Financial strain (continuous)	1.84	0.99	1.00	4.00	1.56	0.85	1.00	4.00
Financial strain (binary)	0.49	0.50	0.00	1.00	0.36	0.48	0.00	1.00
Credit card balance lag	0.25	0.68	0.00	15.48	0.11	0.43	0.00	9.84
Other financial debt lag	0.23	1.25	0.00	55.05	0.08	0.46	0.00	11.06
1st Residence: Total mortgage balance lag	4.65	7.55	0.00	60.00	1.96	5.23	0.00	108.39
1st Residence: First mortgage balance lag	4.08	7.11	0.00	60.00	1.66	4.93	0.00	108.39
1st Residence: HELOC and 2nd mortgage balance lag	0.57	2.25	0.00	44.45	0.30	1.50	0.00	27.53
1st Residence: HELOC balance lag	0.46	1.94	0.00	44.45	0.24	1.32	0.00	27.53
1st Residence: 2nd mortgage balance lag	0.11	1.04	0.00	29.73	0.06	0.68	0.00	22.02
2nd Residence: Total mortgage balance lag	0.21	1.75	0.00	34.93	0.15	3.35	0.00	127.00
Annual rent lag	0.10	0.28	0.00	3.40	0.10	0.38	0.00	19.24
Net cash assets lag	2.90	7.85	0.00	187.17	4.14	8.33	0.00	187.17
Net investment assets lag	9.83	21.36	0.00	232.28	10.49	23.14	0.00	397.12
Other assets lag	6.81	28.23	-2.32	1110.42	6.42	23.38	-2.32	1104.19
House value lag	17.22	15.76	0.00	165.15	16.39	15.85	0.00	165.90
Secondary residence house value lag	1.37	5.35	0.00	78.21	1.22	5.30	0.00	99.54
Household Social Security income lag	0.87	1.14	0.00	11.97	1.86	0.93	0.00	12.10
Household earned income lag	4.14	4.91	0.00	47.12	0.78	2.28	0.00	47.12
Household other income lag	2.40	6.64	0.00	153.71	2.24	5.69	0.00	257.17
Number household members lag	2.36	1.16	1.00	13.00	2.01	0.95	1.00	9.00
Urban residence lag	0.43	0.50	0.00	1.00	0.44	0.50	0.00	1.00
Suburban residence lag	0.23	0.42	0.00	1.00	0.24	0.43	0.00	1.00
Rural residence lag	0.33	0.47	0.00	1.00	0.32	0.47	0.00	1.00
Region (Northeast, Mid-Atlantic)	0.11	0.31	0.00	1.00	0.11	0.31	0.00	1.00
Region (Midwest, East North Central)	0.20	0.40	0.00	1.00	0.17	0.38	0.00	1.00
Region (Midwest, West North Central)	0.08	0.28	0.00	1.00	0.11	0.31	0.00	1.00
Region (South, South Atlantic)	0.25	0.43	0.00	1.00	0.24	0.43	0.00	1.00
Region (South, East South Central)	0.06	0.24	0.00	1.00	0.07	0.25	0.00	1.00
Region (South, West South Central)	0.10	0.30	0.00	1.00	0.09	0.29	0.00	1.00
Region (West, Mountain)	0.07	0.25	0.00	1.00	0.06	0.23	0.00	1.00
Region (West, Pacific)	0.10	0.30	0.00	1.00	0.12	0.32	0.00	1.00
Male	0.36	0.48	0.00	1.00	0.40	0.49	0.00	1.00
Age lag	60.50	3.83	50.00	70.00	74.12	6.65	62.00	102.00
White	0.81	0.40	0.00	1.00	0.85	0.36	0.00	1.00
Black	0.14	0.35	0.00	1.00	0.12	0.32	0.00	1.00

Other race	0.05	0.23	0.00	1.00	0.03	0.17	0.00	1.00
Hispanic	0.09	0.28	0.00	1.00	0.07	0.25	0.00	1.00
Not born in US	0.08	0.27	0.00	1.00	0.07	0.26	0.00	1.00
Less than high school	0.12	0.33	0.00	1.00	0.21	0.40	0.00	1.00
High school	0.32	0.47	0.00	1.00	0.37	0.48	0.00	1.00
GED	0.06	0.23	0.00	1.00	0.05	0.23	0.00	1.00
Some college	0.28	0.45	0.00	1.00	0.21	0.41	0.00	1.00
College or more	0.23	0.42	0.00	1.00	0.16	0.37	0.00	1.00
Married or partnered lag	0.75	0.43	0.00	1.00	0.64	0.48	0.00	1.00
Separated, divorced, widowed lag	0.22	0.41	0.00	1.00	0.34	0.47	0.00	1.00
Never married lag	0.04	0.19	0.00	1.00	0.02	0.15	0.00	1.00
Number of living children lag	2.81	1.91	0.00	14.00	3.33	2.16	0.00	18.00
Number of living children missing lag	0.01	0.12	0.00	1.00	0.02	0.13	0.00	1.00
Health insurance lag	0.71	0.45	0.00	1.00	0.96	0.20	0.00	1.00
ADL lag	0.20	0.66	0.00	5.00	0.21	0.66	0.00	5.00
Self-rated health lag	3.25	1.04	1.00	5.00	3.18	1.02	1.00	5.00
Self-rated memory lag	3.09	0.91	1.00	5.00	2.95	0.88	1.00	5.00
Receive help lag	0.61	0.49	0.00	1.00	0.57	0.49	0.00	1.00
Receive help missing lag	0.11	0.31	0.00	1.00	0.13	0.34	0.00	1.00
Number observations	4,571				9,189			

Source: Author's calculations using the 2004-2014 Health and Retirement Study data

Note: All financial variables are measured in \$10,000s, expressed in 2016 real dollars.

Appendix A2: Log-Odds from Panel Logistic Regression Results for Binary Indicators of Financial Stress

	Age 50-61		Age 62+	
	Difficulty Paying Bills	Financial Strain	Difficulty Paying Bills	Financial Strain
Credit card balance (0,000)	1.394*** (0.115)	1.858*** (0.180)	1.580*** (0.173)	1.974*** (0.224)
Other financial debt (0,000)	1.100+ (0.062)	1.277*** (0.095)	1.226* (0.098)	1.220** (0.091)
First mortgage balance (1st home) (0,000)	1.043*** (0.010)	1.042*** (0.009)	1.054*** (0.012)	1.059*** (0.012)
HELOC balance (1st home) (0,000)	1.051+ (0.030)	1.063* (0.027)	1.071* (0.032)	1.058* (0.027)
Second mortgage balance (1st home) (0,000)	1.344*** (0.107)	1.193* (0.092)	1.115* (0.054)	1.158* (0.071)
Total mortgage balance (2nd home) (0,000)	1.008 (0.042)	0.981 (0.033)	0.999 (0.011)	1.004 (0.008)
Annual Rent (0,000)	1.944** (0.410)	1.548* (0.335)	1.191+ (0.119)	1.163+ (0.101)
Net cash assets (0,000)	0.921*** (0.022)	0.945*** (0.012)	0.918*** (0.013)	0.958*** (0.010)
Net investment assets (0,000)	0.974*** (0.005)	0.981*** (0.004)	0.954*** (0.005)	0.967*** (0.003)
Other assets (0,000)	0.993 (0.005)	0.993+ (0.004)	0.990* (0.005)	0.994+ (0.003)
House value (1st home) (0,000)	0.990+ (0.005)	0.986** (0.005)	0.989** (0.004)	0.985*** (0.003)
House value (2nd home) (0,000)	0.980 (0.016)	0.989 (0.012)	1.000 (0.010)	1.001 (0.008)
Household Social Security income (0,000)	0.935 (0.054)	0.953 (0.055)	0.963 (0.056)	0.982 (0.046)
Household earned income (0,000)	0.920*** (0.016)	0.945*** (0.012)	0.913*** (0.022)	0.951* (0.019)
Household other income (0,000)	0.997 (0.019)	0.991 (0.011)	0.922* (0.031)	0.968 (0.025)
Number of household members	1.281*** (0.066)	1.181** (0.060)	1.112* (0.052)	1.170*** (0.051)
Suburban Residence	0.959 (0.149)	0.963 (0.143)	0.968 (0.119)	1.072 (0.115)
Urban Residence	0.839 (0.125)	0.887 (0.126)	0.837 (0.100)	0.823+ (0.087)
Region (Northeast, Mid-Atlantic)	0.843 (0.354)	0.512+ (0.183)	0.920 (0.272)	1.040 (0.267)
Region (Midwest, East North Central)	1.002 (0.398)	0.620 (0.210)	0.743 (0.211)	0.922 (0.225)
Region (Midwest, West North Central)	0.754 (0.318)	0.628 (0.233)	0.621 (0.191)	0.830 (0.219)
Region (South, South Atlantic)	0.751 (0.295)	0.430* (0.144)	0.864 (0.239)	1.053 (0.253)
Region (South, East South Central)	0.761 (0.336)	0.387* (0.148)	1.142 (0.350)	1.048 (0.281)
Region (South, West South Central)	0.668 (0.279)	0.433* (0.158)	0.806 (0.246)	1.056 (0.281)
Region (West, Mountain)	1.023 (0.447)	0.698 (0.272)	1.045 (0.337)	1.656+ (0.477)
Region (West, Pacific)	0.819	0.556	0.644	1.018

	(0.346)	(0.202)	(0.192)	(0.261)
Male	0.857	0.809+	0.756**	0.875
	(0.107)	(0.097)	(0.076)	(0.077)
Age of respondent	0.932***	0.951*	0.940***	0.955***
	(0.019)	(0.019)	(0.008)	(0.007)
Black	1.686**	1.331	1.087	0.981
	(0.298)	(0.240)	(0.157)	(0.132)
Other race	1.485	1.106	1.134	0.966
	(0.388)	(0.281)	(0.312)	(0.245)
Hispanic	0.563*	0.521**	0.632*	0.507***
	(0.158)	(0.131)	(0.133)	(0.101)
Not born in US	1.269	1.000	1.093	1.049
	(0.338)	(0.236)	(0.205)	(0.179)
Less than high school	1.602*	0.983	1.333*	0.952
	(0.332)	(0.202)	(0.170)	(0.111)
GED	1.585+	2.070**	1.286	1.241
	(0.383)	(0.502)	(0.257)	(0.228)
Some college	1.094	1.339*	1.124	1.398**
	(0.166)	(0.195)	(0.147)	(0.160)
College or more	0.689*	0.910	0.784	1.137
	(0.124)	(0.151)	(0.132)	(0.158)
Separated, divorced, or widowed	1.699***	1.713***	1.188	1.139
	(0.273)	(0.264)	(0.145)	(0.121)
Never married	1.228	1.423	0.889	1.482
	(0.395)	(0.450)	(0.264)	(0.446)
Number of living children	1.025	1.017	1.021	1.006
	(0.033)	(0.032)	(0.022)	(0.020)
Have health insurance	1.026	1.040	1.053	0.923
	(0.121)	(0.120)	(0.197)	(0.155)
ADL of respondent	1.201*	1.109	1.261***	1.181**
	(0.112)	(0.103)	(0.080)	(0.071)
Self-rated health	0.659***	0.672***	0.730***	0.742***
	(0.041)	(0.039)	(0.033)	(0.030)
Self-rated memory	0.895+	0.894+	0.923	0.881**
	(0.057)	(0.055)	(0.046)	(0.039)
Family or friends nearby	0.644***	0.955	0.862	0.916
	(0.081)	(0.110)	(0.082)	(0.077)
Year = 2010	1.276+	1.667***	1.172+	1.480***
	(0.176)	(0.223)	(0.113)	(0.126)
Year = 2012	1.256	1.395*	0.954	1.355**
	(0.218)	(0.228)	(0.112)	(0.142)
Year = 2014	0.782	1.184	0.792+	1.286*
	(0.151)	(0.207)	(0.095)	(0.136)
Constant	145.049***	131.345***	118.895***	48.208***
	(187.206)	(160.366)	(88.925)	(31.042)
Observations	4,571	4,571	9,189	9,189
Number of Unique Individuals	2,569	2,569	5,034	5,034

*** p<0.001, ** p<0.01, * p<0.05

Source: Author's calculations using the 2004-2014 Health and Retirement Study data

Note: All financial variables are measured in \$10,000s, expressed in 2016 real dollars.

Appendix B

Appendix B1: Descriptive Statistics at Baseline, 2010 or 2011 Values

	HECM Borrower		HECM Non-Borrower	
	Mean	Std. Dev.	Mean	Std. Dev.
Forward mortgage debt (00,000)	0.72	0.95	0.75	0.81
Home value (00,000)	2.70 ***	2.04	2.23	1.52
Financial assets (00,000)	0.57	1.69	0.63	2.12
Annual income (00,000)	0.36 *	0.21	0.33	0.21
Consumer debt (00,000)	0.16	0.25	0.14	0.26
Unused revolving credit (00,000)	0.29	0.39	0.25	0.44
No revolving credit card	0.06 ***	0.23	0.13	0.34
Credit score (00)	7.07 ***	0.94	6.78	1.04
Age oldest in household (00)	71.51 ***	6.74	70.11	6.87
Unmarried male	0.15	0.36	0.20	0.40
Married	0.50	0.50	0.45	0.50
Good health	0.81	0.40	0.79	0.41
Observations	728		298	

*** p<0.001, ** p<0.01, * p<0.05

Source: Author's calculations using HECM administrative and survey data

Note: All values are for 2010 or 2011, in 2014 constant dollars. Time invariant variables include Hispanic, Black, and the education variables. Means are reported for samples excluding missing values.

Appendix B2: Probit Regression of the Decision whether to Obtain a HECM, 2010 or 2011

	Coeff.	Std. Error
Consumer debt (00,000)	0.0429	(0.1661)
Financial assets (00,000)	0.0073	(0.0392)
Annual income (000)	-0.0031	(0.3017)
Unused revolving credit (00,000)	0.0346	(0.1218)
No revolving credit card	-0.2864*	(0.1392)
Credit score (00)	0.0762	(0.0488)
Change in HPI	-0.0054	(0.0041)
Black	-0.3844***	(0.0952)
Hispanic	-0.3098	(0.2457)
High school/some college	0.2250+	(0.1339)
Four-year college degree	0.2264	(0.1599)
Post-graduate degree	0.0238	(0.2021)
Year= 2010	0.0989	(0.1104)
Age of oldest HH member	0.0170*	(0.0067)
Unmarried female	-0.0879	(0.0973)
Unmarried male	-0.1251	(0.1091)
Good health	0.0067	(0.1057)
Estimated IPL at baseline in hundreds of thousands	0.0914	(0.0790)
Mortgage debt divided by estimated IPL at baseline	-0.2545**	(0.0842)
Net IPL less than zero	0.0085	(0.0971)
Appraised value is greater than MCA	-2.2876***	(0.4440)
At least one BofA or WF branch in zip at counseling	0.0440	(0.0617)
Observations	1,026	
Log likelihood	-6326.3	

*** p<0.001, ** p<0.01, * p<0.05; Robust standard errors in parentheses

Source: Author's calculations using HECM administrative and survey data

Note: Includes state fixed effects. All financial variables are measured as of 2010 or 2011, in 2014 constant dollars. Coefficients of the indicators of variables representing missing values are not reported.

Appendix B3: Results for Six Endogenous Financial Variables in HECM Debt Stress Analysis

	(1)	(2)	(3)	(4)	(5)	(6)
	Consumer Debt	Financial Assets	Total Mortgage	Unused Revolving	Credit Score	Unused HECM
Consumer debt (00,000)	0.3835*** (0.0508)	-0.3306 (0.2215)	0.2000 (0.1218)	0.0165 (0.0315)	0.2287 (0.1404)	-0.0983** (0.0355)
Financial assets (00,000)	0.0024 (0.0047)	0.2375** (0.0781)	-0.0096 (0.0146)	0.0055 (0.0043)	-0.0389 (0.0394)	0.0143 (0.0117)
Annual income (000)	0.0668* (0.0314)	1.4186** (0.4524)	0.4258* (0.1844)	0.1057* (0.0426)	0.1185 (0.2725)	-0.0043 (0.0891)
Unused revolving credit (00,000)	0.0127 (0.0116)	0.3317+ (0.1766)	-0.0934 (0.0834)	0.5006*** (0.0443)	0.2175+ (0.1202)	0.0542 (0.0334)
No revolving credit card	0.0026 (0.0106)	0.2072 (0.1517)	-0.1607+ (0.0849)	-0.0161 (0.0114)	-0.7866** (0.2688)	-0.0111 (0.0309)
Credit score (00)	0.0120** (0.0046)	0.0746 (0.0512)	0.0586+ (0.0314)	0.0402*** (0.0068)	0.6336*** (0.0575)	-0.0015 (0.0143)
Change in HPI	-0.0005 (0.0005)	0.0171+ (0.0090)	-0.0022 (0.0025)	0.0020*** (0.0005)	0.0197** (0.0063)	0.0006 (0.0011)
Black	0.0238* (0.0120)	-0.0523 (0.1152)	-0.1443* (0.0633)	-0.0017 (0.0142)	0.1994 (0.1431)	-0.0124 (0.0175)
Hispanic	-0.0271 (0.0180)	-0.1549 (0.2800)	-0.2609 (0.1737)	-0.0412 (0.0343)	-0.0911 (0.3140)	-0.1146** (0.0428)
High school/some college	0.0097 (0.0123)	-0.1547 (0.1240)	0.1995* (0.0895)	0.0083 (0.0116)	-0.0695 (0.1462)	0.0167 (0.0319)
Four-year college degree	0.0193 (0.0160)	0.5261* (0.2620)	0.3631*** (0.1068)	0.0260 (0.0181)	0.0638 (0.1703)	0.0013 (0.0401)
Post-graduate degree	0.0092 (0.0217)	0.5809+ (0.3221)	0.2838* (0.1375)	0.0518+ (0.0294)	-0.2243 (0.2100)	-0.0007 (0.0583)
Year= 2010	-0.0112 (0.0120)	-0.0763 (0.1619)	-0.0611 (0.0745)	0.0457** (0.0162)	0.3917* (0.1687)	0.0286 (0.0286)
Age of oldest HH member	-0.0008 (0.0006)	-0.0145+ (0.0080)	0.0073+ (0.0040)	0.0000 (0.0008)	-0.0034 (0.0086)	0.0030+ (0.0018)
Unmarried female	-0.0188* (0.0094)	-0.1890 (0.1285)	-0.0345 (0.0643)	-0.0141 (0.0138)	-0.0292 (0.1087)	-0.0018 (0.0252)
Unmarried male	-0.0103 (0.0113)	-0.3150+ (0.1646)	-0.0656 (0.0631)	0.0052 (0.0171)	-0.0119 (0.1540)	-0.0007 (0.0261)
Good health	0.1309 (0.0829)	-0.5722 (0.8433)	-0.0820 (0.1352)	0.0519 (0.0486)	-0.4275+ (0.2562)	0.1103 (0.2152)
Dummy: Health condition good or better	-0.0213 (0.0142)	0.3848*** (0.1033)	-0.1246+ (0.0713)	0.0085 (0.0150)	0.1297 (0.1495)	0.0306 (0.0218)
Total mortgage debt at baseline (00,000)	0.0008 (0.0048)	-0.1866* (0.0836)	0.3443*** (0.0456)	-0.0083 (0.0081)	-0.1048+ (0.0628)	-0.1092*** (0.0189)
Home value (1st home) at baseline (00,000)	-0.0012 (0.0025)	0.0762+ (0.0414)	0.2287*** (0.0297)	0.0058 (0.0044)	0.0678* (0.0279)	0.0603*** (0.0164)
Observations	1,026	1,026	1,026	1,026	1,026	1,026
Log likelihood	-6326.3	-6326.3	-6326.3	-6326.3	-6326.3	-6326.3

*** p<0.001, ** p<0.01, * p<0.05; Robust standard errors in parentheses

Source: Author's calculations using HECM administrative and survey data

Note: Includes state fixed effects. All financial variables are measured as of 2010 or 2011, in 2014 constant dollars. Coefficients of the indicators of variables representing missing values are not reported.

Appendix C

Appendix C1: Probit Results for Probability of Claiming Social Security Retirement at Age 62, Financial Strain Sample

	(1)		(2)		(3)	
	Marginal	Std. Err.	Marginal	Std. Err.	Probit	Std. Err.
	Effects		Effects		Coef	
Financial strain (continuous)			-0.019	(0.019)	0.057	(0.078)
Financial strain*Respondent earnings					-0.064*	(0.026)
Total mortgage balance (1st home) (0,000)	-0.000	(0.003)	0.000	(0.003)	0.002	(0.009)
House value (1st home) (0,000)	-0.002	(0.002)	-0.002	(0.002)	-0.008	(0.005)
Annual Rent (0,000)	0.026	(0.068)	0.031	(0.068)	0.106	(0.222)
House value (2nd home) (0,000)	-0.006	(0.004)	-0.006	(0.004)	-0.019	(0.013)
Total mortgage balance (2nd home) (0,000)	0.011	(0.009)	0.011	(0.009)	0.031	(0.028)
Net cash assets (0,000)	-0.000	(0.005)	-0.001	(0.005)	-0.002	(0.015)
Net investment assets (0,000)	0.001	(0.001)	0.001	(0.001)	0.003	(0.003)
Other assets (0,000)	0.001	(0.002)	0.000	(0.002)	0.002	(0.005)
Credit card balance (0,000)	-0.005	(0.023)	-0.004	(0.023)	-0.030	(0.075)
Other financial debt (0,000)	0.001	(0.026)	0.005	(0.026)	0.018	(0.088)
Respondent annual earnings (0,000)	-0.029***	(0.008)	-0.030***	(0.008)	-0.009	(0.046)
Spouse annual earnings (0,000)	0.000	(0.009)	0.000	(0.008)	-0.001	(0.028)
Respondent earning=0 at 60 (binary)	0.137*	(0.055)	0.136*	(0.055)	0.335*	(0.161)
Spouse earning=0 at 60 (binary)	0.007	(0.054)	0.010	(0.054)	0.017	(0.177)
Respondent pension income (0,000)	0.056*	(0.027)	0.055*	(0.027)	0.177*	(0.087)
Spouse pension income (0,000)	0.081**	(0.031)	0.080**	(0.031)	0.246*	(0.100)
Male	0.029	(0.037)	0.028	(0.037)	0.058	(0.122)
Hispanic	0.172*	(0.087)	0.169+	(0.087)	0.563+	(0.295)
Black	-0.023	(0.054)	-0.023	(0.055)	-0.106	(0.181)
Other race	-0.107	(0.071)	-0.105	(0.071)	-0.345	(0.248)
Not born in US	-0.109	(0.073)	-0.110	(0.073)	-0.413	(0.257)
Less than high school	-0.030	(0.062)	-0.031	(0.061)	-0.093	(0.205)
GED	0.137	(0.088)	0.141	(0.087)	0.436	(0.280)
Some College	-0.031	(0.043)	-0.027	(0.043)	-0.086	(0.143)
College or more	-0.147**	(0.052)	-0.148**	(0.052)	-0.504**	(0.178)
Suburban residence	-0.012	(0.047)	-0.013	(0.047)	-0.072	(0.153)
Rural residence	-0.030	(0.045)	-0.031	(0.045)	-0.098	(0.149)
Region (Northeast, Mid-Atlantic)	0.068	(0.128)	0.065	(0.128)	0.229	(0.424)
Region (Midwest, East North Central)	0.138	(0.122)	0.139	(0.123)	0.437	(0.408)
Region (Midwest, West North Central)	0.073	(0.140)	0.072	(0.141)	0.262	(0.456)
Region (South, South Atlantic)	0.150	(0.118)	0.148	(0.118)	0.483	(0.404)
Region (South, East South Central)	0.201	(0.132)	0.201	(0.133)	0.710	(0.459)
Region (South, West South Central)	0.004	(0.134)	0.002	(0.135)	0.049	(0.445)
Region (West, Mountain)	0.104	(0.141)	0.101	(0.141)	0.301	(0.460)
Region (West, Pacific)	0.071	(0.132)	0.069	(0.132)	0.225	(0.434)
Separated, divorced, widowed	0.042	(0.054)	0.043	(0.053)	0.167	(0.174)
Never married	0.055	(0.101)	0.062	(0.101)	0.216	(0.321)
Respondent ADL	0.045	(0.036)	0.047	(0.036)	0.137	(0.120)
Spouse ADL	0.066*	(0.031)	0.068*	(0.030)	0.231*	(0.099)
Self-rated health	0.003	(0.019)	0.000	(0.019)	0.001	(0.064)
Number of household residents	-0.025	(0.016)	-0.023	(0.016)	-0.074	(0.054)
Number of living children	0.006	(0.009)	0.005	(0.009)	0.014	(0.030)
Have health insurance	-0.062	(0.042)	-0.062	(0.042)	-0.187	(0.132)
Positive self rated memory	0.007	(0.020)	0.007	(0.020)	0.025	(0.065)
Family or friends nearby	-0.030	(0.039)	-0.033	(0.039)	-0.098	(0.127)
Year = 2008	0.085+	(0.046)	0.085+	(0.046)	0.295+	(0.150)
Year = 2012	0.108*	(0.043)	0.111**	(0.043)	0.385**	(0.141)

Observations	649	649	649
Log likelihood	-352.91	-352.4	-348.8

*** p<0.001, ** p<0.01, * p<0.05, +p<0.10; robust standard errors in parentheses

Source: Author's calculations using the 2004-2014 Health and Retirement Study data

Note: All financial variables are measured in \$10,000s, expressed in 2016 real dollars.

Appendix C2: Probit Results for Probability of Claiming Social Security Retirement at Age 62, Difficulty Paying Bills Sample

	(1)		(2)		(3)	
	Marginal	Std. Err.	Marginal	Std. Err.	Probit	Std. Err.
	Effects		Effects		Coef	
Difficulty paying bills (continuous)			-0.028	(0.017)	0.035	(0.069)
Difficulty paying bills*Respondent earnings					-0.056**	(0.019)
Total mortgage balance (1st home) (0,000)	0.002	(0.002)	0.003	(0.002)	0.010	(0.008)
House value (1st home) (0,000)	-0.004*	(0.002)	-0.004*	(0.002)	-0.013**	(0.005)
Annual Rent (0,000)	0.029	(0.063)	0.037	(0.063)	0.063	(0.197)
House value (2nd home) (0,000)	-0.001	(0.003)	-0.001	(0.003)	-0.001	(0.010)
Total mortgage balance (2nd home) (0,000)	0.002	(0.009)	0.001	(0.009)	0.001	(0.028)
Net cash assets (0,000)	-0.001	(0.004)	-0.002	(0.004)	-0.006	(0.011)
Net investment assets (0,000)	0.002*	(0.001)	0.002*	(0.001)	0.006*	(0.003)
Other assets (0,000)	0.001	(0.001)	0.000	(0.001)	0.002	(0.004)
Credit card balance (0,000)	-0.024	(0.020)	-0.019	(0.020)	-0.068	(0.064)
Other financial debt (0,000)	0.023	(0.025)	0.030	(0.025)	0.099	(0.080)
Respondent annual earnings (0,000)	-0.029***	(0.007)	-0.031***	(0.007)	-0.006	(0.039)
Spouse annual earnings (0,000)	-0.002	(0.007)	-0.002	(0.007)	-0.009	(0.023)
Respondent earning=0 at 60 (binary)	0.132**	(0.048)	0.124**	(0.048)	0.295*	(0.136)
Spouse earning=0 at 60 (binary)	0.028	(0.048)	0.030	(0.048)	0.074	(0.148)
Respondent pension income (0,000)	0.050*	(0.022)	0.047*	(0.022)	0.150*	(0.068)
Spouse pension income (0,000)	0.068**	(0.021)	0.065**	(0.021)	0.197**	(0.065)
Male	0.050	(0.034)	0.049	(0.034)	0.138	(0.105)
Hispanic	0.096	(0.080)	0.095	(0.079)	0.301	(0.249)
Black	-0.051	(0.049)	-0.046	(0.049)	-0.137	(0.157)
Other race	-0.008	(0.070)	-0.011	(0.069)	-0.021	(0.217)
Not born in US	-0.089	(0.069)	-0.084	(0.069)	-0.303	(0.226)
Less than high school	-0.044	(0.058)	-0.043	(0.058)	-0.134	(0.185)
GED	0.057	(0.081)	0.063	(0.081)	0.174	(0.244)
Some College	-0.002	(0.039)	-0.002	(0.039)	0.003	(0.123)
College or more	-0.078+	(0.047)	-0.083+	(0.047)	-0.267+	(0.148)
Suburban residence	-0.035	(0.041)	-0.034	(0.041)	-0.115	(0.128)
Rural residence	-0.049	(0.039)	-0.052	(0.039)	-0.155	(0.125)
Region (Northeast, Mid-Atlantic)	0.079	(0.098)	0.077	(0.099)	0.248	(0.309)
Region (Midwest, East North Central)	0.149+	(0.090)	0.149	(0.091)	0.439	(0.290)
Region (Midwest, West North Central)	0.016	(0.106)	0.019	(0.107)	0.062	(0.330)
Region (South, South Atlantic)	0.144	(0.088)	0.141	(0.089)	0.406	(0.286)
Region (South, East South Central)	0.151	(0.101)	0.151	(0.102)	0.485	(0.325)
Region (South, West South Central)	0.077	(0.103)	0.074	(0.103)	0.233	(0.322)
Region (West, Mountain)	0.056	(0.110)	0.053	(0.110)	0.142	(0.340)
Region (West, Pacific)	-0.004	(0.101)	-0.004	(0.101)	-0.033	(0.315)
Separated, divorced, widowed	0.013	(0.049)	0.014	(0.049)	0.069	(0.152)
Never married	0.097	(0.102)	0.098	(0.101)	0.282	(0.304)
Respondent ADL	0.008	(0.032)	0.008	(0.032)	0.022	(0.100)
Spouse ADL	0.046	(0.029)	0.049+	(0.029)	0.157+	(0.090)
Self-rated health	-0.014	(0.017)	-0.017	(0.017)	-0.053	(0.055)
Number of household residents	-0.011	(0.015)	-0.009	(0.015)	-0.022	(0.048)
Number of living children	0.008	(0.009)	0.008	(0.009)	0.020	(0.027)
Have health insurance	-0.050	(0.037)	-0.054	(0.037)	-0.161	(0.112)
Positive self rated memory	-0.009	(0.018)	-0.008	(0.018)	-0.031	(0.056)
Family or friends nearby	-0.023	(0.035)	-0.029	(0.036)	-0.064	(0.110)
Year = 2008	0.093*	(0.046)	0.095*	(0.046)	0.319*	(0.144)
Year = 2010	0.097*	(0.046)	0.096*	(0.046)	0.334*	(0.145)

Year = 2012	0.111**	(0.043)	0.112**	(0.043)	0.375**	(0.135)
Observations	857		857		857	
Log likelihood	-487.76		-486.45		-481.2	

*** p<0.001, ** p<0.01, * p<0.05, +p<0.10; robust standard errors in parentheses

Source: Author's calculations using the 2004-2014 Health and Retirement Study data

Note: All financial variables are measured in \$10,000s, expressed in 2016 real dollars.



Center for Financial Security

School of Human Ecology
University of Wisconsin-Madison

1300 Linden Drive
Madison, WI 53706

608-890-0229
cfs@mailplus.wisc.edu
cfs.wisc.edu