Housing Wealth, Bequests, and the Elderly

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Abstract

There has been little consensus on why individuals do not spend down their wealth by death. Competing theories debate whether assets are bequeathed intentionally or are unplanned. Combining data on expectations of future bequests in the Health and Retirement Study with changes in housing wealth during the housing boom, we aim to estimate whether a plausibly exogenous wealth shock changes expected bequests. We find such wealth shocks lead to an increase in the expected likelihood of leaving a large bequest. However, we do not find complete pass through of the wealth increase, and find larger responses for individuals with lower baseline wealth, health and risk aversion. Combined with evidence of other responses, the results suggest roles for both planned and pre-cautionary savings bequest motivations.

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1. Introduction

Economists have long observed that individuals do not spend down their wealth at death as the classic lifecycle model would have predicted. Instead, they die owning assets that are bequeathed. This has led to an interest among economists as to whether these bequests were intentional or unintentional, where individuals die before they could finish spending down their wealth. More specifically, there is a desire in the literature to understand if there are bequest motives and what role they play in end-of-life asset decisions. While being interesting in its' own right, understanding how elderly make end-of-life decisions about assets is important for a variety of policy applications, including but not limited to estate planning, understanding intergenerational wealth transfer mechanisms, and estate taxes.

The literature has offered contradictory potential explanations and motivations for why people die with assets. A variety of models have suggested that dying with assets is a planned outcome. Planned motivations include altruism, wherein the individual derives utility from leaving assets to the recipient, or strategic motivations, where bequests are made to influence the behavior of the recipient instead of helping them. Other models have hypothesized egoistic motivations, where the individual derives utility by having assets at death even though they cannot consume them. In contrast to these models of planned bequests, it has been suggested that bequests are realized because individuals are unable to perfectly forecast the consumption path that lets them die with zero assets. In particular, individuals facing uncertainty about necessary expenditures or their date of death may plan a consumption path that holds extra assets as a form of precautionary savings. In this world, end-of-life bequests are not planned. The fact that individuals are observed to die with assets therefore is simply because individuals have assets remaining at death.

In this article, we augment the previous literature by presenting new evidence on the causes of bequests and, more specifically, examining whether individuals adjust bequest plans in response to plausibly exogenous shocks to wealth. We provide three main contributions to the existing literature. First, we are among a small set of literature to study the expectations of future bequests instead of realized bequests and, second, we investigate whether expected bequests respond to unanticipated wealth changes, using the housing boom as a plausible source of exogenous changes in household wealth. Third, we use the unanticipated wealth changes to investigate heterogeneous responses in bequest planning across individual characteristics to provide evidence about bequest motivations.

We exploit MSA-by-calendar-year variation in the housing boom between 1998 and 2006 as a source of plausibly exogenous variation in household wealth. Because changes in home prices are fully capitalized into housing equity, the variation in the magnitude and timing of the housing boom across locations and time will represent changes in household wealth. This source of variation in wealth has been used in a variety of applications such as college attendance (Lovenheim, 2011 and Lovenheim and Reynolds, 2013) and fertility (Lovenheim and Mumford, 2013) but also the elderly, including retirement (Zhao and Burge, 2017) and use of long-term care services including home health aids, informal care, and nursing home services (Font, Frank, and Swarz, 2017). We make a similar argument that local housing price changes are likely to represent unanticipated changes in wealth, and document that our identification strategy and results are robust to a series of specification checks.

We then combine this wealth variation with detailed longitudinal individual-level data on elderly from the Health and Retirement Study (HRS). The HRS data provides information about bequest expectations in the form of questions about how likely individuals are to leave bequests

of various sizes, as well as to whom they intend to leave bequests. The HRS also provides a large number of individual characteristics, which we use both as conditioning variables but also as a way of exploring heterogeneous responses in the data.

We find that the average high-wealth elderly homeowner does not change their expectations of leaving a $100,000 bequest in response to a housing wealth shock, largely because they likely were already planning to leave $100,000 in bequests, and thus, they are not on the margin for updating expectations. Among the baseline lower wealth sample, those with baseline non-housing wealth below $100,000, we find a 10.7 percentage point increase in expected bequests, consistent with models of planned bequest motivations. Importantly, we find no corresponding effect among renters in the same areas, suggesting that we are not capturing a spurious correlation with some other unobserved factor that varies by city and year, such as local labor market effects.

The coefficients on the two-year housing price changes indicate that there is far from perfect pass-through, suggesting that there may be complex responses to the wealth changes, including, possibly, unplanned bequest motivations. We find evidence of larger responses among those with low baseline health and lower baseline non-housing wealth, consistent with the housing wealth increases loosening household constraints. We measure smaller responses among those who are more risk averse or who feel they cannot engage in long-term planning. These results seem consistent with a role for precautionary savings in bequest motivations. Finally, because of the evidence of incomplete pass through, we use the available information in the HRS to investigate other changes in behavior. We look at imperfect proxies and do not find many changes on investment and consumption, though we do find increased use of estate planning (wills and trusts) which is also consistent with intentional or planned bequest motivations.

The next section of the paper includes a review of the hypotheses and empirical evidence offered in the previous literature. The third section begins with a simple descriptive model and then details the HRS data and methodology used. Next, we present all of the empirical results, including robustness checks, in Section 4 and then provide a discussion of the results in Section 5. Section 6 concludes.

2. Literature Review

Researchers at least as far back as Yaari (1964, 1965) have noted that bequest motives are not well understood nor were considered in classic models of lifetime consumption. The traditional life cycle model predicted that all wealth would be spent down at death. However, in practice the majority of elderly die owning assets. A large literature has attempted to reconcile the theoretical model with this empirical fact by proposing possible reasons that individuals may die with assets. As discussed in the introduction, these explanations typically fall into one of two categories: planned or unplanned bequest motivations. Unfortunately, distinguishing between these models is difficult in data. Exact bequest behaviors and motivations are not easily observed in data, forcing research to instead investigate observed lifetime consumption paths or realized end-of-life assets to infer bequest behavior. Furthermore, the theoretical models suggest that individuals may vary in their bequest motivations, but researchers often do not know a priori how to identify these individuals in data based on individual characteristics.

Research clearly indicates that children are frequent recipients of bequests or gifts (e.g. Gale and Scholz, 1994) but researchers disagree on whether the pattern suggests altruism or other motivations. Altonji, Hayashi and Kotlikoff (1997) find little evidence to support altruism in inter-vivos transfers between children and parents while Hurd (1987) finds that individuals with children have faster wealth decumulation, seemingly inconsistent with altruistic motivations.

McGarry (1999) finds evidence that size of bequests various across the permanent income of children while Bernheim, Shleifer and Summers (1985) find evidence that bequests to children are correlated with attention paid by parents to children, consistent with their model of strategic bequest motivations. Finally, in contrast to Kotlikoff and Summers (1981) argue that only a limited amount of wealth accumulation can be attributed to life-cycle savings, and thus a large portion of wealth accumulation may be due to bequests, Hurd and Mundaca (1989) find that inheritances and gifts among affluent families only account for 20-30% of household wealth.

Other evidence suggests that uncertainty about the consumption path is the primary factor causing elderly to die with assets. Hurd (1987) finds evidence that a large portion of bequests appear to be due to uncertainty about death, suggesting that most bequests are accidental. Hurd and Smith (2001) compare expected and actual bequests in the Health and Retirement Study, finding that individuals dissave prior to death and that bequest probabilities are correlated with household wealth and out-of-pocket medical expenses. Dynan, Skinner and Zeldes (2002) argue that uncertainty leads to precautionary savings and presents evidence from the Survey of Consumer Finances that retirees are much more likely to list "for retirement" and "emergency or sudden illness" as reasons for savings compared to saving money for their estate or for their children. However, Kopczuk and Lupton (2007) find evidence that a large majority of elderly in the Health and Retirement Study have a bequest motive. Furthermore, they find that access to private health insurance or expectations of future medical expenses has little effect on bequest behavior, suggesting that savings for uncertain health expenses is not a driving factor in asset accumulation and consumption decisions. Similarly, Lockwood (2016) argues that elderly without bequest motives would be more likely to buy private long-term care insurance as a substitute for precautionary savings. In practice, there is a very low incidence of private long-

term care insurance among the elderly signaling they value bequests, or at least incidental bequests, as buying long-term care insurance would potentially be at the expense of leaving assets to heirs. Finally, Bernheim (1991) finds that Social Security annuity benefits appear to crowd out private annuity purchases and are positively correlated with increases in life insurance holdings, consistent with strong bequest motives driving individuals to hold bequeathable forms of wealth.

We hope to add to this debate by investigating how stated bequest expectations among the elderly adjust to wealth shocks. A large literature has studied has the elderly respond to changes in resources. While Venti and Wise (1998) found that within earnings deciles, differences in wealth is not due to wealth shocks but instead seems to be driven by savings and spending decisions when the elderly were young, others have found that wealth shocks do affect elderly decision. Kezdi and Sevak (2004) show that elderly respond to wealth losses/shocks (via the stock market) by reducing their consumption by 5-7% but they do not find that retired elderly re-enter the workforce. Goda, Shoven, and Slavov (2012) find that within year changes in the stock market as measured by the Standard and Poors index does not explain most of the reason that households have reported longer working times. Coile and Levine (2007) find that elderly increase retirement in response to labor market downturns. While Christelis, Georgarakos and Jappelli (2015) find a larger marginal propensity to consume out of financial wealth compared to housing wealth, others have found that the elderly respond to housing wealth. Angrisani, Hurd and Rohwedder (2015) find evidence that the elderly respond to housing wealth changes, documenting that homeowners during the Great Recession decreased spending by more than stock owners. Sheiner and Weil (1992) found that money from the sale of a house tends "not to remain in the portfolio after the house is sold". Lehnert (2004) finds that elderly close to

retirement are responsive to housing wealth shocks and are more likely to "downsize their house and thus realize capital gains" compared to younger ages.

3. Data and Methodology

3.1 Descriptive model

We begin with a simple illustrative model of the set of decisions that lead to bequests. Consider a two-period model where individuals consume or save in each period, and die with certainty at the end of the second period. Assume that individuals seek to maximize utility based on consumption in each period (c_1, c_2) and may derive utility by leaving an intentional bequest b at the end of the second period. The intertemporal utility function can be written as

$$U(c_1, c_2, b) = u(c_1) + \beta u(c_2) + \beta v(b)$$

where β is the discount factor. We will assume that individuals have some income *I* in period 1 that can be used for consumption or savings, however they have no income in period 2 other than the assets they saved at interest rate *r*, $(1 + r)(I - c_1)$.[1]

We will introduce two sources of uncertainty that affect bequests. First, individuals may die between periods 1 and 2 with probability γ. In this case, all savings intended for period 2 become unintentional bequests, for which we assume there is no utility value. The second source of uncertainty is that individuals could experience a negative shock ϵ to resources in period 2. This negative shock is roughly analogous to a health shock. For simplicity, assume that the distribution of ϵ is known at the start of period 1 but the actual shock is realized at the start of period 2, conditional on the individual surviving to period 2. Thus, we can express the budget condition of the individual as $c_1 + s_1 \leq I$ in period 1, where c_1 and s_1 are consumption and

[1] We will allow them to fully consume their assets in period 2.

savings. In period 2, the budget can be expressed as $c_2 + b_2 + \epsilon \leq (1+r)s_1 \leftrightarrow c_2 + b_2 + \epsilon \leq (1+r)(I - c_1)$.

In period 2, the individual chooses consumption $C_2(c_1, \epsilon)$ and bequests $B_2(c_1, \epsilon)$, both conditional on period 1 consumption and the realized shock, such that the marginal utilities are equal, $u'(c_2) = v'(b)$. In period 1, the individual solves

$$\max_{c_1} U(c_1, C_2, B_2) = u(c_1) + \beta(1-\gamma)E[[u(C_2) + v(B_2)]$$

The solution to this will then be c_1^*, $c_2^*(c_1^*, \epsilon)$, and $b_2^*(c_1^*, \epsilon)$ and expected bequests at the start of period 1 can be expressed as $E(b) = \gamma(1+r)(I - c_1^*) + (1-\gamma)E(b_2^*(c_1^*, \epsilon))$. The first component represents unplanned bequests from period 1 savings that result from unanticipated death. The second component represents the expectation of planned bequests, conditional on the shock and available income passed through in savings (determined by the choice of consumption in the first period). If $v'(b) = 0$ then individuals will make no planned bequests and all bequests will be unintentional. If individuals have altruistic or egoistic motivations then $v'(b) > 0$ and bequests may reflect a combination of planned and unintentional components.

Our simple model can help explain some heterogeneity in expected bequests across individuals. For example, individuals with a higher intentional bequest motive (e.g. altruism or egoism) will expect to leave more bequests; since, $u(\cdot)$ and $v(\cdot)$ are assumed to be separable, higher intentional bequest motives change the allocation between c_2 and b_2, but have no effect on c_1, thus no effect on unintended bequests. Furthermore, we can think about how a change in resources might affect bequest expectations. This would occur in the model as an increase in the income in the first period, but in our application that would be represented by housing wealth. We would expect that more of the change in resources would be passed through to bequests as intentional bequest motivations increase. That is because the change in expected bequests would

be $\frac{\partial E(b)}{\partial I} = \gamma(1+r)\left(1 - \frac{\partial c_1^*}{\partial I}\right) + (1-\gamma)\frac{\partial E(b_2^*(c_1^*,\epsilon))}{\partial I}$, and $\frac{\partial E(b_2^*(c_1^*,\epsilon))}{\partial I} = 0$ if there are no planned bequest intentions (all bequests would be unanticipated). However, the exact magnitude of the pass-through will depend on the substitution between the per-period consumption and bequests. Our hope is that estimating the heterogeneous responses to wealth changes will provide some insight into these decisions.

3.2 Data and empirical specification

To investigate the effect of an exogenous wealth shock on expected bequests, we use the Health and Retirement Study (HRS). The HRS is a biennial and longitudinal data set following over 20,000 individuals. It includes a wealth of information on demographics, wealth, family structure, and both individual and household characteristics. The data follows individuals fifty and older beginning in 1992 with new cohorts of individuals added every six years (i.e. 1998, 2004, 2010). The HRS began with two separate cohorts the very old (Assets and Health Dynamics (AHEAD) cohort) and nearly old (HRS cohort) which were combined into a single data set in 1998 when the questions became standardized across everyone in the sample.

We create a panel of individuals from both cohorts starting in 1998, when the surveys were standardized. We choose to end our sample in 2006 because we are utilizing variation in housing prices and do not want to confound our estimates by including the Great Recession in our analysis. Note that our sample period captures a period of significant changes in the housing market during the housing boom, which varied both in magnitude and timing across space. In the Great Recession, there were simultaneous crashes of housing, financial and labor markets that confound our ability to measure the effects of wealth on expected bequests. However, we will demonstrate that our main results are robust to extending the sample to 2012, which encompasses the crash of the Great Recession.

Our main outcome measure comes from questions about expectations of bequests asked in each year of the survey. This bequest could take the form of any assets, including property, or money. The measures are useful because they let us investigate how forward-looking expectations of future bequests change overtime. Unfortunately, the questions have some limitations. First, individuals are not asked about how much they expect to bequeath. Instead, they are asked about the probability of leaving different bequest amounts. This means that we are able to investigate changes in the likelihood of leaving a bequest of a specific amount, $E(b \geq b')$, but we cannot directly investigate changes in expected bequests $E(b)$.

Second, we are limited to the bequest sizes asked about in the survey. We focus on the likelihood of leaving a bequest of at least $100,000, measured as a continuous probability from 0 to 100.[2] Because our probability measure is censored at the top, we will not be able to detect some changes, such as households that were always going to leave $100,000 now deciding to leave $150,000. While we cannot solve this limitation, we will frequently restrict the sample to the set of households for whom we can measure a response. These are individuals with lower initial wealth levels, who we will show are less likely to already expect to leave $100,000. Our default measure is the continuous probability of such a bequest, but we also investigate models where we dichomotize the likelihood into `at least a 50 percent probability' of a $100,000 bequest.

Let i, s, and t index individual, state of residence, and calendar year respectively. We use the following baseline specification:

$$\Pr(bequest)_{it} = \alpha + \gamma \Delta P_{it} + \beta X + \upsilon_t + \phi_s + \epsilon$$

[2] Alternatively, we could have investigated the probability of leaving a bequest of at least $10,000. However, such a large portion of the sample expects to leave this amount so there is little action in the dependent variable.

where $\Pr(bequest)_{it}$ is the expected probability at time *t* of household *i* leaving a bequest of $100,000. ΔP_{it} is the two-year change in housing wealth experienced by household *i* at time *t* measured in $100,000 increments, *X* are observable individual level characteristics, and we include a set of calendar-year and state fixed effects. We estimate this as a linear probability model using the Cameron, Gelbach, and Miller (2011) multi-clustering method for standard errors to allow us to cluster by state and person identifier.

The individual characteristics include gender, age, marital status, minority status, education, retirement status, number of people living in the household, and household income, for example from employment or Social Security. We include information about whether the individual has children and grandchildren, as well as the number of both. We also include measures of base-year non-housing wealth, as we would expect that the likelihood of bequests will increase with non-housing wealth, regardless of any change in housing wealth.

We also include other base-year characteristics that may affect the likelihood of large bequests based on the prior literature. If bequests are driven largely by precautionary savings, we would expect that the risk aversion of individuals may affect their bequest and consumption behavior. In 1998, the HRS included a set of questions around a series of hypothetical lotteries that can be used to measure baseline risk aversion. Barsky et al. (1997) document that this data correlates with a variety of behaviors likely associated with risk aversion among respondents in the HRS. Given that approximately 60% of the sample fall into the most risk-averse category, we simplify to a binary variable for being in that category. Note that all estimates are robust to specifying models with all four categories (results available upon request).

Additionally, we might expect that individuals who have poor levels of health may be more likely to need their assets, therefore not expecting to leave bequests. The HRS has a 5

category measure of self-reported health in 1998, ranging from "Poor" to "Excellent." We combine the two lowest categories, "Poor" and "Fair", into a single indicator of bad health. Lastly, because we are considering expectations of future bequests, we might expect that the length of an individual's planning horizon may influence how they view future bequests. The data on planning horizon asks individuals about what time period is most important for planning, spending, and saving, and ranges from "a few months" to "more than 10 years." We create an indicator for having the longest planning horizon or "more than 10 years."

3.3 Identification

Our main variable of interest on the right-hand side is the change in housing prices experienced by the homeowner in the previous two years. Housing prices will vary across locations and over time during our sample, which we demonstrate in detail below. Because housing price changes are fully capitalized into home equity, these changes across space and time will represent a change in household housing wealth. We use a two-year window in housing price changes to match the biennial HRS pattern. The two-year window means that we are looking at short-term changes, though we considered four-year changes as well and the substantive results were unchanged in sign and significance.

Given our year and fixed effects, our identification comes from individuals within the same state receiving different housing price increases because of variation in the timing and magnitude of the housing boom across geography. Thus, individuals living within the same state will receive price increases of different magnitudes at different times based on the city in which they reside. This variation across geography and time in housing prices has been used as exogenous wealth shocks previously by researchers to study fertility choices (Lovenheim and Mumford, 2013), college choices (Lovenheim, 2011 and Lovenheim and Reynolds, 2013),

elderly labor supply (Zhao and Burge, 2017), and elderly long-term care choices (Font, Frank, and Swartz, 2017). These authors argue, and present evidence, that the exact timing and location of housing prices increases during the housing boom are not correlated with other local economic conditions, such as the labor market, in a way that would violate their identification. For example, while housing supply elasticities influence how much housing prices increased in the long-run in particular areas (e.g. Saiz (2010), Glaesar, Gyourko and Saks (2005) and Gyourko, Mayer and Sinai (2013)), there is substantial variation across and, even within, cities in the timing of housing price increases.

To illustrate the variation, Figure 1 demonstrates the percentage change in home prices using the MSA-level house price index from the Office of Federal Housing Enterprise Oversight (OFHEO) from 1998 to 2002 and 2002 to 2006, approximately the timing of our study. The figure shows substantial variation in the timing and magnitude of housing price changes, even within cities. For example, Austin, TX experienced 35% increases in housing prices between 1998 and 2002 but only 16.9% increases in 2002 to 2006. By contrast, San Antonio, TX experienced 16.3% and 27.9% increases during the same periods. Similarly, Denver, CO saw home prices increase by 46% and 12% during those period compared to 26.4% and 21.7% for Colorado Springs, CO. In Florida, both Tampa and Miami increased by approximately 38% percent from 1998 to 2002 but Miami grew by 108% from 2002 to 2006 compared to 82% for Tampa. Thus, there is a large degree of variation in short-term housing price changes that we can leverage to learn about bequest expectations.

Thus, housing prices are varying across cities, even within states, across time, in a complex pattern that is unlikely to correlated with bequest expectations other than through changes in house prices. The literature has documented that this variation is uncorrelated with

local labor market conditions or other asset changes. However, the prior literature does note that *reported* housing value changes in the survey could be endogenous because of owner/renter decisions, location decisions, and mismeasurement of value. Consistent with the prior literature, we take several steps to limit these problems and produce a measure of wealth changes whose variation is plausibly exogenous to individual decisions about consumption and bequests. First, instead of using reported housing value changes in the survey, we impute housing price changes using the MSA-level house price index from the Office of Federal Housing Enterprise Oversight (OFHEO). This price index is constructed from repeat sales of single family homes and has been used commonly in the literature investigating the effects of housing wealth changes on behavior. We impute the housing price change by combining the MSA-level home price change with initial home value in the base year to calculate the change in the price homeowners experienced.[3] Second, we fix homeownership status and location in the base year, thus preventing endogenous changes in housing location or homeownership. Our assumption is that homeownership and location in the base year is not correlated with any specific timing of future bequest decisions, which seems plausible since it is unlikely that individuals in the base year would be able to perfectly predict which locations would experience home prices increases in specific years.

Because we are looking at housing wealth changes, our main estimation sample is restricted to individuals who owned their home in the base year of the sample. However, we will use the sample of individuals that are renters in the base year to perform robustness checks to test our identification strategy and the exogeneity of housing wealth shocks. Renters will not benefit

[3] One might worry that our use of base year reported values to construct our imputed changes could be biased by endogenously reported house values in the base year. We find that unlikely because it would have to be correlated with future and locations of home price increases. However, we replicated all results of this study using the percentage change in home price as the variable of interest on the right hand side, finding no substantive differences. We prefer our measure because of the ease of comparing changes in housing price levels to levels of bequests on the left-hand side.

directly from home price increases, but would respond to any other contemporaneous changes that might be correlated with the local housing market, such as the local labor market. We will demonstrate that we find no evidence of renters responding to local housing price changes, suggesting that our main specification is capturing the wealth effect of housing and not some other possible shock.

We also considered a specification with individual fixed effects, a more restrictive model that identifies off of differential changes in housing prices over time for individuals in the sample. Unfortunately, this model does not allow us to explore the relationship between bequest intentions and time-invariant baseline characteristics. We can, however, use this model with interactions of the baseline characteristics and housing wealth changes, which is the method we use in Section 4.2 to investigate heterogeneity in the bequest intention responses. We later demonstrate that our substantive findings are similar using this more restrictive model.

3.4 Summary statistics

Table 1 presents summary statistics of the main variables in the analysis. Among all homeowners, the average respondent reports a 50.4 percent chance of leaving a bequest of $100,000. These homeowners also experience, on average, a $27,900 increase in housing wealth over two years, although the standard deviation is larger than the mean suggesting that some people experienced large changes in housing wealth. Nearly all of the sample reports having children and over 75 percent report having grandchildren, for an average of 3.1 children and 4.6 grandchildren. While bequests are not limited to children and grandchildren, they are likely recipients for many respondents (e.g. see Gale and Scholz (1994)).

Of course, a bequest of $100,000 is more likely as all forms of wealth increase, not just housing wealth. In the homeowner sample, the average level of non-housing wealth is $225,000

and the median is $69,400. Thus, many respondents are not on the margin of leaving a $100,000 bequest (they have already reached the top of our censored outcome). As a result, for some of our analysis, we restrict the sample to those respondents who have less than $100,000 in non-housing wealth in the base year of the survey. Consistent with our hypothesis, the average probability of leaving a $100,000 bequest is only 33.7% in this lower wealth sample compared to 72.1% among those who have at least $100,000 in non-housing wealth in the base year. Furthermore, approximately 80% of the higher non-housing wealth sample state that they have a greater than 50% chance of leaving a $100,000. Thus, we expect to see a smaller response among these higher wealth individuals because of the limitations on our dependent variable.

The remainder of the table presents summary statistics for our low and high non-housing wealth samples. The average non-housing wealth of the wealth sample is substantially higher (approximately $487,100 compared to only $26,499), the lower wealth being consistent with prior research showing that housing was the largest non-pension asset in the elderly portfolio (Munnell and Soto, 2005). Compared to the less wealthy sample, the wealthier sample is less likely to be a minority, more likely to be married, more likely to have completed college and have higher income. They also experience a larger increase in housing wealth because we impute the local house price change combining the initial housing price, which is higher for these individuals, with the local price changes. Finally, the most prominent variation in the variables we will use to explore heterogeneous effects is about baseline health. Approximately 21.5 percent of homeowners report having bad health, but that is concentrated among the less wealthy, with 28.2 percent of the lower-wealth sample reporting having bad health compared to 12.6 percent in the higher wealth sample.

4. Empirical Findings

4.1 Housing Wealth Shocks and Changes to Bequest Expectations

We begin by estimating our baseline model, individual covariates without information about housing wealth changes, for all homeowners on the stated likelihood of leaving a $100k bequest. The regressions include all of the covariates listed in the table as well as basic demographic characteristics (age, minority status, gender) and state and year fixed effects. Standard errors are clustered at the year and individual level. The results in column (i) of Table 2 generally fit what might be expected. Having children increases the chance of a $100k bequest by 4.8 percentage points, although it is not statistically significant, but the likelihood of the large bequest decreases as the number of children increases. The coefficients on having grandchildren and the number of children are negative, but not statistically significant. These results are broadly consistent with intentions to leave money to family members but the odds of a large bequest decreases with additional generations and numbers of individuals, likely because the total assets to be bequeathed may be divided into smaller portions.

Conditional on other covariates (including income and non-housing wealth), college graduates are 12.7 percentage points more likely to intend to leave a $100k bequest. There does not appear to be any difference in the conditional likelihood of intending to leave a large bequest across categories of risk aversion but individuals whose planning horizon is at least 10 years are 6.1 percentage points more likely to say they intend to leave a large bequest. The individuals financial and health situations also are important, with a self-identification of having bad health lowering the likelihood of a $100k bequest by 10.6 percentage points and a $100k increase in non-housing wealth associated with a 1.9 percentage point increase in the intended bequest. This is consistent with the story Venti and Wise (1997) found that the elderly do not change their

housing tenure or home equity unless faced with a serious wealth shock such as widowhood or the need for a nursing home.

A primary purpose of this paper is to investigate whether an exogenous change in wealth, in our case housing wealth, has an impact on the expected bequests of individuals. However, individuals with a high level of non-housing wealth may not be marginal in that decision. Therefore, we split the sample into households with base year non-housing wealth less than $100k and those with more than $100k and re-estimate our baseline characteristic model for each sample. Generally, the qualitative results for the less wealthy (column (ii)) and the more wealthy (column (iii)) are similar to the overall estimates in column (i). The exceptions are that income and baseline wealth have a larger impact for the less wealthy sample, consistent with their lower level of financial resources, and this sample is also somewhat more likely to reduce their likelihood of leaving a bequest if they have bad health. Additionally, the lower-wealth sample shows stronger effects for having children, number of children and having grandchildren.

Columns (iv) through (vi) present the estimates including the housing wealth changes. A $100k increase in housing wealth in the previous two years has no impact on bequest expectations of the average homeowner in the sample, with a point estimate that is both small and statistically insignificant. However, as suspected, that average effect is masking an important variation based on initial levels of non-housing wealth. More wealthy individuals state no change in a large financial bequest likelihood given a change in housing wealth, perhaps because they were already planning to leave a $100k bequest prior to the housing wealth change. In contrast, the less wealthy do change their expectations, with a $100k increase in housing wealth associated with a 10.7 percentage point increase in the likelihood of leaving a large bequest. This is quite a large change, approximately a 31 percent increase relative to the baseline

likelihood. This differential response is consistent with prior evidence from Yamashita (2007) and Cooper (2013) that constrained households are more responsive to changes in housing equity in terms of borrowing and consumption. Note however that even for the lower-wealth sample, the magnitude of the effect is quite below perfect pass-through of the housing wealth increase into expected bequests. We will return to discuss this after first exploring the robustness of our results.

As previously discussed, wealth changes during the housing boom have previously been used as a measure of an exogenous wealth shock to households, and there is little reason to suspect that the exogeneity fails in our context. Certainly, the fact that inclusion of the housing price measures in columns (iv) through (vi) has little impact on the coefficients of other covariates, compared to columns (i) to (iii), is consistent with the housing price change being uncorrelated with other observable factors. However, we can provide a more direct test by investigating how local housing price changes affect the bequest expectations of renters (as has been done in other studies, see Lovenheim and Reynolds (2013), Font, Frank, and Swartz (2017), among others). Renters should experience no direct wealth increase from local housing price changes, and therefore we should see no change in bequest expectations, unless there is some other confounding factor that varies across space and time with the housing boom and bequest expectations. We find it unlikely that such a factor exists, and the prior literature has generally not found such contemporaneous unobserved factors in other applications, but finding that renters respond similarly to local housing price increases would provide evidence for the existence of such a factor.

To investigate this, we impute local housing price changes for renters in the HRS and then re-estimate our regressions on those samples. Because the sample of high wealth renters is

very small, we only report results for all renters and for the lower wealth renters (which corresponds to the homeowners who actually responded to housing wealth changes, see Appendix Table A-1 for summary statistics of the renter sample). The estimates in Table 3 support our identification story. Local housing price changes have no substantive or statistically significant effect on bequest expectations either for the full sample or the less wealthy. Interestingly, the effects of many covariates are similar in sign and magnitude to homeowners as well. Given these results, and the existing prior literature using local housing price changes during the housing boom as sources of exogenous wealth changes, we have little reason to suspect that we are capturing some other contemporaneous effect, such as from local labor markets.[4]

Our main results are also robust to a number of alternative specifications. First, we have estimated the likelihood of a potential $100k bequest on the left-hand side instead of the amount of money intending to be left as a bequest, which is unfortunately not in our data. Our results are robust to using a binary variable equal to 1 if the individual states at least a 50% chance of leaving a $100k bequest (see the first three columns of Appendix Table A-2).[5] We restricted our data to the housing boom years in our data (1998 to 2006) because we did not want to confound our estimates with the contemporaneous declines in the housing market, labor market and stock markets during the Great Recession. However, our results are robust to extending the sample to 2012 (see the first three columns of Appendix Table A-3). Finally, we estimated a model using individual fixed effects. This more restrictive model identifies entirely off of changes in housing

[4] Our results are also robust to restricting the sample to those who are retired at baseline, so endogenous retirement is not driving our results. Similarly, including interactions of age and the housing price change to account for the aging of the sample, beyond the year fixed effects, does not change the pattern of results.

[5] Because very few high-wealth households state having less than a 50% chance of leaving a large bequest, we only present estimates for the full sample and the low-wealth sample.

wealth overtime for the same individual and does not allow us to observe how baseline characteristics affect bequest expectations. The magnitude of the response to the housing wealth increase decreases among the lower-wealth sample, suggesting even a smaller response (see the first three columns of Appendix Table A-4).

Our results suggest that the elderly respond to an increase in wealth with increased expectations of leaving large future bequests. However, the point estimate itself, while large relative to baseline, is smaller than we might expect if there was complete pass through of the wealth increase to the bequest. A $100k increase in housing wealth for the average lower-wealth household, does not even raise the probability of $100k bequest to 50 percent (33.7 percent likelihood at baseline and a 10.6 percentage point increase from housing wealth would be 44.3 percent). This may be due, simply, to the top-coded outcome measure we have available to us. However, it is also possible that the estimate suggests that the elderly are potentially planning on consuming some of the wealth or holding it in reserve. We explore both of these possibilities in the remaining sections, first by investigating heterogeneous responses across individuals, and then by investigating other possible outcomes. We then provide a discussion of the results in Section 5.

4.2 Heterogeneous Changes in Bequest Expectations

Next we explore heterogeneity across individuals in the housing price response for two reasons. First, the average effects estimated in Table 2 may mask large responses among some individuals, and second, because variation across individuals may help inform about bequest motivations. We explore this heterogeneity by interacting our housing price change with four baseline characteristics: whether the individual is in the most risk averse category, whether the individual states having bad health, whether the individual has a long planning horizon and their

initial level of non-housing wealth. We have attempted the interactions one at a time as well as putting all interactions in the same model, finding the same basic pattern. For simplicity we will present and discuss the model with all interactions in Table 3, although the results for the other models are presented in appendix tables. We only present the coefficients on the four characteristics of interest and the interaction with housing prices, but the model also includes all of the covariates previously considered.

Column (i) of Table 3 present the results for the low-wealth sample of homeowners. All of the interaction terms are statistically significant and the magnitudes are often substantial, providing evidence of heterogeneous responses among the lower wealth sample that showed a modest average response in Table 2. Before discussing the specifics, it is worth noting that there is much less evidence of heterogeneous responses among the high wealth sample in column (ii), for whom we expect less of a response since many households are already planning to leave a large bequest. The estimated coefficients are much smaller in magnitude and not consistently statistically significant. There is also no evidence of a heterogeneous response among the rent sample in column (iii), further evidence that our low wealth results are not being driven by some unknown spatial and temporal phenomenon correlated with both housing prices and bequest expectations. Finally, the patterns we find, particularly for the low wealth sample, are similar in the more restrictive model using individual fixed effects (see Appendix Table A-4).

What do the results for low-wealth individuals suggest? We would expect that risk averse individuals are likely to respond to pre-cautionary savings motivations; holding constant the likelihood of needing resources in the future, the uncertainty would make them want to save more and therefore plan on bequeathing less. We see simple evidence of this in summary statistics: among all homeowners, approximately 44 percent of the most risk averse individuals

plan on leaving a $100,000 bequest compared to approximately 52 percent of the more risk averse individuals (the corresponding numbers of the low-wealth sample are approximately 28 and 35 percent).. The interaction term shows that this pattern holds for an unanticipated change in resources for the low-wealth sample in column (i). Thus, a $100k increase in housing wealth produces a smaller (13.5 percentage points) increase in the probability of a large bequest for the most risk averse individuals, compared to less risk averse individuals.[6] Note that we find a similar pattern, but much smaller magnitude, for the high wealth sample in column (ii), so highly risk averse expected to pass through less of the housing price change into bequests compared to the wealthy but more risk tolerant individuals.

Our planning horizon variable indicates people who state that 10 or more years is the most important horizon for planning and saving. We might hypothesize that these individuals would be more likely to pass through a wealth increase into bequests, either because they are willing or able to plan far into the future. Again, simple summary statistics suggest that such individuals do plan on bequeathing more money: 50 percent of those with 10-year planning horizons expect to leave a $100,000 bequest compared to only 39 percent of those with shorter horizons. Similarly, the interaction term in column (i) shows that more of the housing wealth increase is passed through to higher likelihoods of a large bequest for those with a longer planning horizon.

We have also hypothesized that bad baseline health may affect bequest expectations, with such individuals expecting to leave less bequests because of current or expected future needs. Again, simple summary statistics provide some evidence to support this. Among all

[6] Note that this result does not mean that risk averse people lower the stated likelihood of bequests. It is that they increase their stated likelihood less than the more risk averse. This can be seen more clearly in column (ii) of Appendix Table A-5 where we only use the interaction with risk aversion. The less risk averse increase their likelihood of a large bequest by 24 percentage points, while the more risk averse increase by 15.9 percentage points.

homeowners, those with bad baseline health state an average 22 percent chance of leaving a $100,000 bequest, compared to a 44 percent chance among those in better health (12 and 25 percent for the low-wealth sample). The interaction term in column (i) shows that those in poor health are more likely to leave a large bequest following an increase in wealth, so they pass through more of the housing price increase into expected bequests. This is conditional on risk aversion, and would be consistent with a loosening of household constraints.

Lastly, we consider the interaction of housing price changes and baseline non-housing wealth. Instead, the positive and statistically significant coefficient on the interaction term in column (v) indicates a complementary relationship. This appears to be driven, somewhat, by individuals with negative wealth. Replacing the continuous variable with a binary variable for having negative wealth at baseline produces a positive coefficient on the interaction, although the effect is not statistically significant.

Overall, the results in this section suggest that there is substantial heterogeneity in the pass-through of housing wealth changes in the lower-wealth sample. One potential interpretation of Table 3 is that there are two main channels affecting pass-through: loosening of household constraints and differences in planning behaviors. The former comes from the evidence of higher pass-through of those with bad health and the complementary relationship of non-housing wealth. The latter from the evidence of lower pass through of risk-averse individuals and those with shorter planning horizons. In fact, a factor analysis on our four variables of interest (replacing the continuous non-housing wealth measure with an indicator for negative non-housing wealth and using a polychoric correlation) reveals two factors. Bad health and negative wealth load equally to the first factor, while being in the most risk averse category and having a long planning horizon load equally (with opposite sign) to the second factor. These factors

appear to be associated with "low resources" and an inability or unwillingness to plan long into the future. While the scale of these factors are not generally interpretable, they are strongly explanatory when included in our model instead of the four separate variables. The interaction of the first factor ("low resources") is strongly positive, consistent with the loosening constraints interpretation. The interaction of the second factor ("risk averse, short-planning horizon") is strongly negative, consistent with individuals who dislike uncertainty or who feel they cannot plan far into the future not passing the wealth increase through to expected bequests.[7] We will return to this discussion in Section 5 after investigating other outcomes.

4.3 Other related behavioral responses

Lastly, we consider how changes in housing wealth affect a variety of other behaviors and outcomes. If homeowners, particularly the less wealthy, are not fully passing through their wealth gains from the housing market into intended bequests then it would be interesting to know what else they may be using the funds for. Thus, instead of looking for heterogeneity in the response across individuals, we now turn our attention to other possible outcomes upon which the individuals may respond. If we had the full set of possible outcomes in our data, we could exactly identify where any of the housing wealth may be leaking to. Unfortunately, no dataset, including the HRS, has such comprehensive data. We therefore explore a set of outcomes that are each imperfect proxies for potential categories of variables. We do so by estimating our base model with all covariates and the housing price change separately for these outcomes.

We present the coefficient and standard errors on the housing price change variable for each outcome in Table 4. Each column represents a separate outcome and estimates are provided

[7] The coefficient on the housing price change is 0.194*** (0.052), the interaction with the first factor is 0.583*** (0.197) and the interaction with the second factor is -0.797*** (0.108).

for all homeowners in the top panel, for the less wealthy in the middle panel, and for the more wealthy homeowners in the bottom panel.

We begin with a set of outcomes that measure end-of-life planning. If individuals are really changing their bequest expectations due to a change in housing price, then we would expect individuals to take concrete action towards leaving a bequest. Column (i) presents estimates of whether an individual has put assets into a trust. The coefficient on the two-year housing price change for all homeowners is statistically significant but somewhat small, consistent with a 0.7 percentage point increase in the likelihood of having assets in trust. This average for all homeowners masks heterogeneity across wealth with the likelihood of having assets in trust increasing by 4.3 percentage points among the less wealthy homeowners compared to 0.5 percentages for the wealthier homeowners. The pattern of larger coefficients for the less wealthy homeowners continues in column (ii) where the housing prices is associated with a 4.3 percentage point increase in the likelihood of having a will among the less wealthy, and the effect for the wealthier homeowners is small in magnitude and not statistically significant.

The estimates in the first two columns indicate that those homeowners with lower base year non-housing wealth are not just more likely to change their stated bequest expectations (Table 2) but more likely to actually take action to leave bequests. We next consider a set of outcomes that provide some insight into the recipient of such bequests. Columns (iii) to (v) present estimates of having a will that includes children, family or charity. There is clear evidence that the less wealthy individuals are creating wills that include children and families, around 5.5 percentage points for each. However, there is less evidence that they are planning on leaving assets to charity, with the coefficient smaller (approximately a 0.7 percentage point increase) and not statistically significant. In all cases, the point estimates for the wealthier

sample are smaller in magnitude, consistent with both the lower changes in stated intentions in Table 2 and less deliberate action towards bequests seen in columns (i) and (ii).

The estimates so far suggest that the housing wealth is leading individuals, particularly with lower base year non-housing wealth, to take actions to leave a bequest. Given the estimates in Table 3 that expected bequests were highly responsive to housing wealth changes for those with bad health, we next consider several measures of health and wellness in columns (vi) to (viii). Interestingly, there is a small positive effect of a housing price increase on individuals stating that their health is `Very Good,' the two highest categories, including both very good and excellent self-reported health. Whether that is due to actual improvements in health, better health behaviors, or simply a more optimistic outlook is unclear. In columns (ii) and (iii) we investigate two separate behaviors: skipping meals or skipping prescriptions because of a lack of funds. For all homeowners the estimates are not statistically or economically significant. Comparing the results by wealth level suggests that there is a larger response among the less wealthy, who also responded the most in terms of bequest expectations. These individuals are 4.1 percentage points more likely to report being in Very Good health following a housing price increase, and are less likely to report skipping meals or prescriptions, although neither is statistically significant. All of these coefficients are larger in magnitude than the estimates for the wealthier sample. Relatedly, Font, Frank, and Swartz (2017) found wealth changes from the housing boom and bust led to an increase in usage of community based long-term care services (home health aids, informal care) and no effect on nursing home access.

Our measures of health and health outcomes are imperfect proxies of any changes in health behavior but the estimates from Table 3 and Table 4 could be consistent with housing wealth increases loosening constraints on health spending or activities. In the last two columns

of Table 4 we consider two possible investment opportunities that homeowners could take: purchasing a second home and owning a business. The coefficients for both outcomes are not statistically significant for any sample, although the point estimate for owning a second home is much larger for the less wealthy sample than the wealthy sample. Overall, we find little evidence that individuals are using additional housing wealth to make investments, at least in the two categories that we can measure.

5. Discussion

How should we interpret our empirical results, particularly in relation to the previous literature on elderly bequests? One interpretation is that our results do not provide definitive support in favor of a single bequest motivation discussed in the previous literature. Instead, our results provide evidence suggesting that some portion of bequests are intentional, but that there is likely a role for unintentional bequests, particularly in the form of precautionary savings.

As noted in Kopzcuk and Lupton (2007), members of the HRS clearly indicate that they intend to leave bequests, suggesting some type of planned bequest. Our results provide further evidence of intentional bequest motivations because we demonstrate that lower-wealth households respond to exogenous shocks to wealth by updating their bequest expectations. In particular, they plan to pass part of the increase in wealth onto recipients of their bequest. Furthermore, it is not just that they update their stated intentions, but that they take concrete actions to bequeath their wealth. Increases in local housing wealth lead the less wealthy elderly to create trusts with assets and write wills, presumably to dictate how their wealth will be bequeathed. These actions would appear to be most consistent with models of altruism or strategic bequests, given that assets are specifically being directed towards recipients in the family, particularly children.

Other evidence, however, supports the hypothesis that some bequests are the result of precautionary savings. In particular, we see less than perfect pass-through of the wealth shock to expected bequests, suggesting that some of the wealth shock is either being saved or consumed by the elderly. The pattern of pass-through across individuals seems to be broadly consistent with precautionary savings. We find that the most risk-averse individuals, who are most likely to engage in savings because of uncertainty of expenses or their consumption path, are much less likely to update their bequest expectations compared to those individuals with less risk-aversion. Conversely, individuals who report that they plan longer into the future are more likely to pass-through the wealth increase.

Several other pieces of evidence also suggest a role for precautionary savings. The literature has frequently discussed uncertainty in health expenditures as a motivation for savings. Similarly, we find that households with low levels of self-reported health in the base year are more likely to update their bequest expectations, consistent with the housing wealth change loosening a constraint on the household. Similarly, the less wealthy households demonstrate a complementary relationship between baseline non-housing wealth and the housing wealth shock. This would also be consistent with loosened constraints, as these households are more likely to face financial constraints in the absence of the housing wealth shock.

Thus, we interpret our results as providing evidence for both models of planned and unplanned bequests. Unfortunately, we are not able to directly measure the relative portion of planned and unplanned bequests for the average homeowner. However, our results do suggest that there may be substantial heterogeneity in bequest motivations across individuals. This suggests that it may be difficult to empirically identify bequest motives for the average individual.

6. Conclusion

Our results help provide new insight into end-of-life asset decisions of the elderly for several reasons. First, we are among a small set of the literature to study expected bequests rather than actual or realized bequests. Second, we utilize variation in the housing boom as a source of plausibly exogenous shock to wealth. Combined together, these innovations allow us to observe how expectations of future bequests are updated in response to changes in wealth. Finally, we can further explore the heterogeneous variation in the response across households, which will reveal additional information about the bequest motivations of individuals.

We find clear evidence that bequest expectations do adjust to exogenous changes in housing wealth, with the probability of leaving a $100,000 bequest increasing among those households with lower initial non-housing wealth. We also find evidence in support of both theories of planned and unplanned bequest motivations. The updating of expectations suggests a form of planned bequests. However, the coefficient suggests that the pass-through of the housing wealth shock into wealth is less than perfect, suggesting some amount of housing wealth leaks into other activities than planned bequests, possibly including pre-cautionary savings.

We find larger pass-through of the housing wealth change into future bequests for those with lower baseline health and non-housing wealth. This would be consistent with the housing wealth changes loosening household constraints allowing more assets to be bequeathed. We also find smaller pass-through for more risk-averse individuals and those with shorter planning horizons. These results would suggest that individuals more concerned with, or possibly facing more, uncertainty about the future having lower expectations of passing through the housing wealth increases into future bequests. These results of heterogeneous responses appear to be broadly consistent with some amount of pre-cautionary savings motivations.

Our evidence in support of both planned and unintended bequests suggest a high level of complexity in the bequest motivations of the average elderly individual, or suggests that there is a large degree of heterogeneity in bequest motivations that may make it uninformative to even discuss the motivations of the average individual. Given the importance of end-of-life asset decisions on driving wealth accumulation across generations, as well as the potential to affect public policy associated with elderly and estate planning, additional research is needed to more cleanly identify how the elderly population make end-of-life asset decisions.

Conflict of interest: The authors declare that they have no conflict of interest.

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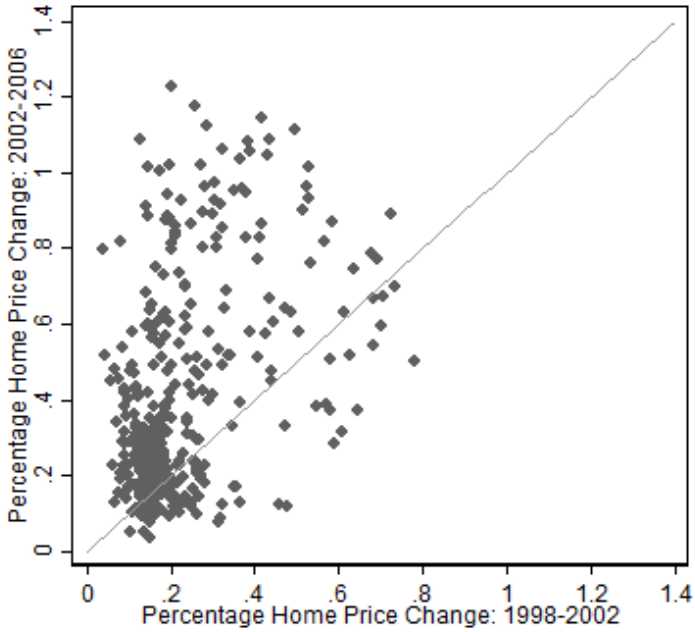
Figure 1: MSA-level Changes in Home Prices 1998-2006



Note: Each dot represents an MSA with data on home price changes calculated using the OFHEO index discussed in the text. The x-axis is the percentage change in home prices from 1998 to 2002, the y-axis is the percentage change in home prices from 2002 to 2006.

Table 1: Summary Statistics

	All Homeowners		Non-housing wealth < 100k		Non-housing wealth > 100k	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Probability of $100k bequest	0.504	0.429	0.337	0.404	0.721	0.359
Probability of $100k bequest, >50%	0.585	0.493	0.424	0.494	0.801	0.400
2-year house price change ($100k)	0.279	1.754	0.177	0.425	0.418	2.637
Female	0.522	0.500	0.546	0.498	0.490	0.500
Minority	0.148	0.355	0.205	0.404	0.071	0.257
Married	0.661	0.473	0.573	0.494	0.779	0.415
Number of people in HH	2.237	1.209	2.290	1.367	2.159	0.941
Has kids	0.953	0.212	0.956	0.204	0.948	0.222
Number of kids	3.094	1.959	3.244	2.063	2.890	1.790
Has grandkids	0.767	0.423	0.790	0.407	0.738	0.440
Number of grandkids	4.560	5.264	5.001	5.596	3.977	4.722
College	0.465	0.499	0.369	0.483	0.595	0.491
Retired	0.427	0.495	0.391	0.488	0.477	0.500
Household income ($100k)	0.629	0.970	0.427	0.399	0.901	1.366
Age	64.354	8.718	63.953	8.726	64.919	8.675
Baseline non-housing wealth ($100k)	2.225	4.534	0.264	0.421	4.871	5.990
Baseline bad health	0.215	0.411	0.282	0.450	0.126	0.332
Baseline 10-year planning horizon	0.136	0.343	0.120	0.325	0.157	0.364
Baseline most risk averse	0.611	0.487	0.639	0.480	0.576	0.494
N	8925		5117		3798	

Notes: This table shows the sample means and standard deviations for all homeowners (columns 1 and 2), low wealth homeowners (columns 3 and 4), and high wealth homeowners (columns 5 and 6). Probability of $100,000 bequest and greater than 50% chance of $100,000 bequest are our two outcome variables of interest. The explanatory variable of interest, 2 year house price change, was calculated using the Office of Federal Housing Enterprise Oversight housing price index. The baseline characteristics were from 1998 responses of individuals in the HRS.

Table 2: Estimates of Observable Characteristics and Housing Price Characteristics on the Probability of $100k Bequest

		Homeowners			Renters
	All	All	Low wealth	High wealth	Low wealth
	(i)	(ii)	(iii)	(iv)	(v)
2-year house price change ($100k)		0.004	0.107*	0.001	0.034
		(0.004)	(0.056)	(0.002)	(0.041)
Has kids	0.048	0.048	0.085**	0.038	0.014
	(0.033)	(0.033)	(0.040)	(0.036)	(0.031)
Kids	-0.013***	-0.013***	-0.014***	-0.001	-0.008
	(0.004)	(0.004)	(0.004)	(0.007)	(0.005)
Has grandkids	-0.034*	-0.034*	-0.046**	-0.012	0.027
	(0.020)	(0.020)	(0.020)	(0.033)	(0.031)
Grandkids	-0.002	-0.002	0.002	-0.005	-0.001
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
College graduate	0.127***	0.127***	0.076***	0.073***	0.084***
	(0.021)	(0.021)	(0.023)	(0.017)	(0.026)
Retired	0.043***	0.043***	0.037**	0.028	-0.005
	(0.011)	(0.011)	(0.016)	(0.020)	(0.023)
Income ($100k)	0.026	0.025	0.193***	0.012	0.119***
	(0.020)	(0.020)	(0.030)	(0.011)	(0.022)
Number of people in HH	-0.005	-0.005	0.002	0.005	0.004
	(0.008)	(0.008)	(0.007)	(0.012)	(0.007)
Married	0.078***	0.078***	-0.005	-0.018	0.034
	(0.020)	(0.020)	(0.014)	(0.029)	(0.035)
Baseline most risk averse	-0.014	-0.014	-0.023	0.005	-0.076**
	(0.013)	(0.013)	(0.016)	(0.017)	(0.036)
Baseline bad health	-0.106***	-0.106***	-0.070***	-0.027	-0.022
	(0.017)	(0.017)	(0.015)	(0.029)	(0.026)
Baseline 10-year planning horizon	0.061***	0.061***	0.034	0.054**	0.063
	(0.018)	(0.018)	(0.023)	(0.022)	(0.066)
Baseline non-housing wealth ($100k)	0.019***	0.019***	0.135***	0.009***	0.116
	(0.003)	(0.003)	(0.052)	(0.002)	(0.082)
N	8364	8364	4735	3619	1117

Notes: This table shows the estimated effect of selected observable characteristics on the probability of leaving $100,000 bequest. Regressions also include demographic variables such as age, female, and minority status., as well as state and year fixed effects. Standard errors, clustered by state and person identifier, are shown in parentheses using the Cameron, Gelbach, and Miller estimate technique. Columns (i) to (iv) are homeowners, column (v) are renters. Low wealth refers to individuals with less than $100,000 in non-housing wealth in the base year of the sample; high wealth individuals had more than $100,000.

Table 3: Interaction of Housing Price Change and Covariates on the Probability of a $100k Bequest

	Homeowners		Renters
	Low wealth	High wealth	Low wealth
	(i)	(ii)	(iii)
2-year house price change ($100k)	0.180***	0.055**	0.044
	(0.048)	(0.020)	(0.058)
2-year house price change ($100k)	-0.135***	-0.049**	-0.009
* most risk averse	(0.028)	(0.020)	(0.104)
2-year house price change ($100k)	0.195***	0.066	0.012
* bad health	(0.041)	(0.050)	(0.050)
2-year house price change ($100k)	0.048**	-0.029	-0.064
* 10-year planning horizon	(0.021)	(0.026)	(0.191)
2-year house price change ($100k)	0.098**	-0.002***	-0.057
* non-housing wealth ($100k)	(0.042)	(0.001)	(0.102)
Baseline most risk averse	-0.000	0.022	-0.074**
	(0.017)	(0.020)	(0.032)
Baseline bad health	-0.094***	-0.042	-0.027
	(0.017)	(0.035)	(0.028)
Baseline 10-year planning horizon	0.025	0.063**	0.088
	(0.025)	(0.029)	(0.080)
Baseline non-housing wealth ($100k)	0.121**	0.009***	0.136
	(0.051)	(0.002)	(0.087)
N	4735	3619	1117

Notes: This table estimates the interaction of baseline characteristics with the 2-year house price change on the probability of leaving a $100,000 bequest. Regressions include the same covariates as in the baseline models reported in Table 2. Standard errors are shown in parentheses and clustered by state and person identifier using the Cameron, Gelbach, and Miller technique. Columns (i) and (ii) are homeowners, column (iii) are renters. Low wealth refers to individuals with less than $100,000 in non-housing wealth in the base year of the sample; high wealth individuals had more than $100,000.

Table 4: Effect of Housing Wealth Changes on Other Related Outcomes

	Assets in Trust	Has a will	Has will with kids	Has will with family	Has will with charity	Very Good Health	Skip Meals	Skip Prescriptions	Own Second Home	Own Business
	(i)	(ii)	(iii)	(vi)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
All homeowners										
2-year house price change ($100k)	0.007***	0.002	0.005	0.004	0.002	0.005*	-0.000	-0.000	0.002	-0.002
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.000)	(0.001)	(0.004)	(0.002)
< $100k in Non-housing wealth										
2-year house price change ($100k)	0.043***	0.043***	0.056***	0.054***	0.007	0.042***	-0.004	-0.008*	0.011	-0.002
	(0.008)	(0.013)	(0.011)	(0.010)	(0.006)	(0.015)	(0.003)	(0.005)	(0.017)	(0.007)
> $100k in Non-housing wealth										
2-year house price change ($100k)	0.005***	0.001	0.002*	0.001	0.002	0.003**	-0.000	0.000	0.002	-0.001
	(0.001)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)	(0.000)	(0.001)	(0.003)	(0.002)

Notes: This table measures the estimated effect of housing wealth changes on other related outcomes including financial planning (i-v), health (vi-viii), and investment (ix, x). Regressions include the same covariates as in the baseline model reported in Table 2. Standard errors are clustered by state and person identifiers using the Cameron, Gelbach, and Miller technique.

Table A-1: Summary Statistics for Renters

	All Renters		Renters, non-housing wealth < 100k	
	Mean	St. Dev.	Mean	St. Dev.
Probability of $100k bequest	0.174	0.329	0.114	0.270
Probability of $100k bequest, >50%	0.256	0.437	0.200	0.400
Imputed 2-year housing price change ($100k)	0.384	0.403	0.378	0.398
Female	0.604	0.489	0.627	0.484
Minority	0.403	0.491	0.444	0.497
Married	0.264	0.441	0.225	0.418
Number of people in HH	1.974	1.359	1.980	1.400
Has kids	0.900	0.300	0.905	0.293
Number of kids	3.008	2.104	3.111	2.135
Has grandkids	0.752	0.432	0.775	0.418
Number of grandkids	5.063	6.025	5.304	6.162
College	0.365	0.482	0.312	0.463
Retired	0.381	0.486	0.372	0.483
Household income ($100k)	0.343	0.773	0.247	0.477
Age	64.067	8.911	63.902	8.883
Baseline non-housing wealth ($100k)	0.558	2.064	0.078	0.223
Baseline bad health	0.364	0.481	0.387	0.487
Baseline 10-year planning horizon	0.100	0.300	0.093	0.291
Baseline most risk averse	0.628	0.484	0.633	0.482
N	1277		1117	

Notes: This table shows the sample means and standard deviations for all renters (columns 1 and 2) and low wealth renters (columns 3 and 4). Probability of $100,000 bequest and greater than 50% chance of $100,000 bequest are our two outcome variables of interest. The explanatory variable of interest, 2 year house price change, was calculated using the Office of Federal Housing Enterprise Oversight housing price index. The baseline characteristics were from 1998 responses of individuals in the HRS.

Table A-2: Baseline Estimates of Observable Characteristics on the Probability of $100k Bequest > 50%

	All	Non-housing wealth < $100k	All	Non-housing wealth < $100k
	(i)	(ii)	(iii)	(iv)
2-year house price change ($100k)			0.004	0.098*
			(0.004)	(0.051)
Has kids	0.062**	0.093**	0.061**	0.092**
	(0.029)	(0.040)	(0.029)	(0.039)
Kids	-0.017***	-0.016***	-0.017***	-0.017***
	(0.005)	(0.005)	(0.005)	(0.005)
Has grandkids	-0.043**	-0.052**	-0.043**	-0.049*
	(0.020)	(0.026)	(0.020)	(0.026)
Grandkids	-0.002	0.001	-0.002	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
College graduate	0.115***	0.074***	0.114***	0.070**
	(0.022)	(0.029)	(0.022)	(0.028)
Retired	0.031**	0.013	0.031***	0.014
	(0.012)	(0.020)	(0.012)	(0.020)
Income ($100k)	0.025	0.203***	0.024	0.190***
	(0.019)	(0.034)	(0.019)	(0.033)
Number of people in HH	-0.001	0.008	-0.001	0.009
	(0.010)	(0.009)	(0.010)	(0.009)
Married	0.090***	0.025	0.090***	0.022
	(0.022)	(0.018)	(0.022)	(0.018)
Baseline most risk averse	-0.006	-0.000	-0.006	-0.003
	(0.013)	(0.018)	(0.013)	(0.018)
Baseline bad health	-0.098***	-0.064***	-0.098***	-0.062***
	(0.019)	(0.018)	(0.019)	(0.018)
Baseline 10-year planning horizon	0.050**	0.040	0.050**	0.037
	(0.020)	(0.032)	(0.020)	(0.032)
Baseline non-housing wealth ($100k)	0.018***	0.153***	0.018***	0.151***
	(0.002)	(0.052)	(0.003)	(0.053)
N	8925	5117	8925	5117

Notes: This table shows the estimated effect of observable characteristics on the greater than 50% probability of leaving a $100,000 bequest. Regressions also include demographic variables such as age, female, and minority status., as well as state and year fixed effects. Standard errors are clustered by state and person identifier are shown in parentheses using the Cameron, Gelbach, and Miller estimate technique.

Table A-3: Interaction of Housing Price Change and Covariates on the Probability of a $100K Bequest for Homeowners, Including Great Recession

	(i) Baseline All	(ii) Baseline <100k	(iii) Baseline >100k	(iv) Interacted All	(v) Interacted <100k	(vi) Interacted >100k
2-year house price change ($100k)	0.003	0.077**	0.001	0.079***	0.122***	0.020
	(0.003)	(0.034)	(0.002)	(0.025)	(0.032)	(0.014)
2-year house price change ($100k)				-0.068***	-0.088***	-0.015
* most risk averse				(0.022)	(0.025)	(0.012)
2-year house price change ($100k)				0.136***	0.135***	0.027
* bad health				(0.033)	(0.034)	(0.032)
2-year house price change ($100k)				0.004	0.047	-0.004
* 10-year planning horizon				(0.029)	(0.031)	(0.023)
2-year house price change ($100k)				-0.003***	0.046	-0.001*
* non-housing wealth ($100k)				(0.0001)	(0.034)	(0.000)
N	10201	5668	4523	10201	5668	4523

Notes: This table estimates the effect of an imputed 2-year price change on the probability of leaving a $100,000 bequest for renters in the sample and serves as validation for our identification. Regressions include the same covariates as in the baseline model reported in Table 2. Standard errors are clustered by state and person identifiers using the Cameron, Gelbach, Miller technique.

Table A-4: Interaction of Housing Price Change and Covariates on the Probability of a $100K Bequest for Homeowners, Individual Fixed Effects

	(i) Baseline All	(ii) Baseline <100k	(iii) Baseline >100k	(iv) Interacted All	(v) Interacted <100k	(vi) Interacted >100k
2-year house price change ($100k)	-0.001	0.006	-0.001*	0.022	0.060	0.001
	(0.001)	(0.030)	(0.000)	(0.018)	(0.049)	(0.017)
2-year house price change ($100k)				-0.022	-0.085*	-0.002
* most risk averse				(0.017)	(0.047)	(0.016)
2-year house price change ($100k)				0.111**	0.102*	0.160**
* bad health				(0.053)	(0.061)	(0.080)
2-year house price change ($100k)				0.031	0.077**	0.015
* 10-year planning horizon				(0.022)	(0.036)	(0.021)
2-year house price change ($100k)				-0.001	0.044	-0.000
* non-housing wealth ($100k)				(0.001)	(0.039)	(0.001)
N	8364	8364	4735	4735	3619	3619

Notes: This table estimates the interaction of baseline characteristics with the 2-year house price change on the probability of leaving a $100,000 bequest. Regressions include the same covariates as in the baseline model reported in Table 2. Standard errors are clustered by state and person identifiers using the Cameron, Gelbach, Miller technique.

Appendix Table A-5: Interaction of Housing Price Change and Covariates on the Probability of a $100k Bequest for Homeowners with Less Than $100k in Non-housing Wealth

	(i)	(ii)	(iii)	(iv)	(v)	(vi)
2-year house price change ($100k)	0.107*	0.240*	0.092*	0.099*	0.081	0.180***
	(0.056)	(0.055)	(0.055)	(0.053)	(0.052)	(0.048)
2-year house price change ($100k)		-0.159***				-0.135***
* most risk averse		(0.024)				(0.028)
2-year house price change ($100k)			0.174***			0.195***
* bad health			(0.032)			(0.041)
2-year house price change ($100k)				0.085***		0.048**
* 10-year planning horizon				(0.021)		(0.021)
2-year house price change ($100k)					0.143***	0.098**
* non-housing wealth ($100k)					(0.049)	(0.042)
Baseline most risk averse	-0.023	0.005	-0.025	-0.023	-0.022	-0.000
	(0.016)	(0.018)	(0.016)	(0.016)	(0.016)	(0.017)
Baseline bad health	-0.070***	-0.067***	-0.094***	-0.069***	-0.069***	-0.094***
	(0.015)	(0.015)	(0.017)	(0.016)	(0.015)	(0.017)
Baseline 10-year planning horizon	0.034	0.033	0.037	0.016	0.032	0.025
	(0.023)	(0.024)	(0.023)	(0.027)	(0.024)	(0.025)
Baseline non-housing wealth ($100k)	0.135***	0.132**	0.136***	0.135***	0.118**	0.121**
	(0.052)	(0.051)	(0.052)	(0.051)	(0.048)	(0.051)
N	4735	4735	4735	4735	4735	4735

Notes: This table estimates the interaction of baseline characteristics with the 2-year house price change on the probability of leaving a $100,000 bequest for the baseline low wealth sample. Column (vi) shows the fully interacted model with all four interactions included. Regressions include the same covariates as in the baseline model reported in Table 2. Standard errors are shown in parentheses and clustered by state and person identifier using the Cameron, Gelbach, and Miller technique.