Housing and Savings Behavior across Family Types

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Abstract

Does marital status affect households' investment choices? Is accounting for distinct family types necessary for the correct evaluation of policies that aim at stimulating housing demand? To answer these questions, I develop a life-cycle model of housing and financial portfolio choice with dynamic and heterogeneous family types. I find that divorce risk encourages precautionary savings of couples in the form of liquid assets and reduces their demand for illiquid housing. Expected marriage, low income levels and larger exposure to income fluctuations prevent singles from becoming homeowners. Abstracting from distinct family types amplifies the attractiveness of housing and, as a result, overstates the effectiveness of housing policies such as lowering property taxes and reducing transaction costs by a factor greater than two. This mis-specification is largest for young households who are most likely to be single and whose marital transition risk is highest. In contrast, regulations that facilitate stock market participation help to foster wealth accumulation, because they encourage investment in high return assets that are cheaper to liquidate in the event of a (marital or labor income) shock.

Keywords: Housing, Portfolio Choice, Life-Cycle, Family Composition, Marital Risk

JEL Classification: D14, D15, E21, G11, G51, J12

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1 Introduction

In the United States, housing represents the largest asset in most households' portfolios and constitutes the primary way through which they accumulate wealth (Goetzmann, Spaenjers, and Van Nieuwerburgh, 2021). In addition, being a homeowner is often regarded as part of the American Dream, and has been shown to improve children's outcomes and to strengthen involvement with the local community.[1] As a result, increasing homeownership attracts considerable attention among policy makers and has resulted in numerous policy proposals targeted at stimulating housing demand.[2] Today, the United States alone invests around \$200 billion annually to finance policies that promote homeownership (Sodini, Van Nieuwerburgh, Vestman, and von Lilienfeld-Toal, 2021).

However, to evaluate the transmission of any policy that operates through housing demand, it is necessary to understand the determinants of households' investment choices over their life-cycle. The literature has so far identified a variety of household characteristics that shape the demand for housing. Examples of these include age, income dynamics, or wealth holdings (e.g. Attanasio, Bottazzi, Low, Nesheim, and Wakefield, 2012, Paz-Pardo, 2020). In this paper, I argue that marital status is another important, yet understudied, driver of households' housing and investment decisions because it affects labor income profiles and because their illiquidity makes houses expensive to liquidate in the event of marriage or divorce.

In particular, I address two questions: First, what are the key channels through which marital status affects investment dynamics of couples vs. singles? Second, does accounting for distinct family types change the effectiveness of housing policies over the life-cycle?

[1] See Forbes (2019) or Goodman and Mayer (2018) on housing and the American Dream, Haurin, Parcel, and Haurin (2002) on children's outcomes, and DiPasquale and Glaeser (1999) on homeownership and local community involvement.

[2] For example, President Biden declared June 2021 as "National Homeownership Month" and explicitly called "...to recognize the enduring value of homeownership and recommit ourselves to helping more Americans realize that dream". Policy examples include housing subsidies to first-time buyers, tax credits, the home mortgage interest deduction (HMID) but also reforms that aim at reducing property or transfer taxes.

I first document novel empirical patterns on heterogeneity in financial portfolio composition and in housing choices across couples, single men and single women in the United States by combining data from the Survey of Consumer Finances (SCF) and from the Panel Study of Income Dynamics (PSID). I show that on average almost 80% of all couples own their house, whereas less than half of all single households do. In contrast, the average house value of couple owners is per capita $55,000 lower than that of single men and $29,000 lower than that of single women. Moreover, at retirement age, the average couple household has accumulated per capita around $50,000 more in financial savings than the average single man, and around $150,000 more than the average single woman.

Next, I develop a life-cycle framework of housing, financial portfolio choice and family structure that is able to replicate these empirical patterns. In the model, households derive utility from nondurable consumption and from housing services. They decide on consumption, savings in safe and in risky financial assets as well as their housing stock, forming expectations about future labor income, asset returns and marital status. Housing is discrete, giving rise to a minimum house size available for purchase. In addition, housing adjustments are subject to transaction costs and homeowners have to pay annual maintenance costs.

Family types are heterogeneous in terms of their labor income profiles which I estimate separately for single women, single men and couples from the PSID. I find that couple households have on average higher labor income levels than singles. At the same time, they are exposed to smaller labor income fluctuations which in turn affects their willingness to bear risk along other dimensions, for example in financial markets (Heaton and Lucas, 2000).

Additionally, couples face the possibility of getting divorced whereas singles may meet a partner whom they marry. Both events impose substantial financial uncertainty that works in opposite directions. Divorce constitutes a financial risk because it requires households to split their assets and because it results in a state with lower labor income levels and higher labor income risk. Marriage, in contrast, crowds out private savings as it reflects a financial outcome with disproportionally high returns (through asset holdings of the partner) and the ability to pool income within the household. In order to realistically replicate this financial uncertainty, I require the model to match empirical shifts in homeownership rates and in financial wealth throughout the years preceding and following a marital shock.

Moreover, households enjoy economies of scale which differ between housing and non-durable consumption, to capture that housing services might be more easily divided among family members than non-durable consumption items (Yang, 2009). Hence, heterogeneity in the number of household members by age and by family type affects both the optimal allocation of resources across time and the optimal intratemporal allocation across goods.

Key Channels. I calibrate the model to match key moments on ownership, savings behavior, stock market participation and house prices in the US. By means of counterfactual simulations, I show that marital transition risk and heterogeneity in labor income profiles are the most important determinants through which marital status affects individual housing demand.

The income and asset losses associated with divorce induce couples to increase precautionary savings in safe assets and lower their demand for risky assets and for illiquid housing. On aggregate, the increased savings motive dominates the portfolio shift towards low-return assets, resulting in larger wealth holdings than in a world without divorce. In addition, the increased savings motive shifts the distribution of couples in the economy towards asset-richer households who are more likely to be homeowners. Therefore, allowing for divorce increases the aggregate share of owning couples, despite lower housing demand.

In contrast, marriage represents an outcome with disproportionately high returns through asset holdings of the partner. Furthermore, it increases households' prospective savings ability because of higher income levels and resource sharing, crowding out private savings of singles relative to a world without marital transitions. At the same time, marriage reflects an event that may render a previously purchased home suboptimal, reducing singles' housing demand. Consequently, both aggregate financial savings and homeownership rates of singles decrease when allowing for marriage in the model.

Low labor income levels further prevent singles from accumulating financial savings and keep them out of homeownership. The corresponding drop in household income following a divorce strengthens couples' savings motive, additionally contributing to the empirical observation that couples are more likely to be homeowners and that they hold more financial wealth than singles.

Similary, larger labor income fluctuations of single households increase their own risk exposure but also that of couples in the event of divorce. Thus, more labor market risk of singles reduces the demand for risky assets (to reduce overall risk exposure) and for housing (which cannot be easily liquidated in the event of an adverse labor income shock) of all households. For singles, this mechanism operates most strongly along the extensive margin (that is, households shift from small owner-occupied housing towards renting). As a result, the average housing wealth of owning singles is tilted towards larger homes, contributing to the empirical pattern that, conditional on owning, singles invest more wealth into housing than couples.

Implications for Policy Evaluation. Using the calibrated model, I show that accounting for family composition is quantitatively important for the evaluation of policies that aim at stimulating housing demand. I simulate two types of reforms: lowering housing transaction costs and reducing property taxes. Thus, the first policy facilitates housing adjustments in response to shocks whereas the latter lowers the flow costs of housing. I then perform the same exercises in a standard framework with one generic household type and compare the effectiveness of both reforms in terms of increasing homeownership rates across set-ups.

My main results are as follows. Introducing marriage and divorce lowers the attractiveness of indivisible housing and aggregate homeownership rates increase less in response to both policies. Additionally, the presence of single households who have low income levels and who are exposed more to labor income fluctuations (and are thus less likely to invest into housing) further weaken policy transmission. Quantitatively, abstracting from distinct family types overstates the effectiveness of lowering property taxes by 133% and that of decreasing transaction costs by 53%. Hence, the framework with one generic household type not only overestimates the effectiveness of both reforms and but also biases their relative magnitude. Lowering property taxes shields households from large expenditure commitments each period. However, once I allow for marital transitions, households value relatively more to be able to adjust their housing size (in the event of a marital shock) at little cost.

In addition, because marriage and divorce probabilities are decreasing in age, the magnitude of this mis-specification across frameworks is largest for young households. Since young households are the age group that most housing policies in the US are primarily targeted at, this result further emphasizes the importance of accounting for distinct family types when designing or evaluating reforms that aim at stimulating housing demand.[3]

Lastly, I evaluate both policies in terms of increasing households' net worth and as an alternative consider a regulation that facilitates stock market participation. I find that the latter is most effective in fostering overall wealth accumulation, especially among singles, since it encourages investment in assets that pay high returns in expectations but allow for relatively small investment amounts and can be more easily pooled in the event of marriage.

Related Literature. This paper contributes to several strands of the literature. Broadly, it relates to a large literature on housing in macroeconomics and on financial portfolio allocation of households. Piazzesi and Schneider (2016) provide a detailed review of the former and Gomes, Haliassos, and Ramadorai (2020) as well as Campbell (2006) of the latter. For a literature review on life-cycle dynamics of household's portfolio composition, see Poterba and Samwick (2001) and, more recently, Gomes (2020).

More specifically, I complement a literature that studies the interaction of housing dynamics and a financial portfolio choice within life-cycle frameworks (Cocco (2005), Yao and Zhang (2005), Flavin and Yamashita (2011), Chetty, Sándor, and Szeidl (2017), Vestman (2019), Paz-Pardo (2020), Brandsaas (2021)). Expanding on their work, I am the first to introduce

[3] Typically, most housing policies are targeted at first-time buyers with the explicit goal of stimulating housing demand among young ("millennial") households. See for example Choi, Zhu, Goodman, Ganesh, and Strochak (2018).

distinct family types and am thus able to quantify the importance of marital status on housing decisions as well as their interaction with a financial portfolio choice.

Furthermore, my paper extends previous work that analyzes how marital dynamics affect household investment decisions. For example, Fisher and Gervais (2011), Fischer and Khorunzhina (2018), Chang (2019), Khorunzhina and Miller (2019), and Bartscher (2020) study the effect of marriage and divorce on home-buying decisions and mortgage applications. Love (2010) and Hubener, Maurer, and Mitchell (2015) develop a joint framework of household structure and financial portfolio choice that abstracts from housing to study how men and women re-balance their financial portfolio following family shocks such as divorce. More generally, many papers focus on the interaction of marital transition dynamics or marital status and household savings behavior (e.g. Cubeddu and Ríos-Rull (2003), Yamaguchi, Ruiz, and Mazzocco (2014), Voena (2015), Fehr, Kallweit, and Kindermann (2016), Borella, De Nardi, and Yang (2018), and De Nardi, French, Jones, and McGee (2021)). Some empirical work such as Stevenson (2007), Mundra and Uwaifo Oyelere (2016), and Goodman, Pendall, and Zhu (2019) investigates the determinants of housing choices conditional on marital status. Relative to these papers, my focus is on how marital status interacts with housing demand over the life-cycle and on deriving implications for policies that aim at stimulating homeownership.

My paper is closest to Peter, Schneider, and Piazzesi (2020) who propose a joint framework of housing choices and marital status to study homeownership rates between singles and couples across Europe. Their findings indicate that higher homeownership rates among couples can be attributed to weak rental markets or strong credit markets, depending on the specific country under consideration. In contrast to their work, my paper is limited to one country (the US), additionally includes a financial portfolio choice between safe and risky assets and emphasizes life-cycle dynamics of portfolio composition depending on the family type.

Finally, my paper is related to a macroeconomic literature on life-cycle dynamics of portfolio composition with durable goods. Attanasio et al. (2012) study the channels through which housing demand evolves over the life-cycle. Fernández-Villaverde and Krueger (2011) emphasize the importance of housing as collateral because it relaxes borrowing constraints, explaining why households accumulate housing early in life and only later start saving in financial assets. Albeit being present in my framework as well, this channel is weakened through the introduction of single households who are reluctant to invest in housing early in life as they expect to get married soon. Similarly, Yang (2009) focuses on life-cycle patterns of consumption and shows that the collateral value of housing is key to replicate the increasing housing stock early in life, while its illiquid nature can account for the slow decumulation of housing among the old. In relation to her, I provide evidence that the illiquidity of housing not only helps to understand its slow decumulation during old age but also the marital gap in homeownership across couples and singles.

Roadmap. The remainder of this paper is structured as follows. Section 2 presents empirical evidence on life-cycle patterns of portfolio dynamics of single men, single women and couples. Section 3 introduces the structural model. Next, Section 4 explains the calibration strategy, Section 5 analyzes the channels through which marital status affects household's investment choices and Section 6 discusses implications for policy evaluation. Section 7 concludes.

2 Key Facts

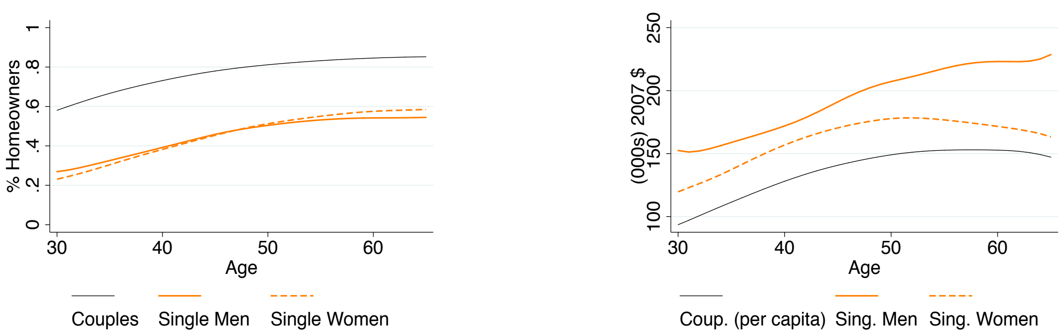
The following section first documents key differences in investment behavior across couples, single men and single women over their life-cycle, relying on data from the Survey of Consumer Finances, waves 1989-2016.[4] Second, to further shed light on how marital risk interacts with households' investment decisions, I conduct an event study of housing and financial portfolio choices around the time of marriage and divorce. Later on, I will validate the performance of the structural model with regard to these empirical patterns.

[4] Appendix A describes the data and sample selection criteria in detail.

2.1 Life-Cycle Patterns of Investment Choices Across Families

Figure 1a shows that the share of homeowners among couples is higher than among both single men and single women at every age in the US. On average, this "marital gap" in homeownership rates is around 30%pts, corresponding to the share of single owners being 46% lower than the share of couple owners. Single women refer to family units with a female head without a spouse. Single men are defined accordingly. Couples include legally married individuals with both spouses present in the household.[5] Figure 1b documents the average housing wealth of homeowners across family types. Conditional on owning, couples allocate (per capita) on average $44,000 less wealth into housing than singles.[6] Thus, couples invest more in housing along the extensive margin whereas singles tend to invest more along the intensive margin, once they become owners. Moreover, while I find hardly any gender differences in the share of single owners, the conditional housing wealth of single men is higher than of single women, in particular during older ages.

Figure 1: Housing Choices Across Family Types (Data)



(a) Homeownership Rates

(b) (Conditional) Mean House Value

Notes: Figure 1 plots the life-cycle profiles of homeownership rates and average house value of owners by family type. House value is defined as the value of a household's primary residence, irrespective of any mortgage debt. Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

Figure 2 considers financial investment patterns across family types. In contrast to housing wealth, couples accumulate more financial assets (per capita) than both single men and single

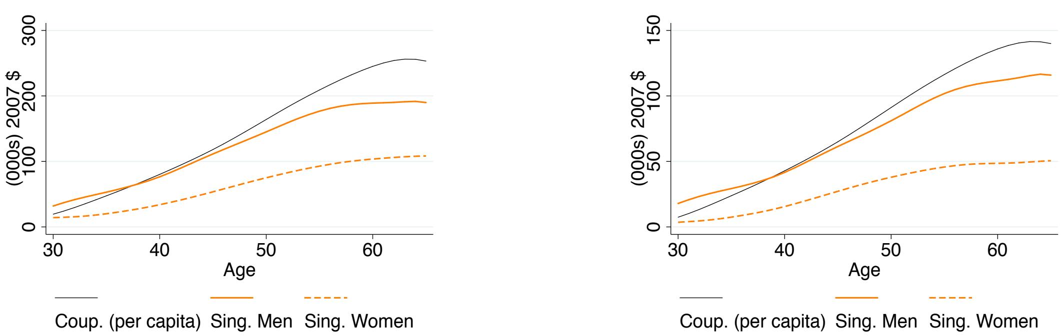
[5] In Appendix B, I show that the reported empirical patterns are robust to including cohabiting individuals either in the "couples" or in the "singles" category.

[6] Figure 1b displays the mean conditional house value, irrespectively of any housing debt. Appendix A.2.2 shows that this finding is robust to considering the median as well as to considering housing equity.

women (Figure 2a).[7] Financial assets are defined as the sum of all risky and safe financial assets that the household holds. Risky assets refer to direct stock holdings, corporate and foreign bonds, the fraction of mutual funds that is invested in the former as well as the fraction of retirement accounts which is invested in stocks. Safe financial assets include cash holdings, savings and checking accounts, government bonds as well as the fraction of mutual funds and retirement accounts which is invested in safe assets.

At the entry of retirement, the average financial wealth of single women is little over $100,000, that of single men almost $200,000 and couples hold on average per capita $250,000 in financial assets. This pattern prevails when considering only risky financial assets (Figure 2b). However, Figure 2b combines the extensive margin (i.e. whether or not the household holds any risky assets) and the intensive margin of risky asset holdings. When plotting both margins separately (reported in Appendix A.2.2), I find that, as for housing wealth, couples are more likely to participate in risky asset markets, but that they, conditional on participation, do not hold more risky assets than singles. Single men hold persistently more financial wealth than single women, again with this gender gap widening in age.[8]

Figure 2: Financial Choices Across Family Types (Data)



(a) Mean Financial Assets

(b) Mean Risky Assets

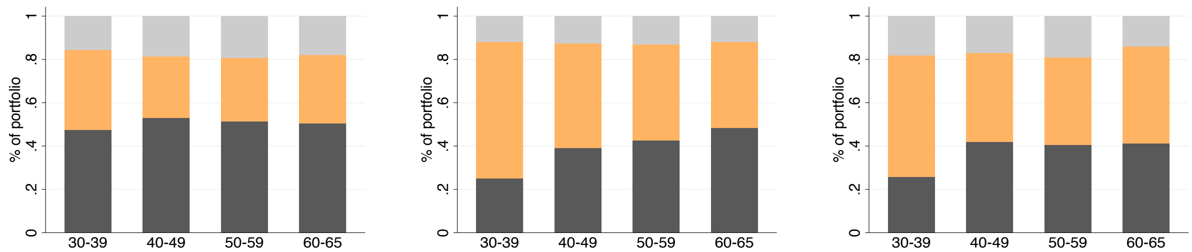
Notes: Figure 2 plots average financial assets and average risky assets by family type. Financial assets are defined as the sum of safe and risky financial assets. Risky assets contain direct stock holdings, corporate and foreign bonds, the fraction of mutual funds that include the former as well as the fraction of retirement accounts which is invested in stocks. Safe financial assets refer to cash holdings, savings and checking accounts, government bonds and the fraction of mutual funds and retirement accounts which is invested in safe assets. Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

[7] Again, this finding is robust to considering median of financial assets, see Appendix A.2.2 for details.

[8] Appendix A.2.1 reports the life-cycle profiles of housing and financial wealth accumulation of never married singles vs. divorced individuals.

Finally, Figure 3 plots the portfolio shares of housing, risky financial assets and safe financial assets by family type and by age group. The housing share is defined as housing equity over overall wealth.[9] In line with Figure 1, the housing share of couples is higher than that of singles. Additionally, the housing share of couples is relatively flat over their life-cycle whereas that of both single men and single women is increasing in age.

Figure 3: Portfolio Shares by Age (Data)



(a) Couples (b) Single Women (c) Single Men

Notes: Figure 3 plots the average share of overall wealth invested in housing, safe and risky assets by family type and age category. The housing share denotes housing equity as a fraction of overall wealth (the sum of the house value, safe and risky assets net of any mortgage debt). Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

2.2 Housing and Financial Portfolio Choices around Marital Shifts

To understand how marital risk interacts with investment choices of households, one key dimension is households' housing and financial portfolio shifts around marriage and divorce. These shifts directly affect the financial riskiness of marital transitions and hence, households' overall risk exposure. In this section, I conduct an event study of housing- and asset choices in the years preceding and following marriage and divorce.[10]

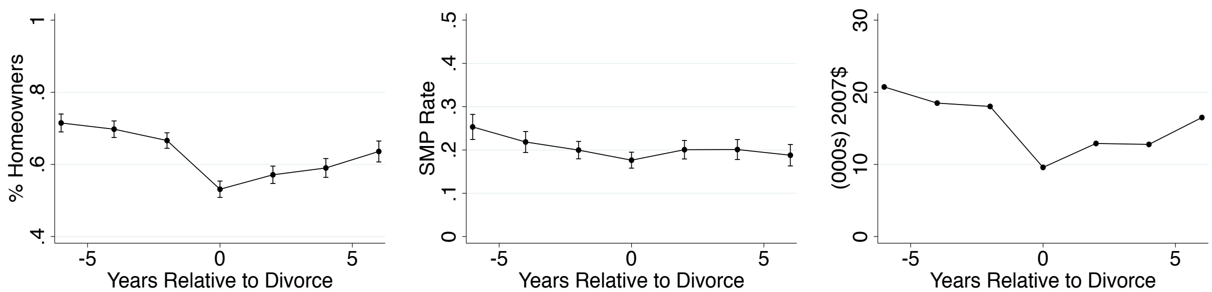
Divorce. Figure 4 documents average homeownership rates, stock market participation rates and median financial asset holdings around the time of divorce. All values refer to household level estimates. The year zero indicates the first year in which the respondent reports to be divorced. Following a divorce (i.e. between year -2 and year 0), homeownership rates drop

[9] Figure 18 in Appendix A.2.2 illustrates how these patterns differ when splitting the housing share into mortgages and house value (as opposed to considering housing equity).

[10] To do so, I work with data from the PSID because of its panel structure.

by around 30% and median financial assets by around 50% because spouses have to split up their assets. In the years after divorce, median financial assets and the share of homeowners gradually increase again. In contrast, the average stock market participation rate (Figure 4b) is hardly affected by the separation: it slightly declines in the years prior to divorce and stays mostly flat afterwards.

Figure 4: Housing and Financial Portfolio Allocation around Divorce (Data)



(a) Homeownership Rate (b) Stock Market Participation (c) Median Financial Assets

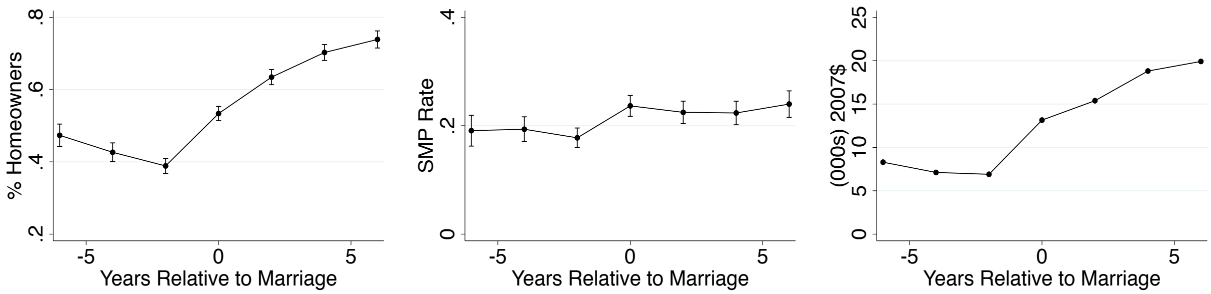
Notes: Figure 4 plots the the evolution of homeownership rates, stock market participation rates and median financial assets in the years preceding and following a divorce. All values refer to household level estimates. The year zero indicates the first observation in which the individual reports to be divorced. Data is from the Panel Study of Income Dynamics (PSID), waves 1989-2016.

Marriage. Figure 5 reports average homeownership rates, stock market participation rates and median financial asset holdings around the time of marriage. Again, all values refer to household level estimates. The year zero indicates the first year in which the respondent reports to be married. After getting married (that is, between year -2 and year 0), the average homeownership rate as well as median financial assets rise continuously. This increase captures both an age effect but also reflects that (newly) married households accumulate more financial wealth than singles and are more likely to become homeowners. The share of stock market participants slightly jumps in the period of marriage and remains flat afterwards (Figure 5b).

2.3 Robustness Exercises

I conduct several sensitivity checks with respect to the reported marital gaps in investment choices and list the results in Appendix B. The documented gaps are robust to replicating

Figure 5: Housing and Financial Portfolio Allocation around Marriage (Data)



(a) Homeownership Rate (b) Stock Market Participation (c) Median Financial Assets

Notes: Figure 5 plots the evolution of homeownership rates, stock market participation rates and median financial assets in the years preceding and following a marital union. All values refer to household level estimates. The year zero indicates the first observation in which the individual reports to be married. Data is from the Panel Study of Income Dynamics (PSID), waves 1989-2016.

the analysis on one cohort of individuals, to including cohabiting households either in the "couples" or "singles" category, and to excluding the housing boom period in the early 2000s as well as the years of the Great Recession, which are both periods with either strong increases or drops in house prices.

3 A Life-Cycle Model of Housing and Portfolio Choice

In this section, I develop a stochastic life-cycle model with three types of households: single men, single women and couples. Time is discrete and the model period is two years. Agents enter the model at age 30, retire deterministically at age 64 and live at most for 84 years, that is $j \in \{30, 32, \ldots, 64, \ldots, 84\}$. Households value non-durable consumption and derive utility from housing. During the working stage, they are subject to idiosyncratic labor income shocks and allocate their portfolio between illiquid housing, liquid safe assets and liquid risky assets. They face marital transition shocks that depend on their current labor income, their age and in the case of marriage, their gender. To purchase a home, households have access to collateralized borrowing (mortgages). During retirement, agents' marital status is fixed, they receive a flat pension payment, and face a positive probability of dying. They can invest in housing, safe and risky assets, and can take out loans in the form of mortgages. At age 84, households have to re-pay all their debt. Upon dying, agents value leaving bequests.

3.1 Preferences

Households derive utility from nondurable consumption c and from housing services s. As common in the literature (e.g. Yang, 2009), I express the per-period utility function as:

$$\frac{(g(c,s))^{1-\gamma}}{1-\gamma}$$

where γ denotes the coefficient of relative risk aversion and $g(c,s)$ is specified as:

$$g(c,s) = \left(\omega\left(\frac{c}{\eta^c_{ij}}\right)^{\nu} + (1-\omega)\left(\frac{s}{\eta^s_{ij}}\right)^{\nu}\right)^{\frac{1}{\nu}}$$

The term ω measures the taste for housing services relative to nondurable consumption goods and ν specifies the substitutability between these two goods. The terms η^c_{ji} and η^s_{ji} are demographic shifters for changing household sizes over the life-cycle. They vary by age j, household type i (couple, single woman or single man) and are allowed to differ between nondurable consumption goods and housing services to take into account that housing services may be more easily shared than non-durable consumption goods such as food or clothing (Nelson, 1988). The term η is smaller than the overall number of household members and indicates economies of scale. Hence, differences in household size alter the optimal allocation of resources across goods within one period in addition to affecting the optimal allocation of resources over time.

3.1.1 Bequest Motive

In the event of death, individuals derive utility from leaving bequests as in De Nardi (2004):

$$\phi(a', H') = L\frac{(\xi + a' + p_h H')^{1-\gamma}}{1-\gamma}$$

where a' denotes financial assets, $p_h H'$ is the value of the house, ξ captures the luxuriousness of the bequest motive and L governs the bequest intensity. Couples value leaving bequests if they both die within the same period. Whenever only one spouse dies, the surviving spouse keeps the house and continues life as a single with a fraction of the couples' financial assets to account for bequests to non-spousal heirs.

3.2 Children

Children enter the model as a deterministic function of age, gender and marital status through changes in the demographic shifters η^c and η^s. In particular, I compute the average number of children by marital status, gender and age from the data and allocate that number of children to all agents in the model who are in the respective age group and have the respective household type. The choice to introduce children in a rather parsimonious way is supported by the data: in Appendix A.2.3, I show that, conditional on family type, investment choices of households (both in terms of homeownership rates as well as in terms of financial wealth accumulation) with and without children are not significantly different from one another. Hence, marital status *per se* seems to be a more important driver of portfolio allocation decisions than the presence of children.

3.3 Household Earnings

Working Age. During working age, households supply labor inelastically and face uninsurable income shocks. Labor income can be split into a deterministic and into a stochastic component. Both of these components vary by household type (couples, single men, single women). Income y_{ij} at age j for household type i can be expressed as:

$$y_{ij} = \bar{x}_i \chi_{ij} \tilde{y}_{ij}$$

where $\bar{x}_i$ denotes the constant and χ_{ij} represents an age-specific term. The term $\tilde{y}_{ij}$ captures the stochastic component of labor income.

Guvenen, Karahan, Ozkan, and Song (2021) and De Nardi, Fella, Knoef, Paz-Pardo, and Van Ooijen (2021) emphasize higher-order moments of the labor income process and show that households' earnings dynamics are characterized by negative skewness and excess kurtosis, both properties that a normally distributed income shock fails to capture.[11] To account for these properties in my set-up, I parameterize $\tilde{y}_{ij}$ as an AR(1) process in logs with innovations drawn from a Gaussian mixture ("GMAR Process"):

$$\tilde{y'} = \rho\tilde{y} + \nu$$

where $\rho \in (0, 1]$ captures the persistence of shock ν which is defined as:

$$\nu = \begin{cases} \mathcal{N} \sim (\mu_1, \sigma_1^2) & \text{with probability } p_{\tilde{y}} \\ \mathcal{N} \sim (\mu_2, \sigma_2^2) & \text{with probability } (1 - p_{\tilde{y}}) \end{cases}$$

For small $p_{\tilde{y}}$, negative μ_1, large σ_1^2 and small σ_2^2, this parameterization allows for negative skewness and excess kurtosis. To keep the process stationary, it has to hold that $\mu_2 = \left(\frac{-p_{\tilde{y}}}{1-p_{\tilde{y}}}\right)\mu_1$.

Retirement. Pension payments are modeled as a fraction of the household's last realized labor income to mimic in a parsimonious way that in the US pension payments are a fraction of an individual's life-time earnings.

[11] Negative skewness implies that more mass of the earnings distribution is concentrated in its left than in its right tail. Excess kurtosis describes heavy tails, meaning that most households experience very small earnings changes, however when hit by a shock, these tend to be quite large.

3.4 Asset Markets

Financial Assets. Households choose between two types of financial assets: one-period safe assets (a_s) and one-period risky assets (a_r). The safe asset pays a time-invariant return r_s. The return of the risky asset is drawn from the distribution $r_r \sim N(\mu_r, \sigma_r^2)$, which is i.i.d and with $\mu_r > r_s$. Following Fagereng, Gottlieb, and Guiso (2017), I allow for the possibility of stock market crashes and augment the return of the risky asset by a "disaster" state. That is, with probability $(1 - p_{tail})$ the return is drawn from the above normal distribution and with probability p_{tail} a tail event $r_{tail} < \underline{r}_r$ materializes. Whenever households choose to invest part of their financial savings into risky assets, they have to pay a per-period lump-sum participation cost S^F to do so.[12] Moreover, homeowners can borrow in one-period mortgages against the value their house, which entails a borrowing premium, i.e. $r_m > r_s$.[13] Additionally, mortgages are subject to an LTV requirement, meaning that the maximum amount of household debt is a fraction ζ_h of the price of its home.

Housing. Households can either be homeowners or renters and have access to houses of discrete sizes:

$$\mathcal{H} = \{R_1, \ldots, R_R, H_1, \ldots, H_H\}$$

where R denotes renting. Both renters and homeowners derive utility from housing services s that are modeled as a correspondence between the size of the house $\mathcal{H}$ and the consumption benefits s derived from it. Owner-occupied housing H can be bought at a fixed price p_H, which deterministically appreciates over time.[14] The discrete structure of the housing grid gives rise to a minimum house size available for purchase (H_1), meaning that households need to accumulate a certain amount of wealth before they can become homeowners.

[12] In the household finance literature, there is an ongoing debate whether stock market participation costs are best approximated by per-period lump-sum costs as in e.g. Vissing-Jorgensen (2002) or Gálvez (2018), or by one-time entry costs, as e.g. in Alan (2006), Cocco (2005) or Gomes and Michaelides (2005). I work with per-period costs to avoid having to introduce risky assets as an additional state variable.

[13] The mortgage premium is constant across all households which is supported by empirical evidence: in Appendix A.2.5, I show that mortgage characteristics of single households do not significantly differ from those of couples in my sample.

[14] For simplicity, I abstract from house price risk. See Appendix A.2.5 for a more detailed discussion.

For homeowners, their house serves as collateral for mortgages. Housing is illiquid, meaning that households have to pay a fraction of the house price whenever they sell or purchase a home. Additionally, they have to pay annual maintenance costs which captures both actual maintenance works but also other housing-related flow expenses such as property taxes. Renting households have to pay a fraction α_R of the price of the smallest owner-occupied house ($p_h H_1$) as rent, with this fraction depending on the specific rental they live in.

3.5 Marriage and Divorce

The Evolution of Marital Transitions. Marriage and Divorce are treated as exogenous shocks. Each period, single individuals get married with a probability $\mu(i, j, \tilde{y}_i)$ that depends on their gender i, age j and current productivity realization $\tilde{y}_i$, forming expectations about their prospective partner's asset and income levels.[15] Couples face an age and productivity dependent divorce probability $\lambda(j, \tilde{y}_c)$.[16]

Asset Allocation after Marital Shocks. If two individuals get married, they pool their financial wealth. If neither spouse owns a house at the time of the marital shock, the couple starts married life as renters (and can subsequently jointly re-optimize). If one of the spouses owns a house, the renting spouse moves in with the owning partner. If both spouses are homeowners at the time of marriage, the couple moves into the larger house and sells the smaller one.

If owning couples get divorced, they can either liquidate their house or let one of the spouses keep it, depending on what yields the highest joint continuation value. In the former case, after having liquidated their house, they split all assets equally with a fraction of them being destroyed to account for e.g. legal fees. If one of the spouses keeps the house, the other

[15] Section 4.1 explains the mapping of partners in terms of observable characteristics in the event of marriage.

[16] By targeting marital transitions probabilities conditional on age, income, (and gender), I capture most of the empirical variation in marriage and divorce patterns along observable household characteristics. Nevertheless, to ensure that I am not missing a quantitatively important link between housing and marital risk (e.g. couples may use their house as a commitment device to avoid a divorce), I re-did the analysis using marital transition probabilities of only homeowners. My results are robust to this modification.

spouse receives a larger fraction of the couples' financial assets (after an exogenous fraction has been destroyed). All couples who hold negative financial wealth have to liquidate their house. This assumption is necessary to avoid situations in which one spouse receives the entire wealth following a divorce.[17] Renting couples split their financial assets equally upon divorce, again with a fraction of them being destroyed.

3.6 Taxes

Households pay flat capital taxes τ_k on capital income both from safe and risky assets. Labor income is subject to a progressive tax which maps pre-tax earnings y into post-tax earnings $\mathbb{Y}(y)$ according to[18]:

$$\mathbb{Y}(y) = \tau_l y^{1-\tau_p}$$

The term τ_l governs the average level of taxation and τ_p determines its degree of progressivity. As in the US tax code, mortgage payments above the standard deduction are deductible from the income tax, hence reducing the taxable amount of income, y.

3.7 Timing

In the beginning of period t, households learn their current productivity state, their stock market return, and their marital status. Thus, agents start period t with a given amount of net worth that depends on their decisions in period $t-1$, their marital status and the realization of shocks. Afterwards, they decide on how much to consume, their housing stock next period, whether they want to take out a mortgage, and how much to save in risky and safe assets. If they invest part of their endowment in the risky asset (i.e. if $a_{r_{t+1}} > 0$), they have to pay the participation costs S^F in the current period (t).

[17] Because the LTV requirement has to hold each period, households' net worth is always positive.

[18] This specification follows Benabou (2002), Heathcote, Storesletten, and Violante (2017) and Guner, Kaygusuz, and Ventura (2014).

3.8 Recursive Formulation

There are six value functions for singles, couples, and individuals living in couples, both during working age, as well as during retirement.[19] Given that mortgages are modeled as one-period debt, that the stock market participation cost has to be paid per-period, and the i.i.d nature of the return process for the risky asset, I can combine financial assets and labor income into one "cash-on-hand" state variable: $a = \sum_{l=r,s}(1+(1-\tau_k)r_l)a_l - (1+r_m)m + \mathbb{Y}(y(.), m)$ where $\mathbb{Y}(.)$ denote after-tax earnings as described in section 3.6.[20]

Singles – Working Age. The state variables of a single agent are gender i, age j, cash-on-hand a, house $\mathcal{H}$ (which can, in the case that $\mathcal{H} = R$, be rented) and stochastic productivity realization $\tilde{y}$.[21] Each period, she decides on consumption, the housing stock next period, how much to borrow in mortgages, and how much to invest in safe and risky assets. The corresponding value function reads as:

$$
\begin{aligned}
V^S(i,j,a,\mathcal{H},\tilde{y}_i) = \max_{a_r',a_s',\mathcal{H}',m',c} \; & u(c,s) + \beta(1-\mu(i,j,\tilde{y}_i))\mathbb{E}V^S(i,j+1,a',\mathcal{H}',\tilde{y}_i') \\
& + \beta\mu(i,j,\tilde{y}_i)\mathbb{E}\hat{V}^C(j+1,\tilde{a}',\tilde{\mathcal{H}}',\tilde{y}_c')
\end{aligned}
$$

$$
a_r' + a_s' - m' + c = a + p_h\mathcal{H} - p_h\mathcal{H}' - \underbrace{\mathbb{1}_{\mathcal{H}'\neq\mathcal{H}}\Phi(\mathcal{H},\mathcal{H}')}_{\text{Adjustment cost}} - \underbrace{\mathbb{1}_{a_r'>0}S^F}_{\text{SMP cost}} - \underbrace{\mathbb{1}_{\mathcal{H}=R}\alpha_R p_h H_1}_{\text{Rent}} - \underbrace{\mathbb{1}_{\mathcal{H}\neq R}\pi\mathcal{H}}_{\text{Maintenance cost}}
$$

$$
\underbrace{m' \leq \zeta_h p_h \mathcal{H}'}_{\text{LTV - Constraint}}
$$

$$
c \geq 0 \qquad a = \underbrace{\sum_{l=r,s}(1+(1-\tau_k)r_l)a_l - (1+r_m)m + \mathbb{Y}(y(i,j,\tilde{y}_i),m)}_{\text{"cash-on-hand"}}
$$

where $\tilde{a}'$ and $\tilde{\mathcal{H}}'$ refer to expected financial assets and housing stock, respectively, in the next

[19] The latter is the relevant object to compute the continuation values of singles in the case of marriage (Borella, De Nardi, and Yang, 2019).

[20] Because labor income is not i.i.d, I still keep track of the current productivity realization $\tilde{y}$ when expressing the problem recursively.

[21] The term i denotes family type, i.e. single men, single women or couple. However, when considering only singles, family type and gender are interchangeable.

period if the individual gets married with probability $\mu(i,j,\tilde{y}_i)$. The term p_h denotes the current house price, which is zero for rental properties (i.e. if $\mathcal{H}=R$).

Singles – Retirement. During retirement, singles' state space is characterized by gender i, age j, cash-on-hand a, housing stock $\mathcal{H}$ and the last income realization before retirement $(\hat{y}_i)$ which is necessary to compute pension payments. In the terminal period (J), agents have to re-pay all their debt. The term ψ_{ij} denotes age and gender specific survival risk.

$$V_R^S(i,j,\mathcal{H},a,\hat{y}_i) = \max_{a'_s,a'_r,\mathcal{H}',m',c} u(c,s)+$$
$$\beta\psi_{ij}\mathbb{E}V_R^S(i,j+1,\mathcal{H}',a',\hat{y}_i)+\beta(1-\psi_{ij})L\frac{(\xi+a'+\mathcal{H}')^{1-\gamma}}{1-\gamma}$$

$$a'_r+a'_s-m'+c = a+p_h\mathcal{H}-p_h\mathcal{H}'-\mathbb{1}_{\mathcal{H}'\neq\mathcal{H}}\Phi(\mathcal{H},\mathcal{H}')-\mathbb{1}_{a'_r>0}S^F-\mathbb{1}_{\mathcal{H}=R}\alpha_R p_h H_1-\mathbb{1}_{\mathcal{H}\neq R}\pi\mathcal{H}$$

$$m'\leq\zeta_h p_h\mathcal{H}' \qquad m_J=0$$

$$c\geq 0 \qquad a=\sum_{l=r,s}(1+(1-\tau_k)r_l)a_l-(1+r_m)m+\mathbb{Y}(pen(\hat{y}),m)$$

Couples – Working Age. The state variables of a couple can be summarized by age j, joint cash-on-hand a, joint housing state $\mathcal{H}$ and joint productivity realization $\tilde{y}_c$. The corresponding value function reads as:

$$V^C(j,a,\mathcal{H},\tilde{y}_c) = \max_{a'_r,a'_s,\mathcal{H}',m',c} u(c,s)+$$
$$\beta(1-\lambda(j,\tilde{y}_c))\mathbb{E}V^C(j+1,a',\mathcal{H}',\tilde{y}'_c)+\beta\lambda(j,\tilde{y}_c)\mathbb{E}\sum_{i=f,m}V^S(j+1,\tilde{a}',\tilde{\mathcal{H}}',\tilde{y}'_i)$$

$$a'_r+a'_s-m'+c = a+p_h\mathcal{H}-p_h\mathcal{H}'-\underbrace{\mathbb{1}_{\mathcal{H}'\neq\mathcal{H}}\Phi(\mathcal{H},\mathcal{H}')}_{\text{Adjustment cost}}-\underbrace{\mathbb{1}_{a'_r>0}S^F}_{\text{SMP cost}}-\underbrace{\mathbb{1}_{\mathcal{H}=R}\alpha_R p_h H_1}_{\text{Rent}}-\underbrace{\mathbb{1}_{\mathcal{H}\neq R}\pi\mathcal{H}}_{\text{Maintenance cost}}$$

$$\underbrace{m'\leq\zeta_h p_h\mathcal{H}'}_{\text{LTV - Constraint}}$$

$$a = \underbrace{\sum_{l=r,s}(1+(1-\tau_k)r_l)a_l - (1+r_m)m + \mathbb{Y}\left[y_c(j,\tilde{y}_c),m\right]}_{\text{“cash-on-hand”}}$$

Again, $\tilde{a}'$ and $\tilde{\mathcal{H}}'$ denote expected financial assets and housing, respectively, in the following period if the couple gets divorced with probability $\lambda(j,\tilde{y}_c)$.

Couples – Retirement. Retired couples individually face the risk of dying. If one spouse dies, the surviving one continues his or her life as single with a fraction δ of the couple's assets and – if they are homeowners – keeps the house. If both spouses die within the same period, they jointly value leaving bequests. Their value function reads as:

$$\begin{aligned} V_R^C(j,a,\mathcal{H},\hat{y}_c) = \max_{a_s',a_r',\mathcal{H}',m',c} & u(c,s) + \beta\psi_{jf}\psi_{jm}\mathbb{E}V_R^C(j+1,a',\mathcal{H}',\hat{y}_c) + \\ & \beta\sum_{i=f,m}\psi_{ij}(1-\psi_{-ij})\mathbb{E}V_R^S(i,j+1,\delta a',\mathcal{H}',\hat{y}_i) + \\ & \beta(1-\psi_{jf})(1-\psi_{jm})L\frac{(\xi+a'+\mathcal{H}')^{1-\gamma}}{1-\gamma} \end{aligned}$$

$$a_r' + a_s' - m' + c = a + p_h\mathcal{H} - p_h\mathcal{H}' - \mathbb{1}_{\mathcal{H}'\neq\mathcal{H}}\Phi(\mathcal{H},\mathcal{H}') - \mathbb{1}_{a_r'>0}S^F - \mathbb{1}_{\mathcal{H}=R}\alpha p_h H_1 - \mathbb{1}_{\mathcal{H}\neq R}\pi\mathcal{H}$$

$$m' \leq \zeta_h p_h\mathcal{H}' \qquad m_J = 0$$

$$c \geq 0 \qquad a = \sum_{l=r,s}(1+(1-\tau_k)r_l)a_l - (1+r_m)m + \mathbb{Y}(pen(\hat{y}_c),m)$$

Value to an individual of becoming a couple. The value of an individual in a couple is the relevant object when computing the value of single i for getting married to partner p, i.e. the present discounted value of the individual's utility in the event of marriage (Borella et al., 2019). Variables denoted with a $h\hat{a}t$ indicate optimal allocations computed with the value function for couples, given the respective state variables. The value of an individual in a retired couple $\hat{V}_R^C$ is defined accordingly.

$$\hat{V}^C(i,j,a,\mathcal{H},\tilde{y}_c) = u(\hat{c},\hat{s}) + (1-\lambda(j,\tilde{y}_c)\beta\mathbb{E}\hat{V}^C(i,j+1,a',\mathcal{H}',\tilde{y}_c') +$$
$$\lambda(j,\tilde{y}_c)\beta\mathbb{E}V^S(i,j+1,a',\tilde{\mathcal{H}}',\tilde{y}_i')$$

4 Calibration

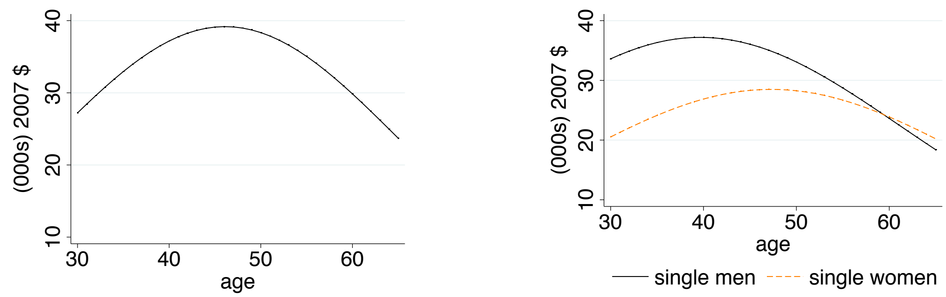
I calibrate the model using a two-step strategy as standard in the literature (e.g. Cagetti, 2003, Gourinchas and Parker, 2002). That is, I first calibrate all parameters that can be identified directly from the data and set some other parameters in line with the literature. Then, I internally calibrate the remaining parameters.

4.1 Externally chosen Parameters

I calibrate my model to the years from 1989 until 2017. Table 2 summarizes all externally calibrated parameters. The housing grid is defined over five discrete choices: two rentals and three sizes for homeowners, that is $\mathcal{H} = \{R_1, R_2, H_3, H_4, H_5\}$. I set the coefficient of relative risk aversion γ to 1.5 and the housing utility share $(1-\omega)$ to 0.1, both values that are common in the housing literature. I borrow the parameter for the bequest intensity $L = 0.128$ and for the luxuriousness of bequests $\xi = 0.73$ from Cooper and Zhu (2016) who estimate both values in the context of a portfolio choice model with CRRA preferences. The average rent-to-price ratio is 0.1, as estimated in Davis, Lehnert, and Martin (2008). In particular, I assume the rent for the small rental to be 5% of the smallest (owner-occupied) house price and that of the big rental to be 15% of the smallest (owner-occupied) house price. I follow Cocco (2005) and set the annual maintenance costs to be 1% of the house price. The LTV constraint is set to 0.8 (i.e. households can borrow up to 80% of their house value) and adjustment costs are assumed to be 5% of the house price, both values taken from Paz-Pardo (2020).

Labor Income Profiles. Figure 6 plots the empirical life-cycle profiles for average household labor income of single men, single women and couples which inform me about the deterministic component of the labor income process.[22] In per-capita terms, couples' household income is lower than single men's until around age 40. In contrast, single women's labor income is always lower than that of couples and lower than that of single men below age 60.

Figure 6: Life-Cycle Income Profiles (Deterministic Component)



(a) Couples (per capita)　　(b) Singles

Notes: Figure 6 plots the life-cycle profiles of the deterministic part of labor income by family type. Labor income is defined as annual earnings out of labor income and social security benefits. Couples' value is expressed in per-capita terms, hence their overall household income is twice as large. Data is from the Panel Study of Income Dynamics (PSID), waves 1989-2017.

The stochastic part of the labor income process displays negative skewness and excess kurtosis across all family types.[23] Both the cross sectional dispersion and the variance in income changes is lower for couples than for singles, suggesting some form of insurance across spouses. For example, couples have the ability to pool individual income streams or to adjust spousal labor supply in response to income shocks, both margins that are not available to singles. In turn, lower income variance affects household's willingness to bear risk along other dimensions, such as asset markets (Heaton and Lucas, 2000, Fagereng, Guiso, and Pistaferri, 2018). In addition, singles face a higher kurtosis in income changes. Thus, their income process is characterized by more heavy tails, meaning they face larger jumps in their period-by-period income transitions, adding an additional layer of risk.

Pension Payments. Pension payments are assumed to be 70% of the labor income during the last year of work (i.e. at age 64).

[22] Appendix C.1 explains in detail how I obtain these profiles.
[23] In Appendix C.2, I report in detail the estimation results as well as the corresponding data fit.

Marital Transition Probabilities. I compute marital transition probabilities from PSID data by estimating the following logit function, separately for couples and singles:

$$\xi_{t+1} = \frac{exp(X_t \beta^s)}{1 + exp(X_t \beta^s)}$$

where ξ_{t+1} denotes the likelihood of getting married (respectively divorced) within the next period conditional on not being married (respectively being married) in the current period. Explanatory variables include a constant, age, age-squared, current productivity realization and in the case of marriage, gender.[24] Figure 27 and Table 11 in Appendix C.3 report the corresponding life-cycle profiles and regression coefficients, respectively. Both marriage and divorce probabilities are declining in age. In addition, the probability of experiencing a marital transition is non-monotone in income: individuals with medium productivity face the highest marriage probability and are least likely to get divorced whereas individuals at the lowest end of the income distribution are most likely to get divorced and have the smallest probability of getting married.

Marriage Market. Individuals are always matched to a partner with the same age who holds the empirical average amount of financial assets, conditional on age and gender. In 70% of marital unions, the partner is a renter (with a 50:50 chance of living in the small or big rental), whereas the remaining 30% own a small house, corresponding to the average homeownership rate of singles below age 40 (which is when most marriages occur). The probability of meeting a partner such that the couples' productivity realization is $\tilde{y}_c$ depends on the individual's own productivity realization $\tilde{y}_i$ at the time of marriage according to:

$$\Pi_m(.) = \Pi_m(\tilde{y}_c | \tilde{y}_i)$$

I estimate the function $\Pi_m(.)$ non-parametrically from the PSID.

[24] For couples, age refers to the average age across spouses.

Asset (and Income) Allocation upon Divorce. After a divorce, the first productivity realization as a single depends on the couples' productivity realization at the time of the separation:

$$\Pi_d(.) = \Pi_d(\tilde{y}_i|\tilde{y}_c)$$

which I again estimate non-parametrically from the PSID. Moreover, following Cubeddu and Ríos-Rull (2003), I set the fraction of assets that is exogenously destroyed upon a marital dissolution to 20%. In the event that couples do not liquidate their house, the spouse without the house is left with 70% of the households' financial assets.

Asset Returns. House prices grow deterministically at an annual rate of 3%, which is the average value of the Case-Shiller Index throughout my sample period. The annual return rate of the risk-free asset is 2% and the mortgage premium is 2%, i.e. $r_m = 0.04$. Both values are taken from Cocco (2005). The risky asset has a risk premium of 4%, and a variance of $Var(\tilde{R}(s)) = \sigma_r^2 = (0.1758)^2$, reflecting the annual total return index of the S&P 500 during my sample period. With a 98% probability, the return of the risky asset is drawn from that normal distribution and with a 2% probability a disaster state materializes which results in a loss of 40% of all risky assets, both values that Barro (2009) empirically estimates from historical US data on stock market crashes. When simulating the model for a large set of individuals over their life-cycle, I treat the risky asset return as an aggregate shock that evolves according to the observed stock market performance in the US from 1989 until 2016.

Demographic Shifters. Table 1 summarizes the values for the demographic shifters η^c and η^s that I obtain from Yang (2009). The first two household members refer to adults whereas all remaining members are children. In the data, I compute the average number of household members by age and family type and assign the corresponding values for both η^c and η^s to each household in the model.

Tax Parameters. I take the values for the tax parameters τ_l and τ_p from Guner et al. (2014) who estimate them using IRS data. I work with their estimates for married couples with one child (the median number of children for couples in my sample), which implies $\tau_l = 0.91$ and

Table 1: Equivalence Scales (Yang, 2009)

Family Size	1	2	3	4	5	6	7
η^c (non- housing)	1	1.34	1.65	1.97	2.27	2.57	2.87
η^s (housing)	1	1.1	1.2	1.3	1.4	1.5	1.6

Notes: Table 1 lists the demographic shifters for non-durable consumption goods η^c and for shelter services η^s, depending on the number of household members ("family size"). The first two members refer to adults whereas 3 to 7 denote children.

$\tau_p = 0.064$, and for singles without children (the median number of children for singles in my sample), resulting in $\tau_l = 0.882$ and $\tau_p = 0.036$.

Table 2: Externally Calibrated Parameters

Parameter	Source	Value
Model Period Length	PSID frequency	2 years
Housing Grid	–	$\{R_1, R_2, H_3, H_4, H_5\}$
CRRA (γ)	–	1.5
Housing utility share ($1-\omega$)	–	0.1
Bequest Intensity	Cooper and Zhu (2016)	0.128
Luxuriousness of bequest	Cooper and Zhu (2016)	0.73
Rent-to-price ratio (α)	Davis et al. (2008)	0.1
LTV	Paz-Pardo (2020)	0.8
Annual housing maintenance cost	Cocco (2005)	0.01
Housing adjustment cost	Paz-Pardo (2020)	{0.05;0.05}
Survival Probability	Life Tables	see text
Demographic Shifter ($\eta^s < \eta^c$)	Yang (2009)	see text
Tax Parameter	Guner et al. (2014)	see text
Initial Conditions	PSID, SCF	see text
Income Processes	PSID	see text
Prob. of Marriage (μ) & Divorce (λ)	PSID	see text
Asset Returns	Cocco (2005), Barro (2009)	see text

Notes: Table 2 lists all model parameters that are either estimated directly from the data or set in line with previous literature.

Survival Probabilities. I compute the gender specific death probabilities at age j from the Life Tables of the US Social Security Administration as the likelihood to die within the next two years conditional on having survived up to age j.[25] I take the inverse of those probabilities and work with average values between the years 1990, 2000 and 2010, corresponding to the sample period of my study. If one member of a couple household dies, the surviving spouse

[25] All tables available under this link [Accessed April 19, 2021].

keeps 70% of the household's assets (Jones, De Nardi, French, McGee, and Rodgers, 2020).

Initial Conditions. The initial distribution of family types mimics the distribution of couples, single men and single women at age 30 from PSID data. The initial distribution of housing is chosen such that it reflects the distribution of homeowners by gender and marital status at age 30 in the SCF. Regarding house sizes, agents initially either rent (with a 50:50 chance of renting the small or the big rental) or own the smallest house. The initial distribution of financial assets reflects its empirical counterpart conditional on homeownership status, gender and marital status at age 30 from the SCF.

4.2 Internally calibrated Parameters

In the following, I explain the calibration of parameters that cannot be identified directly from the data, with a particular focus on the elasticity of substitution between housing services and non-durable consumption goods (ν).

Elasticity of Substitution between s & c. Large parts the housing literature set the elasticity of substitution between non-durable consumption and housing services to one (i.e. $\nu = 0$) which implies that the momentary utility function $g(c, s)$ takes the Cobb-Douglas form (e.g. Cocco, 2005, Yang, 2009). This assumption can be justified by the almost constant housing expenditure share by wealth and age in micro data (e.g. Davis and Ortalo-Magné, 2011). However, it is no longer suitable for the current set-up because the empirical housing expenditure share of singles is larger than that of couples.[26] Therefore, to pin down ν, I target the ratio of housing expenditure shares between couples and singles. Recall that economies of scale are larger for housing services than for other consumption goods, implying that $\eta^s < \eta^c$. In this case, for the housing expenditure share to be decreasing in the number of household members, it has to hold that $\nu < 0$, meaning that the elasticity of substitution between c and s is below one.[27]

[26] See Appendix A.2.4 for more details and corresponding figures.

[27] The optimal relation between non-durable consumption c and housing services s can be expressed as

Remaining Parameters. The remaining parameters can be summarized by the discount factor (β), the utility flow from housing services, depending on the specific house size (s_1, s_2, s_3, s_4, s_5), the price of owner-occupied housing (p_3, p_4, p_5) as well as the stock market participation cost (S^F). I normalize the utility flow of the small rental R_1 to one. Hence, including ν, the model has ten free parameters that I jointly calibrate to match ten moments. Table 3 summarizes the results.

I target the average net wealth-to-income ratio, that is financial wealth net of mortgages over household income, of couples at age 45 to match the discount factor and take its data value of 1.82 from the SCF. In the model, financial wealth of households is expressed as safe and risky assets net of mortgages which is why the empirical net wealth-to-income ratio is the moment that maps best into the model set-up. I take the homeownership rate of couples at age 45 from the SCF to target the utility flow from living in the larger rental (s_2). To calibrate the utility flow from owning, I match the average housing share of couples at age 35 (for s_3), at age 45 (for s_4) and at age 55 (for s_5) in the SCF. Importantly, I target both the homeownership rate and housing share of couples because singles' housing tenure choices are more sensitive to the smallest available (owner-occupied) house size (through e.g. lower labor income levels) and hence, I evaluate the model performance by its ability to endogenously replicate their housing choices over the life-cycle (see Section 4.3). To pin down house prices, I target average housing wealth (conditional on owning) at different ages. Finally, I match the mean stock market participation rate of couples at age 45 in the SCF to calibrate the flow cost of stock market participation.

Table 3 shows that the model matches its associated data targets well. The discount factor ($\beta = 0.888$) is low compared to frameworks with only one financial asset but close to values in the household finance literature with multiple assets. For example, Cooper and Zhu (2016) estimate an annual discount factor of 0.87 in a portfolio framework with CRRA preferences, whereas Catherine (2020) finds $\beta = 0.92$. The estimates for the utility flow of the big rental is

$c = s * \left(\frac{\omega}{1-\omega}\right)^{\frac{1}{1-\nu}} \left(\frac{\eta^s_{ji}}{\eta^c_{ji}}\right)^{\frac{\nu}{1-\nu}}$. Hence, for the housing expenditure share $\left(\frac{s}{s+c}\right)$ to be decreasing in the number of household members, it has to hold that $\nu < 0$ whenever $\eta^s < \eta^c$.

$s_2 = 10$. For owner-occupied houses I find $s_3 = 2$, $s_4 = 7$ and $s_3 = 10$. Hence, the per-period flow utility from owing the smallest house is twice as large as renting the smallest rental unit. In contrast, the utility flow from living in the large rental is calibrated to be equal to the utility flow of the biggest house size, allowing households to upgrade their living situation without necessarily having to become homeowners. The calibrated annual stock market participation cost of \$1,275 lies within the range of estimates from previous papers that model participation costs as a flow variable, despite a relatively low γ.[28] Cocco (2005) reports an estimate of \$1,000 with a coefficient for the relative risk aversion of $\gamma = 5$. Catherine (2020) estimates a stock market participation cost of \$1,010 with a CRRA coefficient of $\gamma = 8.2$. In contrast to these papers, the current framework includes marital transition risk, which lowers household's demand for risky assets and thus lowers the calibrated participation cots for a given value of γ. Finally, I find a value for ν of -0.05, implying an elasticity of substitution between non-durable consumption goods and housing services of 0.95.

Table 3: Internally Calibrated Parameters: Targets & Fit

Parameter	Value	Key Moment	Data	Model
Discount factor (β)	0.888	mean W/I (net)	1.82	1.83
Big rental size (s_2)	10	homeownership rate at 45	78%	81%
Small ownership size (s_3)	2	Housing Share at 35	58%	57%
Medium ownership size (s_4)	7	Housing Share at 45	61%	53%
Big ownership size(s_5)	10	Housing Share at 55	55%	42%
Price of small house (p_3)	\$120,000	house value of owners at 35	\$204,214	\$146,552
Price of medium house (p_4)	\$180,000	——॥—— at 45	\$238,085	\$184,264
Price of big house (p_5)	\$255,000	——॥—— at 55	\$239,957	\$216,708
Stock market cost (S^F)	\$1,275 p.a.	mean SMP at 45	62%	62%
Elasticity of subs. (ν)	-0.05	$\frac{\text{hous. expenditure share singles}}{\text{hous. expenditure share couples}}$	1.0860	1.0743

Notes: Table 3 lists all model parameters that are internally calibrated to match the moment listed in column "Key Moment". The homeownership rate at age 45, the housing share as well as the mean stock market participation at age 45 refer to couple households.

[28] The larger γ, the more risk averse are agents and hence, lower stock market participation costs are needed to match empirical participation rates.

4.3 Model Validation

With the calibrated model at hand, I simulate a panel of 50,000 households over their life-cycle. Using this simulated panel, I validate the model performance by showing its fit for some important untargeted data profiles.

Asset Shifts around Marital Transitions. To validate parameters that govern the marriage market and asset allocations upon marital transitions, Figure 7 shows how the model replicates housing choices and changes in financial wealth in the years preceding and following a marital shock, with values in the year prior to the marital transition normalized to zero.[29] Correctly capturing portfolio shifts around the timing of marriage and divorce is crucial to realistically replicate the financial riskiness of marital shocks, which in turn directly affects savings behavior and investment choices of households.

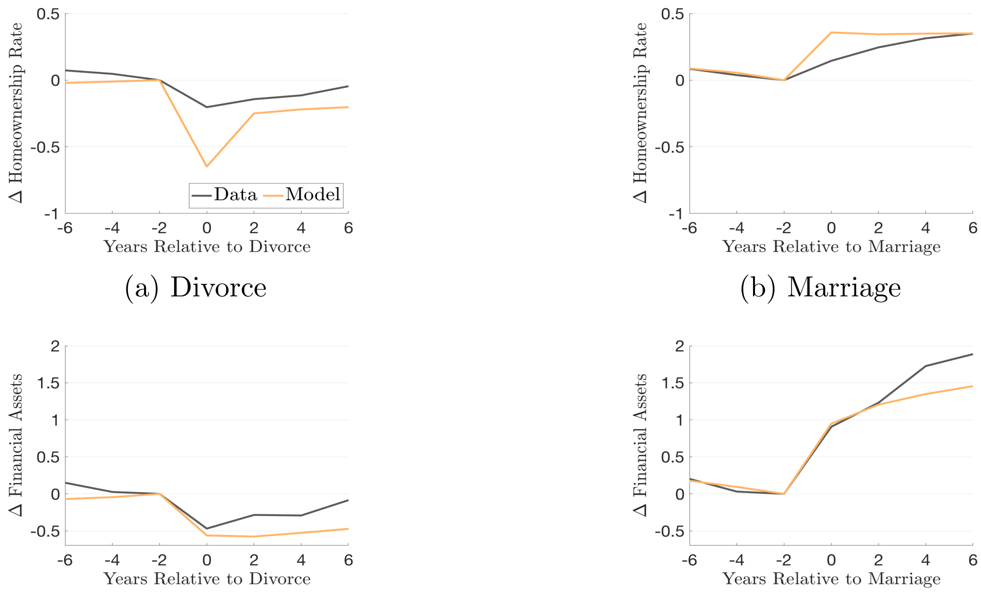
The model captures well the increase in homeownership rates after marriage and the evolution of financial wealth in the event of both marriage and divorce. In contrast, it over-predicts the drop in homeownership rates after a divorce which is partly mechanical: as at most one spouse can keep the house following a divorce, the model naturally produces a drop in homeownership of around 50%pts.[30] Nevertheless, given that it generates an increase in homeownership rates close to empirical levels after one model period (two years), I regard this validation exercise as successful.

Life-Cycle Profiles of Housing and Asset Accumulation. Figure 8 shows the model fit for life-cycle profiles of financial wealth accumulation across family types and Figure 9 compares homeownership rates for single men, single women and couples in the data with model-implied simulations. Figure 10 reports the model fit for the average housing wealth of homeowners. The model matches very well the financial wealth accumulation of couples and single men whereas it slightly over-predicts the wealth accumulation of single women.

[29] Because the SCF is a repeated cross-section and the PSID has a panel structure, I compute the empirical moments from the PSID despite matching homeownership rates and financial assets from the SCF.

[30] The drop would be exactly 50%pts if all divorcees decide that one spouse keeps the house and if the homeownership among couples were 100%.

Figure 7: Portfolio Allocation around Marital Shocks – Data vs. Model



(a) Divorce (b) Marriage

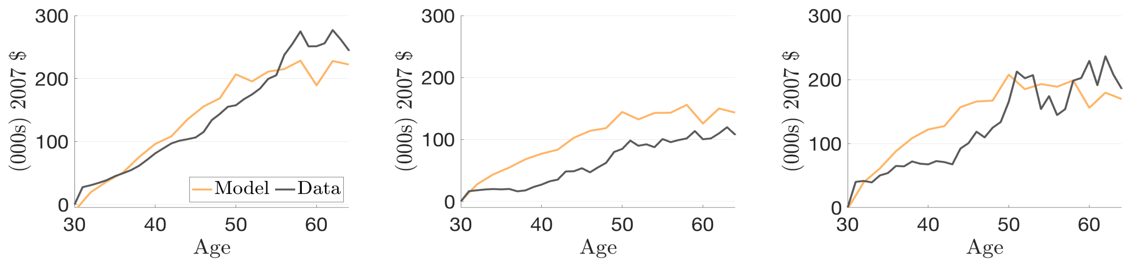
(c) Divorce (d) Marriage

Notes: Figure 7 plots the change in homeownership rates and in median financial assets in the years preceding and following a marital transition, with values in the year prior to the transition normalized to zero. The gray lines refer to the data (waves 1989 to 2017 of the Panel Study of Income Dynamics (PSID)), whereas the orange lines plot model simulations.

Moreover, it is able to replicate the life-cycle path of homeownership rates across all family types and that, conditional on owning, couples live (per capita) in smaller houses. It predicts too little housing wealth for owning couples, thus overstating the (reverse) marital gap in conditional housing wealth. However, most importantly, the model is able to endogenously generate the empirical marital gaps highlighted in Section 2: couples are more likely to be homeowners than singles but they live, conditional on owing, in (per capita) smaller houses. In contrast, couples accumulate (per capita) more financial wealth than singles.

Further Results. Appendix D reports the model fit for the share of overall wealth that households allocate to housing, safe and risky assets by age groups (corresponding to Figure 3). In Appendix B, I test the sensitivity of my results to increasing the housing grid and validate the model performance with regard to matching empirical moving frequencies by marital status. Previous literature has documented that couples move less often than singles (e.g. Mincer, 1978, Blackburn, 2010, Gemici, 2011, Burke and Miller, 2018) which could shift their incentive to become homeowners. To further address this concern, I conduct a

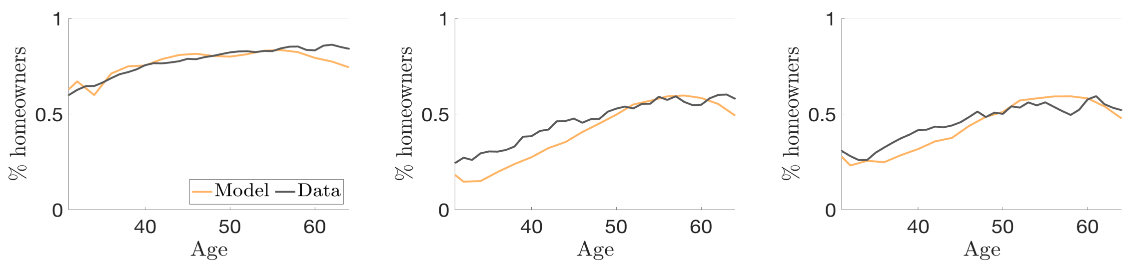
Figure 8: Financial Wealth by Family Type – Data vs. Model



(a) Couples (per capita) (b) Single Women (c) Single Men

Notes: Figure 9 plots the model fit for life-cycle profiles of financial wealth by family type. The gray lines refer to the data (waves 1989 to 2016 of the Survey of Consumer Finances (SCF)), whereas the orange lines plot model simulations.

Figure 9: Homeownership Rates by Family Type – Data vs. Model



(a) Couples (b) Single Women (c) Single Men

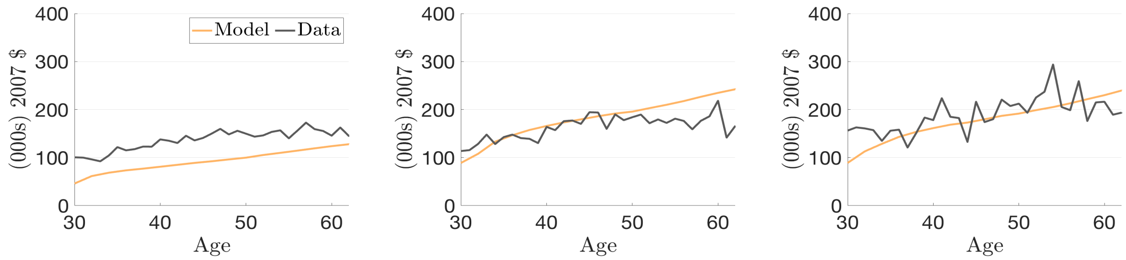
Notes: Figure 9 plots the model fit for life-cycle profiles of homeownership rates by family type. The gray lines refer to the data (waves 1989 to 2016 of the Survey of Consumer Finances (SCF)), whereas the orange lines plot model simulations.

robustness in which I introduce an iid moving shock as in Cocco (2005) that is allowed to differ by marital states. I show that the main results are not sensitive to its introduction.

5 (How) Does Marital Status Affect Housing Demand?

By means of counterfactual simulations, I now turn the of the first research question and study the channels through which marital status affects households' investment choices. In each counterfactual, I change one element, re-solve and re-simulate the model and contrast the resulting life-cycle profiles to the baseline economy. To analyze the role of marital risk, I shut down marriage and divorce ($\mu = \lambda = 0$). To further disentangle the relative importance of each factor, I perform one counterfactual with only marriage ($\lambda = 0$) and one with only divorce ($\mu = 0$). I then evaluate the relative contribution of marital heterogeneity in labor

Figure 10: Average Housing Wealth of Owners by Family Type – Data vs. Model



(a) Couples (per capita) (b) Single Women (c) Single Men

Notes: Figure 10 plots the model fit for the average house value of home owners by family type. The gray lines refer to the data (waves 1989 to 2016 of the Survey of Consumer Finances (SCF)), whereas the orange lines plot model simulations.

income levels, labor income risk and in household sizes (through economies of scale) by changing the value of both single men and single women for each element to the corresponding value of couples.

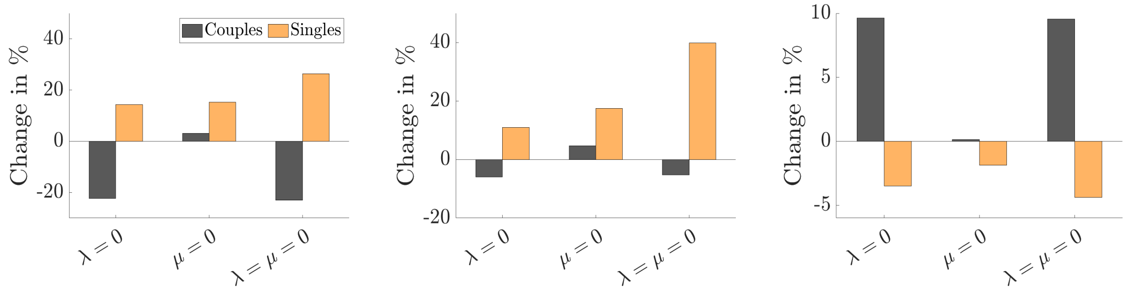
5.1 The Role of Marital Transition Risk

Marriage and divorce are key drivers of the observed marital gaps in investment choices. Figure 11 shows the aggregate change in financial wealth accumulation, in homeownership rates and in conditional housing wealth of couples and singles in response to shutting down marital transitions. All changes are expressed in percent. In addition, Figures 12 and 13 compare the housing policy functions for couples and single men between the baseline model and each marital counterfactual. Appendix D.2 reports the corresponding policy functions for single women.

No Divorce ($\lambda = 0$). In the absence of divorce risk, couples reduce their (precautionary) financial savings by around 20% (Figure 11a). This effect arises from two sources. First, divorce results in a destruction of part of the household's assets against which it wishes to self-insure. Second, once being divorced, couples' exposure to labor income risk increases and, through economies of scale, they need more than half of the previous consumption level to maintain the same level of utility.

Additionally, Figure 12a shows that shutting down divorce lowers the asset threshold at which

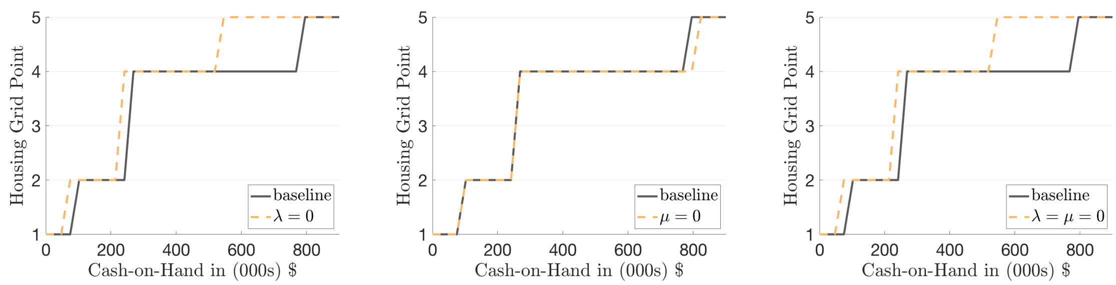
Figure 11: Counterfactuals – The Role of Marital Transition Risk



(a) Asset Accumulation (b) Homeownership Rate (c) (Cond.) Housing Wealth

Notes: Figure 11 reports the change in asset accumulation, homeownership rates and conditional housing wealth when shutting down divorce ($\lambda = 0$), shutting down marriage ($\mu = 0$) or both ($\mu = \lambda = 0$). The gray bars refer to couples whereas the orange bars denote singles. All changes are expressed in percent.

Figure 12: Housing Policy Functions – Couples



(a) No Divorce (b) No Marriage (c) No Marital Transitions

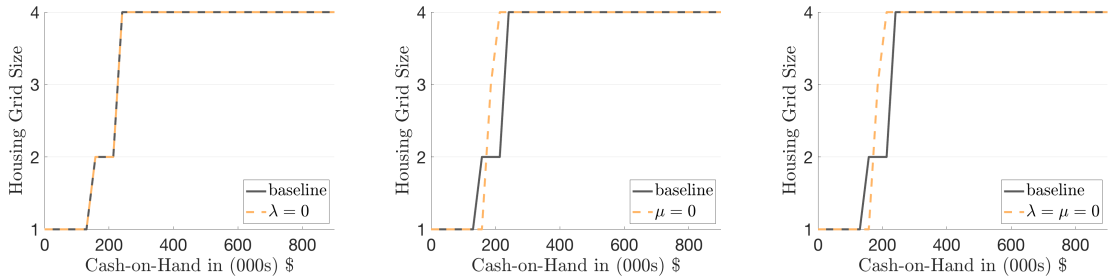
Notes: Figure 13 plots the housing policy functions for couples in the baseline as well as in the counterfactual without divorce ($\lambda = 0$), without marriage ($\mu = 0$) and without any marital transitions ($\lambda = \mu = 0$). All Figures refer to couples of age 30 who rent the smallest house size and have a medium productivity realization.

couples transition into ownership and at which they increase their housing size, reflecting an increase in their housing demand. With regard to housing tenure choices, the reduced savings motive is quantitatively stronger than the increased housing demand: as the distribution of couples shifts towards lower-asset households, the aggregate homeownership rate of couples drops by around 7% (Figure 11b).

In contrast, as displayed in Figure 11c, the conditional housing wealth of couples increases. Because of increased housing demand, equally rich couples now invest in larger houses (Figure 12a). Moreover, as the homeownership rate of couples drops, some low asset households become renters, shifting the distribution of owning couples towards larger homes.

Aggregate financial savings of singles increase by 15% which arises from a composition ef-

Figure 13: Housing Policy Functions – Single Men



(a) No Divorce

(b) No Marriage

(c) No Marital Transitions

Notes: Figure 13 plots the housing policy functions for single men in the baseline as well as in the counterfactual without divorce ($\lambda = 0$), without marriage ($\mu = 0$) and without any marital transitions ($\lambda = \mu = 0$). All Figures refer to single men of age 30 who rent the smallest house size and have a medium productivity realization. Appendix D.2 reports the corresponding policy functions for single women.

fect rather than from a change in individual housing demand (Figure 13a): never married singles hold on average more financial assets than divorced individuals because low income households are more likely to divorce and because divorce is costly.[31] Consequently, the share of single homeowners increases and the distribution of owning singles shifts towards smaller houses, resulting in lower conditional house values.

No Marriage ($\mu = 0$). For singles, marriage acts as a financial outcome with disproportionally high returns through asset holdings of the prospective partner and allows for the possibility to pool income as well as to benefit from economies of scale. As a result, singles accumulate more financial assets in a world without marriage than they do in the baseline (Figure 11a). In addition, Figure 13b shows that, conditional on their cash-on-hand level, singles are more likely to become homeowners as they no longer face the possibility of meeting a partner and having to sell the house. Quantitatively, the homeownership rate of singles increases by around 17% (Figure 11b). In contrast, as some previously renting singles now own the smallest owner-occupied house, the conditional housing wealth of singles declines (Figure 11c).

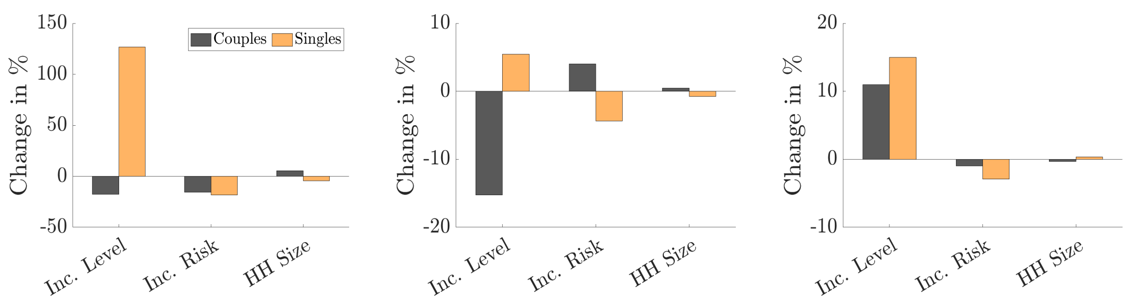
The stronger savings motives of singles induces couples to save more as well because they want to hold sufficient financial assets in the event of divorce (Figure 11a). As a result, the

[31] The fact that never married singles hold more financial wealth than divorced individuals is in line with empirical evidence, see Figure 15 for more details.

homeownership rate of couples increases slightly. However, as these changes are quite small, the house value of owning couples remains almost the same as in the baseline (Figure 11c).

No Marital Transitions ($\mu = \lambda = 0$). For couples, the effect of shutting down divorce is quantitatively so much stronger than shutting down marriage that their response in the counterfactual without any marital transitions remains virtually the same as in the one with only marriage, both on aggregate as well in terms of policy functions. For singles, by contrast, financial savings increase on aggregate by 26%, compared to 15% in each of the previous two counterfactuals. This result reflects a combination of their increased savings motive in the absence of marriage and the fact that never married singles hold are on average more financial assets than divorced individuals. In addition, the aggregate homeownership rate of singles increases substantially (by almost 40%). Finally, the average housing wealth of owning singles decreases because many low-asset households switch from renting to owning the smallest house, tilting the conditional distribution of housing wealth towards smaller homes.

Figure 14: Counterfactuals – Further Channels



(a) Asset Accumulation (b) Homeownership Rate (c) (Cond.) Housing Wealth

Notes: Figure 14 plots the change in asset accumulation, homeownership rates and conditional housing wealth when assigning singles the deterministic part of couples' income process ('Inc. Level'), the stochastic part of couples' income process ('Inc. Risk') and their average household sizes, conditional on age ('HH Size). The gray bars refer to couples whereas the orange bars denote singles. All changes are expressed in percent.

5.2 Further Factors

To explore other channels that further contribute to marital gaps in investment choices, Figure 14 plots the change in financial wealth accumulation, in homeownership rates and in conditional housing wealth in response to changing singles' labor income profiles (separately for the deterministic and the stochastic component) and their average number of household members to the corresponding couple value. Again, all changes are expressed in percent.

Income Level. Assigning singles the deterministic part of couples' income process effectively increases their average labor income. Consequently, singles save more, are more likely to be homeowners and live in larger houses. Couples, in contrast, save less than in the baseline. The income drop in the event of divorce becomes smaller and hence, divorce is not as financially risky. Furthermore, through reduced (marital) risk exposure, the housing demand of couples increases.[32] With regard to housing tenure choices, the reduced savings motive again dominates the increased housing demand, resulting in a lower homeownership rate of couples (Figure 14b).

Income risk. When assigning singles the stochastic part of couples' labor income process, I lower their exposure to income fluctuations. As a result, precautionary savings of singles decline (Figure 14a). In addition, because of reduced labor income risk, the housing demand of singles increases. Nevertheless, through fewer financial savings, homeownership rates of singles slightly drop on aggregate and the distribution of single owners shifts to slightly smaller houses. For couples, divorce is again a less financially risky outcome as in the baseline. Consequently, they accumulate less financial assets and their demand for housing increases. In contrast to singles, the share of owning couples becomes larger, as the larger willingness to invest into housing dominates the reduced savings motive.

Household Sizes. When assigning singles the same average household members as couples, I increase their household size, conditional on age. In response, singles have larger consumption needs each period, resulting in lower financial savings, lower homeownership rates and in a slight increase of conditional house values. For couples, divorce becomes more risky, and in response, their financial savings and homeownership rates increase. However, overall, the effect of changing household sizes is small, especially when compared to the importance of

[32] The corresponding policy functions are reported in Appendix D.2.

marital transition risk.

6 Implications for Policy Evaluation

In this section, I address the second research question and show that abstracting from distinct family types is misleading in judging the effectiveness of policies that aim at stimulating homeownership, especially among young households, which is the age group that most housing reforms in the US are primarily targeted to.

First, I lower the transaction costs of housing Φ from 5% to 2% of the house price. Second, I reduce property taxes by decreasing annual maintenance costs π from 1% to 0.45% of the house price.[33] Hence, the first policy change facilitates housing adjustment in response to shocks whereas the latter aims at lowering the flow cost of housing. To make both policies comparable in magnitude, I require the average per-household gain to be similar across reforms. For example, when lowering housing adjustment costs from 5% to 2% of the house price, I calculate the overall "savings" on all housing transactions that occur in the economy after the policy implementation (i.e. 3% of the respective house price per transaction) and average these savings across all years and households.

To analyze the importance of marital risk and family composition, I perform the same policy exercise in a standard framework with one generic household type. To do so, I collapse all three family types and re-calibrate the income process, household sizes (i.e. the demographic shifters), tax parameters and survival risk for the pooled sample while fixing preference parameters to be the same as in the benchmark.[34]

[33] In Appendix E.3, I show that the results in this section are robust to changes in house prices and to changes in marital transitions probabilities in response to the introduction of both reforms.

[34] The reduced framework matches key aggregate data moments of asset accumulation and housing choices when using the same parameters as in the benchmark. See Appendix F for details.

Table 4: Effectiveness of Housing Policies Across Frameworks

	Δ Homeownership Rate	
	$\Phi \downarrow$ (5% → 2%)	$\pi \downarrow$ (1% → 0.45%)
Annual per-HH Gain:	\$400	\$390
Panel I: Benchmark		
Couples	+6.03%pts	+5.88%pts
Single Men	+4.30%pts	+4.73%pts
Single Women	+3.89%pts	+5.21%pts
Aggregate	+5.52%pts	+5.64%pts
Panel II: $\lambda = \mu = 0$		
Couples	+9.16%pts	+13.02%pts
Single Men	+4.50%pts	+4.23%pts
Single Women	+4.11%pts	+6.64%pts
Aggregate	+8.46%pts	+11.91%pts
Panel III: One HH-Type	+8.43%pts	+13.16%pts

Notes: Table 4 reports the average increase in homeownership after lowering housing transaction costs ($\Phi \downarrow$) and lowering housing maintenance costs ($\pi \downarrow$) in the benchmark *(Panel I)*, in the benchmark without marriage and divorce *(Panel II)* and in the reduced framework with one generic household type *(Panel III)*.

6.1 Increasing Homeownership

Table 4 displays the increase in homeownership rates across family types in response to both policies. The row "Annual per-HH Gain" reports the described measure of magnitude. *Panel I* shows the results for the benchmark economy whereas *Panel II* displays the results for an economy with distinct family types but without marital risk, i.e. the benchmark framework with $\mu = \lambda = 0$. *Panel III* contains the results for the reduced framework.

In the benchmark economy, both policies result in a quantitatively similar increase of homeownership rates by around 5.5%pts and this increase is evenly distributed across household types: for couples, both policies lift homeownership rates by around 6%pts, whereas the share of single homeowners increases by 4-5%pts.

In contrast, when shutting down marital transitions (*Panel II*), homeownership rates increase by 8.46%pts when lowering adjustment costs and by 11.91%pts when lowering property taxes. In the absence of marriage and divorce, households are more willing to invest their wealth into (illiquid) housing. Consequently, both policies attract more home-buyers who previously preferred to remain renters.

Moreover, lowering property taxes ($\pi \downarrow$) now appears to be over 40% more effective than facilitating house size adjustments ($\Phi \downarrow$). Lower maintenance costs decrease the per-period expenditure commitments of homeowners and thus, make them less vulnerable to income fluctuations. However, once I account for marital transitions, households face the risk of having to sell their house (either following a divorce or because they move in with their partner), increasing their desire for being able to do so at little cost.

Furthermore, the increase in households' responsiveness across *Panel I* and *Panel II* is almost entirely driven by couple households. Singles have lower income levels than couples and are exposed to more labor income fluctuations. Thus, even in the absence of marriage, the share of singles who either cannot afford or do not want to buy a house (to be better able to smooth consumption in response to income shocks) remains relatively large. In contrast, most couples have the financial means to invest in owner-occupied housing and it is rather the possibility of divorce (which requires allocating or liquidating their home) that makes them reluctant to become owners.

As a result, the reduced framework which abstracts from both marital risk and distinct family types (*Panel III*) predicts an even stronger increase in homeownership, especially in response to the second reform. Compared to the benchmark, it overstates the effectiveness of lowering transaction costs by 53% and of lowering maintenance costs by 133%.

6.2 Heterogeneity over the Life-Cycle

In this section, I explore whether the magnitude of the policy mis-specification between the benchmark and the reduced framework varies over the life-cycle. Table 5 compares the increase in homeownership rates in response to both reforms across set-ups for young (age 30 to 39), middle-aged (age 40 to 49) and old (age 50 to 64) households.

In both economies, the effect of the policies become stronger as households age, suggesting that the overall increase in the share of homeowners is not merely driven by earlier transition into ownership. Additionally, the discrepancy across frameworks is strongest early in the life-cycle: with regard to lowering transaction costs, abstracting from family types overstates the policy response of households below age 40 by 108%, of middle-aged households by 76% and of old households by 41%. The intuition behind this result is twofold. First, marriage and divorce probabilities are declining in age. Hence, abstracting from marital risk increases the attractiveness of housing investments the most for young households who consequently react more strongly to the introduction of the policy. Second, the share of single households – who are least responsive to housing policies – is largest among the age group below 40, further contributing to the negative age gradient of the mis-specification. However, in the US, most housing policies are primarily targeted towards young households, further emphasizing the importance of taking into account family composition when evaluating such reforms.

6.3 Fostering Overall Wealth Accumulation

Enabling more households to become homeowners is often regarded as desirable because housing represents an important channel of wealth accumulation for middle-class Americans. Therefore, I now turn to evaluating the proposed policy reforms in terms of increasing households' net worth. Additionally, I study the effect of lowering stock market participation costs. Table 6 reports the results.[35]

In the benchmark framework (*Panel I*), lowering stock market participation costs is most effective in terms of fostering overall wealth accumulation and increases average household net worth by $8,737. In contrast, both housing policies do so only by a little over $5,000. This

[35] Table 14 in Appendix G splits the increase in overall net worth into changes in average house values and changes in aggregate financial savings.

Table 5: Effectiveness of Housing Policies by Age Groups

	Δ Homeownership Rate		
Age	30 to 39	40 to 49	50 to 64
Panel I – Housing transaction costs ↓:			
Couples	+2.44%pts	+4.70%pts	+8.88%pts
Single Men	+2.98%pts	+4.06%pts	+5.57%pts
Single Women	+0.78%pts	+4.84%pts	+6.18%pts
Aggregate	+2.34%pts	+4.64%pts	+7.95%pts
One HH-Type	+4.86%pts	+8.17%pts	+11.21%pts
Difference	108%	76%	41%
Panel II – Housing maintenance costs ↓:			
Couples	+2.56%pts	+4.26%pts	+8.75%pts
Single Men	+3.10%pts	+5.17%pts	+5.79%pts
Single Women	+2.63%pts	+6.56%pts	+6.91%pts
Aggregate	+2.61%pts	+4.67%pts	+8.01%pts
One HH-Type	+9.53%pts	+16.95%pts	+12.51%pts
Difference	265%	263%	56%

Notes: Table 5 reports the average increase in homeownership after lowering housing transaction costs ($\Phi \downarrow$, *Panel I*) and after lowering housing maintenance costs ($\pi \downarrow$, *Panel II*) in the benchmark and in the reduced framework with one generic household across different age groups. The columns "Difference" display the increase in homeownership rates in the reduced framework when compared to the aggregate increase in the benchmark.

Table 6: Effect of Housing Policies on Net Worth

	Δ Net Worth in \$		
	$\Phi \downarrow$ ($5\% \rightarrow 2\%$)	$\pi \downarrow$ ($1\% \rightarrow 0.35\%$)	$S^F \downarrow$ ($\$1,275 \rightarrow \$713$)
Annual per-HH Gain:	\$400	\$390	\$395
Panel I: Bench			
Couples	8,427	6,868	10,041
Single Men	-3,701	-1,571	5,996
Single Women	1,347	4,175	6,161
Aggregate	5,316	5,097	8,737
Panel II: One HH-Type	2,945	7,015	5,769

Notes: Table 6 reports the average increase in households' net worth in response to lowering housing transaction costs ($\Phi \downarrow$), lowering housing maintenance costs ($\pi \downarrow$) and lowering stock market participation costs ($S^F \downarrow$) in the benchmark economy *(Panel I)* and in the reduced framework *(Panel II)* with one generic household type.

effect is especially pronounced for single households: encouraging stock market participation increases the average net worth of single men by 228% more than fostering housing investment and the average net worth of single women by 123% more, compared to a 31% increase for couples. Singles have lower labor income than couples, keeping them out of the stock market (due to participation costs) and out of homeownership (due to a minimum house size). Reducing stock market participation costs enables them to enter the stock market and to invest relatively little wealth into risky assets. In contrast, even with reduced transaction or maintenance costs, becoming a homeowner still requires relatively large amounts of wealth to pay for the downpayment.

When turning to the reduced framework with one generic household-type, *Panel II* in Table 6 shows that lowering maintenance costs increases average household net worth by a little more than \$7,000, decreasing transaction costs by around \$3,000 and facilitating stock market participation by \$5,769. Hence, encouraging investment in risky financial assets does not necessarily appear to be more effective in terms of fostering overall wealth accumulation, again altering the results drawn from the benchmark framework with distinct family types.

7 Conclusion

This paper analyzes how marital status interacts with housing decisions of individuals and shows that explicitly taking family structure into account is necessary for the correct evaluation of policies that aim at stimulating housing demand, especially early in the life-cycle.

First, I provide novel empirical evidence that singles are less likely to be homeowners than couples but that they – conditional on owning – allocate more wealth into housing. In contrast, couples accumulate per capita more financial wealth than singles. By developing a life-cycle framework of family types, housing and financial portfolio choice, I show that low income levels of singles and the presence of marriage and divorce induce couples to accumulate more (precautionary) savings whereas it depresses savings of singles, contributing to the marital gap in financial wealth and in homeownership rates. Lower income risk of couples decreases the asset threshold at which they become homeowners, shifting the distribution of owning couples towards smaller houses. Abstracting from distinct family types biases the effectiveness of policies intended to increase homeownership as it overstates the attractiveness of illiquid housing. This bias is most strongly pronounced among young households whose marital transition risk is highest and among whom the share of single households is largest. However, they are the primary target group of housing policies in the US, highlighting the importance of taking into account marital status when evaluating or designing such reforms.

Generally, given that the share of single households is expected to rise further, taking household structure explicitly into account when studying macroeconomic outcomes will gain importance in the future. An interesting extension of my framework would be to quantify asset price adjustments in response to changing demand that arises from demographic shifts. So far, most of the literature has focused on the impact of an aging society on the current low-interest environment. However, as singles demand more safe assets, a rising share of single households in the economy is another – potentially quantitatively important – structural factor that may further depress the equilibrium return on safe assets.

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A Data Appendix

A.1 The Sample

I work the waves 1989 until 2016 from the Survey of Consumer Finances (SCF) to measure housing and financial choices of households. The SCF is a triennial repeated cross-section analysis sponsored by the Federal Reserve Board. It oversamples asset-rich households, therefore I weigh each observation by the provided survey weights to ensure the representativeness of the US population. For income variables and demographic characteristics I work with data from the Panel Study of Income Dynamics (PSID) spanning from 1989 until 2017.[36] Besides the core sample, the PSID oversamples low-income families (the 'SEO' sample) and immigrant families (the 'immigrant' sample). To make the sample comparable to that from the SCF, I drop these two sub-samples and work with the provided survey weights. In both datasets, I restrict the sample to individuals between 30 and 65 years old. Moreover, I drop the lowest and upper half of a percentile of all financial variables to ensure that results are not driven by individual outliers.

In total, the PSID sample consists of 81,788 individual-year observations that correspond to 2,070 individual single women, 1,589 individual single men and 5,550 individuals living in married couples. The average individual is observed for 5 waves and no individual is observed for more than 15 (biannual) waves. The data drawn from the SCF (which is a repeated cross-section) includes 39,357 observations, referring to 25,009 individuals in couples, to 4,696 single men and to 7,512 single women.

A.2 Supplementary Figures & Tables

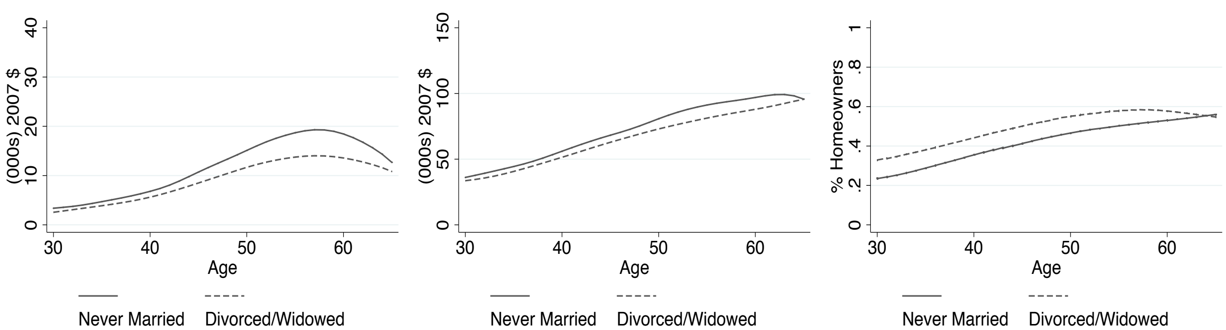
In this section, I document additional empirical patterns on housing and financial portfolio composition dynamics of single men, single women and couples in the United States.

[36] Because the Survey of Consumer Finances starts in 1989, I restrict my data sample taken from the PSID to the waves from 1989 until 2017. Data were collected annually until 1997 and afterwards every two years.

A.2.1 Portfolio Choices of Singles by Type

Singles at different ages vary in their marital histories and in their expectations about future marital states which may affect housing choices and portfolio allocation. Figure 15 plots the life-cycle profiles of median financial assets, conditional home equity and homeownership rates separately for never married and divorced (resp. widowed) singles. Divorced singles are more likely to be homeowners and invest – conditional on owning – less into housing than never married individuals. In contrast, never married singles accumulate more financial assets than divorced individuals.

Figure 15: Portfolio Allocation of Singles by Type (Data)



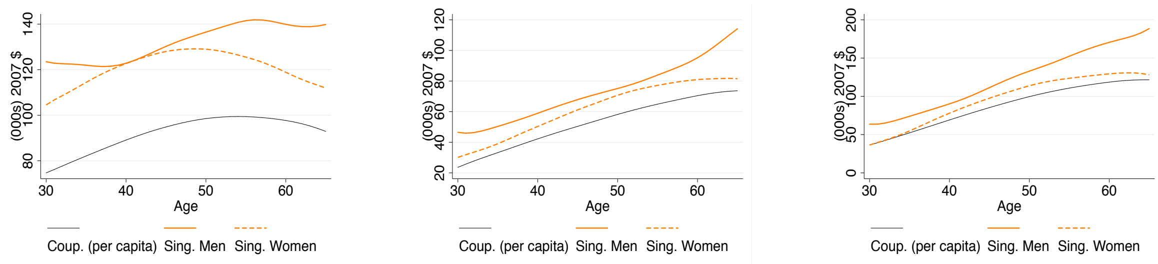
(a) Median Financial Assets (b) (Cond.) Housing Equity (c) Homeownership Rates

Notes: Figure 15 plots the life-cycle profiles for median financial assets, housing equity of homeowners and homeownership rates for never married singles as well as for divorced or widowed singles. Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

A.2.2 Life-Cycle Patterns of Portfolio Composition

In Section 2, I show that the mean house value of owning singles is larger than that of owning couples (per capita). Figure 16 confirms this (negative) marital gap for median house values, mean home equity and median home equity. Figure 17a plots median financial assets by family type, confirming that couples accumulate (per capita) more financial assets than singles. When separately considering the extensive and intensive margin of risky asset holdings (Figure 17), I find that couples are more likely to participate in the stock market. However, conditional on participating, single men accumulate more risky assets than couples, both with regard to the mean and the median of risky asset holdings. Figure 18 replicates Figure 3 but breaks housing equity into mortgages (red bars) and house value (gray bars).

Figure 16: Housing Choices Across Family Types – Further Specifications



(a) Median House Value (b) Median Home Equity (c) Mean Home Equity

Notes: Figure 16 plots the median house value as well as median and mean home equity of owners over the life-cycle. House value is defined as the value of a household's primary residence, irrespective of any mortgage debt. In contrast, home equity refers to the the value of a household's primary residence net of any mortgage debt on this property. Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

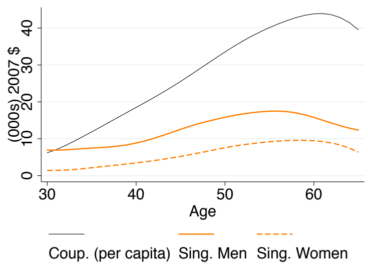
A.2.3 Children

During their 30s and 40s, more than 80% of couples and more than 60% of single women have children living in their household, whereas only around 20% of single men do.[37] In turn, children may affect households' savings decisions and portfolio allocation. Figure 19 shows that households with kids are indeed more likely to be homeowners but do not significantly differ from childless households in terms of savings behavior (wealth-to-income ratio) or stock market participation below age 60.[38] The differences beyond 60 arise because households who still have kids in their household at that age are a particular, but small, subsample of the population. Moreover, conditional on household type, differences in homeownership rates by kids disappear for single women and become very small for couples and single men (Figure 20). Thus, it seems that marital status per se is a more important predictor for portfolio choices than having children. This finding confirms Peter et al. (2020) who show that once they control for being couple or single, children do not explain any additional variation in the housing tenure choice across a sample of European countries.

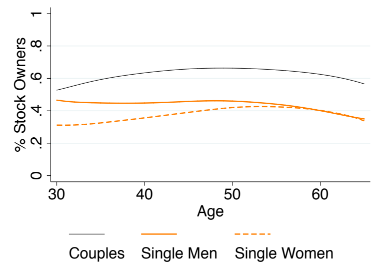
[37] Own calculations from SCF data.

[38] "Kids" refers to children that live in the same households or are below 25 and live elsewhere. All Figures look similar when considering only kids who live in the same household or having kids in general.

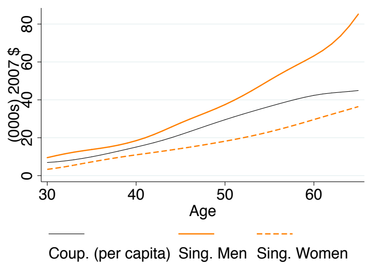
Figure 17: Financial Choices Across Family Types – Further Specifications



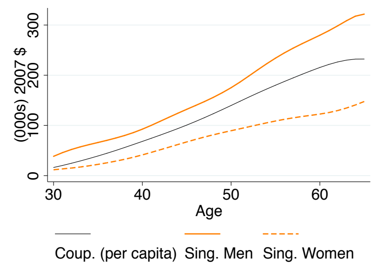
(a) Median Financial Assets



(b) Stock Market Participation



(c) (Cond.) Median Risky Assets



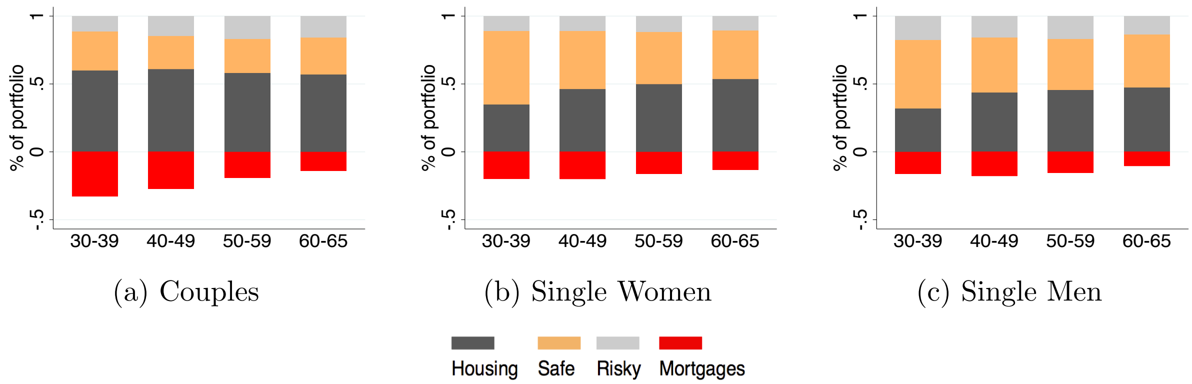
(d) (Cond.) Mean Risky Assets

Notes: Figure 17 plots the life-cycle profiles of stock market participation rates, median financial assets as well as mean and median risky asset holdings, conditional on participating in the stock market. Financial assets are defined as the sum of safe and risky financial assets. Risky assets contain direct stock holdings, corporate and foreign bonds, the fraction of mutual funds that include the former as well as the fraction of retirement accounts which is invested in stocks. Safe financial assets refer to cash holdings, savings and checking accounts, government bonds and the fraction of mutual funds and retirement accounts which is invested in safe assets. Stock market participation is defined as holding a strictly positive amount of risky assets. Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

A.2.4 Housing Expenditure Share by Marital Status & Kids

Figures 21 and 22 report housing expenditures shares for singles and couples across the wealth distribution and over the life-cycle. All figures are computed using PSID data. From wave 1999 onwards, households report expenditures on food, transportation, education, health care, children and housing. The latter includes mortgage and loan payments, rent, property taxes, insurance payments, utilities, cable TV, telephone, internet charges, home repairs and home furnishings. I define the housing expenditure share to be the share in overall reported expenditures that a household allocates to the housing category. I find that the housing expenditure of singles is higher than of couples, whereas I do not find any heterogeneity by wealth nor by age (conditional on marital status). Moreover, for singles, the expenditure share on housing is independent on whether or not they live with children in their household.

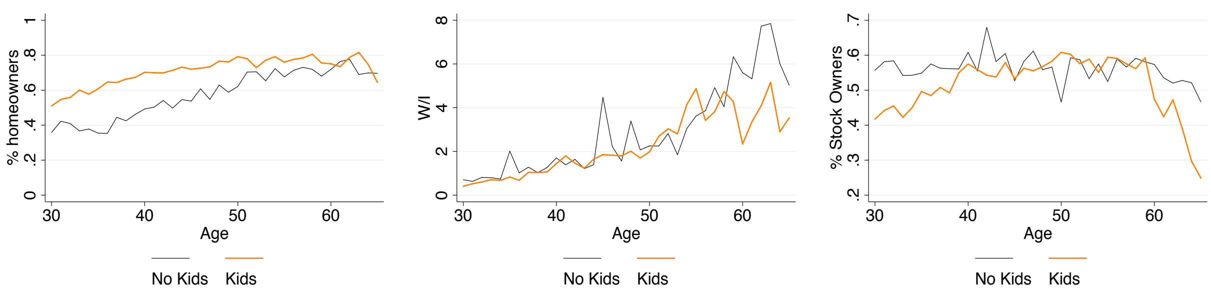
Figure 18: Portfolio Shares by Age – Including Mortgages



(a) Couples (b) Single Women (c) Single Men

Notes: Figure 18 plots the average share of overall wealth invested in housing, mortgages, safe and risky assets by family type and age group. The housing share denotes housing wealth as a fraction of overall wealth (the sum of the house value, safe and risky assets). Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

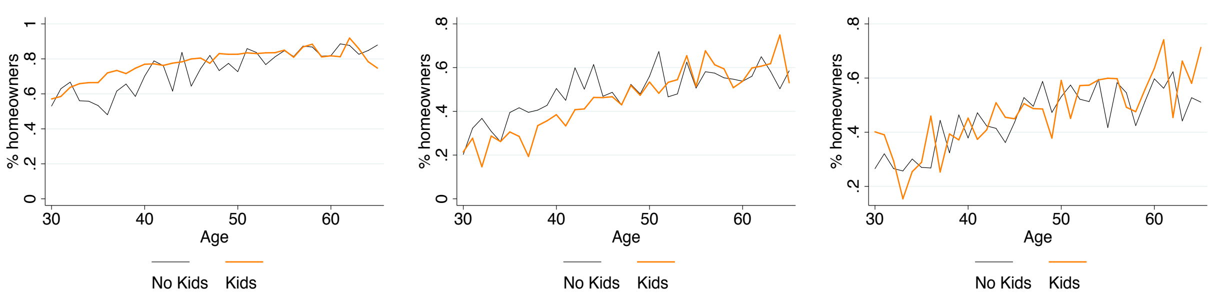
Figure 19: Children and Portfolio Composition



(a) Homeownership Rate (b) W/I Ratio (c) SMP Rate

Notes: Figure 19 plots the life-cycle profiles of homeownership rates, wealth-to-income ratios and Stock market participation rate of households with and without kids. "Kids" refer to all children who live in the same household or who are younger than 25 and live elsewhere. Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

Figure 20: Children and Homeownership Rate by Family Type

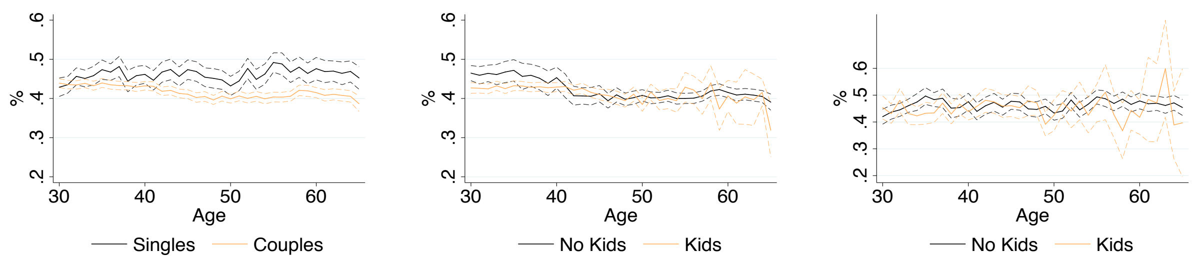


(a) Couples (b) Single Women (c) Single Men

Notes: Figure 19 plots the life-cycle of homeownership rates by family type and whether or not the household has kids. "Kids" refer to all children who live in the same household or who are younger than 25 and live elsewhere. Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

For couples, Figure 21b displays a higher expenditure share for married households without kids during young ages. Thus, an increase in the number of household members is associated with a decline in the housing expenditure share and this effect is stronger between singles and couples (that is, more adult household members) than across couples with and without children. These findings are in line with Peter et al. (2020) who show that the expenditure share on rent is larger for singles than for couples in Europe.

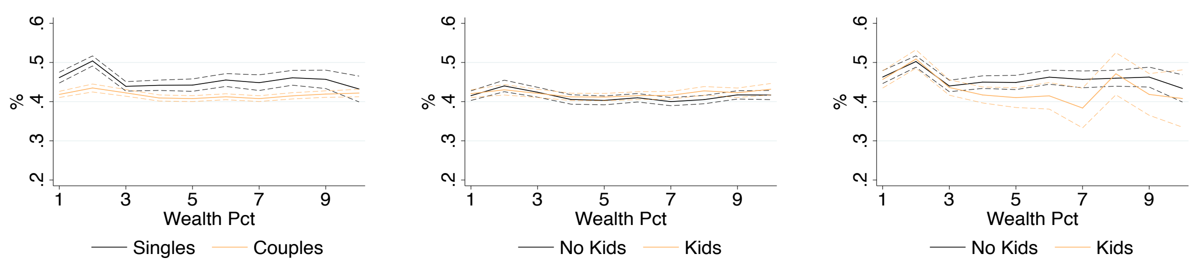
Figure 21: Expenditure Shares on Housing across Age



(a) By Marital Status (b) By Children – Couples (c) By Children – Singles

Notes: Figure 21 plots the housing expenditure by marital status and by children over the life-cycle. The housing expenditure is defined as expenditures on housing (mortgage and loan payments, rent, property taxes, insurance payments, utilities, cable TV, telephone, internet charges, home repairs and home furnishings) over all reported expenditures categories which include food, transportation, education, health care, children and housing. Data is from the Panel Study of Income Dynamics (PSID), waves 1999-2017.

Figure 22: Expenditure Shares on Housing across the Wealth Distribution



(a) By Marital Status (b) By Children – Couples (c) By Children – Singles

Notes: Figure 21 plots the housing expenditure by marital status and by children along the wealth distribution. The housing expenditure is defined as expenditures on housing (mortgage and loan payments, rent, property taxes, insurance payments, utilities, cable TV, telephone, internet charges, home repairs and home furnishings) over all reported expenditures categories which include food, transportation, education, health care, children and housing. Data is from the Panel Study of Income Dynamics (PSID), waves 1999-2017.

A.2.5 Mortgage Characteristics by Family Type

One potential concern in the current analysis is that singles face a different borrowing environment than couples which would render the assumption of homogeneous mortgage premia across all family types unrealistic. To understand the plausibility of this assumption, Table 7 lists the share of mortgage holders with adjustable loan rates as well as the average mortgage rate across couples, single men and single women in SCF data. Both types of mortgage characteristics do not significantly vary by family type. Additionally, when linearly regressing the mortgage rate on family type while controlling for observable households characteristics (income, mortgage value, age and interview wave), the coefficients for family type turns out to not be statistically significant different from zero.

Table 7: Mortgage Characteristics by Family Type

	Couples	Singles	
		Men	Women
% with adjustable loan	12.90	12.63	12.24
	(11.73;13.53)	(11.58;12.90)	(12.58;13.22)
Mean mortgage rate in %	6.67	6.58	6.67
	(6.66;6.70)	(6.55;6.66)	(6.66;6.75)

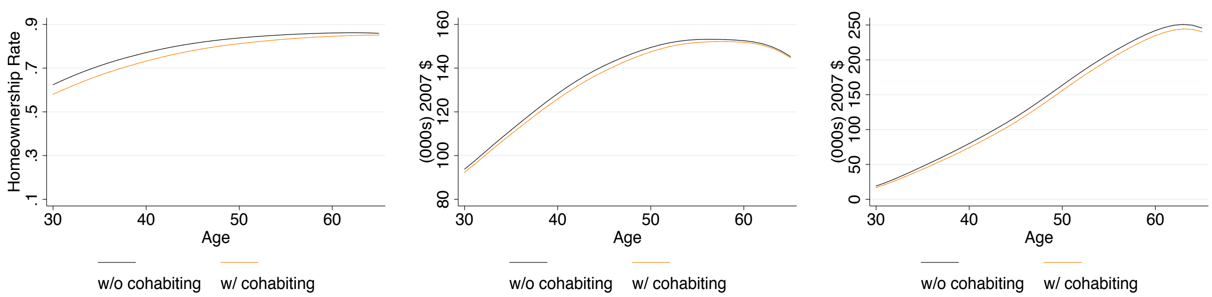
Notes: Table 7 reports the average mortgage rates and share of households with adjustable rate mortgages by family type. All values are expressed in % and refer to the mortgage that the respective household lists as primary, or "first", mortgage. 95% confidence intervals in parentheses. Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

B Robustness Checks – Empirics

B.1 Cohabiting Couples

Throughout the benchmark analysis, I drop all couples who cohabit but are not legally married. However, as documented in for example in Adamoupoulou, Hannusch, Kopecky, and Obermeier (2021), the share of cohabiting individuals has more than doubled throughout my sample period. Therefore, Figure 23 and Figure 24 replicate the main Figures from Section 2 when either including cohabiting households in the couples category or in the singles category, respectively (for singles, I allocate cohabiting households to single men if the household head is a man and to single women if the household head is a woman). I do not find any significant differences across specifications. If anything, the homeownership rate of only legally married couples is higher than if I jointly consider married and cohabiting couples. However, and most importantly, it is still substantially higher than that of singles.

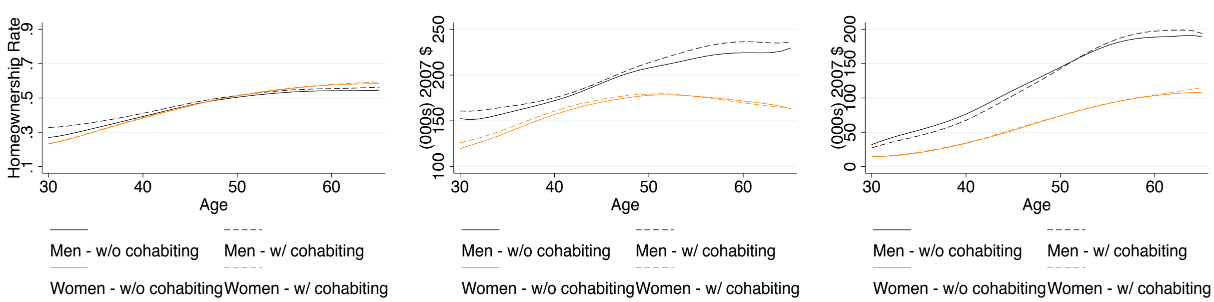
Figure 23: Robustness to Cohabiting Individuals – Couples



(a) Homeownership Rates (b) (Cond.) House Value (c) Financial Assets

Notes: Figure 23 plots homeownership rates, the average house value of owners as well as financial asset accumulation of couples, with and without including cohabiting couples in the couples category (orange and black lines, respectively). Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

Figure 24: Robustness to Cohabiting Individuals – Singles



(a) Homeownership Rates (b) (Cond.) House Value (c) Financial Assets

Notes: Figure 24 plots homeownership rates, the average house value of owners as well as financial asset accumulation of single men (black lines) and single women (orange lines), with and without including cohabiting couples in the singles category (dashed and solid lines, respectively). Cohabiting couples belong to "single men" if the household reference person is a man and to "single women" if the household reference person is a woman. Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

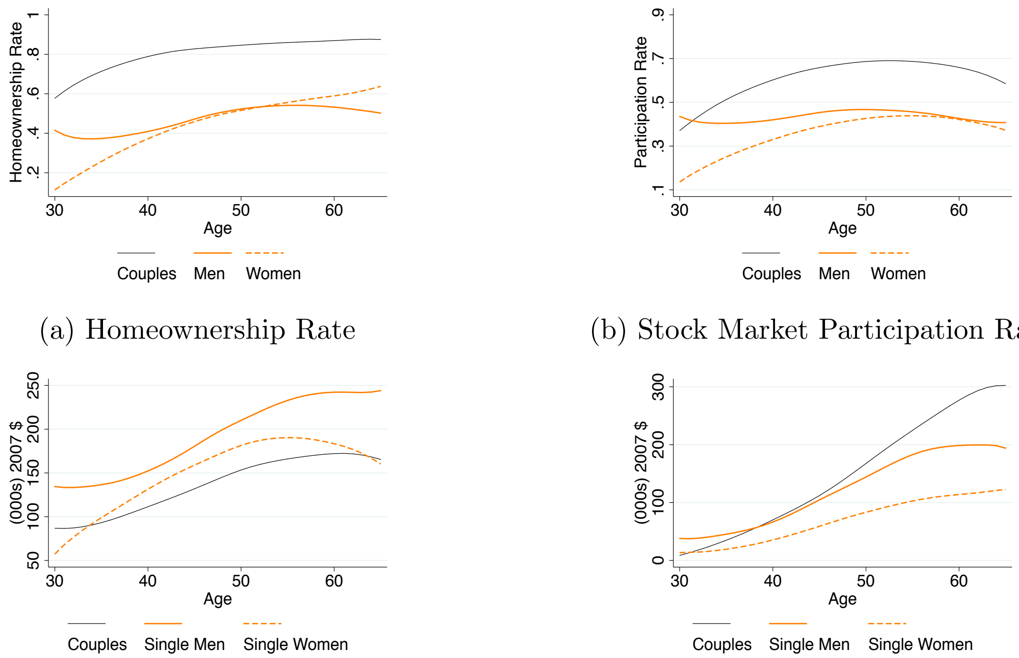
B.2 Cohort Effects

One cannot simultaneously identify age, year and cohort effects because of perfect multicollinearity. However, Ameriks and Zeldes (2004) show that life-cycle profiles of equity shares look very different depending on whether one imposes either cohorts or year effects to be zero. Throughout my analysis I pool all cohorts who participated in the SCF (resp. PSID). To test the sensitivity of my results to this implicit assumption that cohort effects are zero, Figure 25 reports the life-cycle profiles of stock market participation rates, homeownership rates, conditional house values and financial assets for individuals who were born between 1945 and 1960. As for the entire sample, I confirm the marital gap in homeownership rates, stock market participants as well as (financial) asset accumulation. Additionally, the conditional house value of singles is higher than that of couples, in line with the benchmark results. Hence, it appears that the reported life-cycle patterns in Section 2 are not driven by differences in investment behavior across cohorts.

B.3 Excluding Housing Boom and Bust Years

My sample period covers both the housing boom period in the early 2000s as well as the subsequent house price collapse after the financial crisis in 2008. Arguably, both episodes were rather unusual but strongly affected investment patterns. One potential concern is that these episode had heterogeneous effects across family types and hence drive the documented marital gaps in housing choices or in financial portfolio allocation. Figure 26 reports the life-cycle profiles of homeownership rates, stock market participation rates, conditional house values and financial assets by family type after dropping the years of the housing boom and of the Great Recession (waves 2001, 2004, 2007 and 2010) from the sample. I do not find any significant differences in the documented patterns when compared to the benchmark results in Section 2.

Figure 25: Portfolio - Robustness to Cohort Effects



(a) Homeownership Rate

(b) Stock Market Participation Rate

(c) (Cond.) House Value

(d) Financial Assets

Notes: Figure 25 plots homeownership rates, stock market participation rates, the average house value of owners as well as financial asset accumulation by family type on the cohort of individuals born between 1945 and 1960 (in the case of couples, the average birth year across spouses has to be between 1945 and 1960). Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

C Model Calibration

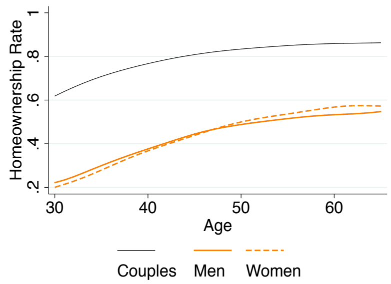
C.1 First Stage: Income Process – Deterministic Component

I define labor income as annual household income out of labor earnings (including labor income from farms and businesses) and social security benefits converted into 2007 dollars using the CPI-U.[39] I drop households who, according to this measure, report less than \$500 annual income. To estimate the labor income profiles, I follow Borella et al. (2019), split the sample by family type and separately regress the log of income for household i at age j,

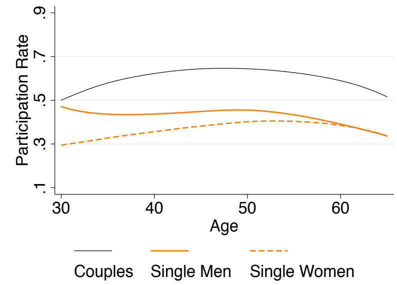
$$log(income_{ij}) = \alpha + \beta_1 age_{ij} + \beta_2 age_{ij}^2 + \beta_3 woman_i * age_{ij} + \beta_4 woman_i * age_{ij}^2 + \delta_i + u_{ij}$$

[39] CPI estimates taken from the US Bureau of Labor Statistics, available under this link [Accessed April 19, 2021].

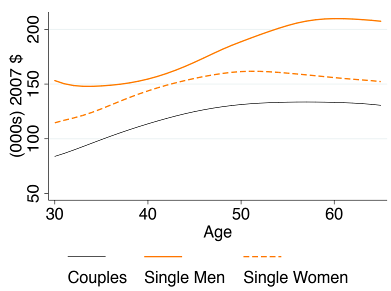
Figure 26: Portfolio - Robustness to Boom & Bust Periods



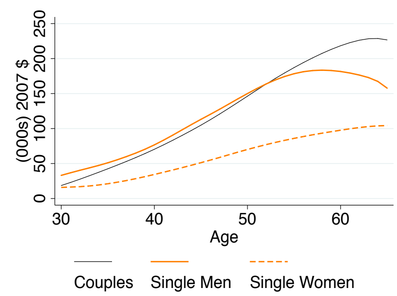
(a) Homeownership Rate



(b) Stock Market Participation Rate



(c) (Cond.) House Value



(d) Financial Assets

Notes: Figure 26 plots homeownership rates, stock market participation rates, the average house value of owners as well as financial asset accumulation by family type when dropping the waves 2001, 2004, 2007 and 2010 from the sample. Data is from the Survey of Consumer Finances (SCF), waves 1989, 1992, 1995, 1998, 2013 and 2016.

on a fixed effect δ_i, age, age^2 as well as – for singles – their interaction term with a dummy that indicates if the individual is a woman. For singles, to obtain shifters for gender, I regress the sum of the fixed effect and the residual on a gender dummy:

$$\delta_i + u_{ij} \equiv w_{ij} = \gamma_0 + \gamma_1 woman_i + \epsilon_{ij}$$

The coefficients from these income equations (reported in Table 8) inform me about the deterministic component of the labor income process which can be split into a constant and an age-specific part.

C.2 First Stage: Income Process – Stochastic Component

I estimate the parameters governing the stochastic part of the income process $\tilde{y}$ with the simulated method of moments, requiring it to match empirical second, third and fourth

Table 8: Regression Coefficients for Income Estimation (Deterministic Component)

	Couples	Singles	
		First Stage	Second Stage
Woman			-1.153***
			(0.0178)
age	0.132***	0.0938***	
	(0.00560)	(0.0116)	
$age^2 * 100$	-0.141***	-0.119***	
	(0.00625)	(0.0123)	
age*woman		0.0198***	
		(0.00539)	
Constant	8.883***	8.616***	0.703***
	(0.122)	(0.272)	(0.0139)
Observations	32,811	13,193	13,193
Number of unique indiv.	5,745	3,467	
R^2	0.045	0.026	0.241

Notes: Estimations are based on (fixed-effect) OLS regressions from PSID Data, waves 1989-2017. Corresponding Figure is Figure 6 in the main text. Dependent variable of first stage: Log of annual income (labor income and social security benefits). Dependent variable of second stage: fixed effects plus residual from first stage. *Woman* is a dummy indicating if the individual is woman; Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

moments of residual income levels (ϵ_{ij}) in the cross section and for income changes within individuals over time.

Given the functional form of the stochastic income process specified in Section 3.3, I need to estimate five parameters per family type. Table 9 summarizes the estimation results and Table 10 shows the corresponding data fit. My point estimates imply almost equal persistence across family types. However, singles face larger variances σ_1^2 as well as σ_2^2 and their innovations are less likely to be drawn from the normal distribution with negative mean. The estimated process matches very well the standard deviation and the kurtosis for both income changes and income levels by family type. In addition, it replicates the less negative skewness in income changes for single women, albeit generally predicting too low values for the skewness of income changes. In contrast, it implies slightly too large values for the skewness in the cross sectional dispersion of income realizations when compared to the data.

Table 9: Estimation Results – Stochastic Income Process

	Couples	Singles	
Parameter		Men	Women
ρ	0.7500	0.7502	0.7505
μ_1	-0.0615	-0.0909	-0.1263
σ_1^2	0.9508	1.4090	2.2888
σ_2^2	0.3141	0.3288	0.4261
$p_{\tilde{y}}$	0.2171	0.1514	0.0425

Notes: Table 9 presents the estimation results for the stochastic part of the income process by family type, following the parameterization explained in Section 3.3.

Table 10: Data vs. Model – Stochastic Income Process

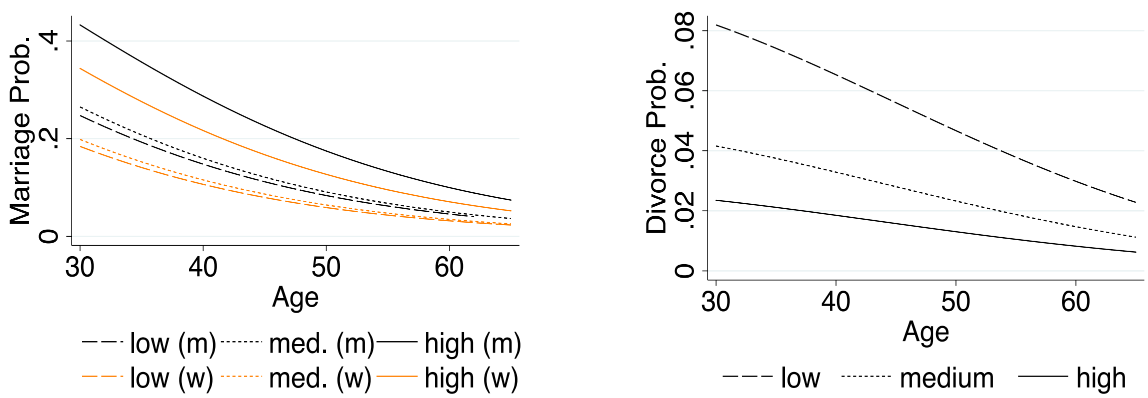
	Income Levels			Income Changes		
	Couples	Singles		Couples	Singles	
Moment		Men	Women		Men	Women
SD	0.7934	0.9496	0.9524	0.5614	0.6711	0.6737
	0.7834	0.9257	0.9161	0.5665	0.7017	0.6669
Skewness	-0.0969	-0.0932	-0.0412	-0.1629	-0.1565	-0.0611
	-0.1329	-0.1514	-0.2111	-0.1190	-0.1197	-0.0301
Kurtosis	3.9445	3.5814	3.4568	7.5249	9.3101	10.3191
	3.9078	3.6574	3.4522	7.5280	9.3043	10.3260

Notes: Table 10 compares the second, third and fourth moment for income levels in the cross section as well as for income changes within individuals in the data (gray numbers) with those generated by the simulated income process (black numbers), given the parameter values listed in Table 9. Data is from the PSID, waves 1989-2017.

C.3 First Stage: Marriage and Divorce Probabilities

Figures 27 plot the life-cycle profiles for divorce and marriage probabilities by productivity realization and, in the case of marriage, by gender. All profiles are obtained by running logit regressions on PSID data whose coefficients are reported in Table 11.

Figure 27: Marital Transition Probabilities



(a) Marriage Probability

(b) Divorce Probability

Notes: Figure 27 plots marriage and divorce probabilities by age for individuals with a "low", "medium" and "high" productivity realization, respectively. In Figure 27a, (m) refers to men and (w) refers to women. Estimates are based on logit regressions whose coefficients are reported in Table 11. Data is from the Panel Study of Income Dynamics, waves 1989-2017.

Table 11: Regression Coefficients for Marriage and Divorce Hazards

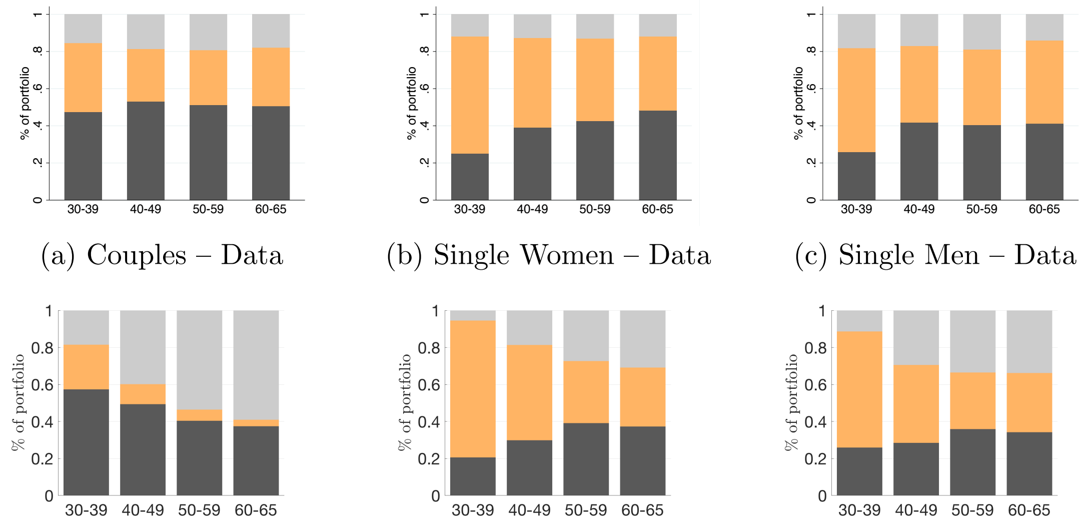
	(1) Marriage Prob.	(2) Divorce Prob.
Woman	-0.376***	
	(0.0653)	
Age	-0.0627*	0.0143
	(0.0348)	(0.0452)
$age^2 * 100$	0.0018	-0.0554
	(0.0401)	(0.0507)
$\tilde{y}_2$	-0.0852	-0.0221
	(0.324)	(0.533)
$\tilde{y}_3$	-0.385	-0.557
	(0.292)	(0.449)
$\tilde{y}_4$	-0.0891	-0.299
	(0.253)	(0.399)
$\tilde{y}_5$	0.0924	-0.721*
	(0.240)	(0.387)
$\tilde{y}_6$	0.257	-1.056***
	(0.237)	(0.389)
$\tilde{y}_7$	0.199	-1.143***
	(0.243)	(0.411)
$\tilde{y}_8$	0.843***	-1.309**
	(0.285)	(0.641)
$\tilde{y}_9$	0.562	
	(0.527)	
Constant	0.784	-2.348**
	(0.767)	(1.038)
Observations	10,746	27,155

Notes: Estimations are based on Logit regressions from PSID Data, waves 1989-2017. Corresponding Figure is Figure 27 in the main text. Dependent variable: Likelihood of getting married (resp. divorced) within the next two years, conditional on not being married (resp. being married) today. The age of a couple is the average age across both spouses. *Woman* is a dummy indicating if the individual is woman. $\tilde{y}_x$ is a dummy indicating whether the individual has that productivity realization, with $\tilde{y}_1$ being the base. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

D Further Model Results

D.1 Additional Figures on Model Fit

Figure 28: Portfolio Shares by Age – Data vs. Model (untargeted)



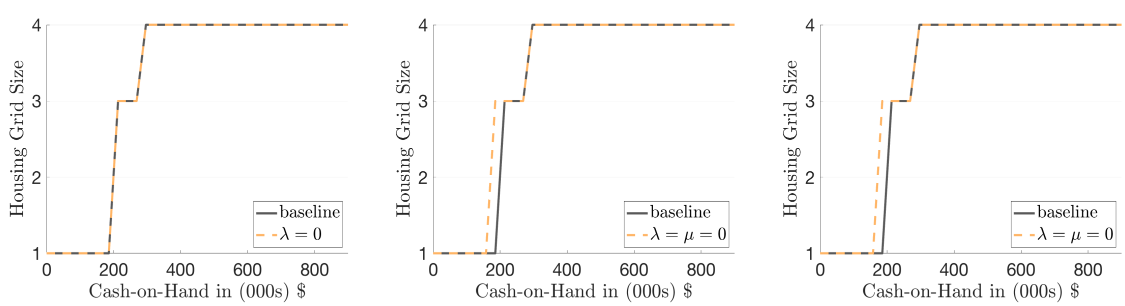
(a) Couples – Data (b) Single Women – Data (c) Single Men – Data

(d) Couples – Model (e) Single Women – Model (f) Single Men – Model

Notes: Figure 28 compares portfolio shares by family type from the data (upper panel) with those generated by the model (lower panel). Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

D.2 Additional Policy Functions

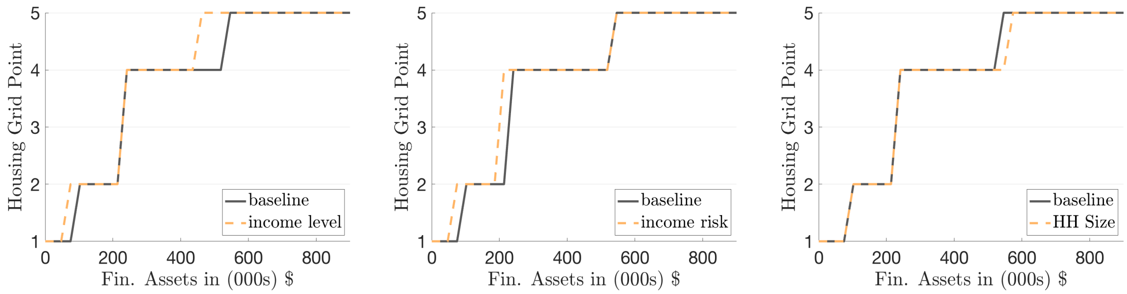
Figure 29: Housing Policy Functions – Single Women



(a) No Divorce (b) No Marriage (c) No Marital Transitions

Notes: Figure 29 plots the housing policy functions for single women in the baseline as well as in the counterfactual without divorce ($\lambda = 0$), without marriage ($\mu = 0$) and without any marital transitions ($\lambda = \mu = 0$). All Figures refer to single women of age 30 who rent the smallest house size and who have the medium productivity realization. Figure 13 in the main text reports the corresponding policy functions for single men.

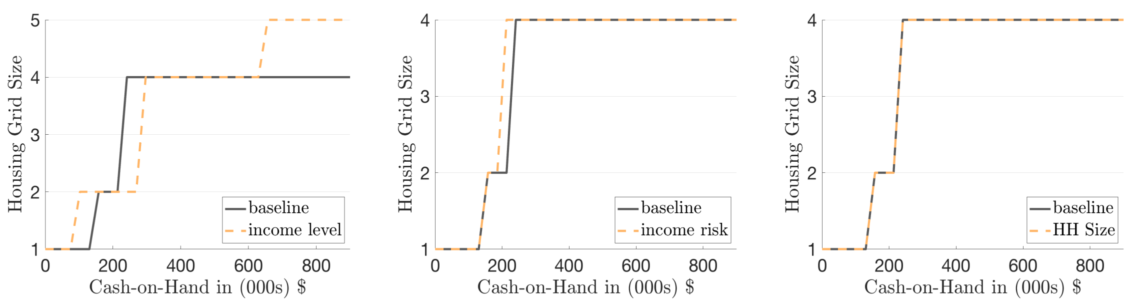
Figure 30: Housing Policy Functions – Couples (Further Factors)



(a) Income Level (b) Income Risk (c) HH Sizes

Notes: Figure 30 plots the housing policy functions for couples in the baseline as well as in the counterfactuals that assign singles the income level, income risk, and average number household members of couples, respectively. All Figures refer to couples of age 30 who rent the smallest house size and who have the medium productivity realization.

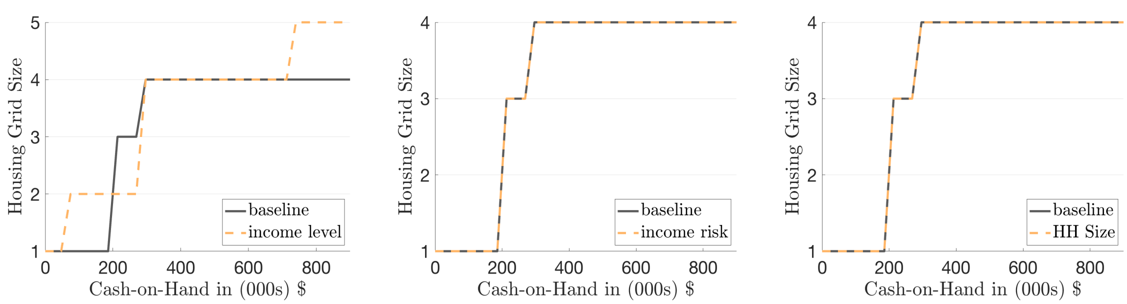
Figure 31: Housing Policy Functions – Single Men (Further Factors)



(a) Income Level (b) Income Risk (c) HH Sizes

Notes: Figure 31 plots the housing policy functions for single men in the baseline as well as in the counterfactuals that assign singles the income level, income risk, and average number household members of couples, respectively. All Figures refer to single men of age 30 who rent the smallest house size and who have the medium productivity realization.

Figure 32: Housing Policy Functions – Single Women (Further Factors)



(a) Income Level (b) Income Risk (c) HH Sizes

Notes: Figure 32 plots the housing policy functions for single men in the baseline as well as in the counterfactuals that assign singles the income level, income risk, and average number household members of couples, respectively. All Figures refer to single men of age 30 who rent the smallest house size and who have the medium productivity realization.

E Robustness Checks – Model

E.1 Moving Frequency

Empirical evidence suggests that singles move more often than couples what shifts their incentives to invest in illiquid housing relative to liquid financial assets (e.g. Mincer, 1978, Blackburn, 2010, Gemici, 2011, Burke and Miller, 2018). Hence, it is possible that higher homeownership rates of couples can be (partially) explained by their lower moving frequency. To test for the importance of this channel, I conduct two exercises. First, Figure 33 compares moving frequencies by marital status in the data to those generated by the model (without being targeted) and shows that the model replicates these frequencies very well. Second, I introduce an iid moving shock as in Cocco (2005). Each period, households face an exogenous probability to be hit by a moving shock in which case they are forced to move (in the same house size) and have to pay the corresponding adjustment costs. Importantly, the size of the shock is higher for singles to capture their higher incentive to re-locate. Relative to marital transition risk and labor income profiles, the effect of this moving shock on investment choices is quantitatively small and hence, the main results from Sections 5 and 6 remain unaffected by its introduction.

Figure 33: Moving Frequencies – Data vs. Baseline Model (untargeted)

(a) Couples (b) Singles

Notes: Figure 33 plots the moving probabilities by marital status from the data (gray lines) and compares them with model simulations (orange lines). The left graph shows couple households whereas the right graph pools single men and single women, both graphs including owners and renters. Data is from the Panel Study of Income Dynamics (PSID) waves 1997-2017, and refer to the survey question "Did you move since the last interview"?

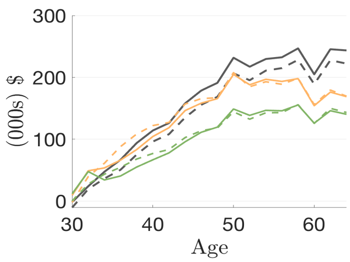
E.2 Housing Grid

In the model, housing is defined over a discrete grid, imposing a minimum threshold into ownership. Hence, it is possible that some low-asset households would find it optimal to buy smaller houses than available in the market and consequently choose to remain renters. Additionally, some households who are located in the right tail of the asset distribution might be constrained by the largest house available, partially explaining the relatively low house values of owning couples in the model. To address this concern, I conduct a robustness exercise in which I increase the housing grid along both directions. In particular, I introduce an additional house that is 1.3 times larger and 1.3 times more expensive than the biggest one previously available. In addition, I decrease the price of the smallest house by 25% and introduce a further housing option whose size and price lies between the (now cheaper) small and medium sized home. Figure 34 plots the resulting life-cycle profiles and compares them to the baseline framework. The homeownership rate of singles increases substantially when allowing for a smaller house, indicating that the they are (financially) constrained by the lowest housing size. However, the existence of such a threshold can be empirically justified, as in many areas, especially those that singles are most likely to live in (e.g. large cities), even studios are quite expensive and smaller properties are not available in the market. In contrast, the conditional house value of couples does not increase in response to allowing for larger house sizes, indicating that they are not constrained by to few options in the upper part of the housing grid.

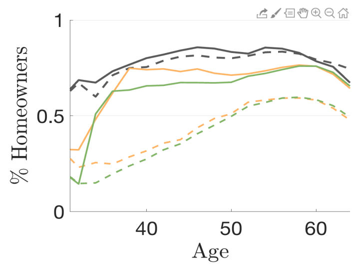
E.3 Price Adjustments

I conduct all policy experiments under the implicit assumption that owner-occupied housing supply is fully elastic, i.e. that house prices remain unaffected by the introduction of policy reforms. To test the sensitivity of my results with regard to that simplification, I follow Paz-Pardo (2020) and approximate potential equilibrium effects by re-performing the policy exercises under the assumption that owner-occupied housing supply is characterized by an

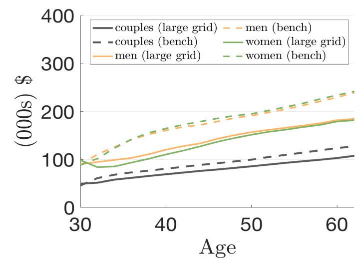
Figure 34: Robustness Exercise – Increasing the Housing Grid



(a) Financial Savings



(b) Homeownership Rate



(c) (Cond.) House Value

Notes: Figure 34 plots the life-cycle profiles of homeownership rates, financial savings and conditional house values across family types in the baseline model (dashed lines) and in version with a larger housing grid (solid lines).

isoelastic supply function with elasticity $\epsilon = 1.75$, an empirical estimate for the average U.S. metropolitan area by Saiz (2010). To do so, I first compute the housing demand in the baseline model which I define as the number of households i who live in owner-occupied housing, given house prices: $\sum_i H^d(p_H)$. I define this quantity to be the initial housing stock H^s in the economy. Thus, I assume that house prices in the baseline model clear the market: $\sum_i H^d(p_H) = H^s$. Next, I compute the housing demand in each policy counterfactual under baseline prices, that is $\sum_i H^{d'}(p_H)$. Assuming an empirical housing supply elasticity of $\epsilon = 1.75$, the goal is to find the new house prices p'_H, such that:

$$\sum_i H^{d'}(p'_H) = H^{s'}$$

where

$$\epsilon = \frac{\frac{p'_H - p_H}{p_H}}{\frac{H^{s'} - H^s}{H^s}}$$

Hence, I can solve for p'_H by substituting these two equation into one another. To account for different prices across house sizes, I consider the average house price in the economy and assume that all house prices adjust by the same fraction and that they appreciate deterministically as in the benchmark (that is, I do not allow for any segmentation in the housing market). *Panel I* in Table 12 reports the results. As before, I find that the reduced framework overstates the effectiveness of housing policies and does more so for the case of lowering maintenance costs.

In addition, it is possible that couples who own a house are less likely to separate and hence, divorce rates fall after the introduction of housing policies. In turn, singles may postpone marriage if they are homeowners. Therefore, I re-run the policy exercises from Section 6 under the assumption that marriage and divorce rates drop by 20% in response to the housing reforms. *Panel II* in Table 12 shows that the main results of the paper are robust with respect to these changes in marital transition probabilities.

Table 12: Comparing Policies – Adjusting Prices

	Δ Homeownership Rate	
	$\Phi \downarrow$ ($5\% \to 2\%$)	$\pi \downarrow$ ($1\% \to 0.45\%$)
Panel I: Adjusting House Prices		
Couples	5.16%pts	4.65%pts
Single Men	5.39%pts	6.01%pts
Single Women	3.84%pts	6.25%pts
Aggregate	5.01%pts	5.04%pts
One HH-Type	11.89%pts	13.65%pts
Panel II: Marital transition rates $\downarrow$		
Couples	+6.11%pts	+6.44%pts
Single Men	+4.57%pts	+6.75%pts
Single Women	+4.04%pts	+4.78%pts
Aggregate	+5.63%pts	+6.25%pts

Notes: Table 12 reports the average increase in homeownership rates in response to lowering housing transaction costs ($\Phi \downarrow$) and lowering maintenance costs ($\pi \downarrow$) under the assumption that housing supply is characterized by an isoelastic supply function with elasticity 1.75 *(Panel I)* and that both marriage and divorce probabilities drop by 20% in response to the introduction of the reforms *(Panel II)*.

E.4 House Prices

In the model, housing acts as a safe investment. The rationale behind this modeling choice is that I am mostly interested in channels that heterogeneously affect couples and singles and therefore translate into different investment choices. However, all households are equally exposed to house price risk. Moreover, previous literature (Cocco, 2005) has shown that the house price risk does not significantly affect housing demand, because housing primarily serves as a consumption good. In addition, Adelino, Schoar, and Severino (2021) document that the majority of US households (71%) perceive housing as a safe investment.[40] Even in 2011, shortly after the financial crisis and the corresponding house price crash, 66% of households considered housing as safe.

F Reduced Framework

The reduced economy is identical to the benchmark economy except that it only contains one generic household type. It can be described by two value functions, one for working age V_W^B and one for retirement V_R^B, respectively:

$$V_W^B(j, a, \mathcal{H}, \tilde{y}) = \max_{a'_r, a'_s, \mathcal{H}', m', c} u(c, s) + \beta \mathbb{E} V_W^B(j+1, a', \mathcal{H}', \tilde{y}')$$

$$a'_r + a'_s - m' + c = a + p_h \mathcal{H} - p_h \mathcal{H}' - \mathbb{1}_{\mathcal{H}' \neq \mathcal{H}} \Phi(\mathcal{H}, \mathcal{H}') - \mathbb{1}_{a'_r > 0} S^F - \mathbb{1}_{\mathcal{H}=R} \alpha p_H H_1 - \mathbb{1}_{\mathcal{H} \neq R} \pi \mathcal{H}$$

$$m' \leq \zeta_h p_h \mathcal{H}' \qquad a = \sum_{l=r,s} (1 + (1 - \tau_k) r_l) a_l - (1 + r_m) m + \mathbb{Y}\left[y(j, \tilde{y}), m\right]$$

$$V_R^B(j, a, \mathcal{H}, \hat{y}) = \max_{a'_s, a'_r, \mathcal{H}', m', c} u(c, s) + \beta \psi_j \mathbb{E} V_R^B(j+1, a', \mathcal{H}', \hat{y}) + \beta (1 - \psi_j) L \frac{(\xi + a' + \mathcal{H}')^{1-\gamma}}{1-\gamma}$$

$$a'_r + a'_s - m' + c = a + p_h \mathcal{H} - p_h \mathcal{H}' - \mathbb{1}_{\mathcal{H}' \neq \mathcal{H}} \Phi(\mathcal{H}, \mathcal{H}') - \mathbb{1}_{a'_r > 0} S^F - \mathbb{1}_{\mathcal{H}=R} \alpha_R p_H H_1 - \mathbb{1}_{\mathcal{H} \neq R} \pi \mathcal{H}$$

$$m' \leq \zeta_h p_h \mathcal{H}' \qquad m_J = 0 \qquad a = \sum_{l=r,s} (1 + (1 - \tau_k) r_l) a_l - (1 + r_m) m + \mathbb{Y}(pen(\hat{y}), m)$$

To calibrate the reduced framework, I re-estimate all model elements which are allowed

[40] These numbers are based on a nationally representative housing survey from Fannie Mae of more than 50,000 households between 2010 and 2016.

to vary by family type in the benchmark for the pooled sample: income profiles (both in terms of level and risk), average household sizes and survival probabilities. Moreover, I use the tax parameters for the entire population provided in Guner et al. (2014). All remaining parameters (including preference values) are held constant when compared to the benchmark. Table 13 shows the data fit for key moments in the reduced framework.

Table 13: Model Fit – One HH-Type Economy

	Data	Model
W/I at 45	1.24	1.55
Mean SMP at 45	48%	51%
homeownership rate at 45	61%	56%
Mean (cond.) house value at 45	$257,634	$201,664

Notes: Table 13 reports the model fit for the reduced framework with one generic household type. Data values refer to the pooled sample in the Survey of Consumer Finances (SCF), waves 1989-2016.

G Policy Exercises – Wealth Accumulation

Table 14 splits the increase in average household net worth in response to the reforms discussed in Section 6 into changes in housing wealth and into changes in financial wealth, corresponding to Table 6 in the main text. Both housing policies increase housing investment at the expense of financial savings, while decreasing S^F results in households substituting away from housing towards risky assets, slightly decreasing aggregate housing wealth.

Table 14: Comparing Policies – Housing and Financial Wealth

	$\Phi\downarrow$ ($5\% \to 2\%$)	$\pi\downarrow$ ($1\% \to 0.35\%$)	$S^F\downarrow$ ($\$1,275 \to \$713$)
	Δ Housing Wealth in \$		
Panel I: Bench			
Couples	20,999	14,803	306
Single Men	7,092	5,444	-4,344
Single Women	10,066	10,655	-505
Aggregate	16,935	12,634	-552
Panel II: One HH-Type	18,242	20,645	-1,383
	Δ Financial Wealth in \$		
Panel I: Bench			
Couples	-12,572	-7,935	9,736
Single Men	-10,793	-7,015	10,340
Single Women	-8.720	-6,480	6,673
Aggregate	-11,619	-7,537	9,288
Panel II: One HH-Type	-15,298	-13,630	7,152

Notes: Table 14 reports changes in housing wealth and in financial wealth in response to lowering housing adjustment costs ($\Phi\downarrow$), lowering housing maintenance costs ($\pi\downarrow$) and lowering stock market participation costs ($S^F\downarrow$) in the benchmark economy *(Panel I)* as well as in the reduced economy with one household type *(Panel II)*.