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 couples to accumulate liquid financial 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. Importantly, this misspecification is largest for young households who are often directly targeted by policies that aim at increasing homeownership rates.

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, has been shown to improve children's outcomes, and to strengthen involvement with the local community.[1] As a result, the goal of increasing homeownership rates attracts considerable attention among policy makers and has lead to 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, wealth holdings, or parental transfers (e.g. Attanasio, Bottazzi, Low, Nesheim, and Wakefield, 2012, Paz-Pardo, 2023, Brandsaas, 2021b). 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 illiquid nature makes houses difficult to allocate 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, is accounting for distinct family types necessary for the correct evaluation of housing policies over the life-cycle?

To that end, I first document novel empirical patterns on heterogeneity in financial asset

[1] See Forbes (2019) or Goodman and Mayer (2018) on housing and the American Dream, Haurin, Parcel, and Haurin (2002) or Green and White (1997) 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.

accumulation and housing choices across couples, single men, and single women in the United States by combining data from the Survey of Consumer Finances (SCF) and Panel Study of Income Dynamics (PSID). On average, almost 80% of 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 housing services. They decide on consumption, saving in safe and 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. 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 financial uncertainty that works in opposite directions. Divorce constitutes a financial risk because it requires households to split their assets and results in a state with lower labor income levels and higher labor income risk. Marriage, in contrast, 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 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, capturing 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 affects both the optimal allocation of resources across time as well as the optimal intratemporal allocation across goods.

Key Channels. I calibrate the model to match key moments on ownership, financial asset holdings, stock market participation, and house prices in the US. By means of counterfactual simulations, I then analyze the channels through which marital status affects housing demand and investment choices of couples and singles.

Higher divorce risk induces couples to increase their financial savings and to shift their portfolio away from illiquid housing. The faster financial asset accumulation is mainly driven by the change in households' income processes associated with divorce: following a marital resolution, the income level of individuals drops and, at the same time, their exposure to income fluctuations increases. Hence, in the presence of higher divorce risk, households accumulate more financial assets to insure themselves against such an event. Moreover, allowing for divorce lowers couples' demand for housing because their illiquid nature makes houses expensive to liquidate in the event of a break-up.

Marriage, in contrast, represents an outcome with disproportionately high returns through asset holdings of the partner. Furthermore, it increases households' prospective saving ability because of higher income levels and resource sharing, crowding out financial savings of singles. At the same time, marriage reflects an event that may render a previously purchased home suboptimal, reducing singles' housing demand. In addition, singles' relatively larger exposure to income fluctuations and lower labor income levels further reduce their demand for housing and prevent them from accumulating sufficient financial savings to enter the housing market, explaining around one fourth of the marital gap in homeownership rates that we observe in the data.

Empirical Model Verification. Next, I verify that key model predictions hold in the US micro data. First, I compare couples and singles who will eventually get divorced or married with those for whom I do not observe such an event. The underlying idea is that individuals have some knowledge about their marital transition probabilities that is unknown to the researcher. In line with model predictions, I find that couples who will eventually get divorced hold less housing wealth and save more in financial assets than couples for whom I do not observe such an event. On the other hand, singles who will get married in the future hold less housing wealth and save fewer in financial assets than singles who do not. Second, I analyze the relation between singles' average income and couples' financial saving behavior across US states. According to the model, the income drop following divorce is one key channel that induces couples to accumulate more financial wealth to insure themselves against that even. Hence, conditional on their own income level, couples should save more in states where singles' income is lower, if we believe that couples (at least partially) infer their own income level following a divorce by observing single households around them. In fact, I find that a 10% increase in the average labor income of singles is associated with a 1%pts reduction the saving rate of couples (out of income).

Implications for Policy Evaluation. Finally, I show that accounting for family composition is quantitatively important for the correct evaluation of policies that aim at stimulating housing demand. Using the calibrated model, 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. Allowing for marriage and divorce lowers the attractiveness of indivisible housing and, as a result, aggregate homeownership rates increase less in response to both policies in the model with distinct family types than they do in the one household type framework. Quantitatively, abstracting from distinct family types overstates the effectiveness of lowering property taxes by 118% and that of decreasing transaction costs by 92%. Hence, the framework with one generic household type not only overestimates the effectiveness of both reforms and but also biases their relative magnitude. In the presence of marital transition risk, households value relatively more to be able to adjust their housing size at little cost, explaining why lowering transaction costs appears to be relatively more effective in the framework with distinct family types.

In addition, because marriage and divorce probabilities are decreasing in age, the magnitude of the misspecification across frameworks is largest for young households. However, since young households are also 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]

Related Literature. This paper contributes to several strands of the literature. Broadly, it relates to a large literature on housing and financial portfolio allocation of households. Piazzesi and Schneider (2016) provide a detailed review of the former and Gomes, Haliassos, and Ramadorai (2021) as well as Campbell (2006) of the latter. For a literature review on life-cycle dynamics of household portfolio composition, see Poterba and Samwick (2001) or Gomes (2020). More specifically, I complement previous papers that study 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 (2023), Brandsaas (2021a)). Expanding on their work, I am the first to introduce distinct family types and am thus able to quantify the importance of marital status household's investment choices.

Along these lines, my paper builds on existing work that analyzes how marital dynamics affect home-buying decisions and mortgage applications (e.g. Fisher and Gervais, 2011, Fischer and Khorunzhina, 2019, Chang, 2023, Khorunzhina and Miller, 2022, Bartscher, 2023). 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 marriage and divorce. In addition, many papers focus on the interaction of marital transition dynamics with household savings more generally (e.g. Cubeddu and Ríos-Rull, 2003, Yamaguchi, Ruiz, and Mazzocco, 2014,

[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).

Voena, 2015, Fehr, Kallweit, and Kindermann, 2016, Borella, De Nardi, and Yang, 2018, 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 the exact channels through which marital status interacts with housing demand and to analyze the importance of accounting for marital status when evaluating policies that aim at stimulating housing demand.

Furthermore, Peter, Schneider, and Piazzesi (2020) propose a joint framework of housing and distinct family types to study homeownership rates between singles and couples across Europe. Their findings indicate that higher homeownership rates of 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 the importance of marital transition risk in explaining heterogeneous investment patterns by marital status.

Finally, my paper relates to a macroeconomic literature on life-cycle dynamics of portfolio composition with durable goods. Attanasio et al. (2012) study how the demand for housing varies 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 has important additional implications for investment choices of couples in the presence of divorce risk.

Roadmap. The remainder of this paper is structured as follows. Section 2 presents empirical evidence on life-cycle patterns of portfolio dynamics across family types. Section 3 introduces the structural model. Section 4 explains the calibration strategy, Section 5 presents the main results, 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. Second, to further shed light on how marital risk interacts with households' investment decisions, I conduct an event study of housing and financial savings around the time of marriage and divorce. Later on, I will validate the performance of the structural model with regard to these empirical patterns. 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. 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 who lives without a spouse. Single men are defined accordingly. Couples include legally married individuals with both spouses present in the household.

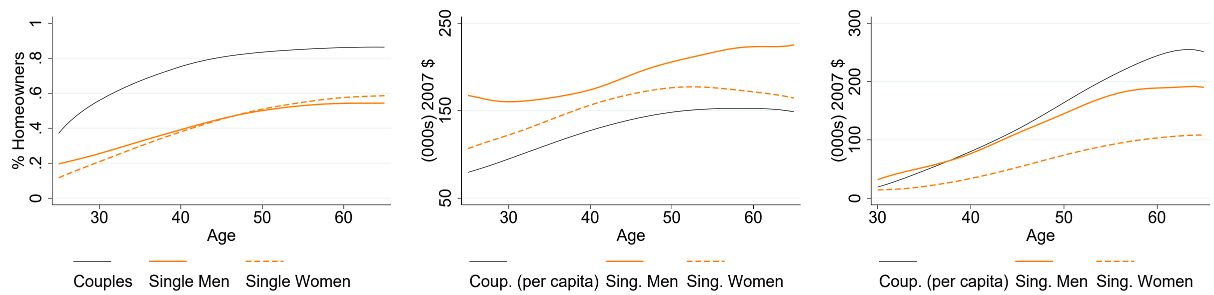
Figure 1b documents the average housing wealth of homeowners across family types. Conditional on owning, couples allocate (per capita) on average $44,000 less wealth into housing than singles.[4] Thus, couples invest more in housing along the extensive margin whereas singles tend to invest more along 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.

In contrast, couples accumulate more financial assets (per capita) than both single men and single women (Figure 1c).[5] Financial assets are defined as the sum of all risky and

[4] Figure 1b displays the average house value, irrespectively of any housing debt. The qualitative pattern is robust to considering the median house value or housing equity.

[5] Again, this finding is robust to considering median financial assets.

Figure 1: Investment Patterns Across Family Types (Data)



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

Notes: Figure 1 plots the life-cycle profiles of homeownership rates, average house value of owners, and mean financial assets by family type. House value is defined as the value of a household's primary residence, irrespective of any mortgage debt. 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.

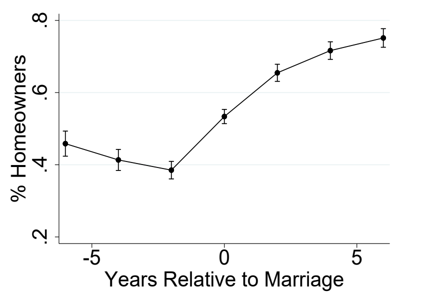
safe financial assets that the household holds. Risky assets refer to direct stock holdings, corporate and foreign bonds, the fraction of mutual funds that is invested in the former as well as the fraction of retirement accounts which is invested in stocks. Safe financial assets include cash holdings, 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.

2.2 Housing and Financial Wealth around Marital Shifts

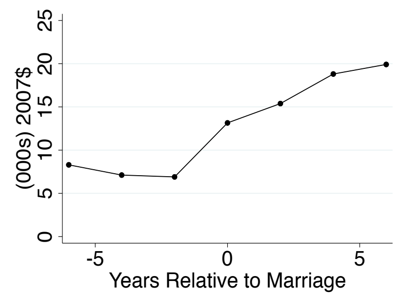
Shifts in housing and financial wealth around the timing of marriage and divorce directly affect the financial riskiness of marital transitions and hence, households' overall risk exposure. Figure 2 documents average homeownership rates and median financial asset holdings in the years preceding and following marriage and divorce. All values refer to household level estimates. The year zero indicates the first year in which the respondent reports to be married or divorced, respectively. Data is from the PSID because of its panel structure.

After getting married (that is, between year -2 and year 0), the average homeownership rate as well as median financial assets rise continuously (Figures 2a and 2b). 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. In contrast, following a divorce, homeownership rates drop by around 30% (Figure 2c). Additionally, median financial assets decrease by around 50% (Figure 2d) in the period directly after the marital dissolution. However, in subsequent years, both median financial assets and the share of homeowners gradually increase again.

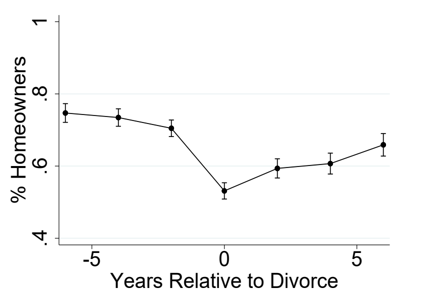
Figure 2: Housing and Financial Wealth around Marriage and Divorce (Data)



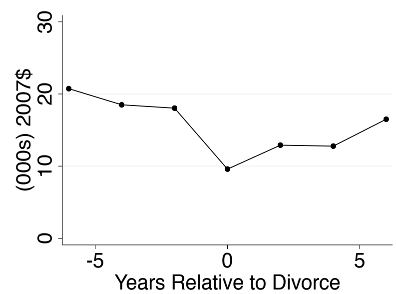
(a) Homeownership Rate (Marriage)



(b) Median Financial Assets (Marriage)



(c) Homeownership Rate (Divorce)



(d) Median Financial Assets (Divorce)

Notes: Figure 2 plots the evolution of homeownership rates and median financial assets in the years preceding and following marriage and divorce. All values refer to household level estimates. The year zero indicates the first observation in which the individual reports to be married or divorced, respectively. Data is from the Panel Study of Income Dynamics (PSID), waves 1989-2016.

2.3 Robustness Checks

In Appendix B, I show that the documented patterns are robust to geographical sorting of singles vs. couples, to replicating the analysis on one cohort of individuals, to including cohabiting households in either 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.

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. Having the risky asset is important because it offers a high-return saving option besides housing. Absent of that asset, some households might be pushed into owner occupied housing simply because they lack other (high return) investment opportunities. In addition, households 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:

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

The term ω measures the taste for housing services relative to nondurable consumption goods and ν specifies the substitutability between these two goods.[6] 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, single man). They are allowed to differ between nondurable consumption goods and housing services to take into account that housing services may be more easily shared among family members than non-durable consumption goods such as food or clothing (Nelson, 1988). Hence, differences in household sizes 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.2.1, I show that, once I condition on family type, investment choices of households with and without children are quite similar to another.

[6] I allow for a more flexible degree of substitutability across goods than imposing Cobb Douglas preferences (that is, setting $\nu = 0$), because singles have a higher housing expenditure share than couples in the data. See Appendix A.2.2 for details.

Hence, marital status per se seems to be a more important driver of portfolio allocation choices 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 the importance of higher-order moments to capture the overall labor income risk that households face. Therefore, I follow Ferriere, Grübener, Navarro, and Vardishvili (2023) and 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, both common properties of labor income processes. 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.

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 for which it holds that $\mu_r > r_s$. 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, where $\underline{r}_r$ denotes the lowest possible return realization of the (discretized) normal distribution. 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.[7] Moreover, homeowners can borrow in one-period mortgages against the value their house, which entails a borrowing premium, i.e., $r_m > r_s$.[8] Additionally, mortgages are subject to an LTV requirement, meaning that the maximum amount of household debt is a fraction ζ_h of the house price.[9]

Housing. Households can either be homeowners or renters. They 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.[10] The discrete structure of the housing grid gives rise to a minimum house size available for purchase (H_1), meaning that households

[7] 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 (2022), 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.

[8] The mortgage premium is constant across all family types which is supported by empirical evidence: in Appendix A.2.3, I show that mortgage characteristics of single households do not significantly differ from those of couples in my sample.

[9] I do not additionally include a debt-to-income (DTI) ratio because labor income is risky and hence, households would precautionary choose too low mortgage levels in order to avoid the constraint to bind in case of a bad income shock.

[10] For simplicity, I abstract from house price risk. See Appendix D.4 for a more detailed discussion.

need to accumulate a certain amount of wealth before they can become homeowners. Such a threshold may in particular be binding for singles and reflects that in many areas, especially those that attract single households (e.g. large cities), even the smallest available properties for purchase are quite expensive.

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 smallest owner-occupied house price ($p_h H_1$) 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.[11] Couples face an age and productivity dependent divorce probability $\lambda(j, \tilde{y}_c)$.

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. However, it may be that housing tenure itself affects marital transitions probabilities.[12] Therefore, to provide a lower bound of my estimates, I conduct a robustness exercise in which I use marital transition rates of only homeowners. The results of this exercise are reported in Appendix D.5.

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

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

[12] For example, Wei, Zhang, and Liu (2017) find that housing acts as a status good that can improve outcomes in the marriage market in China. Farnham, Schmidt, and Sevak (2011) show that house prices affect marital stability in the US, and Kim, Mastrogiacomo, Hochguertel, and Bloemen (2022) document that couples use divorce as a strategic device to shed housing debt in the Netherlands.

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 either liquidate their house or let one of the spouses keep it. 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 spouse receives a larger fraction of the couples' financial assets (after an exogenous fraction has been destroyed).[13] 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.[14] 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 from safe and risky assets. Labor income is subject to a progressive tax rate $t(\tilde{y}) = 1 - \tau_l \tilde{y}^{\tau_p}$, where $\tilde{y}$ denotes multiples of average household income (Benabou, 2002, Heathcote, Storesletten, and Violante, 2017, Guner, Kaygusuz, and Ventura, 2014). The term τ_l governs the average level of taxation and τ_p determines its degree of progressivity which are both allowed to differ by marital status. Denote the corresponding function that maps pre-tax earnings y into post-tax earnings by $\mathbb{Y}(y)$. As in the US tax code, mortgage payments above the standard deduction are deductible from the income tax, reducing the taxable amount of income, y.

3.7 Timing

In the beginning of period t, households learn their labor income shock, stock market return, and 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.

[13] This assumption mimics the US juridical system on asset allocation upon divorce. As Fischer and Khorunzhina (2019) point out, most US states have enacted either equal or equitable property division. The former refers to assets being split 50-50, whereas the latter allows for judicial discretion with the goal of not favoring either partner financially. Moreover, Yamaguchi et al. (2014) find in US data that the wealth level of newly-divorced households is on average a little less than half of the formerly couple's.

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

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).

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.[15] 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.[16]

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 $\tilde{y}$.[17] Each period, a single household decides on consumption, their 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:

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

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

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

[15] The latter is the relevant object to compute the continuation values of singles in the case of marriage (Borella, De Nardi, and Yang, 2020).

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

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

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

where $\tilde{a}'$ and $\tilde{\mathcal{H}}'$ refer to expected financial assets and housing stock, respectively, in the next 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 $(\hat{y}_i)$. 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, their joint house $\mathcal{H}$, 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, 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., 2020). Variables denoted with a $\hat{hat}$ 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

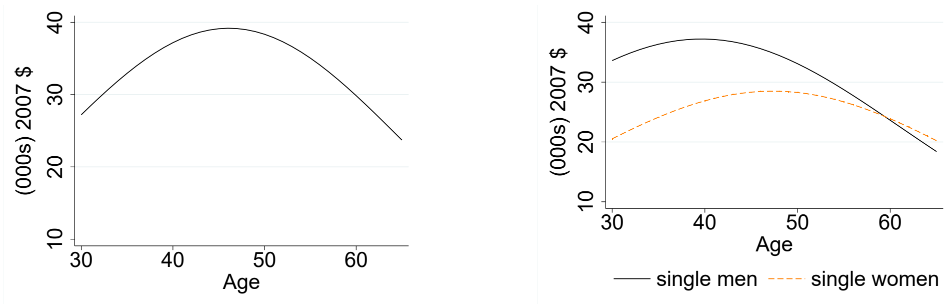
I calibrate my model to the years from 1989 until 2017. Table 2 summarizes all externally calibrated parameters. The housing grid is defined over five discrete choices: two rentals and three sizes for homeowners, that is $\mathcal{H} = \{R_1, R_2, H_3, H_4, H_5\}$. I set the coefficient of relative risk aversion γ to 1.5 and the housing utility share $(1-\omega)$ to 0.2, both values that are common in the housing literature and the latter being supported by aggregate housing expenditure shares from National Income and Product Accounts (NIPA). 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. Following empirical estimates in Davis, Lehnert, and Martin (2008), the rent for the small rental is set to 5% of the smallest (owner-occupied) house price and that of the big rental to 10% 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 such that 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 (2023).

Labor Income Profiles. Figure 3 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.[18] In per-capita terms, couples' house-

[18] Appendix C.1 explains in detail how I obtain these profiles.

hold 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 3: Life-Cycle Income Profiles (Deterministic Component)



(a) Couples (per capita)

(b) Singles

Notes: Figure 3 plots the deterministic part of labor income by family type and age. Labor income is defined as annual earnings out of labor income and social security benefits. The value for couples is expressed in per-capita terms. Data is from the Panel Study of Income Dynamics (PSID), waves 1989-2017.

Moreover, I find that the stochastic part of the labor income process displays negative skewness and excess kurtosis across all family types.[19] 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). Additionally, singles face a higher kurtosis in income changes than couples. 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 60% of the labor income during the last year of work (i.e. at age 64).

Marital Transition Probabilities. I compute marital transition probabilities from PSID

[19] In Appendix C.2, I report in detail the estimation results as well as the corresponding data fit.

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.[20] Figure 20 in Appendix C.3 reports the corresponding life-cycle profiles. 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 the function $\Pi_m(.) = \Pi_m(\tilde{y}_c|\tilde{y}_i)$ which I estimate non-parametrically from the PSID.

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 according to the function $\Pi_d(.) = \Pi_d(\tilde{y}_i|\tilde{y}_c)$ 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 of a divorce, I assume that 25% of couples liquidate their house, 41% of couples allocate it to the wife, and 34% to the husband. I take this splitting directly from the PSID: the avearge

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

homeownership rate drops by around 25% in the two years following a divorce, and it is around 20% higher for single women than for single men. Whenever couples do not liquidate their house, the spouse without the house is left with 70% of the households' financial assets. To validate these assumptions, I will later on require the model to match empirical shifts in housing and financial assets around the timing of marriage and divorce (see Section 4.3).

Asset Returns. House prices grow deterministically at an annual rate of 2.28%. This value reflects the average Case-Shiller Index throughout my sample period (3%), adjusted for the fact that houses prices in the model do not fluctuate across periods. 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.

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 members 3 to 7 denote children.

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 $\tau_p = 0.064$, 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 ($1-\omega$)	NIPA Data	0.2
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 (2023)	0.8
Annual housing maintenance cost	Cocco (2005)	0.01
Housing adjustment cost	Paz-Pardo (2023)	{0.05;0.05}
Survival Probability	Life Tables	see text
Demographic Shifter ($\eta^s < \eta^c$)	Yang (2009)	see text
Tax Parameters	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 set the gender specific death probabilities at every age j according to the Life Tables of the US Social Security Administration, defined as the likelihood to die within the next two years conditional on having survived up to age j.[21] 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 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

[21] All tables available under this link [Accessed July 12, 2023].

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

The internally calibrated 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), the stock market participation cost (S^F), and the measure of the sustainability between goods ν. I normalize the utility flow from the small rental R_1 to one. In addition, I require the large rental to yield the same utility as the medium owner occupied house (i.e., $s_2 = s_4$). In this way, households can upgrade their living situation without necessarily having to become homeowners.[22] Hence, the model has nine free parameters that I jointly calibrate to match nine 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 to match the discount factor and take its data value of 1.88 from the SCF. In the model, financial wealth of households is expressed as safe and risky assets net of mortgages which is why the net wealth-to-income ratio is the empirical 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 large rental (s_2). To calibrate the utility flow from owning, I match the average housing share of couples at age 35 (for s_3) 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 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 replicate their housing choices

[22] The possibility to upgrade one's home while continuing to rent is important as it prevents high income, couple households to be pushed into owning and thereby creating the marital gap in homeownership rates simply because couples lack other options than buying.

over the life-cycle (see Section 4.3). To pin down house prices, I target average housing wealth (conditional on owning) at different ages. Because house prices are appreciating in the model, I target the prices agents have to pay at age 45, and let them evolve according to the exogenously set return. I match the average stock market participation rate of couples in the SCF to calibrate the flow cost of stock market participation. Finally, to calibrate ν, I target the average expenditure share that households allocate to housing services.

Table 3 shows that the model matches its associated data targets well. The discount factor ($\beta = 0.89$) 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 (2022) finds $\beta = 0.92$.

The estimates for the utility flow of the big rental and the medium owner occupied house are $s_2 = s_4 = 6$. For the remaining owner-occupied houses, I find $s_3 = 4$ and $s_5 = 7$. Hence, the per-period flow utility from owning the smallest house is four times as large as renting the smallest rental unit. My estimates for house prices range between \$120,000 and \$255,000. The calibrated annual stock market participation cost of \$1,350 lies within the range of estimates from previous papers that model participation costs as a flow variable. Cocco (2005) reports an estimate of \$1,000 whereas Catherine (2022) estimates a stock market participation cost of \$1,010. Finally, I find a value for ν of -0.1, implying an elasticity of substitution between non-durable consumption goods and housing services of 0.9.

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 4 documents the model fit for changes in financial wealth and homeownership rates in the years preceding and following a marital shock. The values in the period prior to the marital transition are

Table 3: Internally Calibrated Parameters: Targets & Fit

Parameter	Value	Key Moment	Data	Model
Discount factor (β)	0.89	mean W/I (net)	1.88	1.93
Big rental size (s_2)	6	homeownership rate at 45	83%	83%
Small ownership size (s_3)	4	housing share at 35	58%	53%
Big ownership size(s_5)	7	housing share at 55	55%	43%
Price of small house (p_3)	$120,000	house value of owners at 35	$204,000	$165,000
Price of medium house (p_4)	$195,000	——〃—— at 45	$238,000	$211,000
Price of big house (p_5)	$255,000	——〃—— at 55	$234,000	$249,000
Stock market cost (S^F)	$1,350 p.a.	mean SMP	63%	64%
Elasticity of subs. (ν)	-0.1	mean hous. expenditure share	0.43	0.45

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 and the housing share refer to couple households.

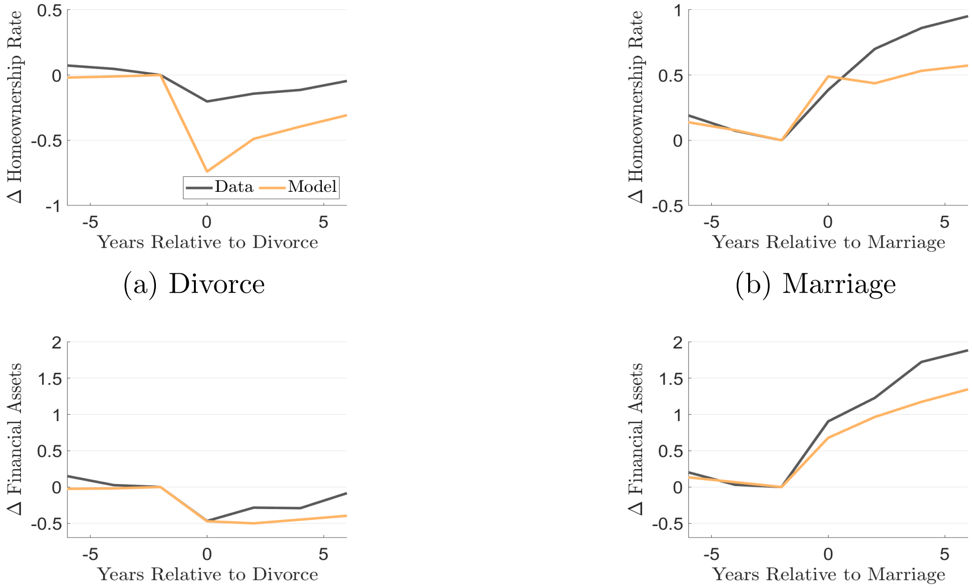
normalized to zero.[23] Capturing portfolio shifts around the timing of marriage and divorce is important to realistically replicate the financial riskiness of marital shocks, which in turn directly affect investment choices of households.

The model captures well 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 at least 50%pts. Nevertheless, it does generate a sharp increase after one model period (two years), as well as a the subsequent rise in the share of owners. Moreover, while the model is able to replicate the rise in the homeownership rate in the period directly after marriage, it underpredicts the further increase of owners in later years.

Life-Cycle Profiles of Housing and Asset Accumulation. Figure 5 shows the model fit for life-cycle profiles of financial wealth accumulation across family types. Figure 6 compares homeownership rates for single men, single women, and couples in the data with model-implied simulations, whereas Figure 7 reports the model fit for the average housing wealth

[23] 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 in the SCF.

Figure 4: Portfolio Allocation around Marital Shocks – Data vs. Model



(a) Divorce (b) Marriage

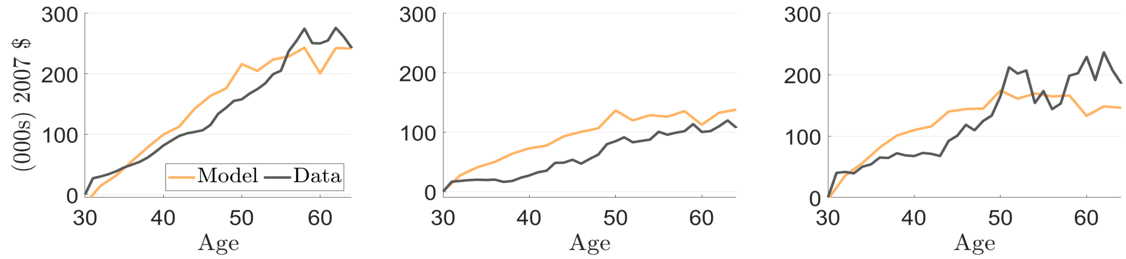
(c) Divorce (d) Marriage

Notes: Figure 4 plots the change in homeownership rates and 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.

among owners. The model matches very well financial asset holdings of couples and single men but slightly over-predicts the wealth accumulation of single women. 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 generate the empirical patterns 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.

Robustness Exercises. In Appendix B, I show that my results are robust to increasing the housing grid size. In addition, I validate the model performance with regard to matching empirical moving frequencies by marital status.

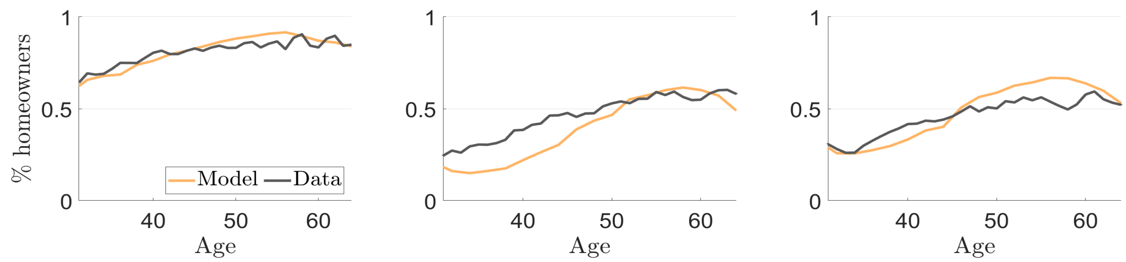
Figure 5: Financial Wealth by Family Type – Data vs. Model



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

Notes: Figure 5 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 6: Homeownership Rates by Family Type – Data vs. Model



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

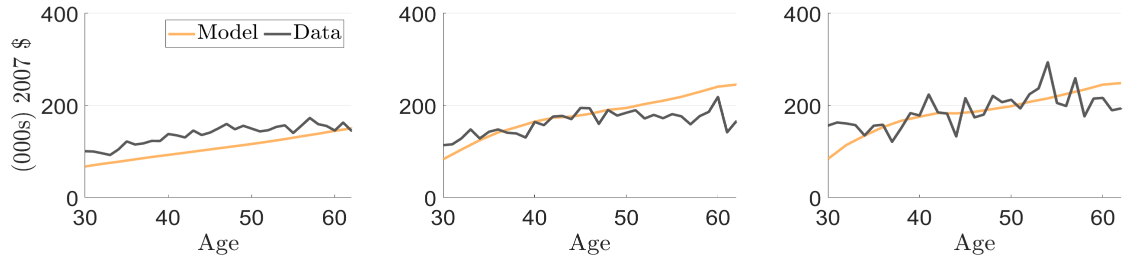
Notes: Figure 6 plots the model fit for life-cycle profiles of homeownership rates by family type. The gray lines refer to the data (waves 1989 to 2016 of the Survey of Consumer Finances (SCF)), whereas the orange lines plot model simulations.

5 (How) Does Marital Status Affect Housing Demand?

I now turn to the first research question and study the channels through which marital status affects households' investment choices. First, I run counterfactual simulations in which 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 ($\mu = 0$) and divorce ($\lambda = 0$), respectively. I then evaluate the relative contribution of marital heterogeneity in labor 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.[24] Next, I analyze the exact channels that drive the (financial) riskiness of divorce. Finally, I verify key predictions derived from

[24] Further factors, such as differential tax rates and survival probabilities, turn out to be quantitatively less important for explaining heterogeneity in investment choices across marital states. Therefore, I abstract from discussing these channels in detail.

Figure 7: Average Housing Wealth of Owners by Family Type – Data vs. Model



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

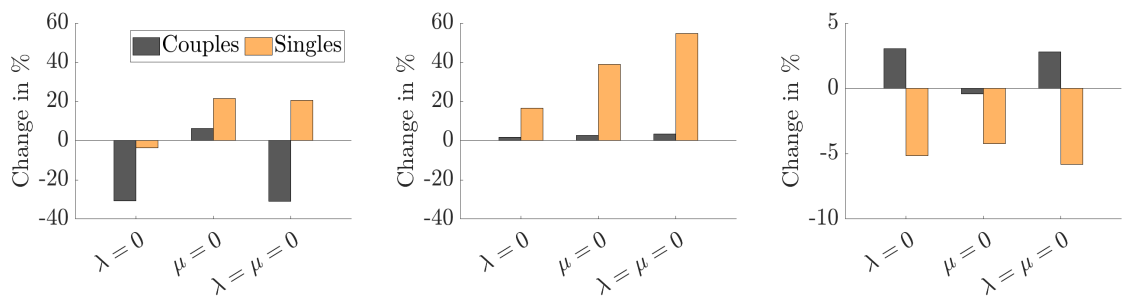
Notes: Figure 7 plots the model fit for the average house value of owners by family type. The gray lines refer to the data (waves 1989 to 2016 of the Survey of Consumer Finances (SCF)), whereas the orange lines plot model simulations.

the counterfactual exercises in the data.

5.1 Marital Transition Risk

Figure 8 shows the aggregate change in financial wealth accumulation, homeownership rates, and conditional housing wealth of couples and singles in response to shutting down marital transitions.[25] All changes are expressed in percent with respect to the baseline model.

Figure 8: Counterfactuals – The Role of Marital Transition Risk



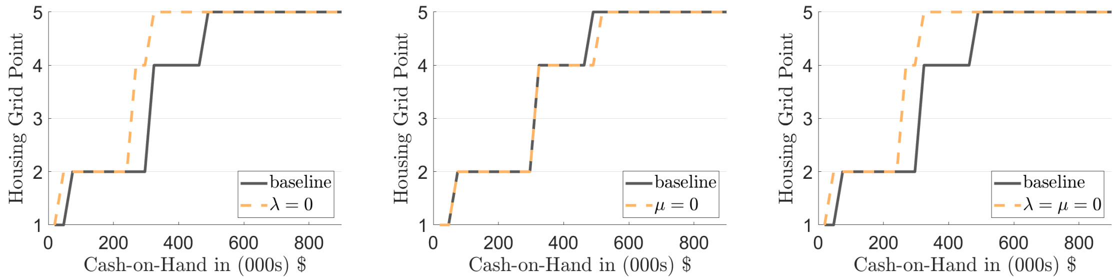
(a) Asset Accumulation (b) Homeownership Rate (c) (Cond.) Housing Wealth

Notes: Figure 8 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.

No Divorce ($\lambda = 0$). In the absence of divorce risk, couples reduce their financial savings on average by around 30% (Figure 8a), which corresponds to around \$84,000 which is the average annual labor income of couples. This effect arises because first, divorce requires

[25] The documented results are robust to assuming that all households face the same marital transition risk as homeowners, to address the concern that housing tenure may affect the likelihood of getting married or divorced. See Appendix D.5 for details.

Figure 9: Housing Policy Functions – Couples



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

Notes: Figure 9 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 40 who rent the smallest house size and have a medium productivity realization.

households to allocate their (indivisible) house and results in a destruction of part of their financial assets. Second, a divorce leads to increased income risk exposure and to a drop in labor income, which matters because, through economies of scale, more than half of the previous consumption level is necessary to maintain the same level of utility. In Section 5.3, I quantify the relative importance of each of these channels for explaining the lower asset holdings of couples in the absence of divorce.

Moreover, Figure 9a shows that shutting down divorce lowers the asset threshold at which couples transition into ownership and at which they increase their housing size, reflecting a stronger demand for housing. As a result, the homeownership rate of couples increases by around 2%, corresponding to in increase of 1.4%-points (Figure 8b). This overall increase is rather small because the distribution of couples shifts towards lower-asset households. In addition, as displayed in Figure 8c, the conditional housing wealth of couples increases as higher housing demand induces equally rich couples to invest in larger homes.

Furthermore, in the absence of divorce, financial savings of singles decline on average by 3.5%. Out of this 3.5%, ca. half arises from a reduced saving motives of singles for the event of getting married. The remaining half, in contrast, reflects a composition effect: on aggregate, never married singles hold slightly less financial wealth than divorcees but invest more into housing, reflecting that divorced singles had the possibility to accumulate more financial assets during marriage but may have ended up without the house. Consequently, the share of single homeowners increases in a world without divorce. In addition, 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, allows for the possibility to pool income, and to benefit from economies of scale. As a result, singles increase their financial asset holdings by around 21.5% (Figure 8a) when shutting down marriage. This increase corresponds to $33,600 or almost 85% of the average single's annual income. In addition, singles' housing demand increases as they no longer face the possibility of meeting a partner and having to sell the house. Quantitatively, in the absence of marriage, the homeownership rate of singles increases by almost 40%, or 14.5%-points (Figure 8b). In contrast, as some previously renting singles now own the smallest owner-occupied house, the conditional housing wealth of singles declines (Figure 8c).

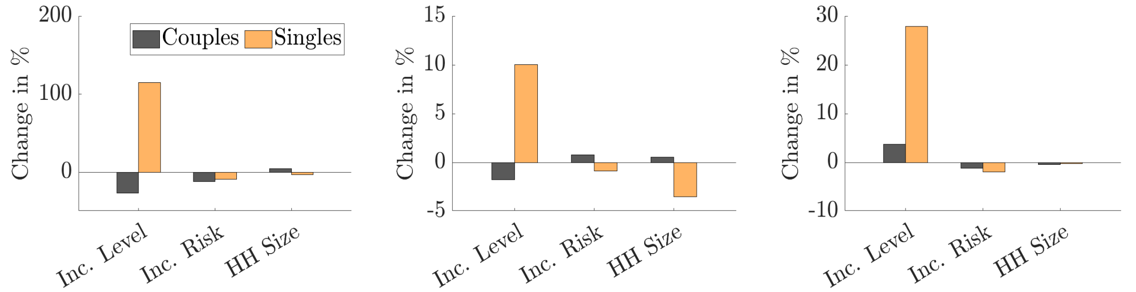
The stronger savings motives of singles induces couples to save more as well because they want to hold sufficient financial assets for the event of a divorce (Figure 8a). As a result, the homeownership rate of couples increases slightly. However, as these changes are quite small, the house value of owning couples remains almost the same as in the baseline (Figure 8c).

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 hardly differs to the one without only divorce. For singles, in contrast, the share of homeowners increases by almost 55%, compared to around 17% and 40% in the previous two counterfactuals, respectively. Again, this result reflects a combination of their increased housing demand and the fact that never married singles are one average more likely to be homeowners than divorced individuals.

5.2 Further Factors

Figure 10 plots the changes in investment behavior in response to altering singles' labor income profiles (separately for the deterministic and stochastic component) as well as their average number of household members to the corresponding value of couples. Again, all changes are expressed in percent.

Figure 10: Counterfactuals – Further Channels



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

Notes: Figure 10 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.

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. As a result, their aggregate homeownership rate declines as well (Figure 10b), shifting the conditional distribution of owners towards larger homes, as some previous owners of the smallest house are now renting (Figure 10c).

Income risk. When assigning singles the stochastic part of couples' labor income process, I lower their exposure to income fluctuations. As a result, financial savings and the share of homeowners among singles decline (Figures 10a and 10b). As before, divorce is now less financially risky for couples than in the baseline. Therefore, they accumulate fewer financial assets and, through reduced risk exposure, increase their demand for housing, resulting on aggregate in a slightly higher homeownership rate.

Household Sizes. When assigning singles the same average number of household members as couples, I increase their household size, conditional on age. In response, singles have larger consumption needs, resulting in lower financial savings, lower homeownership rates, and a (small) decline of conditional house values. For couples, divorce becomes more risky, and in response, their financial savings increase. However, overall, the effect of changing household sizes is quantitatively small, especially when compared to the importance of marital transition risk and heterogeneity in labor income profiles.

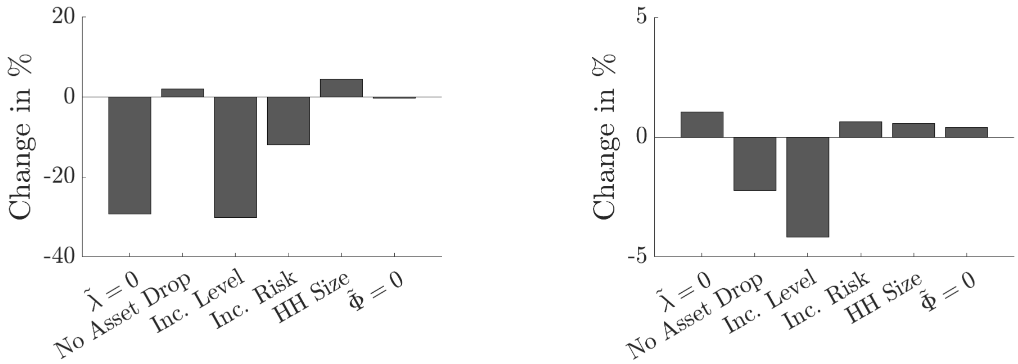
5.3 What makes Divorce Risky?

In a world without divorce, couples decrease their financial savings and increase their demand for (illiquid) housing. This response is a combination of various mechanisms in the model: 20% of financial assets being exogenously destroyed following a divorce, a sudden change in their labor income profile (both in terms of level and risk), shifts in the average number of household members, as well as the indivisible nature of housing.

The goal of this section is to quantify the relative importance of each channel. To do so, I first compute households' decision rules when turning off one channel at a time. Then, I simulate the model but keep all elements – except for the counterfactual decision rules – fixed as in the baseline. This way, I can capture the relative importance of each channel that arises from household behavior, as opposed to from exogenously imposed shifts in e.g. resources. Figure 11 reports the corresponding change in couples' financial asset holdings and homeownership rates for each counterfactual with regard to the baseline. The bars labeled as "$\tilde{\lambda} = 0$" display the response when households believe that they cannot get divorced (but actually face the empirical divorce risk), "No Asset Drop" denotes the case when they believe that none of their financial assets will be exogenously destroyed following a divorce, "Inc. Level" the case in which households believe singles to have the same income level as couples, "Inc. Risk" when they expect singles to face the same income risk as couples, and "HH Size" the case where they act under the assumption that household sizes are fixed across family types. Lastly, to evaluate the importance of the illiquid nature of housing, the bars labeled as "$\tilde{\Phi} = 0$" show couples' responses when they believe that houses can be liquidated without cost (that is, if the adjustment costs Φ are zero) in the event of divorce.

As displayed in Figure 11a, lower asset holdings of couples in a world without (perceived) divorce risk mainly arise from changes in their income profile associated with a marital dissoluation. After a divorce, couples face a drop in household income and, at the same time, their exposure to income fluctuations rises, encouraging them to accumulate more financial assets to insure themselves against that risk. Hence, if households believe that

Figure 11: Decomposing the Riskiness of Divorce



(a) Asset Accumulation

(b) Homeownership Rate

Notes: Figure 11 plots the change in couples' financial asset accumulation (Figure 11a) and homeownership rates (Figure 11b) when households believe that they cannot get divorced ("$\tilde{\lambda} = 0$"), that no financial assets are being exogenously destroyed in the event of divorce ("No Asset Drop"), and that singles have the same income level ("Inc. Level"), same income risk ("Income Risk"), or same number of household members ("HH Size") as couples. "$\tilde{\Phi} = 0$" shows the case when households act as if housing can be liquidated without cost in the event of divorce. All changes are expressed in percent with respect to the baseline model.

singles have the same income level as couples, the distribution of couples shifts towards lower-asset households, resulting in a lower homeownership rate (Figure 11b). In contrast, despite couples being on average less wealthy, the share of owning couple increases if households believe that singles face the same income risk as couples (Figure 11b). In that case, divorce is a less risky outcome than in the baseline and therefore, couples are more willing to invest in illiquid housing.

Moreover, abstracting from the partial destruction of household's financial assets in the case of divorce induces couples to shift their portfolio from housing towards financial savings, as these are no longer being destroyed. Finally, the illiquid nature of housing is more important for explaining changes in homeownership rates than in financial savings. If couples act as if houses could be liquidated without cost in the event of divorce, their homeownership rate increases, whereas their financial savings hardly change compared to the baseline.[26]

[26] An alternative way of analyzing the importance of illiquidity is to impose that couples believe that they either always or never have to sell their house in case of divorce. Similar to Figure 11b, both exercises have hardly any effect on financial asset accumulation, however they either result in a substantial decrease or increase of homeownership rates, respectively.

5.4 Testable Model Predictions

Marital Transition Risk. The model predicts that higher divorce risk reduces couples' demand for illiquid housing and increases their demand for liquid financial assets. In contrast, expected marriage lowers both housing investments and financial wealth holdings of singles. To test these predictions in the data, I work with the PSID (due to its panel dimension) and compare portfolio choices of couples (singles) who will eventually get divorced (married) to those who will not. Hence, the underlying assumption of this specification is that individuals have some knowledge about their future marital transitions which is unobserved to the econometrician. I first split the sample by marital status and then estimate the following household-level specification:

$$\mathcal{Q}_{itr} = \beta * \text{future marital trans}_{itr} + X_{itr} + \tau_t + \delta_r + \psi_{tr} + \epsilon_{itr}$$

where β is the coefficient of interest and represents a dummy indicating whether a couple will divorce in the future or if a single will get married, respectively.[27] As portfolio choices $\mathcal{Q}_{itr}$, I include the homeownership rate, house values and home equity of owners, as well as the saving rate and saving amount in financial assets. I define financial savings as total household income net of all expenditures that can be observed in the PSID. The term τ_t denotes time fixed effects, the term δ_r region fixed effects, and the term ψ_{tr} time-region fixed effects. The vector of control variables X_{it} includes age, the inverse hyperbolic sine transformation of total household income, total number of children, education dummies (no high school degree, high school degree), race dummies. In addition, I control for the inverse hyperbolic sine transformation of financial wealth in the housing specifications, and for housing wealth in the financial saving specifications. Finally, I control for the length of marriage within couples. Table 4 displays the estimated coefficients of interest β. In line with model predictions, couples who will eventually divorce are less likely to be homeowners than those for whom I do not observe such an event (*Panel I*, Column (1)). In addition, although not statistically significant, I find a negative relation between a future divorce and

[27] Among those who are coded as "will not divorce/marry", I cannot observe whether they divorce or marry after dropping out of the sample, or if they will do so in the future. In that way, the estimates in Table 4 reflect a lower bound on the relation between prospective marital transitions and household portfolio choices.

both home equity and the house value among owners (*Panel I*, Columns (2)-(3)). In contrast, both measures of financial saving behavio display a positive sign which is in line with the predictions derived from the structural framework.

Moreover, all $\beta-$coefficients in the specifications on single households (*Panel II* of Table 4) point in the same direction as the model would imply: they are negative across both housing choices and financial saving behavior. However, except for home equity and saving amount, they coefficients are not statistically significant different from zero.

Table 4: Effect of Future Marital Transition on Portfolio Choices

	(1) Homeowner	(2) Home Value (Conditional)	(3) Home Equity (Conditional)	(4) Saving (Amount)	(5) Saving (Rate)
Panel I: Couples					
Will Divorce	-0.0477***	-0.0261	-0.0468	0.109	0.0319
	(0.0132)	(0.0286)	(0.125)	(0.245)	(0.0203)
Controls included	√	√	√	√	√
Observations	23,661	20,322	20,322	14,711	14,711
Panel II: Singles					
Will Marry	-0.0107	-0.0419	-0.338*	-0.516**	-0.0250
	(0.0167)	(0.0496)	(0.194)	(0.259)	(0.0281)
Controls included	√	√	√	√	√
Observations	10,816	5,467	5,467	7,434	7,434

Notes: Estimations are based on OLS regressions on the sample of couples (*Panel I*) and singles (*Panel II*). Data is from the Panel Study of Income Dynamics (PSID), waves 1989-2017. *Will Divorce* is a dummy indicating that the couple will eventually get divorced. *Will Marry* is a dummy indicating that the single will eventually get married. Control variables include age, total household income, total number of children, education dummies, race dummies, financial wealth (for housing specifications), housing wealth (for saving specifications), as well as time, region, and time-region fixed effects. In *Panel I*, I additionally control for the length of the marriage. Saving is defined as total household income net of expenditures. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Labor Income. According to the model, the income drop following a divorce is one key channel that induces couples to accumulate more financial wealth in the presence of higher divorce risk (see Section 5.3). To test this prediction in the data, I estimate a state-level specification that regresses measures of couples' financial saving behavior on the average single income within each state-year cell, controlling for the average income of couples, age, average financial wealth holdings, homeownership rates, region fixed effects, and year fixed effects. The underlying assumption is that couples form expectations about their own labor income after a (potential) divorce by observing single individuals around them. Table 5 displays the results. In line with model predictions, I find a negative relation between the average income of single households and the amount and rate at which couples save in financial assets, conditional on their own income.[28]

Table 5: Saving Behavior of Couples by Singles' Income at State Level

	(1) Saving of Couples (Amount)	(2) Saving of Couples (Rate)
Mean Income Singles	-0.0101	-0.108**
	(0.0209)	(0.0435)
Mean Income Couples	0.229***	1.597***
	(0.0324)	(0.0675)
Controls included	√	√
Observations	386	386

Notes: Estimations are based on OLS regressions. Data is from the Panel Study of Income Dynamics (PSID), waves 1989-2017. *Mean Income Singles* refers to the average labor income of singles by state x year. Correspondingly, *Mean Income Couples* refers to the average labor income of singles by state x year. Control variables include average age across households, average financial wealth, the homeownership rate, as well as region and year fixed effects. Saving is defined as total household income net of expenditures. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

6 Implications for Housing Policy Evaluation

In this section, I address the second research question and show that abstracting from distinct family types is misleading in evaluating the effectiveness of policies that aim at stimulating homeownership, especially among young households.

To do so, I first lower the transaction costs of housing Φ from 5% to 1% of the house price. As a real-world equivalent, one could think of a reduction in property transaction taxes. Sánchez and Andrews (2011) find that taxes constitute on average half of housing transaction costs in OECD countries. Hence, policies that aim at lowering these costs tend to be common (see e.g. Schmidt (2022) for an overview of recently evaluated transaction tax reforms). Second, I reduce property taxes by decreasing annual maintenance costs π from 1% to 0.75% of the house price.[29]

[28] Controlling for couples' average income is important because it ensures that the estimates are not driven by selection into being single or couple in terms of income.

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

Given this section's aim of understanding how family composition affects housing policy evaluation, I focus on one policy that reduces the costliness of holding illiquid assets when getting married or divorced (i.e., the first one), and compare it a reform that lowers the tax on the stock of housing, irrespectively of any changes in the family composition (i.e., the second one). In addition, to make both policies comparable in magnitude, I require the average per-household gain to be similar across reforms.[30]

Finally, to analyze the importance of marital risk and family composition, I perform the same policy exercises in a standard framework with one generic household type which I calibrate to the *pooled sample* of all individuals in my sample.[31]

6.1 Increasing Homeownership

Table 6 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, one household type, framework.

In the benchmark economy (*Panel I*), lowering transaction costs results in an increase of homeownership rates on aggregate by around 4.5%pts which is in line with previous studies.[32] In contrast, lowering property taxes increases aggregate homeownership rates by around 2.5%pts. Hence, in the baseline framework, reducing the adjustment costs of housing appears to be almost 75% more effective than lowering the per-period cost of owning a house.

[30] For example, when lowering housing adjustment costs, I calculate the overall "savings" on all housing transactions that occur in the economy after the policy implementation (that is, 4% of the respective house price per transaction) and average these savings across all years and households.

[31] See Appendix E for details.

[32] Schmidt (2022) estimates an increase in homeownership rates by 1-5%pts in response to a 2%pts reduction in transfers taxes in the Netherlands, Han, Ngai, and Sheedy (2023) an increase of 2.4%pts in response to lowering transfer taxes by 1.3%pts in Toronto, and Cho, Li, and Uren (2021) an increase of 2%pts in response to reducing transfer taxes by 4%pts in Australia (they, however, also replace transaction taxes with a revenue-neutral increase in property taxes). Kaas, Kocharkov, Preugschat, and Siassi (2021) find that the homeownership rate in Germany would rise by around 8%pts if transfer taxes where lowered by by 5%pts, and that this effect is increasing over the life-cycle.

Table 6: Effectiveness of Housing Policies Across Frameworks

	Δ Homeownership Rate	
	$\Phi \downarrow$ ($5\% \rightarrow 1\%$)	$\pi \downarrow$ ($1\% \rightarrow 0.75\%$)
Annual per-HH Gain:	\$432	\$430
Panel I: Benchmark		
Couples	+4.57%pts	+2.57%pts
Single Men	+4.21%pts	+2.94%pts
Single Women	+3.38%pts	+2.17%pts
Aggregate	+4.45%pts	+2.56%pts
Panel II: $\lambda = \mu = 0$		
Couples	+3.73%pts	+2.34%pts
Single Men	+3.63%pts	+4.77%pts
Single Women	+2.50%pts	+2.86%pts
Aggregate	+3.64%pts	+2.63%pts
Panel III: One HH-Type	+8.54%pts	+5.58%pts

Notes: Table 6 reports the average increase in homeownership after lowering housing transaction costs ($\Phi \downarrow$) and 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)*.

When shutting down marital transitions (*Panel II*), homeownership rates increase by 3.64%pts when lowering adjustment costs and by 2.63%pts when reducing property taxes, implying that facilitating housing adjustments ($\Phi \downarrow$) appears to only be around 40% more effective than lowering property taxes ($\pi \downarrow$). Finally, the reduced framework which abstracts from both marital risk and distinct family types (*Panel III*) predicts both policies to be on aggregate more effective than the benchmark model, with this misspecification being more pronounced for the second policy. Compared to *Panel I*, the one household type framework overstates the effectiveness of lowering transaction costs by 92% and that of lowering property taxes by 118%.

As discussed in Section 5.3, the presence of marital transition risk lowers households' willingness to invest in owner-occupied housing because of its illiquid nature. As a result, households are more responsive to policies that aim at stimulating housing demand in models that abstract from this source of risk.[33] In addition, as households do not face the risk of having to sell their house following a change in family status, it is relatively less important for them to be able to do so at little cost. Therefore, the reduced framework overstates the effectiveness of reducing property taxes by more than that of lowering housing adjustment costs. Hence, abstracting from distinct family types and marital transition risk not only overstates effectiveness of housing policies but can also bias the comparison across reforms.

6.2 Heterogeneity over the Life-Cycle

This section explores whether the magnitude of the policy misspecification across the benchmark model and the reduced framework varies over the life-cycle. Table 7 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 fraction of homeowners increases for each age group, including the oldest, suggesting that the overall increase in the homeownership rate is not merely driven by faster transition into ownership. Additionally, the discrepancy across frameworks is strongest among young households, especially when lowering transaction costs: abstracting from family types overstates the response of households below age 40 by 364%, of middle-aged households by 91%, and of old households by 54%. Marital transition risk is highest for young households and hence, abstracting from that risk increases overstates the attractiveness of housing investments the most for this age group. As a result, their response to the introduction of housing policies is amplified the most in the one-household type framework. However, in the US, many housing policies are primarily targeted towards young households, further emphasizing the importance of taking into account family composition and marital transition risk when evaluating such reforms.

[33] Note that the weaker response to the first policy in *Panel II* is mainly driven by the overall higher homeownership rate in the framework without marriage and divorce even in the absence of any policy reform (see Figure 8).

Table 7: 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	+1.33%pts	+4.69%pts	+6.52%pts
Single Men	+3.09%pts	+5.59%pts	+4.06%pts
Single Women	+1.24%pts	+3.52%pts	+4.64%pts
Aggregate	+1.45%pts	+4.66%pts	+6.15%pts
One HH-Type	+6.73%pts	+8.93%pts	+9.50%pts
Difference	364%	91%	54%
Panel II – Property Taxes ↓:			
Couples	+1.60%pts	+2.85%pts	+3.00%pts
Single Men	+2.68%pts	+3.99%pts	+2.44%pts
Single Women	+0.53%pts	+3.20%pts	+2.91%pts
Aggregate	+1.60%pts	+2.96%pts	+1.76%pts
One HH-Type	+5.75%pts	+5.80%pts	+5.26%pts
Difference	223%	96%	198%

Notes: Table 7 reports the average increase in homeownership after lowering housing transaction costs ($\Phi \downarrow$, *Panel I*) and property taxes ($\pi \downarrow$, *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 relative to the aggregate increase in the benchmark.

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 heterogeneous and dynamic 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 financial assets whereas it depresses savings of singles, contributing to the observed marital gaps in financial wealth and homeownership rates.

In addition, I show that abstracting from distinct family types and marital transition risk amplifies the effectiveness of policies aimed at stimulating housing demand because it overstates the attractiveness of illiquid housing. This bias is most strongly pronounced among young households whose marital transition risk is highest. However, young households are also the primary target group of many housing policies in the US, highlighting the importance of taking into account marital status when evaluating or designing such reforms.

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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. I weigh each observation by the provided survey weights to ensure the representativeness of the US population.

For income variables and demographic characteristics I use data from the Panel Study of Income Dynamics (PSID) spanning from 1989 until 2017. Because the Survey of Consumer Finances starts in 1989, I restrict my sample taken from the PSID to waves from 1989 until 2017. Data were collected annually until 1997 and afterwards every two years. 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 and drop the lowest and upper percentile of all financial variables.

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, 4,696 single men, and 7,512 single women.

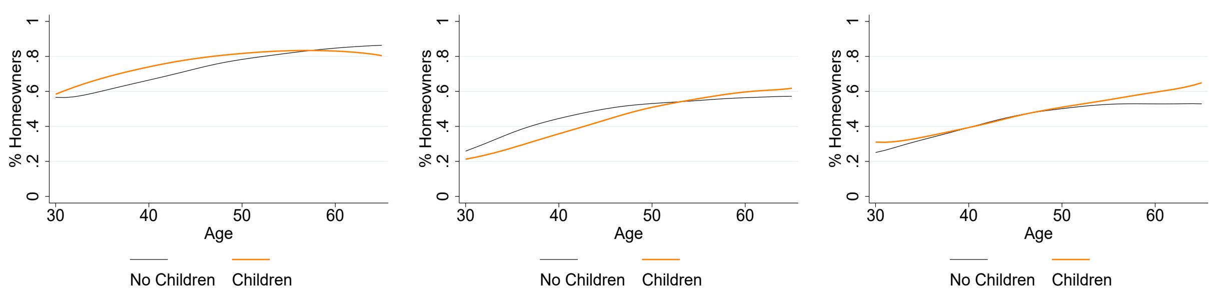
A.2 Supplementary Figures & Tables

A.2.1 Children

Couples and single women are more likely to have children than single men, what in turn may affect their housing choices. To test for this possibility, Figure 12 plots the homeownership rate of couples, single men, and single women with and without children, whereas Figure 13 documents the corresponding home values of owners.[34]

Conditional on family type, households with and without children have almost identical homeownership rates and invest, conditional on owning, very similar amounts into housing. Hence, it seems that marital status per se is a more important predictor for investment 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. Related, Chang (2023) finds that while changing marital transition probabilities have contributed significantly to changes in housing choices of couples and singles between 1970 and 1995, the decline in fertility over the same period has only played a negligible role.

Figure 12: Children and Homeownership Rate by Family Type



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

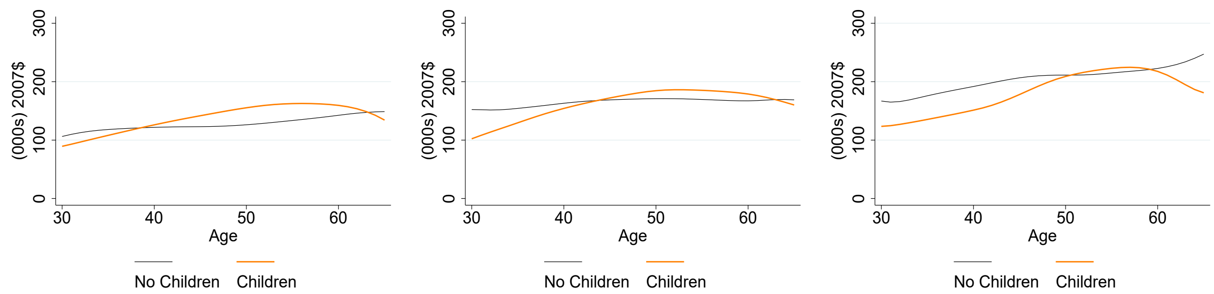
Notes: Figure 12 plots the life-cycle profiles of homeownership rates by family type and whether or not the household has children. "Children" refer to all children who live in the same household or who are younger than 25 and live elsewhere. Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

A.2.2 Housing Expenditure Share by Marital Status & Kids

Figure 14 reports 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 of overall

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

Figure 13: Children and Conditional House Value by Family Type

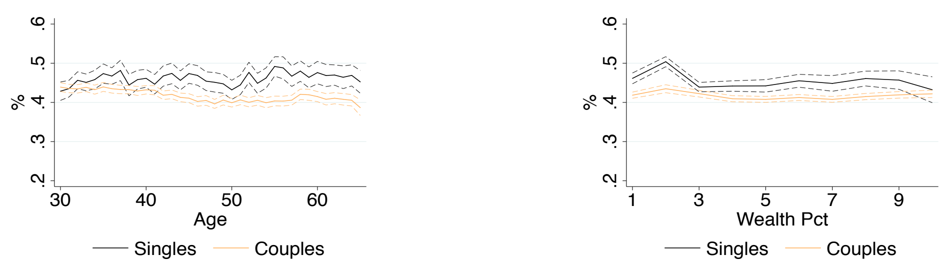


(a) Couples (b) Single Women (c) Single Men

Notes: Figure 13 plots the life-cycle profiles of conditional housing wealth by family type and whether or not the household has children. "Children" 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.

reported expenditures that a household allocates to the housing category. While the housing expenditure share is constant over age and wealth deciles, it is higher for singles than for couples. To allow for this pattern in the model, I relax a common assumption in the housing literature that the momentary utility function $g(c, s)$ takes the Cobb-Douglas form, which implies an elasticity of substitution between non-durable consumption and housing services of one (i.e. $\nu = 0$) (e.g. Cocco, 2005, Yang, 2009).

Figure 14: Housing Expenditure Shares by Marital Status



(a) By Age (b) By Wealth Decile

Notes: Figure 14 plots housing expenditures across marital states by age and wealth deciles. 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.2.3 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 8 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 the SCF. 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 be not statistically significant different from zero.

Table 8: Mortgage Characteristics by Family Type (Data)

	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)

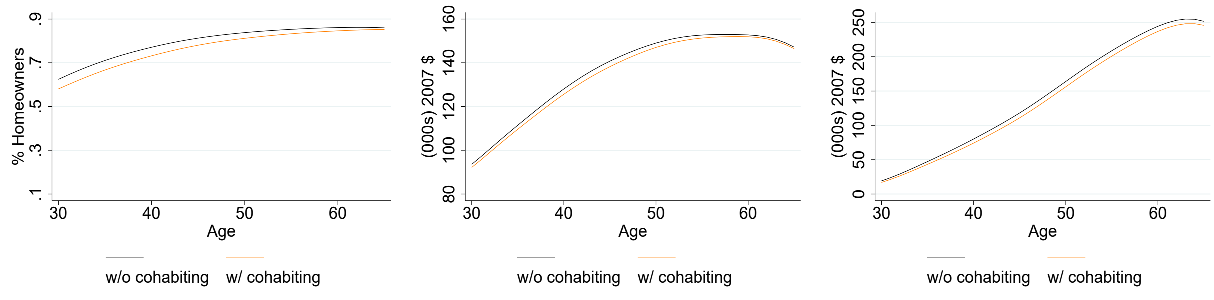
Notes: Table 8 reports average mortgage rates and share of households with adjustable rate mortgages by family type. All values are expressed in % and refer to the mortgage that the respective household lists as primary, or "first", mortgage. 95% confidence intervals in parentheses. Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

B Robustness Checks – Empirics

B.1 Cohabiting Couples

Throughout the benchmark analysis, I drop couples who cohabit but are not legally married because the implications for asset splitting rules upon break-ups strongly differ across these two arrangements. However, as documented for example in Adamoupoulou, Hannusch, Kopecky, and Obermeier (2022), the share of cohabiting individuals has more than doubled throughout my sample period. Therefore, Figure 15 and Figure 16 replicate the main figures from Section 2 when either including cohabiting households in the couples or singles category to ensure that the document patterns are not driven by cohabiting individuals (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 single households.

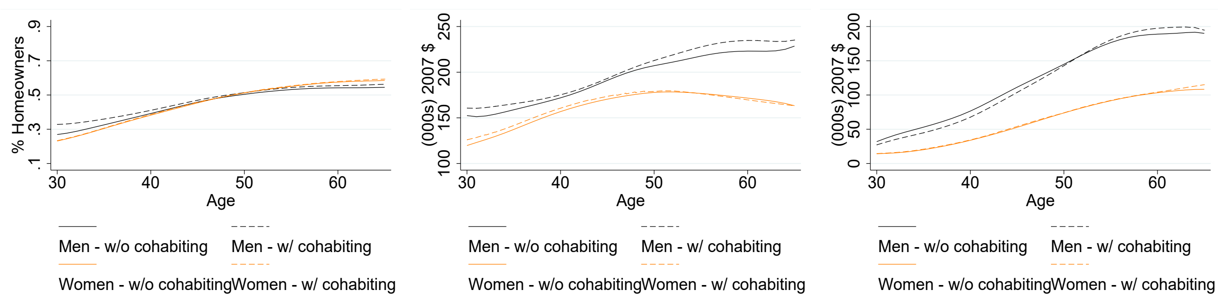
Figure 15: Robustness to Cohabiting Individuals – Couples



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

Notes: Figure 15 plots homeownership rates, the average house value of owners, and financial assets of couples, with and without including cohabiting individuals in the couples category (orange and black lines, respectively). Data is from the Survey of Consumer Finances (SCF), waves 1989-2016.

Figure 16: Robustness to Cohabiting Individuals – Singles



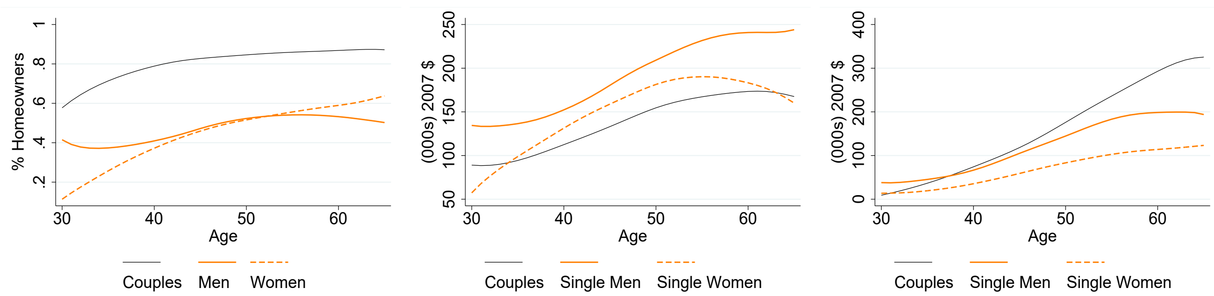
(a) Homeownership Rates (b) (Cond.) House Value (c) Financial Assets

Notes: Figure 16 plots homeownership rates, the average house value of owners, and financial assets of single men (black lines) and single women (orange lines), with and without including cohabiting individuals 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 investment patterns look very different depending on whether one controls for cohorts or year effects. To therefore ensure that the reported life-cycle patterns in Section 2 are not driven by differences in investment behavior across cohorts, Figure 17 reports the life-cycle profiles of homeownership rates, conditional house values, and financial assets for individuals who were born between 1945 and 1960. As for the entire sample, I find a positive marital gap in homeownership rates and (financial) asset holdings. Additionally, the conditional house value of singles is higher than that of couples, in line with the benchmark results.

Figure 17: Portfolio - Robustness to Cohort Effects



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

Notes: Figure 17 plots homeownership rates, the average house value of owners, and financial assets 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.

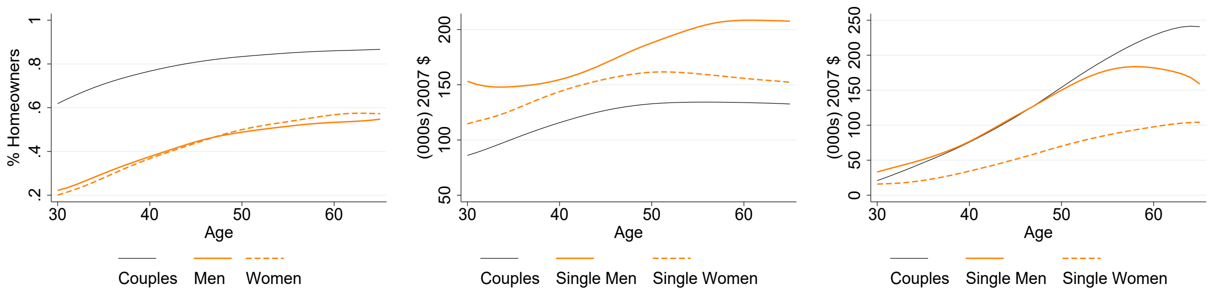
B.3 Excluding Housing Boom and Bust Years

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. One potential concern is that these episodes had heterogeneous effects across family types and may drive the documented marital gaps in housing choices or financial wealth. Therefore, Figure 18 reports the life-cycle profiles of homeownership 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.

B.4 Geographical Variation

If singles and couples sort into different neighborhoods, the observed differences in housing choices may be driven by heterogeneous types of owner occupied houses available in the respective locations or by spatial heterogeneity in house prices. To test for this channel, Figure 19a documents that the marital gap in homeownership rates is positive (i.e. that the share of homeowners is higher among couples than among singles) in every US state.

Figure 18: Portfolio - Robustness to Boom & Bust Periods

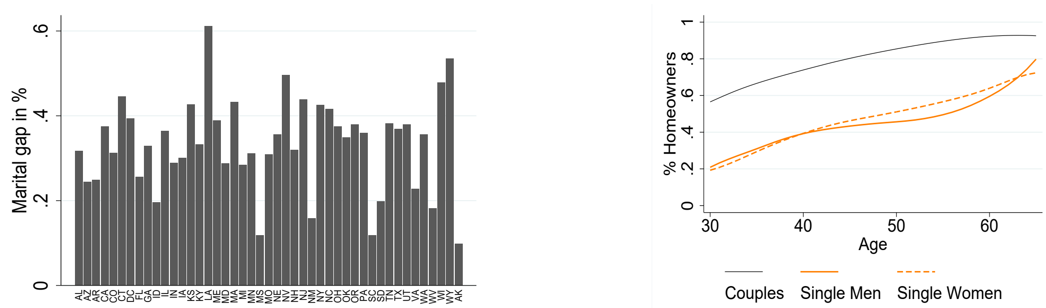


(a) Homeownership Rate (b) (Cond.) House Value (c) Financial Assets

Notes: Figure 18 plots homeownership rates, the average house value of owners, and financial assets 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.

Moreover, the life-cycle profiles of homeownership rates across family types of households who live in metropolitan areas closely resemble those of the entire population (Figure 19b).

Figure 19: Homeownership Rates - Robustness to Geographical Variation



(a) Marital Gap in Homeownership by State (b) Homeownership in Metropolitan Areas

Notes: Figure 19a plots the marital gap in homeownership rates (average homeownership rate of couples minus average homeownership rate of singles) by state. Figure 19b plots the homeownership rates of couples, single men, and single women who live in metropolitan areas, as defined by the 2013 Beale-Ross Rural-Urban Continuum Codes. Data is from the Panel Study of Income Dynamics (PSID), waves 1989-2017 for Figure 19a, and waves 2015-2017 for Figure 19b (which are the only waves in my sample that contain information on whether the HH lives in a metropolitan are).

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. 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. (2020) and first split the sample by family type to then separately regress the inverse hyperbolic sine transformation of income for household i at age j,

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

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. To obtain shifters by gender for singles, 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 9) inform me about the deterministic component of the labor income process which can be split into a constant and an age-specific part.

Table 9: 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	

Notes: Estimations are based on (fixed-effect) OLS regressions with data from Panel Study on Income Dynamics (PSID), waves 1989-2017. Corresponding Figure is Figure 3 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

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

I discretize the stochastic income process (as specified in Section 3.3) following Farmer and Toda (2017), and need to estimate five parameters per family type. Table 10 summarizes the estimation results and Table 11 shows the corresponding data fit. My point estimates imply almost equal persistence (ρ) 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 processes match very well the standard deviation and the kurtosis for both income changes and income levels by family type in the data (Table 11). In addition, they replicat the less negative skewness in income changes for single the estimated processes imply slightly too large values for the skewness in the cross sectional dispersion of income realizations when compared to the data.

Table 10: 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 10 presents the estimation results for the stochastic part of the income process by family type, following the parameterization explained in Section 3.3.

C.3 First Stage: Marriage and Divorce Probabilities

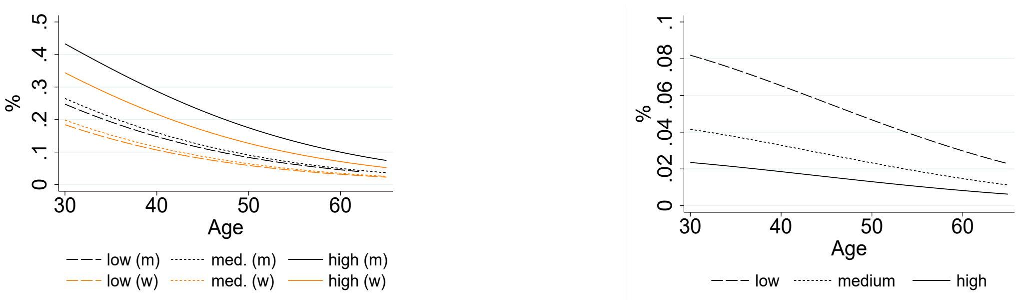
Figures 20 plot the life-cycle profiles for divorce and marriage probabilities by productivity realization and, in the case of marriage, by gender. All profiles are obtained by running logit regressions on PSID data, as specified in Section 4.1.

Table 11: 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 11 compares second, third, and fourth moments of income levels in the cross section as well as 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 10. Data is from the Panel Study of Income Dynamics (PSID), waves 1989-2017.

Figure 20: Marital Transition Probabilities (Data)



(a) Marriage Probability (b) Divorce Probability

Notes: Figure 20 plots marriage and divorce probabilities by age for individuals with a "low", "medium" and "high" productivity realization, respectively. In Figure 20a, (m) refers to men and (w) refers to women. Estimates are based on logit regressions. Data is from the Panel Study of Income Dynamics (PSID), waves 1989-2017.

D Robustness Checks – Model

D.1 Moving Frequency

Empirical evidence suggests that singles move more often than couples which in turn may alter their incentives to invest in illiquid housing (e.g. Mincer, 1978, Blackburn, 2010, Gemici, 2011, Burke and Miller, 2018). Hence, it is possible that the higher homeownership rate of couples can be (partially) explained by their lower moving frequency. To test for the importance of this channel, Figure 21 compares moving frequencies by marital status in the data to those generated by the model. Without being targeted, the model replicates those frequencies fairly well. In fact, it slightly overestimates the moving frequency of singles, while underestimating that of couples.

Figure 21: Moving Frequencies – Data vs. Model (untargeted)

(a) Couples (b) Singles

Notes: Figure 21 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 include owners and renters. Data is from the Panel Study of Income Dynamics (PSID), waves 1997-2017, and refers to the survey question "Did you move since the last interview"?

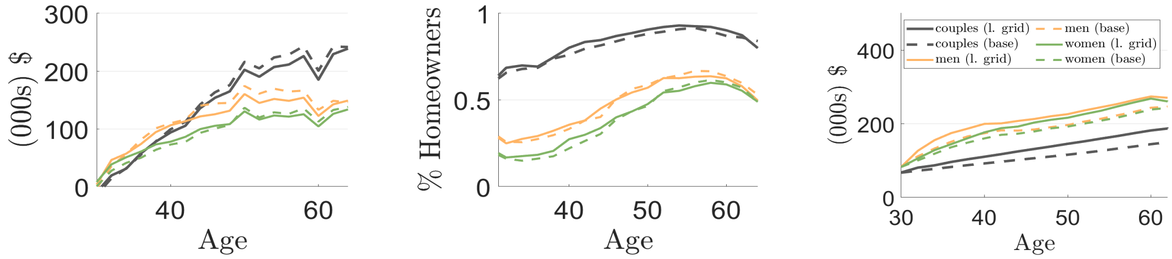
D.2 Housing Grid

Housing is defined over a discrete grid. Hence, some households who are located in the right tail of the asset distribution might be constrained by the largest house available. However, if these are mainly couple households, their lower (per capita) housing wealth in the model might be a mechanical outcome of the housing grid specification. To address this concern, Figure 22 compares average financial assets, homeownership rates, and conditional house values across family types in the baseline model to a version in which I introduce an additional house that is 1.3 times larger and 1.3 times more expensive than the biggest one previously available. While the introduction of this additional house hardly affects financial wealth holdings and homeownership rates, it increases the housing wealth among owners. However, this increase is very similar across all family types, ensuring that the baseline results are not driven by too few housing options.

D.3 Equilibrium Approximations

I conduct all policy experiments in Section 6 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

Figure 22: Robustness Exercise – Increasing the Housing Grid



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

Notes: Figure 22 compares the life-cycle profiles of financial savings, homeownership rates, and conditional house values across family types in the baseline model (dashed lines) to a version that allows for an additional house that is 1.3 times more expensive than the biggest one in the benchmark framework (solid lines).

simplification, I follow Paz-Pardo (2023) and approximate potential equilibrium effects on house prices by re-performing the policy exercises under the assumption that owner-occupied housing supply is characterized by an 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 that housing demand is characterized by the function $H^d = X - 500p_H$. Imposing the empirical housing supply elasticity of $\epsilon = 1.75$, the goal is to find the new house prices p'_H, such that:

$$\sum_i H^{d'}(p'_H) = H^{s'} \qquad \text{where} \qquad \epsilon = \frac{\frac{p'_H - p_H}{p_H}}{\frac{H^{s'} - H^s}{H^s}}$$

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 property taxes.

In addition, it is possible that couples who own a house are less likely to separate and hence, divorce rates decrease in response to the introduction of both housing policies. In turn, singles may postpone marriage if they are homeowners. Therefore, I re-run the policy exercises under the assumption that marriage and divorce rates drop by 20% in response to their introduction. *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 – Equilibrium Approximations

	Δ Homeownership Rate	
	$\Phi \downarrow$ (5% $\to$ 1%)	$\pi \downarrow$ (1% $\to$ 0.75%)
Panel I: Adjusting House Prices		
Couples	+4.74%pts	+1.55%pts
Single Men	+3.37%pts	+2.04%pts
Single Women	+4.20%pts	+2.75%pts
Aggregate	+4.49%pts	+1.67%pts
One HH-Type	+8.67%pts	+9.61%pts
Panel II: Marital transition rates $\downarrow$		
Couples	+4.66%pts	+2.42%pts
Single Men	+7.00%pts	+6.26%pts
Single Women	+5.30%pts	+3.30%pts
Aggregate	+4.88%pts	+2.77%pts

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

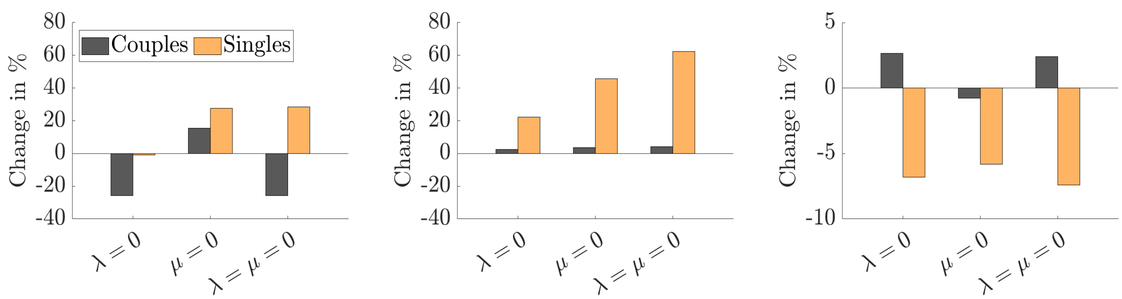
D.4 House Prices

In the model, the return on housing is deterministic. The rationale behind this modeling choice is threefold. First, the focus of this paper is to understand how channels that *heterogeneously* affect couples and singles translate into different investment choices. In contrast, all households are equally exposed to house price risk. Second, previous literature (e.g., Cocco, 2005) has shown that house price risk does not significantly affect housing demand, because housing primarily serves as a consumption good. Third, Adelino, Schoar, and Severino (2021) document that the majority of US households (71%) perceive housing as a safe investment.[35] Even in 2011, shortly after the financial crisis and the corresponding house price crash, 66% of households considered housing as safe.

D.5 Marital Transition Risk of Owners

One potential concern for my analysis is that housing tenure affects marriage and divorce probabilities. Therefore, to provide a lower bound of my estimates, I conduct a robustness exercise in which I feed in the empirical marital transition risk of homeowners, meaning that I lower the divorce risk but increase the probability of getting married. Figure 23 documents changes in asset holdings, homeownership rates, and conditional housing wealth in response to entirely shutting down marriage and divorce compared to that counterfactual model version. The results hardly differ to the baseline case (Figure 8 in Section 5.1), ensuring that my results are not driven by heterogeneous marital transitions rates across owners and renters.

Figure 23: Counterfactuals – Marital Transition Risk of Homeowners



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

Notes: Figure 23 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 ($\mu = \lambda = 0$) in comparison to a model version that assumes all households face marriage and divorce probabilities of only homeowners. The gray bars refer to couples whereas the orange bars denote singles. All changes are expressed in percent.

E Reduced Framework

The reduced economy can be described by two value functions, one for working age V_W^B and one for retirement V_R^R, respectively:

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

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

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

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

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

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

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

I calibrate the reduced framework to the pooled sample of all households. As before, I estimate the first-stage parameters directly from the data: 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 by Guner et al. (2014). Next, I re-calibrate the remaining parameters to match key data moments in the pooled sample. Thereby, I start from the initial set of parameters in the benchmark model and adjust them as little as possible to improve the data fit. In the final calibration, I only lower β from 0.89 to 0.88, γ from 1.5 to 1.4, and the stock market participation cost S^F from \$1,350 to \$1,313 p.a. Table 13 displays the corresponding data fit.

Table 13: Model Fit – One HH-Type Economy

	Data	Model
W/I at 45	1.24	1.25
Mean SMP at 45	47%	46%
homeownership rate at 45	66%	67%
Mean (cond.) house value at 45	\$257,000	\$209,000

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.