Home Equity and the Timing of Claiming Social Security Retirement Income

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Abstract

We examine how changes in house prices affect when eligible individuals start receiving Social Security Retirement Income (SSRI). Since changes in house prices and receipt of SSRI are likely to be correlated with unobservables, we employ an instrumental variables strategy using the land supply elasticity of an MSA interacted with changes in the national house price index as an instrument. We find that the elderly delay SSRI claiming when house prices increase during a boom period, but not during a bust. Our findings highlight that the cashing-out of home equity can be used to finance expenditures to delay SSRI receipt.

Key words: Social Security Retirement Income (SSRI); housing wealth shock; land supply elasticity
JEL Codes: D12, D14, J14, J26, R20

1. Introduction

It is widely recognized that the United States, like many other countries, is moving into an aged society. The proportion of individuals over the age of 65 in the U.S. rose from 8 percent in 1950 to 13 percent in 2010 and is expected to rise to over 20 percent by 2030 as the Baby Boomer generation ages (Lee, 2014). The rapid increase in the share of the elderly population is something policy makers are cognizant of, as it raises concerns about the financial readiness of the retirement system at all levels of government. Therefore, it is important to understand how elderly households draw upon different assets to finance retirement. Among the various financial assets of the elderly, Social Security Retirement Income (SSRI) and home equity are typically the two largest components of their balance sheet, especially for low-income households (Poterba, 2014). While many researchers have examined the role of Social Security in financing retirement,[1] little research thus far has considered the role of home equity, and, in particular, the extent to which it may substitute for SSRI in financing retirement expenses. Given the importance of home equity for the elderly and the recent fluctuations in house prices, studying how the elderly utilize this asset has become increasingly important.[2]

This paper examines how changes in house prices affect when elderly individuals decide to start receiving SSRI. We focus on the timing of receiving SSRI because once the Average Indexed Monthly Earnings (AIME)[3] has been determined based on previous earnings, the amount

[1] For example, see Hurd and Boskin (1984), Burtless (1986), Gruber and Wise (1998), Samwick (1998), Gustman and Steinmeier (2005), Van der Klaauw and Wolpin (2008), Liebman, Luttmer, and Seif (2009), Mastrobuoni (2009), Laitner, and Silverman (2012).

[2] Based on the Survey of Income and Program Participation (SIPP), the average ratio of home equity to total household net worth was 36.07% in 2005 for individuals under the age of 35 and this ratio increased to more than 45% as individuals reach 65 years old, as seen in Figure 1. Due to the fact that the elderly had a larger amount of home equity prior to the Great Recession, they suffered a more substantial decrease in total assets after the decline in real estate prices in 2007, as shown in Figure 1.

[3] The AIME takes the top 35 highest earning years up to age 60 and indexes it for wage growth, and then averages it to get a monthly amount. The AIME aproximates earnings over the beneficiary's lifetime at today's wages.

received depends on when an individual starts claiming the benefits. Specifically, an elderly individual who starts receiving SSRI as soon as he or she is eligible will face a reduced monthly benefit versus if receipt is delayed.[4] The reduced benefit amount is usually substantial and permanent.[5] We examine the trade-off between home equity and SSRI, as elderly individuals may choose to draw upon their home equity when the value of their house increases in order to delay receiving SSRI benefits and avoid the reduction in monthly benefits. Studying this issue will allow us to gain a better understanding of the substitutability of these two assets as a source of income for the aged population.

When considering the interactions between housing wealth and the decision to receive SSRI, there are likely to be endogeneity issues present. First, house prices may respond inversely to SSRI receipt as homeowners may engage in more home maintenance and renovation efforts with the additional income. Second, there may be unobserved local demand shocks that are correlated with both changes in house prices and when an elderly individual decides to receive SSRI. For example, unobserved positive local demand shocks may contribute to higher house prices and, at the same time, overall price inflation in the area, which would increase the likelihood of receiving SSRI benefits early. Alternatively, if house prices decline in an area, it is likely that the local economy is also experiencing a negative demand shock in the labor market, which may cause individuals to claim SSRI earlier. Therefore, the failure to directly control for unobserved

[4] Individuals are eligible to receive SSRI at age 62. Sixty-five is the full retirement age (FRA) for cohorts born before 1938. The FRA increases gradually for cohorts born after 1938. If an individual delays receiving SSRI from 62 to the FRA, the benefit level as a percentage of the primary insurance amount rises. For example, suppose that an individual turns 62 in 2017, his or her full retirement age is 66 and 2 months, and his or her monthly benefit at the FRA is $1,300. If the same person starts receiving benefits at age 62, the monthly benefit will be reduced by 25.8 percent to $964. Examples can be found at https://www.ssa.gov/pubs/EN-05-10147.pdf. We will describe the specifics of the program later in the paper.

[5] Most people receive monthly benefit for the rest of their lives after deciding when to claim. However, there are some exceptions. For more details, see https://www.ssa.gov/planners/retire/withdrawal.html.

local demand shocks would lead to an omitted variables problem that could bias OLS estimates either positively or negatively.

To address these endogeneity concerns, we utilize two different instrumental variables. First, we use MSA house price changes as an instrument for the change in individual house prices to alleviate concerns regarding reserve causality.[6] We argue that this approach addresses individual level endogeneity issues that are unlikely to drive changes in the MSA house price index. Our results suggest that MSA house price changes are strong predictors of changes in individual house prices. However, the Wald test fails to reject the null of exogeneity of the instrument. This is likely because of the broader endogeneity induced by unobserved local demand shocks that are not accounted for with this instrument. To address this second endogeneity concern, we draw upon geographic variation in the land supply elasticity of an MSA, developed by Saiz (2010), as the topological characteristics of an area are unlikely to be correlated with local demand shocks. We interact the supply elasticity measure with the change in the national house price index and use this interaction as an instrument for the change in local house prices. Our identifying assumption is that the cross-sectional variation in local house prices is driven by the underlying exogenous differences in local land supply elasticities, which is not correlated with time-varying local economic activity.[7]

After using the second instrument, we find that larger increases in house prices caused elderly individuals to delay SSRI claiming during the boom period from 2002-2006. Specifically, we find that if house prices increased by 10 percent in the previous two years, the probability of

[6] Several papers have used variation in the house price index at the MSA level to proxy for the change in individual housing wealth, although they approached this as a reduced form regression instead of using the MSA specific house price index as an instrument. See, for example, Lovenheim (2011), Lovenheim and Mumford (2013), Lovenheim and Reynolds (2013), and Zhao and Burge (2017a, 2017b).

[7] This instrument has been used previously in the literature by Mian and Sufi (2011, 2014), Chaney, Sraer, and Thesmar (2012), Mian, Rao, and Sufi (2013), Cvijanović (2014), Dettling and Kearney (2014), Aladangady (2017), and Chetty, Sándor and Szeidl (2017).

claiming SSRI within one year of becoming eligible is reduced by 4 percentage points, and the probability of claiming SSRI within two years of becoming eligible is reduced by 5 percentage points. During the bust period from 2007-2009, we do not find a statistically significant effect on SSRI claiming, which is consistent with the idea that cashing-out home equity is only viable when house prices appreciate.

To examine the possible mechanism driving our results, specifically to see if what we are observing is due to cashing-out home equity, we consider the effect of house price appreciation on the total home loan amount. Using the same identification strategy, we find that elderly individuals are more likely to increase the amount of their home loan (the first mortgage, any additional mortgages, and any home equity lines of credit) when house prices appreciate. This result is consistent with the cashing-out of home equity, suggesting this could be a viable channel to obtain additional funds to finance expenses that allows elderly individuals to delay receipt of SSRI.

Our research contributes to the literature in several ways. First, we fill a gap in the literature by highlighting the trade-off that elderly households make when deciding which assets to utilize to finance consumption. For a typical elderly individual with an average level of wealth, SSRI is the main source of income and housing is the largest asset in their portfolio. The latter lends itself to the opportunity for liquidation and generates another substantial income source. These two income sources may substitute and affect each other in financing the consumption of the elderly. In particular, the timing of claiming SSRI will affect the amount of SSRI which not only contributes to individual life-cycle financial planning decisions but also aggregates to a dramatic shift in timing and amount claimed at the national level. Understanding how this cycles along with housing market fluctuations is important for policy makers to make the necessary adjustments in managing Social Security funds. To our knowledge, our paper is the first to examine the direct

causal link between a change in home equity and if an eligible individual chooses to start receiving SSRI immediately.[8]

Second, we contribute to the literature that attempts to explain Social Security early claiming decisions. There is a large literature documenting large gains in lifetime wealth from delaying SSRI receipt.[9] Yet, despite the large gains from delay many people still choose to claim SSRI soon after becoming eligible (Shoven et al., 2017). There are many potential explanations for this behavior, such as leaving the labor force, liquidity, poor health, and concerns about future benefit cuts due to policy changes (Card, Maestas and Purcell, 2014; Munnell and Soto, 2005; Hurd, Smith, and Zissimopoulos, 2004). This paper contributes to the literature by highlighting how home equity may affect the early claiming decisions. We show that when home equity is more likely to be a viable source of income due to house price appreciation, individuals are less likely to claim SSRI early.

Finally, we add to the literature on how home equity affects the consumption and saving behavior of the elderly.[10] In particular, Mian et al (2013) and Aladangady (2017) suggested that the home equity based borrowing channel is a viable means for individuals to finance consumption. Bostic, Gabriel, and Painter (2009) found that fluctuations in housing wealth have a larger effect on changes in consumption than changes in stock market assets. Furthermore, Engelhardt (1996) and Jiang, Sun, and Webb (2011) found asymmetric effects of changes in housing wealth on savings and consumption behavior, specifically with regards to whether it is a housing boom or

[8] Shoven, Slavov, and Wise (2017) used survey evidence to gain insights into the reasons individuals choose to claim Social Security.

[9] See, for example, Coile et al. (2002), Munnell and Soto (2005), Sass at al (2013), Mahaney and Carlson (2007), Meyer and Reichenstein (2010), and Shoven and Slavov (2014 a, b).

[10] See Engelhardt (1996), Gan (2010), Campbell and Cocco (2007), Bostic, Gabriel and Painter (2009), Browning, Gørtz and Leth‐Petersen (2013), Cooper (2013), Ong, Parkinson, Searle, Smith and Wood (2013), Aladangady (2017), Cooper, (2013), Burger et al., (2015), Mian and Sufi, (2011, 2014), Jiang, Sun, and Webb (2011), Mian, Rao and Sufi, (2013), Aladangady, (2017), and Cloyne et al. (2017).

bust period. However, this research has not considered the elderly specifically and how they may use their home equity to cover expenses versus receiving SSRI benefits. We therefore contribute to the literature by highlighting the decision elderly households make when choosing how to use their housing wealth to finance consumption and possibly delay receipt of SSRI to receive the higher monthly benefits.

The rest of the paper will proceed as follows. Section 2 discusses the key institutional details of the Social Security Retirement Income program in the U.S. Section 3 discusses the conceptual framework of our research. We discuss our identification strategy in Section 4 and data and summary statistics are provided in Section 5. Results are presented in Section 6. Section 7 concludes and discusses the policy implications of this research.

2. Social Security Retirement Income in the United States

The Social Security Retirement program, adopted in 1935, is a form of social insurance that provides benefits to elderly individuals.[11] The program is progressive in that the benefits replace a greater percentage of wealth for low earners than for high earners. Working individuals contribute to the program, which pays for currently retired individuals, with the idea that the young will receive the benefits back when they retire. Social Security has become essential in the U.S., with over 50 million people receiving retirement benefits.[12]

SSRI benefits are determined based on an individual's lifetime earnings. The Social

[11] There are other retirement plans in the U.S., such as a 401k plan which is a voluntary retirement savings plan sponsored by employers. For more details, please visit https://www.irs.gov/retirement-plans/401k-plans. We do not consider these other retirement programs, only the Social Security program run by the federal government.

[12] The original program only provided retirement benefits to the worker. Social Security changed from a retirement program for workers into a family-based economic security program in 1939 by adding payments to the spouse and minor children of a retired worker and survivor's benefits paid to the family in the event of the premature death of a covered worker. More information is available at https://www.ssa.gov/history/briefhistory3.html.

Security Administration adjusts actual earnings to account for changes in average wages since the year the income was received. Then, the Average Indexed Monthly Earnings (AIME) during the 35 years in which the person earned the most are calculated and a formula is applied to these earnings to arrive at the basic benefit or primary insurance amount. This is the amount that each individual can receive at the Full Retirement Age (FRA).

There have been three notable changes to the retirement age since the program's inception. First, the age at which all individuals are eligible for SSRI was lowered to 62 in 1961. However, the benefits received are lower the earlier the beneficiary begins claiming. The argument is that individuals will get a larger reduction if they claim earlier because they will receive benefits for a longer period. The government intends for this reduction to be actuarially fair, though there are questions as to whether this is true in reality (Munnell and Sass, 2012; Heiland and Yin, 2014). Second, in 1972, the government provided Delayed Retirement Credits (DRC) to increase benefits for people who delayed claiming past age 65, but the benefit increase is capped at age 70. Finally, in 1983, the FRA was increased for people born in 1938 or later,[13] making the reduction in benefits birth-year cohort specific. For example, the reduction in benefits for claiming SSRI at age 62 is 20 percent for people born in 1937 or earlier, but is 20.8 percent for people born in 1938. The maximum reduction at age 62 is 30% for the cohort whose FRA is 67.[14] The credit to delay

[13] The FRA is 65 and 2 months for the cohort born in 1938, 65 and 4 months for the 1939 birth cohort, 65 and 6 months for the 1940 cohort, 65 and 8 months for the 1941 cohort, 65 and 10 months for the 1942 cohort, 66 for individuals born between 1943 and 1954, 66 and 2 months for cohort born in 1955, 66 and 4 months the 1956 cohort, 66 and 6 months for the 1957 cohort, 66 and 8 months for the 1958 cohort, 66 and 10 months for the 1959 cohort, and 67 for individuals born in 1960 and later.

[14] For example, if a beneficiary born in 1938 starts receiving retirement benefits at age 62/63/64, he/she will get 79.2%/85.65%/92.2% of the FRA monthly benefit. The corresponding amount will be 78.3%/84.4%/91.1% for the 1939 birth cohort, 77.5%/83.3%/90.0% for the 1940 cohort, 76.7%/82.2%/88.9% for the 1941 cohort, 75.8%/81.1%/87.8% for the 1941 cohort, and 75.0%/80.0%/86.7% for people born between 1943 and 1954. For more details, please visit https://www.ssa.gov/planners/retire/ageincrease.html.

claiming past the FRA is also cohort specific, with a larger benefit for people born later.[15]

Despite the penalty for early claiming, there is still a large claiming spike at age 62. According to the Social Security's *Annual Statistical Supplement*, 56% of eligible individuals claimed SSRI at age 62 in 2002 and 8% of eligible individuals claim within a year after becoming eligible.

3. Conceptual Framework

For a large portion of the elderly population, Social Security is the main source of income and housing is the largest asset in their portfolio. The ability and the extent to which individuals can tap into either of the two sources will have significant impact on a set of decisions, including decisions regarding the labor market.[16] Meanwhile, because SSRI can be claimed anytime between ages 62 and 70 with increasing monthly benefits if claiming is delayed until a later age, the timing of when to start receiving Social Security will affect the amount of SSRI received each month. In fact, the potential benefits associated with delaying when an individual claims SSRI has been established by many researchers in a conceptual framework.[17]

[15] For example, the yearly rate of increase for delayed claiming is 3.0% for 1917-1924 birth cohort, 3.5% for 1925-1926 cohort, and 8.0% for people born in 1943 and later. The monthly rate of increase is one-twelfth of the yearly rate of increase. For more details, please visit https://www.ssa.gov/planners/retire/delayret.html and https://www.ssa.gov/oact/quickcalc/early_late.html.

[16] Zhao and Burge (2017a,b) considered this specifically with regards to the labor supply decisions of the elderly. This includes looking at the decision to retire and leave the labor force entirely, moving from full-time to part-time work, or even un-retiring.

[17] Clark and Gohmann (1983) take into consideration of the delayed claiming after retirement for the life-cycle budget constraint. Mirer (1998) indicates that it is optimal in many context to delay claiming SSRI after reaching eligibility based on a model of life cycle behaviour with no bequest motive. Coile at al. (2002), in particular, have shown significant gains associated with claiming delays in a wide variety of cases based on financial calculations and simulations of an expected utility maximization model. Hubener, Maurer, and Mitchell (2016) further emphasize the claiming timing decided based on Social Security rules has strong influence on life-cycle financial decisions

Despite the theoretically calculated benefits of claiming at a later age, in reality delaying the receipt of SSRI is not as prevalent as expected given the large gains associated with delay.[18] There are several explanations for this behavior. Card, Maestas and Purcell (2014) found that labor market shocks lead to current and future increases in the fraction of workers who initiate SSRI at the earliest claiming age. In other words, if individuals who are age eligible suddenly lose their job, they decide to leave the labor market and start receiving benefits early versus trying to find another job. Other research has shown that individuals who have a higher subjective mortality tend to claim early (Munnell and Soto, 2005; Hurd, Smith, and Zissimopoulos, 2004).[19] Recent studies have shown that behavioral factors also affect the timing of SSRI claiming. For example, Behaghel and Blau (2012) found that individuals have a frame regarding when they will retire and choose to start claiming at that age, regardless of what may be the optimal strategy to maximize lifetime utility. Brown, Kapteyn, and Mitchell (2011) found that when an individual reports he/she will start claiming SSRI depends on the way in which the decision is framed, suggesting that how the benefits are explained may affect when individuals start receiving SSRI.

Another important factor that may contribute to early claiming is that individuals may want to leave the labor force at age 62 but lack the wealth and liquidity to fund their consumption.[20] If individuals are constrained financially and claim early to fund current expenditures, then an unexpected increase in wealth may allow individuals to delay receiving SSRI benefits.[21] This

[18] Coile at al. (2002), for example, show that delays are empirically important for early retirees but are fairly unimportant for late retirees.

[19] An extensive literature has also considered how health insurance, specifically Medicare, affects the timing of retirement, as most workers lose employer-provided health insurance upon retirement. Therefore, workers may delay leaving the labor force until age 65 to ensure ongoing health insurance coverage (Madrian, Burtless, and Gruber, 1994; Rust and Phelan, 1997; Blau and Gilleskie, 2006 and 2008; French and Jones, 2011).

[20] Crawford and Lilien (1981) argued that individuals start receiving SSRI due to liquidity constraint, where low-income workers do not save enough while working and thus claim earlier to finance consumption.

[21] Benitez-Silva, Garcia-Perez, and Jimenez-Martin (2015) found that negative wealth shocks increase early claiming and time in the labor market.

increase in wealth could be in the form of financial or housing wealth. Therefore, individuals who want to delay claiming SSRI to receive the larger monthly benefits can draw upon their home equity to finance expenses. A large segment of the population is income-poor but house-rich (Mayer and Simons, 1994; Merrill, Finkel, and Kutty, 1994), making home equity an important source of wealth for many households. Older households have a larger fraction of home equity that they can use to fund home equity loans and obtain reverse mortgages (Sinai, 2007). However, there has been limited research thus far examining how changes in housing wealth affect if an individual chooses to claim SSRI.

While the relationship between housing wealth and SSRI claiming has not been studied directly yet, there is an extensive literature examining the relationship between housing wealth and consumption and savings decisions.[22] Engelhardt (1996) examined the relationship between house price appreciation and savings, finding an asymmetry in savings behavior. Specifically, households that experience capital losses change savings behavior, but those that experience gains do not adjust savings. Jiang, Sun, and Webb (2011) looked at the recent housing boom to see if it affected consumption of the elderly, finding that when house prices increased there was a modest increase in consumption, but did not find an effect of a house price decline on consumption.[23] Bostic, Gabriel, and Painter (2009) found that housing wealth had a larger effect on consumption than changes in financial wealth through stock market fluctuations.

[22] For the effect of housing wealth on consumption, see Gan (2010), Campbell and Cocco (2007), Bostic, Gabriel, and Painter (2009), Browning, Gørtz, and Leth - Petersen (2013), Cooper (2013), Ong, Parkinson, Searle, Smith, and Wood (2013), and Aladangady (2017). Several recent papers have examined the effect of changes in housing wealth on the labor supply decisions of the elderly, finding mixed results (Disney, Ratcliffe, and Smith, 2015; Goda, Shoven and Slavov, 2011; Farnham and Sevak, 2007; Zhao and Burge, 2017a, 2017b; Ondrich and Falevich, 2016).

[23] Researchers are considering these issues in other countries as well. Campbell and Cocco (2007) found that the largest effect of changes in house prices on consumption for UK residents was among older individuals. Gan (2010) found a similar relationship between housing wealth and consumption in Hong Kong.

We expand upon the literature by exploring the substitutability between cashing-out home equity and receiving SSRI benefits earlier for the elderly. By focusing on the elderly population, we can provide insights for policy makers as to how these individuals trade-off between the two assets. Also, consistent with the literature that has found an asymmetric response to positive and negative changes in home equity, we compare the housing boom and bust periods separately to examine if there are heterogeneous effects with regards to how the elderly respond to house price appreciation versus depreciation.

4. Empirical Strategy

To determine the effect of changes in the value of a home on the decision of an elderly individual to begin receiving SSRI, we exploit the recent housing market fluctuations and conduct our analysis separately for the housing boom (2002 to 2006) and bust (2008 to 2010) periods.[24] We separate our sample into these two time periods because households may respond differently to house price growth versus decline. Specifically, households have the ability to withdraw home equity when house prices appreciate, but not when house prices decline (Mian and Sufi, 2011). Therefore, during bust periods, the elderly may need to consider other options if they want to delay receiving SSRI.

We consider the impact of a percentage change in housing values on the probability of claiming SSRI once individuals become eligible. To do so, we estimate the following Probit regression:

$$claim_t^{i,m} = \Phi\left(\beta_1 \Delta\%H_t^{i,m} + \beta_2 X_t^{i,m} + \gamma_{1s} + \delta_{1t} + \varepsilon_t^{i,m}\right) \qquad (1)$$

[24] Although house prices started to decrease before 2008, we focus on 2008 to 2010 because we use the house price change in the previous two years.

where $claim_t^{i,m}$ is an indicator variable equal to one if individual *i*, living in MSA *m*, began receiving Social Security benefits after becoming eligible in year *t*. We allow *t* to be within one or two years of reaching age 62, depending on the specification. Φ is a standard normal cumulative distribution, $\Delta\%H_t^{i,m}$ is the percentage change in house value in the previous two years for individual *i*, living in MSA *m* in year *t*. We use the two-year change in house prices because our data, the Health and Retirement Survey, is a biannual survey and thus we only observe house prices every other year. We control for individual attributes, $X_t^{i,m}$, including gender, race, marital status, tenure at last job, education, total non-housing wealth, self-assessed health status, and retirement status. We include state fixed effects, γ_{1s}, to control for unobservable state specific attributes and year fixed effects, δ_{1t} , to capture unobservable shocks that are specific to a given year.

As discussed earlier, a simple Probit model likely suffers from two confounding issues that would bias our estimates. The first is reverse causality. Individual house values may inversely respond to when an individual starts receiving Social Security because the additional income from SSRI could be used for home maintenance and renovations that increase property values. To address this concern, we use an MSA specific house price index as an instrumental variable for changes in individual house prices. A similar approach was used previously by Lovenheim (2011), Lovenheim and Mumford (2013), Lovenheim and Reynolds (2013), and Zhao and Burge (2017a, 2017b).[25]

This approach entails estimating the following first-stage regression:

$$\Delta\%H_t^{i,m} = \rho_1 \Delta\%P_t^m + \rho_2 X_t^{i,m} + \gamma_{2s} + \delta_{2t} + \nu_t^{i,m} \qquad (2)$$

[25] These papers explored the variation in MSA housing price in a reduced form setting. They utilized a difference-in-differences strategy, comparing renters to homeowners. We do not use a differencing strategy as it is likely that there are unobservable differences between elderly individuals who choose to own versus rent. Instead, we use MSA housing price variation as an instrument initially but rely more on the exogenous source of the variation driven by MSA land supply elasticity later as our main identification strategy.

where $\Delta\%P_t^m$ is the two-year percentage change in the MSA housing price index. ν_t is the error term.

Our initial findings using this instrument suggest that using the MSA house price index as an IV is unlikely to fully resolve the endogeneity concerns. Specifically, we believe it is likely that unobserved local demand shocks may be correlated with local house price appreciation which may simultaneously affect when individuals choose to start receiving SSRI.

To address the omitted variable bias, we utilize an alternative instrument. We use the MSA housing supply elasticity, proposed by Saiz (2010), interacted with the change in the national house price index as an instrument for a change in individual house values within the MSA. We argue that this is a valid instrument because in response to a nation-wide positive demand shock, MSAs with more inelastic housing supply (i.e. areas with more mountains or near water such as New York City, NY or San Francisco, CA) will experience larger house price changes than MSAs with a more elastic housing supply (i.e. flat areas such as Houston, TX or Kansas City, MO). The housing supply elasticity is likely to be exogenous to local demand shocks, as this is a supply-side measure driven by exogenous topological factors and policy regulations. This instrument has been extensively used in the literature, including by Mian and Sufi (2011, 2014), Chaney, Sraer, and Thesmar (2012), Mian, Rao and Sufi (2013), Cvijanović (2014), Dettling and Kearney (2014), Akadabgadt (2017) and Chetty, Sándor and Szeidl (2017).

Using this instrument, we estimate the following for our first stage regression:

$$\Delta\%H_t^{i,m} = \theta_1 \Delta\%P_t^{US} \times Elasticity^m + \theta_2 X_t^{i,m} + \gamma_{3s} + \delta_{3t} + \epsilon_t^{i,m} \quad (3)$$

where $\Delta\%P_t^{US}$ is the two year percentage change in the national house price index, $Elasticity^m$ is the Saiz (2010) estimate of the housing supply elasticity in MSA m. ϵ_t is the error term.

5. Data and Summary Statistics

Our analysis relies on three data sources. The primary data source is the Health and Retirement Study (HRS) with restricted-access geographic data. The HRS is a longitudinal household survey of more than 26,000 Americans over the age of 50 and is collected every two years. The public version provides detailed information on demographics, financial and housing wealth, health, labor market status, etc. The restricted geographic version adds additional details on the county in which the respondent lives. Given that the instrumental variable we employ is at the MSA level, we use the restricted data to have the necessary geographic detail to conduct our analysis. After a preliminary screening, our sample includes 19,027 individuals.[26]

The second dataset we utilize is the national house price index and MSA house price indexes constructed by the Federal Housing Finance Agency (FHFA).[27] The FHFA index has been widely used to capture national and local price trends of housing markets (i.e. Himmelberg, Mayer, and Sinai 2005).

The third data source is the housing supply elasticities for 269 MSAs provided by Saiz (2010). He estimates land supply elasticities by processing satellite-generated data on elevation, the presence of bodies of water, and the Wharton Regulation Index (WRI), which is a measure of the stringency of land use regulation. Land use regulations play a role in differences in the availability of land (Glaser and Gyourko, 2003; Glaser, Gyourko and Sakes, 2005), together with physical constraints. This supply elasticity measure has been widely used as an instrumental variable for house prices or housing wealth, as mentioned earlier.

[26] Initially, the sample had 37,319 elderly individuals. We exclude the 5,729 individuals who report receiving Social Security benefits before becoming age eligible to receive SSRI. We also exclude the 706 respondents who report ever receiving disability retirement benefits. Further, we include only individuals whom we observe before they turn 60 (two years before the eligibility age), which causes us to lose 11,857 more respondents.

[27] http://www.fhfa.gov/DataTools/Downloads/Pages/House-Price-Index-Datasets.aspx#qat.

We match MSAs and counties using the Geographic Correspondence Engine.[28] Given that we use the MSA-level housing supply elasticity as our main instrumental variable, in our primary specification we limit our sample to the counties located within the MSAs covered by the Saiz (2010) topography-based elasticity measure. We also drop households that experienced a percent change in house prices above the 99th percentile or below the 1st percentile, as well as individuals who moved in the previous two years to ensure that the change in home equity is due to price appreciation/depreciation of the same housing unit. This reduces the sample to 8,959 individuals within 1,235 counties in 215 MSAs.[29]

Table 1 presents summary statistics for all variables included in our analysis. We present the mean and standard deviation of each variable for three periods: the full sample (2002 to 2010), the boom period (2002 to 2006), and the bust period (2008 to 2010). In the full sample, around 52% of the elderly claim SSRI within one year of becoming eligible, which is consistent with the number reported by Munnel and Chen (2015) who use data from the U.S. Social Security Administration. This number is higher in our sample during the boom period but decreases during the housing bust. The lower probability of claiming early during the bust period is likely driven by the deteriorated macroeconomy. This also highlights the importance of controlling for macroeconomic shocks in our model estimation.

Note that, although the HRS is conducted every two years, the respondents report the actual year and month when they started receiving SSRI. This information allows us to expand the biannual panel to an annual panel and record precisely the SSRI withdrawal timing. However, because we only have reported house values during the survey years, we still need to use the two-

[28] http://mcdc2.missouri.edu/websas/geocorr2k.html.
[29] This sample size is before we restrict observations to the boom and bust periods and to those with valid entries for all included control variables.

year change in house prices. For survey years, we take the difference in reported house prices between the two surveys. In non-survey years, we use the reported house prices in the adjacent two years and the MSA house price index to extrapolate the house value in the non-survey year. For example, for 2005 we use the reported house values in 2004 and 2006, as well as the MSA house price index in 2004, 2005, and 2006, to estimate the reported house value in 2005.

With regards to the change in house prices, we see in Table 1 that the two-year average percentage change in house values for our sample is 12% from 2002 to 2010. The national and MSA house price appreciation rate, however, are both approximately 10%. From 2002-2006, this number increased to approximately 19% for our sample and about 17% at the national and MSA level. However, during the bust period from 2008-2010, house prices declined in our sample by about 4%, nationwide by approximately 8%, and by approximately 8.5% in MSAs.[30]

The average housing supply elasticity is around 1.73%. Approximately 57% of respondents are female, 86% are white, and 82% are married. Older workers with more than ten years of service at in their last job are 35% of our sample. Approximately 56% of the sample has completed high school and 28% have a college degree. The average non-housing wealth is about $428,063. The average self-assessed health status is 2.48, which suggests that elderly individuals assess their health as "good" on average.[31] Given the important role of retirement decisions in assessing SSRI

[30] One explanation for why our reported house values are above the national and MSA house price changes is that we are only considering a select sample of the elderly while these indices are based on the entire population. An alternative explanation is that individuals tend to overestimate the value of their home. The evidence on what determines the possible reporting errors is mixed. Haurin, Moulton, and Shi (2017), who examined just the elderly population, found that the size of the error changes with income, credit score, and ethnicity. Goodman and Ittner (1992), however, found that this reporting error is uncorrelated with characteristics of the home, the local economy, and the homeowner. We include a variety of controls to try to minimize any bias in the error term. Other research has used self-reported house values in their analysis, given data constraints such as ours, including Corradin and Popov (2015) and Harding and Rosenthal (2017).

[31] The variable "self-reported general health status" includes five values, with 1 for "excellent," 2 for "very good," 3 for "good," 4 for "fair," and 5 for "poor."

claiming, we also control for retirement status. Approximately 38% of respondents are retired and no longer working. These averages are similar for both the boom and bust periods.

6. Results

Effect of Changes in Home Values on Claiming SSRI Early

We begin our analysis by estimating Equation (1) using a simple Probit regression. Results are presented in Table 2. Columns (1) and (2) examine whether an individual claims SSRI within one year of becoming eligible during the housing boom (2002 to 2006). We control for state fixed effects in both columns and add year fixed effects in Column (2) to capture any unobserved time-varying, nation-wide shocks. Columns (3) and (4) examine whether an individual claims SSRI within two years of becoming eligible, with Column (3) including only state fixed effects and Column (4) adding year fixed effects. Columns (5) to (8) follow the same structure as Columns (1) to (4) but cover the bust period (2008 to 2010). All specifications include controls for gender, race, marital status, tenure at last job, education, non-housing wealth, self-assessed health, and retirement status. We report the coefficients from the Probit model in the upper panel and the corresponding marginal effects in the lower panel. T-statistics are reported in parentheses and are calculated using standard errors clustered at the MSA level.

Looking at the results in Table 2, we do not find consistent evidence of an effect of changes in house value on Social Security benefit claiming during either the boom or bust period. The only statistically significant effect we find is a negative effect in Column (3), which, while this is the anticipated sign, is only marginally significant at the 10% level.

However, as discussed previously, a simple Probit estimation is likely to suffer from endogeneity issues due to reverse causality at the household level and omitted variable bias at the

local level. We address these concerns by using two different instrumental variables. First, we use the MSA house price index as an instrument for the change in house value. The corresponding results are presented in Table 3, where the columns follow the same structure as in Table 2. Panel A presents the second stage results, both the estimated coefficients and the marginal effects, and Panel B shows the first stage coefficients.

Looking at the first stage results in Panel B, we see that the change in the MSA house price index is a statistically significant predictor of individual house price changes. However, the Wald test of exogeneity generally fails to reject the null hypothesis, except in the specifications without year fixed effects in the boom period. This may suggest that the MSA house price index is not a valid instrument, possibly because of the presence of omitted variable bias. In the second stage results presented in Panel A, we again do not find that changes in home value have a statistically significant effect on the probability of claiming SSRI at an earlier age.

To address the potential endogeneity arising from both unobserved local demand shocks and household level reverse causality, we use the interaction of the housing supply elasticity and the change in the national house price index to instrument for changes in home value. Table 4 reports IV Probit regression results using this instrument variable. The structure is the same as Table 3. The first stage results presented in Panel B suggest that this instrument is valid, as the Wald test of the exogeneity of the instrumented variables rejects the null hypothesis.

Panel A of Table 4 presents the second stage coefficients from the IV regression. We find a negative and statistically significant effect of a change in house prices on the likelihood of claiming SSRI benefits early during the boom period. This negative coefficient suggests that when house prices increase, elderly individuals delay receiving SSRI. Specifically, our results indicate that when housing values increase by 10%, the probability of claiming SSRI within one year of

becoming eligible is reduced by 4 percentage points and the probability of claiming SSRI within two years of becoming eligible is reduced by 5 percentage points. This translates into an 8% decrease in the probability of claiming within one year of eligibility and an 8.3% decrease in the probability of claiming within two years of eligibility. The negative coefficient indicates that when house prices increase, elderly individuals may draw upon their home equity to finance expenditures and hence delay receipt of SSRI to receive higher monthly benefits. However, we do not find a statistically significant effect during the housing bust period. This is also consistent with our expectations, as when house prices depreciate the decline in home equity takes away this alternative source of finances.

Gender Heterogeneity and the Role of Life Expectancy

Next, we consider the possible gender heterogeneity of the effects of changes in house prices on the timing of claiming SSRI. We believe that the SSRI claiming response to a change in house value will be different for males versus females. Previous research has found that with regards to labor supply decisions, females are more sensitive to policy changes, possibly because men are more likely to be the primary earner (Zhao and Burge, 2017a, 2017b). It has also been well documented that females on average have a longer life expectancy than males. Given these differences, it is plausible that men and women respond differently with regards to claiming SSRI.

Table 5 reports the IV Probit results stratified by gender using the interaction of changes in the national house price index and the housing supply elasticity as the instrument variable as this is our preferred specification.[32] We focus on the boom period given the results from Table 4

[32] We estimated the standard Probit model and IV Probit using the MSA house price index as an instrument. For both models, like the pooled sample we do not find consistent, statistically significant effects. These results are available from the authors upon request.

that the effect of house price changes on SSRI claiming appears to only be present when house prices appreciate.[33] We do not find a statistically significant effect for males but we do find a strong, statistically significant negative effect for females.[34]

Even though the gender difference in SSRI claiming in response to changes in home values could be due to other factors, we highlight the possible role of life expectancy in determining claiming decisions. A key trade-off in deciding when to claim SSRI is that when an individual claims earlier, he/she gets benefits for a longer period of time but the monthly benefit is lower. Females, who have a longer life expectancy, may be more inclined to delay SSRI claiming since they will benefit for longer from the increased monthly benefits.

To quantify and compare the benefits/losses for females and males based on claiming time, we calculate how the net present value of SSRI benefits differs if an elderly individual chooses to claim at all months from 62 to 70. For simplicity, we assume that the monthly benefit is $1,000 at the Full Retirement Age (FRA) for each birth cohort and gender. We then apply the reduction for claiming before the FRA and the credit for delayed claiming past the FRA from the Social Security Administration.[35] We use the Life Tables by birth cohort and gender provided by Poterba (2014), which gives the mortality rate based on Bell and Miller (2005). We then impute the survival rate from age 62.[36] The final imputed net present value of retirement benefits, assuming an annual

[33] Like the pooled model, when examining the bust period, we do not find any statistically significant effects, and in the interest of brevity do not show them. These results are available from the authors upon request.

[34] Zhao and Burge (2017a, 2017b) also find that females are more responsive than males to changes in housing wealth, but they focus on labor force participation. They find that in response to a doubling of housing wealth, labor force participation rates for females are more than twice as responsive as those for males.

[35] The reduction for early claiming and credit for delayed retirement were obtained from https://www.ssa.gov/planners/retire/ageincrease.html, and https://www.ssa.gov/planners/retire/delayret.html, respectively.

36 The mortality rate in Poterba (2014) is the probability of dying within one year at a certain age (conditional on living to a certain age). We calculate the monthly mortality rate to be 1-(1-annual mortality)^(1/12), giving us the probability of dying within the next month at a certain age. We then calculate the survival rate at age 62 based on the conditional mortality rate.

discount rate of 3%,[37] are shown in Figure 3 and Figure 4.

The figures suggest that females have a higher present value than males to delaying SSRI receipt given their longer life expectancy. The net present value tends to peak at a later age for females, versus for men who the peak appears to be around 62. This indicates that females should claim SSRI later than males, all else equal. At the same time, because females achieve the maximum present value beyond the first two years of eligibility, they have an incentive to delay receiving SSRI, especially if they are able to find alternative income sources. For men, the present value of retirement benefits actually decreases after the first two years of eligibility. These net present value predictions are consistent with our findings in Table 5 that women are more likely to delay receiving SSRI when house prices appreciate.

Borrowing against Home Equity

Our results thus far suggest that elderly individuals tend to delay SSRI claiming when house prices appreciate. Theoretically, an increase in housing wealth could provide additional income for a household through the collateral borrowing channel (see Cooper, 2013; Mian and Sufi, 2011; 2014; Mian, Rao and Sufi, 2013; Akadabgadt, 2017). To provide evidence of the cashing-out of home equity, we examine whether the total amount of home loans (primary mortgage, additional mortgages, and all home equity loans) increases when houses appreciate in value. We present these results in Table 6. The first stage results suggest that the change in the national house price index interacted with the land supply elasticity are strong predictors of changes in individual house values, although the Wald test of exogeneity of our instrumental variable does not reject the null hypothesis except in the specification without year fixed effects in the boom period. The second

[37] This discount rate is the long term inflation rate in the U.S. and has been used in previous papers such as Munnell and Soto (2005) and Heiland and Yin (2014). Consequently, the monthly discount rate is 0.25%.

stage regression indicates that when house prices appreciate, the likelihood that the total home loan amount increased in the previous two years becomes higher. The magnitude of the change is much higher during the boom period than the bust period.[38]

We then directly examine whether the additional income from borrowing against home equity will affect the probability of claiming SSRI within one or two years of becoming eligible. These results, presented in Table 7, show that when the total home loan amount increases, the probability of claiming SSRI within one or two years become significantly lower. The Wald test of exogeneity of our instrumental variable rejects the null hypothesis, but the instrument is not a strong predictor of the housing loan amount, possibly due to missing the individual house price change as the bridging predictor for the probability of increased total home loan amount. In addition, consistent with previous results, we find a significant effect during the boom period but we do not find a statistically significant effect during the housing bust period.

Our results indicate that home equity affects the timing of claiming SSRI through the borrowing collateral channel, which is consistent with previous studies. Even though the results might suffer from weak IVs, which cannot be fully resolved in our setting, we do find consistent evidence in the second stage regressions. Together with the previous results on claiming SSRI early, the evidence seems to suggest that house price appreciation increases the possibility for elderly households to borrow against their housing equity which may substitute for SSRI in financing retirement expenses.

7. Conclusions and Policy Implications

[38] Note that the sample size increased significantly as we do not restrict the sample to within one or two years of an individual becoming eligible to receive SSRI and we do not restrict respondents to have a well-defined early claiming dummy as in previous regressions.

Social Security and the timing of when the elderly decide to claim these benefits has become increasingly important due to the rapid increase in the aging population in the U.S. Besides SSRI wealth, most elderly households carry a large fraction of their asset portfolios in their home equity. In this paper, we use restricted access HRS data to investigate the effects of changes in housing wealth on the probability of claiming SSRI when individuals become eligible during the recent housing boom and bust periods.

Simple Probit estimations are likely to suffer from endogeneity issues due to unobserved individual characteristics and unobserved local demand shocks. To address the endogeneity problems, we utilize two different instrumental variables for the changes in home equity: (1) changes in the MSA house price index and (2) the interaction between changes in the national house price index and a measure of the housing supply elasticity. The second instrument constitutes the central identification strategy of our paper, as we find that using the MSA house price index as an instrument likely does not address all endogeneity issues.

We find consistent evidence that when house prices increase, individuals delay receiving SSRI after immediately becoming eligible. This estimated effect is statistically significant during the boom period but not during the bust period. We also find that females are more likely to respond and delay receiving SSRI after an increase in house prices, consistent with a longer life expectancy encouraging the delay. We further find that people are more likely to increase the total amount of home loans (primary mortgages, any additional mortgages, and any home equity line of credit) when house prices appreciate. This finding suggests that these individuals are borrowing against their home equity to obtain the necessary finances to cover their expenses instead of receiving SSRI earlier.

Overall, our findings suggest that the elderly treat increases in home equity and SSRI as substitutes to finance retirement expenses. A simple present value calculation suggests that the value of a female's retirement benefits could increase by about 17-19 percent if she claims later rather that when immediately eligible. Moreover, individuals may prefer to utilize home equity given the option of a reverse mortgage or the consideration that drawing upon home equity is contingent on current house price appreciation while SSRI is a permeant and safe asset. If home equity provides an alternative source of income that is more contingent on market conditions, elderly females will have the incentives to delay receiving their SSRI benefits and use housing equity to finance their expenditures when this option is available.

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Table 1: Summary Statistics [1]

	full sample		2002 – 2006		2008- 2010	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Claim SSRI within 1 year of eligibility	0.5149	0.4999	0.5460	0.4980	0.4438	0.4972
Claim SSRI within 2 years of eligibility	0.6066	0.4886	0.6311	0.4826	0.5493	0.4979
Δ% in house value in previous 2 years	0.1186	0.3209	0.1888	0.3224	-0.0419	0.2528
Δ% in US HPI in previous 2 years	0.0965	0.1222	0.1746	0.0319	-0.0833	0.0253
Δ% in MSA HPI in previous 2 years	0.0969	0.1653	0.1754	0.1159	-0.0854	0.1095
Housing supply elasticity	1.7326	1.0724	1.7252	1.0865	1.7500	1.0393
Dummy for total home loan increased in the previous 2 years	0.2062	0.4047	0.2191	0.4137	0.1773	0.3822
Female	0.5677	0.4955	0.5553	0.4971	0.5960	0.4910
White	0.8633	0.3436	0.8619	0.3451	0.8663	0.3406
Married	0.8213	0.3832	0.8302	0.3756	0.8009	0.3996
Tenure at last job zero to five years	0.2302	0.4211	0.2257	0.4182	0.2404	0.4276
Tenure at last job five to ten years	0.1159	0.3203	0.1051	0.3068	0.1408	0.3481
Tenure at last job more than ten years	0.3492	0.4768	0.3576	0.4794	0.3300	0.4706
High school	0.5638	0.4960	0.5653	0.4959	0.5605	0.4967
College	0.2774	0.4478	0.2568	0.4370	0.3243	0.4685
Non-housing wealth	428063	2201155	462014	2610368	350404	579714
Self-assessed health status	2.4773	0.9848	2.4565	0.9968	2.5248	0.9558
Retired	0.3847	0.4866	0.3837	0.4864	0.3869	0.4874

Table 2: Probit Regressions - Claiming SSRI within 1 or 2 years after Becoming Eligible[1]
(t statistics are reported in parentheses using clustered standard errors at the MSA level)

	2002 – 2006				2008- 2010			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Claim SSRI within 1 Year		Claim SSRI within 2 Years		Claim SSRI within 1 Year		Claim SSRI within 2 Years	
	Probit Regression Coefficient							
Δ% in house value in previous 2 years	-0.1373	-0.0967	-0.1623*	-0.1177	0.0653	0.1468	0.1708	0.1832
	(-1.13)	(-0.79)	(-1.82)	(-1.34)	(0.30)	(0.67)	(0.68)	(0.69)
	Marginal Effect							
Δ% in house value in previous 2 years	-0.0405	-0.0283	-0.00474*	-0.0342	0.0191	0.0423	0.0478	0.0513
	(-1.13)	(-0.79)	(-1.83)	(-1.35)	(0.30)	(0.68)	(0.68)	(0.69)
State Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	NO	YES	NO	YES	NO	YES	NO	YES
Observations	1600	1600	1578	1578	677	677	669	669
Log Pseudolikelihood	-834.8475	-828.8786	-817.5137	-812.5042	-351.4872	-246.3202	-332.9841	-332.8628

Table 3: IV Probit Regressions – Claiming SSRI within 1 or 2 Years after Becoming Eligible[1]
(t statistics are reported in parentheses using clustered standard errors at the MSA level)

	2002 – 2006				2008- 2010			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Second-Stage								
Dependent Variable	Claim SSRI within 1 Year		Claim SSRI within 2 Years		Claim SSRI within 1 Year		Claim SSRI within 2 Years	
	Probit Regression Coefficient							
Δ% in house value in previous 2 years	-0.4853	0.2581	-0.7711	0.1059	-0.1535	-0.1927	-0.2782	-0.0411
	(-0.62)	(0.23)	(-1.06)	(0.10)	(0.27)	(-0.25)	(-0.56)	(-0.06)
	Marginal Effect							
Δ% in house value in previous 2 years	-0.1378	0.0666	-0.2916	0.0413	-0.0525	-0.0640	-0.0988	-0.0162
	(-0.60)	(0.23)	(-1.05)	(0.10)	(0.27)	(-0.25)	(-0.55)	(-0.05)
Panel B: First-Stage								
Dependent Variable	Δ% in House Value in Previous 2 Years							
Δ% in MSA HPI in previous 2 years	0.7277***	0.6085***	0.7315***	0.6206***	0.9929***	0.9238***	0.9852***	0.9029***
	(5.62)	(4.28)	(5.84)	(4.49)	(13.97)	(9.44)	(14.59)	(9.40)
State Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	NO	YES	NO	YES	NO	YES	NO	YES
Wald Test of Exogeneity	0.22	0.09	0.74	0.04	3.02*	1.86	6.44**	2.18
Observations	1558	1558	1538	1538	639	639	627	627
Log Pseudolikelihood	-1157.2796	-1146.5978	-1101.8946	-1092.6191	-156.5519	-151.1644	-134.1805	-133.0718

[1] Other control variables include gender, race, marital status, tenure in the last job, education, total non-housing wealth, retirement status, and self-assessed health status.

Table 4: IV Probit Regressions – Claiming SSRI within 1 or 2 Years after Becoming Eligible[1]
(t statistics are reported in parentheses using clustered standard errors at the MSA level)

	2002 – 2006				2008- 2010			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Second-Stage								
Dependent Variable	Claim SSRI within 1 Year		Claim SSRI within 2 Years		Claim SSRI within 1 Year		Claim SSRI within 2 Years	
				Probit Regression Coefficient				
Δ% in house value in previous 2 years	-1.3456***	-1.4673**	-1.5865***	-1.5158**	-0.1672	-0.3451	-0.3935	-0.4111
	(-2.67)	(-2.49)	(-3.05)	(-2.37)	(-0.26)	(-0.54)	(-0.63)	(-0.66)
				Marginal Effect				
Δ% in house value in previous 2 years	-0.4265***	-0.4262**	-0.5694***	-0.5469**	-0.0513	-0.1082	-0.1439	-0.1504
	(-2.67)	(-2.50)	(-3.05)	(-2.39)	(-0.25)	(0.54)	(-0.63)	(-0.66)
Panel B: First-Stage								
Dependent Variable	Δ% in House Value in Previous 2 Years							
Δ% in U.S. HPI in previous 2 years	2.4399***	-	2.3907***	-	2.1882***	-	2.1684***	-
	(6.80)	-	(6.66)	-	(7.46)	-	(7.59)	-
Δ% in U.S. HPI in previous 2 years × MSA land supply elasticity	-0.5330***	-0.5080***	-0.5301***	-0.5174***	-0.4687***	-0.4651***	-0.4661***	-0.4663***
	(-4.92)	(-4.56)	(-4.74)	(-4.65)	(-3.60)	(-3.54)	(-3.69)	(-3.67)
State Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	NO	YES	NO	YES	NO	YES	NO	YES
Wald Test of Exogeneity	5.75**	4.53**	6.57**	3.78*	3.38*	4.39**	6.71***	6.84***
Observations	1197	1197	1181	1181	486	486	477	477
Log Pseudolikelihood	-839.7136	-834.4523	-800.8656	-796.5949	-76.2845	-73.0165	-72.4884	-72.4506

[1] Other control variables include gender, race, marital status, tenure in the last job, education, total non-housing wealth, retirement status, and self-assessed health status.

Table 5: IV Probit Regressions - Claiming SSRI within 1 or 2 Years after Becoming Eligible (Heterogeneity by Gender)[1]
(t statistics are reported in parentheses using clustered standard errors at the MSA level)

	2002 – 2006			
	(1)	(2)	(3)	(4)
Dependent Variable	Claim SSRI within 1 Year		Claim SSRI within 2 Years	
	Male	Female	Male	Female
	Probit Regression Coefficient			
Δ% in house value in previous 2 years	-0.3590 (-0.03)	-2.4488*** (-5.56)	-0.3354 (-0.28)	-2.5615*** (-5.30)
	Marginal Effect			
Δ% in house value in previous 2 years	-0.0756 (-0.03)	-0.7205*** (-5.56)	-0.0779 (-0.28)	-0.7415*** (-5.31)
State Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Wald Test of Exogeneity	0.02	10.34***	0.00	10.55***
Observations	534	660	526	652
Log Pseudolikelihood	-302.6201	-479.0185	-312.5938	-435.3687

[1] Other control variables include gender, race, marital status, tenure in the last job, education, total non-housing wealth, retirement status, and self-assessed health status.

Table 6: IV Probit Regressions – The impact of a change in housing value on the probability of cashing out home equity[1]
(t statistics are reported in parentheses using clustered standard errors at the MSA level)

	2002 – 2006		2008- 2010	
	(1)	(2)	(3)	(4)
Panel A:Second-Stage				
Dependent Variable	Indicator Variable = 1 if total housing loan amount in previous 2 years increased			
	Probit Regression Coefficient			
Δ% in house value in previous 2 years	0.9456***	0.6879**	0.5384***	0.5073***
	(3.69)	(2.09)	(3.27)	(3.37)
	Marginal Effect			
Δ% in house value in previous 2 years	0.3540***	0.2674***	0.1868***	0.1732***
	(3.69)	(2.08)	(3.27)	(3.37)
Panel B: First-Stage				
Dependent Variable	Δ% in House Value in Previous 2 Years			
Δ% in U.S. HPI in previous 2 years	1.9751***	-	1.9833***	-
	(7.44)	-	(8.37)	-
Δ% in U.S. HPI in previous 2 years × MSA land supply elasticity	-0.2751***	-0.2767***	-0.4430***	-0.4430***
	(-3.56)	(-3.53)	(-4.63)	(-4.61)
State Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	NO	YES	NO	YES
Wald Test of Exogeneity	6.40**	1.61	2.58	2.33
Observations	11832	11832	7992	7992
Log Pseudolikelihood	-8926.1255	-8909.3752	-4172.6865	-4160.0701

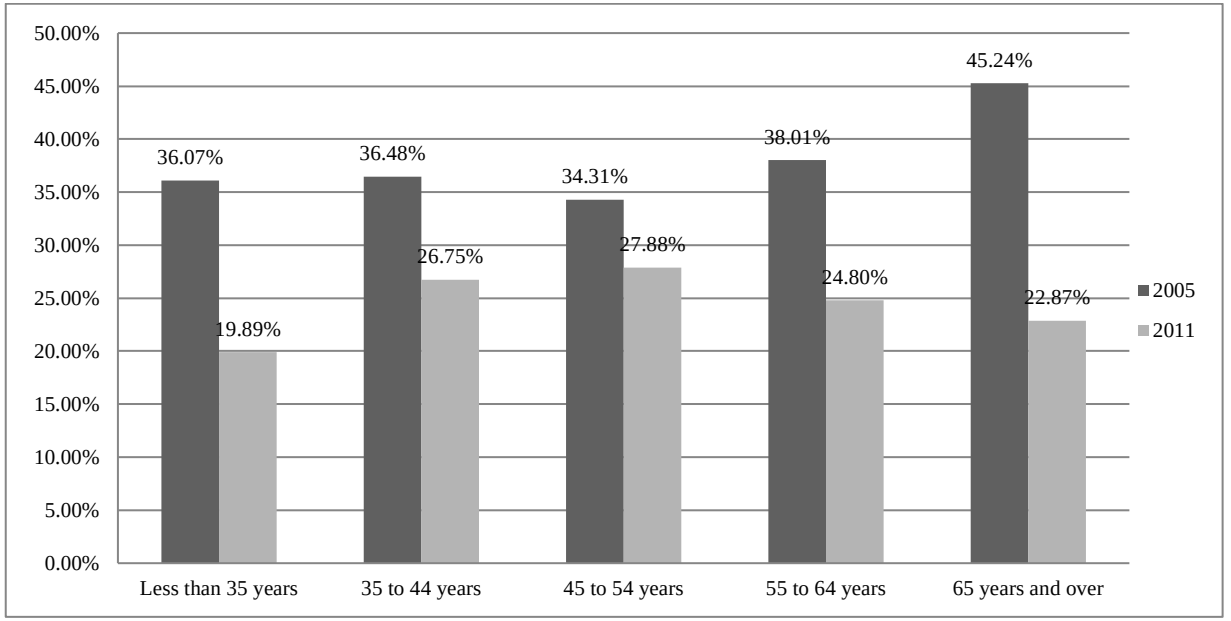
[1] Other control variables include gender, race, marital status, tenure in the last job, education, total non-housing wealth, retirement status, and self-assessed health status.

Table 7: Probit Regressions – The impact of cashing out home equity on SSRI claiming[1]
(t statistics are reported in parentheses using clustered standard errors at the MSA level)

	2002 – 2006		2008- 2010	
	(1)	(2)	(3)	(4)
Panel A:Second-Stage				
Dependent Variable	Withdraw within 1 Year	Withdraw within 2 Years	Withdraw within 1 Year	Withdraw within 2 Years
			Probit Regression Coefficient	
Indicator Variable = 1 if total housing loan amount in previous 2 years increased	-2.0442***	-1.9574***	0.1510	0.4261
	(-11.34)	(-6.14)	(0.13)	(0.30)
			Marginal Effect	
Indicator Variable = 1 if total housing loan amount in previous 2 years increased	-0.6280***	-0.6484***	0.0600	0.1567
	(-11.34)	(-6.14)	(0.12)	(0.30)
Panel B: First-Stage				
Dependent Variable	Total housing loan amount in previous 2 years increased			
Δ% in U.S. HPI in previous 2 years	1.8010	-	0.5366	-
	(1.19)	-	(0.678)	-
Δ% in U.S. HPI in previous 2 years × MSA land supply elasticity	-0.1521	-0.1806	0.2719	0.3043
	(-0.97)	(1.19)	(0.75)	(0.73)
State Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Wald Test of Exogeneity	5.42**	3.35*	0.08	0.01
Observations	734	727	349	344
Log Pseudolikelihood	-819.0046	-835.9681	-383.4974	-385.7844

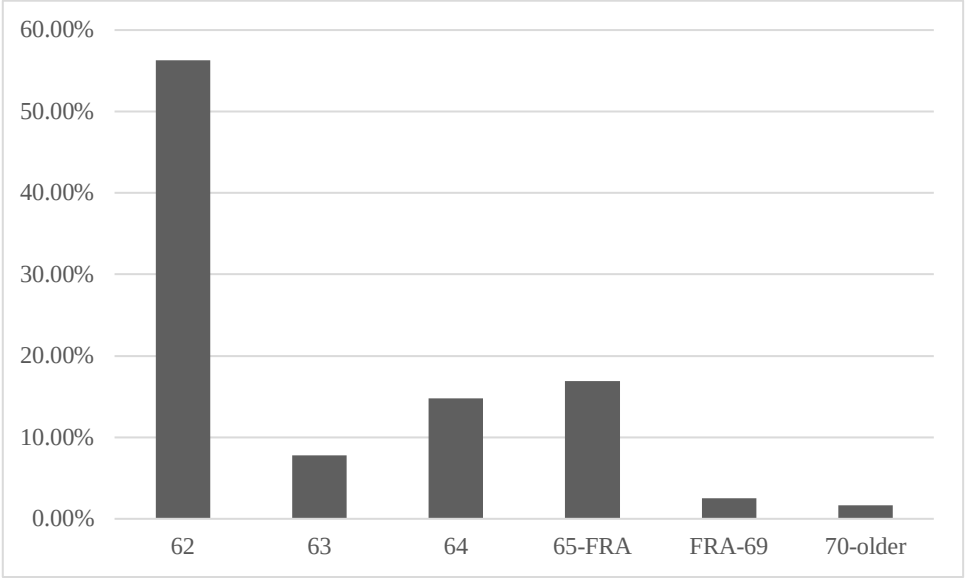
[1] Other control variables include gender, race, marital status, tenure in the last job, education, total non-housing wealth, retirement status, and self-assessed health status.

Figure 1: Ratio of Home Equity to Household Net Worth in 2005 and 2011



Source: Survey of Income and Program Participation (SIPP), 2013.

Figure 2: Age Distribution of Individuals Claiming Social Security Retirement Benefits, 2002



Source: Annual Statistical Supplement to the Social Security Bulletin (2016). We exclude disabled worker whose benefit automatically converts to a retired worker benefit in the month the worker attains FRA.

Figure 3: Present Value by Claiming Age and Birth Cohort for Males

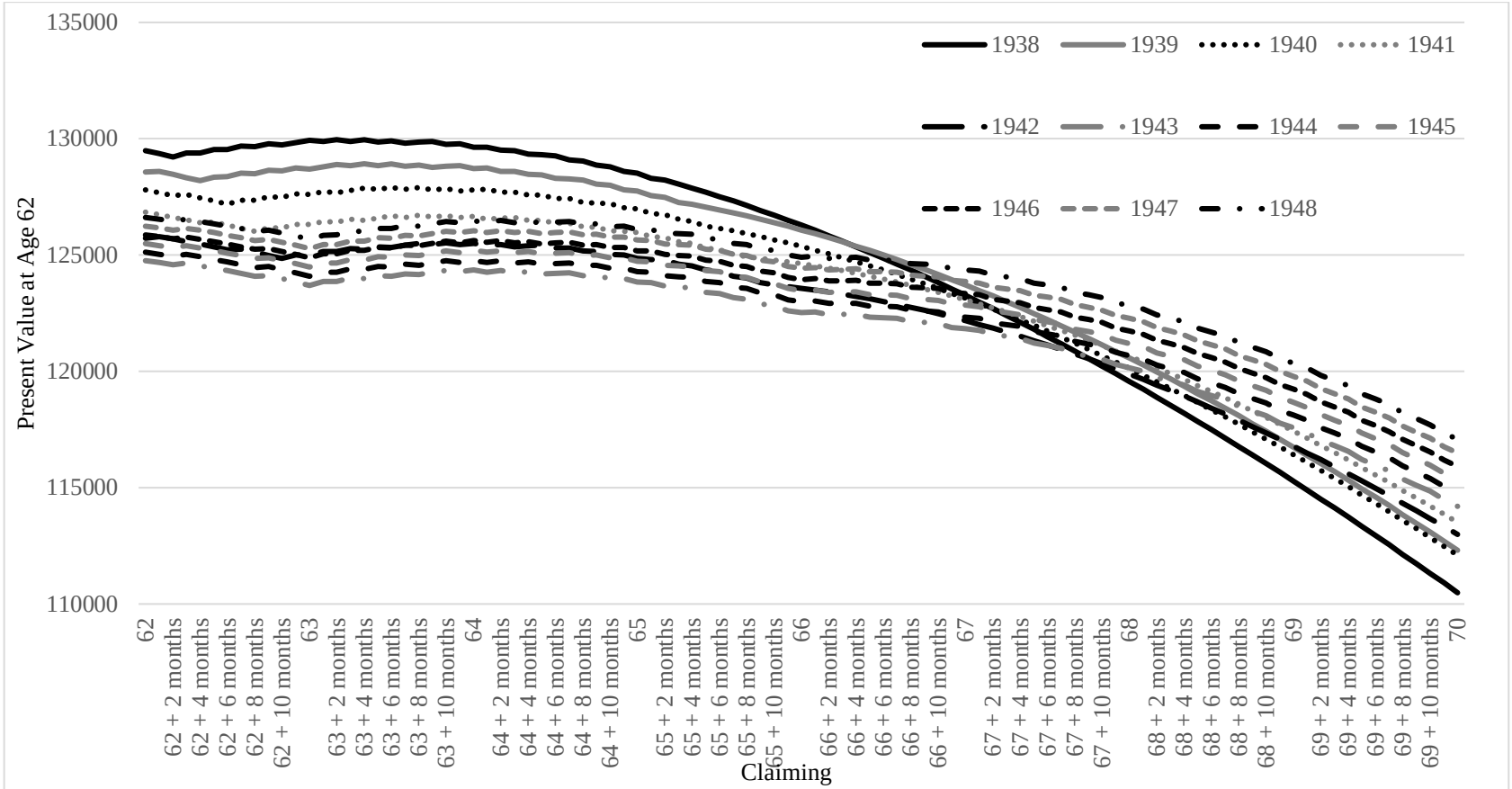


Figure 4: Present Value by Claiming Age and Birth Cohort for Females