Discussion Paper Series – CRC TR 224

Discussion Paper No. 771
Project A 03, C 05

Limited Downsizing of Empty-Nesters: Elderly Housing Concentration and Fertility

Ursula Berresheim[1]
Marina Hoch[2]

July 2026

[1] Department of Economics, University of Mannheim Email: ursula.berresheim@uni-mannheim.de
[2]Department of Economics, University of Mannheim Email: marina.hoch@uni-mannheim.de

Support by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) through CRC TR 224 is gratefully acknowledged.

Limited Downsizing of Empty-Nesters: Elderly Housing Concentration and Fertility

Ursula Berresheim and Marina Hoch*

July 17, 2026

Click here for the latest version

Abstract

The United States faces record-low fertility rates amid persistently high housing costs and a constrained housing supply. One factor may be the limited downsizing of empty-nesters and retirees, which concentrates housing among elderly cohorts and restricts access for young families during their prime childbearing years. This paper investigates the link between low fertility and the high elderly housing concentration. In the U.S. context, we document a strong association between low fertility and both high elderly housing concentration and low housing supply elasticity. To quantify the underlying mechanisms, we develop a general equilibrium overlapping generations model with endogenous fertility and housing. In the model, two channels dominate: liquidity constraints among young households, which prevent them from accessing housing large enough to comfortably raise children, and habit formation among older cohorts, which discourages downsizing and fosters elderly housing concentration. We conduct counterfactual policy analysis aimed at raising fertility through a reduced elderly housing concentration. An increase in property taxation reduces elderly housing concentration, but depresses fertility and welfare. Liquidity-focused interventions are more effective: a targeted transfer to young parents simultaneously raises fertility, reduces concentration, and generates large welfare gains. Yet, the cohort-specific welfare decomposition shows that these gains come partly at the expense of older cohorts.

JEL Codes: J13, R31, E21, R21, J11, R38

Keywords: Fertility, Housing Markets, Housing Wealth Concentration, Demographic Change, Housing Affordability, Taxation

*We are deeply grateful to Michèle Tertilt, Matthias Meier, Moritz Kuhn and Andreas Gulyas for their invaluable guidance and support throughout this project. Furthermore, we appreciate the insightful comments and constructive feedback from Miren Azkarate-Askasua, Minki Kim, David Koll, and Ana Moreno-Maldonado. Their input has substantially improved this work. All remaining errors are our own. This research was supported by the state of Baden-Württemberg through bwHPC and by the German Research Foundation (DFG) through grant INST 35/1597-1 FUGG. Financial support from the German Research Foundation (CRC-TR-224 projects A03 and C05 and Gottfried Wilhelm Leibniz-Prize, TE 966/2-1) is gratefully acknowledged. Berresheim: Department of Economics, University of Mannheim (email: ursula.berresheim@uni-mannheim.de). Hoch: Department of Economics, University of Mannheim (email: marina.hoch@uni-mannheim.de).

1 Introduction

In the United States, fertility rates have fallen to historic lows alongside persistently high housing costs. While both phenomena have attracted growing policy concern, one piece of the puzzle has been received less attention: the intergenerational distribution of housing. Older homeowners occupy a large share of the housing stock, and their limited downsizing constrains the supply of homes for potential parents. The result is a tightening housing market in which young families face limited housing space and affordability pressures precisely during their prime childbearing years. This raises the main questions of our paper: Does the housing wealth of the elderly negatively affect young families' fertility? And if so, which channels drive this concentration, and which policies can address both outcomes simultaneously?

We document four stylized facts about the U.S. housing market: First, there is a negative relationship between the elderly concentration of housing and fertility rates. Second, fertility rates are higher in Metropolitan Statistical Areas (MSAs) with more elastic housing supply. Third, there is a concentration of housing space among elderly cohorts. Fourth, homeowners with children tend to live in larger homes and incur larger housing expenditures.

To address our research questions, we develop an overlapping-generations model with endogenous fertility. Households make decisions over housing, non-durable consumption, and savings, and in the first stage of adulthood, they additionally choose fertility. The economy features both a non-durable goods sector and a housing production sector. The government operates a pay-as-you-go pension system and redistributes tax revenues. The model captures two major trade-offs. The first is the fertility trade-off: households derive warm-glow utility from having children but face higher consumption expenses and a disutility from lower per capita housing space and quality. The second is the elderly downsizing trade-off: although older households no longer have children and experience lower incomes—factors that should reduce housing demand—habit formation, the bequest motive, and housing illiquidity limit their willingness and ability to downsize. Households do not internalize how their fertility choices affect future cohort sizes and social security tax burdens, while older cohorts do not consider how limited downsizing constrains housing supply and, in turn, influences fertility decisions. This raises the question whether policy interventions can simultaneously boost fertility and reduce elderly housing concentration.

We calibrate the model to U.S. data, targeting the age-specific profiles of durable and non-durable consumption, as well as aggregate bequests and fertility. We proceed in two steps: first, analyzing how different channels contribute to elderly housing concentration and fertility, and second, evaluating the effects of policy counterfactuals.

Within the model, we find that two channels are the primary drivers of elderly housing concentration and low fertility: liquidity constraints among young households and habit formation among older cohorts. In a counterfactual exercise where we relax the loan-to-value constraint, housing consumption among young households rises, fertility increases by 3.63 percent, and elderly housing concentration declines by 7.82 percent. Eliminating habit formation generates the largest fertility and housing concentration responses of any experiment in the paper, with fertility rising by 5.67 percent and elderly housing concentration falling by 46.51 percent. Transaction costs and the bequest motive also contribute to higher elderly housing concentration, but their removal does not raise fertility: removing transaction costs raises house prices, which reduces housing affordability for young parents. Eliminating the bequest motive reduces expected transfer income for liquidity-constrained young households, which lowers their fertility through the income channel.

The two primary channels that we identify differ in their policy accessibility. Liquidity constraints can be directly targeted through fiscal instruments. A targeted transfer to young parents raises fertility by 0.53 percent, reduces elderly housing concentration by 0.47 percent, and generates a welfare gain of 4.58 percent for newborns and 1.24 percent under a utilitarian metric. An inheritance tax with lump-sum redistribution achieves more modest but consistent improvements across both dimensions at slightly negative, but near-zero utilitarian welfare cost. Habit formation, by contrast, is a deep preference parameter that cannot be directly targeted by policy. The most natural instrument for addressing elderly downsizing, a property tax increase, reduces housing concentration but depresses fertility by 0.07 percent and reduces welfare by 0.27 percent. Fertility declines despite a potential relaxation of their binding constraint through lower house prices, as housing user costs rise for young parents. We conclude that the intergenerational housing allocation matters for fertility, but low fertility is better addressed by easing young households' access to housing than by trying to change elderly behavior through prices. The cohort-specific welfare analysis points to one caveat: the most effective pro-natalist policies achieve their gains partly through redistribution from older to younger households. The aggregate welfare improvements therefore mask heterogeneous effects across cohorts, and any policy assessment should account for these distributional consequences alongside the fertility and concentration targets.

Our paper contributes to three strands of the literature. First, we complement the empirical literature linking housing markets and fertility (Dettling and Kearney 2014; Lovenheim and Mumford 2013; Doornik et al. 2025) by embedding the housing-fertility decision in a general equilibrium framework, allowing us to decompose the mechanisms at play, and evaluate policies while including general equilibrium effects. Second, we extend the quantitative life-cycle housing literature (Aydilek 2013; Cocco and Lopes 2020; Yang 2009) by introducing endogenous fertility, enabling us to study how housing frictions and preferences affect not only housing allocation but also fertility decisions. Third, we add to the growing literature integrating endogenous fertility with housing (Day and Guest 2016; Coeurdacier et al. 2023; Couillard 2026). Most closely related to Couillard 2026, we take a complementary overlapping-generations approach that explicitly links elderly housing inertia to younger cohort fertility through price externalities, while also evaluating the welfare implications of alternative policy instruments.

This paper is structured as follows. Section 2 situates our work within the existing literature. Section 3 presents the empirical facts that motivate the model's specification and estimation. Section 4 introduces the quantitative model, and Section 5 outlines how the model parameters are specified. In Section 6, we decompose key properties of the baseline economy, while Section 7 presents the main counterfactual policy analyses. Finally, Section 8 concludes.

2 Related Literature

A substantial body of empirical research has established a link between housing market dynamics and fertility decisions. Studies find that higher house prices tend to increase fertility among homeowners through housing wealth effects, while simultaneously reducing fertility among renters (Ang et al. 2024; Atalay et al. 2021; Daysal et al. 2021; Dettling and Kearney 2014; Lovenheim and Mumford 2013; Meng et al. 2023). Conversely, Yi and Zhang 2010 find that house price inflation may reduce overall fertility rates through both income and substitution effects. Finally, Cumming and Dettling 2024 highlight the role of the mortgage market in transmitting monetary policy to fertility behavior, showing that declines in policy interest rates can increase fertility by raising household disposable income.

Empirical evidence further indicates that housing policies significantly shape housing allocations. For example, high transaction costs, such as transfer taxes or age-specific property taxation, are associated with lower residential mobility (Ferreira et al. 2010; Hilber and Lyytikäinen 2017). In contrast, higher property taxes can increase the mobility among elderly homeowners (Shan 2010).

In addition, empirical research has documented the role of down-payment requirements and credit constraints for homeownership, especially for younger households (Fuster and Zafar 2016; Acolin et al. 2016; Tracey and Van Horen 2025). Going one step further, Doornik et al. 2025 shows empirically that access to credit and transitions into homeownership raises fertility, as it enables households to secure more suitable living conditions.

We contribute to this literature by embedding the housing-fertility decision within a general equilibrium framework. This allows us to quantify the effect of housing market frictions and evaluate counterfactual housing policies while accounting for their general equilibrium effects.

Quantitative models have been used to analyze the impact of the above-mentioned housing policies. In particular, several studies examine the relationship between intergenerational housing allocation and property taxation (Chiocchio 2024b; Coven et al. 2024; İmrohoroğlu et al. 2018). Other research more broadly assesses the implications of eliminating mortgage interest deductions (Sommer and Sullivan 2018), as well as housing policies aimed at reducing spatial misallocation (Favilukis et al. 2023).

Our paper also relates to quantitative research on housing over the life-cycle. To replicate life-cycle patterns in housing consumption, down payment requirements, transaction costs, and habits or place attachment are important ingredients (Aydilek 2013; Cocco and Lopes 2020; Yang 2009). Other reasons for intergenerational differences in housing allocations are intergenerational changes in earnings and asset prices (Attanasio et al. 2012; Paz-Pardo 2024). More broadly, Chiocchio 2024a links the rise in house prices to declining marriage rates via longer parental co-residence.

We contribute by enhancing housing models over their life-cycle with an endogenous fertility choice. This approach enables a greater understanding of the impact of model features and housing policies not only on housing allocation but also on fertility decisions.

Several previous studies have examined declining fertility rates using structural models with endogenous fertility. For example, Blackburn and Cipriani 2002 attribute declining fertility to rising life expectancy. Other studies examine fertility responses to economic transitions (Doepke 2004; Elgin 2012) and business cycle fluctuations (Jones and Schoonbroodt 2016). Hock and Weil 2012 focus on how the interaction between fertility and intergenerational transfers affect consumption possibilities. We contribute to this literature by analyzing how the concentration of housing among elderly households affects fertility choices.

Finally, a small but growing literature integrates endogenous fertility with housing considerations. However, these models do not allow for an endogenously emerging intergenerational inequality in housing consumption. Day and Guest 2016 show that incorporating housing costs can attenuate the negative substitution effect of higher female wages, potentially increasing fertility. Moreno-Maldonado and Santamaria 2024 examine how delayed childbearing contributes to urban revival, with house prices acting as an amplifier. Coeurdacier et al. 2023, using a quantitative life-cycle spatial model with endogenous fertility and demographics, highlight the stabilizing role of housing markets for population size and uncover a negative spatial density-dependence of fertility. Most closely related, Couillard 2026 estimates a spatial model of the joint housing-fertility choice to assess the effects of rising housing costs on fertility. We take a complementary approach, developing a general equilibrium overlapping-generations model to explicitly link elderly inertia to downsize to the younger cohort fertility through price externalities.

3 Stylized Facts

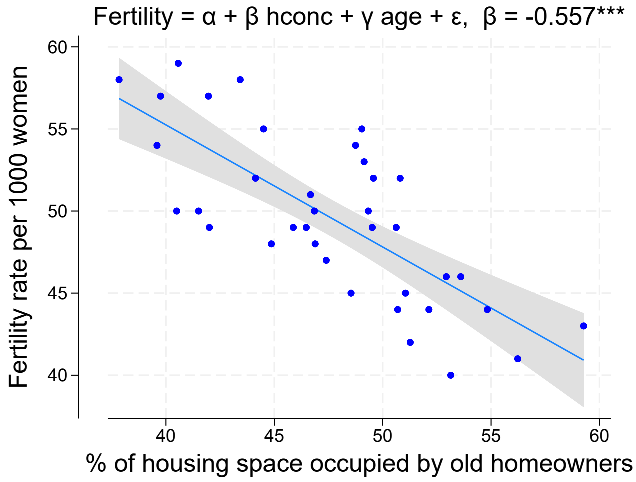
We use data from the American Housing Survey (AHS, 2015–2019), the American Community Survey (ACS, 2015–2019), and housing supply elasticities as estimated by Saiz 2010. Our analysis focuses on owner-occupied housing.[1] We document four key stylized facts.

First, we find a significant negative relationship between elderly housing concentration and fertility rates across metropolitan statistical areas (MSAs). Using pooled data from the 15 largest MSAs between 2015 and 2019, we calculate the share of total housing space occupied by older homeowners. Figure 1 plots this measure of elderly housing concentration against MSA-level fertility rates. Given that elderly housing concentration may be positively correlated with the average age of the population, we estimate a regression controlling for average MSA age. The negative relationship between elderly housing concentration and fertility remains statistically significant even after this adjustment (see Table 12 in the Appendix).

Second, fertility rates are higher in MSAs with more elastic housing supply. Figure 2 presents a binned scatter plot of fertility rates in 2019 against the housing supply elasticities for 236 MSAs, as estimated by Saiz 2010. In areas with low supply elasticity, obtaining a building permit for

1. We restrict the AHS sample to owner-occupied households with heads aged 20 years or older. Observations are excluded if housing expenditure shares (monthly housing costs relative to monthly income) exceed one, or if household income is missing or implausibly low (below half the minimum wage multiplied by standard working hours, weeks worked, and the pension replacement rate).

Figure 1: Fertility and elderly housing concentration



Note: The figure is based on pooled data from the ACS (2015–2019) and AHS (2015–2019) for the top 15 MSAs. The share of housing space occupied by older homeowners is measured as the ratio of total square footage owned by homeowners aged 55 and above to the total square footage owned by all homeowners, by MSA and year (AHS). The fertility rate per 1,000 women refers to women aged 15–50 (ACS).

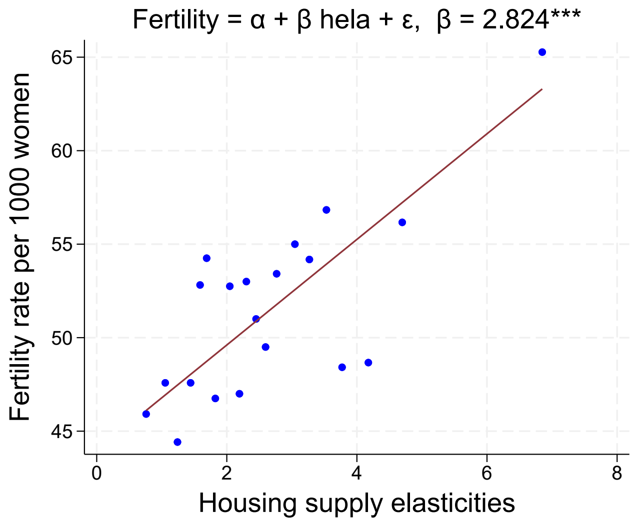
new construction is more difficult, leading households to compete for existing housing stock. This association is consistent with the interpretation that inelastic supply constrains household formation and depresses fertility.

Third, housing space per capita is unevenly distributed across age groups (pooled across all MSAs). We measure housing space both in terms of square feet per person and number of bedrooms per person. Both measures yield a consistent pattern: housing space per capita is relatively low for younger individuals and reaches its minimum in the 40–44 age bracket, coinciding with the period when households are most likely to have children (see Figure 3). Beyond this age group, housing space per capita increases steadily. This is consistent with the interpretation that children gradually leave the household and that older adults accumulate housing assets. However, this cross-sectional pattern may also reflect cohort effects rather than pure life-cycle transitions.

Fourth, homeowners with children tend to live in larger homes and allocate a greater share of their expenditures to housing. Figure 4 illustrates this pattern by comparing house size (Panel A) and housing expenditure shares (Panel B) between homeowners with and without children across the income distribution. Across all income quintiles, households with children consistently choose larger homes and devote a higher proportion of their budget to housing. This result remains robust when using the total number of rooms as an alternative measure of house size (see Figure 9 and Figure 10 in the appendix). These findings are consistent with complementarity between housing and fertility, though they could also reflect reverse causality or selection of family-oriented preferences.

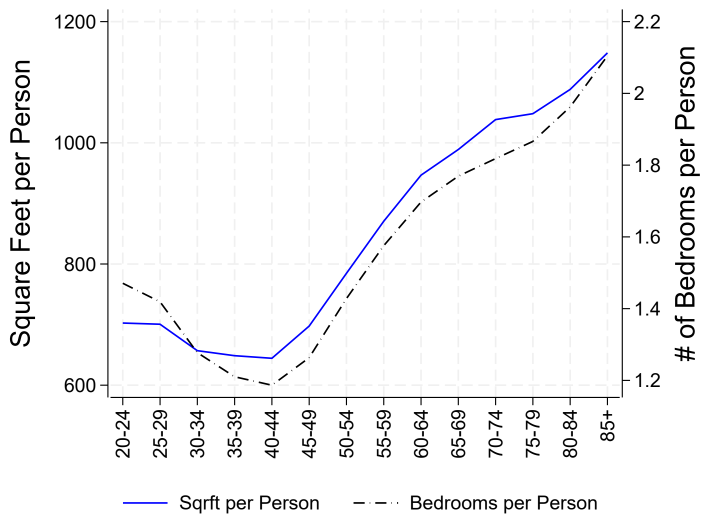
To rationalize these findings, we develop a model with endogenous fertility in which the

Figure 2: Fertility and housing supply elasticities



Note: The figure is based on ACS (2019) and supply elasticities estimated in Saiz 2010. The fertility rate per 1,000 women refers to women aged 15–50 (ACS). Binned scatter plot of 236 MSAs.

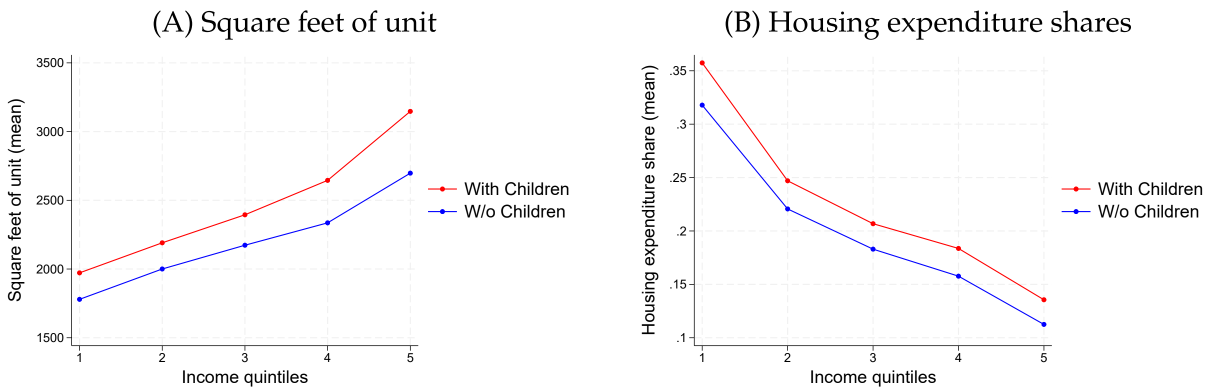
Figure 3: Housing space across age groups



Note: The figure is based on data from the AHS (2015–2019). The sample is restricted to owner-occupied housing units with household heads aged 20 years or older and weighted using the provided sample weights. Households are grouped by the age of the household head. Housing space per person is calculated as total housing square footage (number of bedrooms) divided by the number of household members.

number of children influences the utility derived from housing space. This framework allows us to decompose the underlying drivers of the observed life-cycle patterns and to conduct counterfactual policy analyses.

Figure 4: Fertility and housing choices



Note: Figures are based on pooled data from the AHS (2015–2019). The sample includes owner-occupied housing units with household heads aged 20–55 years. Averages by income quintile are computed using the provided sample weights. Households are classified as having children if at least one child resides in the housing unit.

4 Model

Time is discrete and in each period, J representative cohorts coexist.[2] The life-cycle is divided into four stages, $j \in \{0, 1, 2, 3\}$, corresponding to child, young parent, empty-nester (working adult without children), and retiree. In each stage, excluding the child stage, households make decisions regarding consumption, savings, and housing. In the first adult stage ($j = 1$), young parents additionally choose their fertility rate. A representative firm produces the numéraire consumption good, while housing is supplied via an indirect supply function. The government operates a pay-as-you-go retirement system that finances pensions for retirees and redistributes revenues from property and sales taxes. Bequests are redistributed among living cohorts, and financial intermediaries offer mortgages and collect deposits at fixed interest rates.

Before presenting the model in detail, we highlight two key features of our framework. First, households face a trade-off when deciding on their fertility rate. On one hand, they derive a warm-glow utility from having children. On the other hand, additional children reduce per-capita housing space and quality, while increasing both consumption expenditures and housing maintenance costs. Households do not internalize that their fertility choices affect future cohort sizes, and thus influence the magnitude of both the social security tax burden and aggregate housing demand.

Second, our model can replicate the empirically observed limited downsizing through two mechanisms: habit formation and the bequest motive. Households develop habits over their housing consumption, making them reluctant to reduce their housing size after retirement. Additionally, housing is illiquid due to transaction costs incurred when selling property, which might further discourage downsizing. Upon retirement, the bequest motive reinforces this reluctance: all else equal, it is more advantageous to bequeath a house than to bequeath its liquidated value, which is diminished by transaction costs.

2. We omit time indices henceforth, as the analysis focuses on the stationary equilibrium.

4.1 Population

Every cohort transitions to the next life stage with stage-specific survival probabilities denoted $\pi_j \in [0, 1]$, where $\pi_0 = 1$ and $\pi_3 = 0$. All individuals survive until the young parent stage, and certain death occurs at the end of the retiree stage. The fertility rate n_1 determines the size of the newborn cohort. Let N_t^j be the size of cohort j at time point t, then cohort sizes evolve as follows:

$$N_t^j = \pi_{j-1} N_{t-1}^{j-1} \quad \text{for } j > 1 \quad \text{and} \quad N_t^1 = n_1 N_{t-1}^1 \tag{1}$$

Further, denote N_t the total population size in period t. One can show in the stationary equilibrium, given cohort $j = 1$'s fertility rate n_1, that the total population grows at rate n_1.[3] Assuming time-independent survival rates, it follows that, in the stationary equilibrium, each cohort j has a constant population share μ_j.[4] Both the survival probabilities and the fertility choice affect the relative cohort shares in the stationary equilibrium. A higher fertility implies a relative decrease in the share of older cohorts, while a higher survival rate acts in the opposite direction.

4.2 Households

Households choose non-durable consumption c_j, housing h_j, and in the young parent stage, $j = 1$, their fertility rate n_1. They can further save in liquid assets (in that case $b_{j+1} > 0$) or borrow a collateralized loan (with $b_{j+1} < 0$). As we study representative cohorts, consumption, housing, savings and fertility choices are continuous by construction.

Preferences Preferences are separable across life stages and states of the world. Households maximize lifetime utility, discounted at rate $\beta \in (0, 1)$, as follows:

$$\sum_{j=1}^{J} \beta^{j-1} \left(\prod_{k=0}^{j-1} \pi_k \right) \Big[u(c_j, h_j, n_j) + \beta(1 - \pi_j) \mathcal{B}(b_{j+1}, h_j) \Big]. \tag{2}$$

Utility is derived from flow utility $u(c_j, h_j, n_j)$ and bequest $\mathcal{B}(b_{j+1}, h_j)$. The former takes the form:

$$\begin{aligned} u(c_j, c_{j-1}, h_j, h_{j-1}, n_j) =& \frac{1}{1-\sigma} \left[(1-\psi)\tilde{c}_j^{1-\alpha} + \psi \tilde{h}_j^{1-\alpha} \right]^{\frac{1-\sigma}{1-\alpha}} \\ & - \kappa_h \frac{1}{1+\gamma} \left(\frac{n_j}{h_j} \right)^{1+\gamma} + \mathbf{I}_{j=1} \kappa_n \frac{n_j^{1-\sigma}}{1-\sigma}, \\ & \tilde{c}_j = c_j - \xi_c c_{j-1} \text{ and } \tilde{h}_j = h_j - \xi_h h_{j-1}, \\ & n_j = 0 \text{ for } j > 1, \\ & (\sigma, \psi, \alpha, \kappa_n, \kappa_h, \xi_c, \xi_h) \in \mathbb{R}_+^7, \gamma > -1. \end{aligned} \tag{3}$$

Utility from non-durable consumption and housing follows a nested CES structure, where $1/\alpha$

3. For a derivation see Heer and Maußner 2024.
4. For derivations see Heer and Maußner 2024.

represents the intra-temporal elasticity of substitution between the two goods, and ψ governs the relative importance of housing in utility. Meanwhile, σ pins down the constant coefficient of relative risk aversion. Following Ravn et al. 2006, we model habit formation in consumption and housing from cohort $j > 1$ with degrees ξ_c and ξ_h, respectively. The cases $\xi_c = 0$ and $\xi_h = 0$ nest the specification in the absence of habit formation.[5]

Following Doepke and Tertilt 2016, we assume that households display an additive warm-glow motive for children when they are in the young parents stage ($j = 1$) with importance weight κ_n. Motivated by the empirical observation that per-capita housing space declines with household size, we introduce a crowding disutility term, weighted by κ_h. This captures the idea that the disutility of an additional child is mitigated by larger per-capita housing space. Hence, housing h and fertility n enter preferences as complements, since the cross-partial derivative is positive (i.e. $\partial^2 u(c_j, h_j, n_j)/\partial n_j \partial h_j > 0$).[6]

The utility from leaving a bequest in liquid savings and housing takes the form:

$$\mathcal{B}(b_{j+1}, h_j) = \kappa_\nu \frac{\left[(1+r)b_{j+1} + p h_j + \nu\right]^{1-\sigma}}{1-\sigma}. \tag{4}$$

The functional form follows the specification in De Nardi and Yang 2014. Parameter κ_ν captures the strength of the bequest motive, while ν governs the degree to which bequests are considered a luxury good. Bequests can occur intentionally in the final period or accidentally in earlier periods due to stochastic survival. Liquid savings intended for bequest earn interest at a rate r before being passed on to remaining cohorts, while housing bequests are valued at market prices and thus scaled by the house price p.

Budget Constraints Households are subject to the budget constraint:

$$b_{j+1} + e(n_j)\, c_j + Q(h_j, h_{j-1}) = y_j + (1+r)b_j. \tag{5}$$

Households allocate their income y_j, specified in detail below, along with returns on savings (or net of loan repayments), to consumption, new savings or borrowing, and housing expenditures, which are captured by the function $Q(h_j, h_{j-1})$. Specifically, those costs are defined as follows:

$$Q(h_j, h_{j-1}) = \begin{cases} \tau_p p h_j + \delta(n_j) p h_j & \text{if } h_j = h_{j-1} \\ \tau_p p h_j + \delta(n_j) p h_j - p(h_{j-1} - h_j) + (\tau_s + \omega) p h_{j-1} & \text{if } h_j \neq h_{j-1} \end{cases} \tag{6}$$

Both housing maintenance costs (in the housing expenditure function) and non-durable consumption expenditures are scaled by child-equivalence factors, $e(n_j) > 0$ and $\delta(n_j) > 0$, respectively, with $e'(n_j) > 0$ and $\delta'(n_j) > 0$, to reflect that these 'running' costs increase with the

5. This formulation of habit persistence captures the idea that homeowners become accustomed to a certain housing size and are reluctant to downsize after living in a larger unit. Since the model represents a representative cohort, it abstracts from other dimensions of habit formation, such as the desire to remain in the same house or neighborhood after adapting it to individual needs.

6. This preference specification does not automatically impose Slutsky complementarity, as the sign of $\partial n_j^*/\partial p$ is governed by parameters κ_h, γ which are calibrated internally to match observed empirical moments.

number of children.[7] Housing costs further include property taxation at a rate τ_p and, upon a change in housing, the net gain/loss from selling and buying a new house, net of transaction costs from selling ω.[8] In addition to the transaction costs ω, the government levies a proportional sales tax τ_s. Young parents start the period with zero housing endowment ($h_0 = 0$) and no initial liquid assets ($b_0 = 0$).

Households can take on collateralized loans, subject to the following loan-to-value (LTV) constraint:

$$b_j \geq -\lambda p h_j \tag{7}$$

stating that debt can be accumulated up to a share $\lambda \in (0, 1)$ of the housing market value and consequently a down payment $(1 - \lambda)ph$ is required.

Finally, we impose a full-repayment constraint on debt in the last period, i.e., retirees need to repay their mortgage debt before death:

$$(1 + r)b_J \geq 0\,. \tag{8}$$

Income The household derives cohort-specific income, denoted y_j, which takes the following form:

$$y_j = \begin{cases} (1 - \tau_{ss})y_j^l + a_j + T & \text{if } j = \{1, 2\} \\ y^p + a_j + T & \text{if } j = 3 \end{cases} \tag{9}$$

In every life stage, households receive, cohort-specific bequest a_j and homogeneous, lump-sum transfers T from total tax revenues in property taxation and housing sales taxation. Labor income y_j of the working cohorts ($j = \{1, 2\}$) is subject to a flat social-security tax τ_{ss} to directly finance pension income y^p of the retired cohort $j = 3$. Cohorts receive a constant share d_j of aggregate bequests $A = \sum_{j=1}^{J} \mu_j (1 - \pi_j)[(1 + r)b(\Omega_j) + ph(\Omega_j)]$, such that $a_j = d_j A$. Labor income of the working population is specified by:

$$y_j^l = wz(j). \tag{10}$$

Labor is supplied inelastically and normalized to one. Accordingly, labor income is determined by the equilibrium wage rate w, scaled by a cohort-specific productivity term $z(j)$.

Decision Problem The decision problem of the household can then be written in the standard recursive form. For that, let $\Omega_j = (h_{j-1}, b_j)$ be the cohort-specific state vector, which takes the

7. Unlike non-durable consumption, which is adjusted for household size via adult equivalence scales $e(n)$, housing is not mechanically tied to the number of children. Instead, households choose their housing space, trading off lower expenditure against the disutility of crowding.

8. For completeness, the housing cost function includes the case of the absence of housing transaction; however, given the continuous nature of housing choices in the representative cohort framework, this constitutes a special corner case.

current housing endowment and assets. Let ι_j be the corresponding choice vector, with:

$$\iota_j = \begin{cases} (b_{j+1}, h_j, n_j) & \text{for } j = 1 \\ (b_{j+1}, h_j) & \text{for } j \in \{2, 3\}. \end{cases} \tag{11}$$

The Bellman Equation then writes as:

$$\begin{aligned} V_j(\Omega_j) = \max_{\iota_j} \quad & u(c_j, c_{j-1}, h_j, h_{j-1}, n_j) \; + \; \pi_j \beta \, V_{j+1}(\Omega_{j+1}) + (1 - \pi_j)\beta \mathcal{B}_{j+1} \\ & \text{subject to Preferences (3), Bequest (4), Budget Constraint (5),} \\ & \text{LTV (7), Terminal Debt (8), Labor Income(10).} \end{aligned} \tag{12}$$

4.3 Supply Side

The supply side of the economy consists of two sectors: the final goods sector and the housing sector.

Non-durable Consumption Good Sector The numéraire, non-durable consumption good is produced by a representative firm under perfect competition conditions using the linear technology $Y_C = \Theta_C L_C$, where Θ_C denotes total factor productivity and L_C aggregate efficiency units of labor employed by the non-durable goods' sector. The firm then chooses optimal labor demand according to the following maximization problem:

$$\max_{L_C} \quad \Theta_C L_C - w L_C. \tag{13}$$

Housing Sector We model the housing sector as the following indirect supply function:

$$H_S = \bar{H} p^{\rho}. \tag{14}$$

We borrow this approach from Moreno-Maldonado and Santamaria 2024. The housing stock evolves as a function of the house price p with price elasticity ρ, scaled by parameter $\bar{H}$ that is assumed to grow at the population growth rate n_1.[9]

4.4 Government

The government has a dual role: it operates the pay-as-you-go pension system and collects property and housing sales taxes, which are redistributed as uniform lump-sum transfers. In both cases, the government budget is balanced. Specifically, the pay-as-you-go pension scheme works as follows:

$$\tau_{ss}(\mu_1 y_1^l + \mu_2 y_2^l) = \mu_3 y^p, \tag{15}$$

9. This formulation allows the model to be expressed in per-capita terms. It can be interpreted as the government issuing additional building permits in response to population growth.

where τ_{ss} denotes the social security tax and μ_j age-specific population shares. In addition, the government raises property taxes τ_p and housing sales tax τ_s and redistributes those as uniform, lump-sum transfer T:

$$T = \tau_p \sum_{j=1}^{J} \mu_j p h^*(\Omega_j) + \tau_s \sum_{j=2}^{J} \mu_j p h^*(\Omega_j) \mathbb{I}[h^*(\Omega_j) \neq h^*(\Omega_{j-1})]. \tag{16}$$

4.5 Equilibrium Definition

Given the assumptions we impose, all equilibrium conditions scale by total population size; we can therefore rewrite all optimality conditions in per-capita terms. For that purpose define per-capita variables for housing supply scale $\bar{h} = \frac{\bar{H}}{N_t}$ and labor demand $\hat{l}_C = \frac{L_C}{N_t}$. We assume that $b_1 = 0$.

The competitive, stationary equilibrium of this economy consists of constant wage rate and house price $\{w^*, p^*\}$, pension income y_p^*, uniform lump-sum transfers T^*, policy functions $h^*(\Omega_j), n^*(\Omega_j), b'^*(\Omega_j)$, cohort-specific bequests $\{a_1^*, a_2^*, a_3^*\}$ and constant cohort shares $\{\mu_1^*, \mu_2^*, \mu_3^*\}$ such that the following conditions hold:

i) For given prices, tax rates, lump-sum transfers and pension income, households solve decision problem (12) to get the policy functions $h^*(\Omega_j)$, $n^*(\Omega_j)$ and $b'^*(\Omega_j)$.

ii) For given prices, the representative final goods' producer chooses aggregate labor input to maximize profits under perfect competition (13) such that $w = \Theta_C$.

iii) The population evolves according to the law of motion in Equ. (1).

iv) Governments budgets for the pay-as-you-go pension scheme and the lump-sum redistribution of tax revenues in property and sales tax clears (Equ. (15) and (16)).

v) Total (accidental) bequests equals total cohort-specific income from bequests:

$$\sum_{j=1}^{J} \mu_j (1 - \pi_j)[(1 + r) b^*(\Omega_j) + p h^*(\Omega_j)] = \sum_{j=1}^{J} \mu_j a_j^*.$$

vi) The labor market, housing market, and goods market (implied by Walras' Law) clear, respectively:

$$\hat{l}_C^* = \mu_1 + \mu_2$$

$$\sum_{j=1}^{J} \mu_j (1 + \delta(n^*(\Omega_j)))h^*(\Omega_j) = \bar{h} p^{\rho}$$

$$\sum_{j=1}^{J} \mu_j (e(n^*(\Omega_j)) c_j^* + \omega p^* h^*(\Omega_{j-1}) \mathbf{I}[h^*(\Omega_j) \neq h^*(\Omega_{j-1})]) = \Theta_C \hat{l}_C^*.$$

5 Calibration

In this section, we describe the model calibration. We proceed in two steps. First, we determine a set of parameters externally using standard parameters from the literature, normalizations, or direct estimates from the data. Table 1 summarizes the externally determined parameters. Second, we estimate the remaining set of parameters internally to match basic desirable features observed in the data.

Table 1: External parameters

Parameter	Interpretation	Value	Source
Demographics			
J	Number of adult cohorts	3	-
T_j	Length of life stage	20	Life expectancy of 80 years
$[\pi_1, \pi_2, \pi_3]$	Cohort specific survival rates	[0.978, 0.912, 0.0]	Actuarial Life Table of 2004 (Social Security Administration)
$[d_1, d_2, d_3]$	Bequest shares	[0.13, 0.61, 0.26]	Inheritance received by age group (SCF, 2001-2019)
Preferences			
β	Yearly discount factor	0.98	Attanasio et al. 2008
σ	Risk aversion	1.5	Attanasio et al. 2008
α	Substitutability of h and c	0.8	Kaplan et al. 2020
ξ_c	Habit formation in consumption	0.0	Aydilek 2013
ν	Degree of luxury of bequests	1.0	Set equal to median income
Labor productivity / retirement income			
z_1	Young parent	0.81	Household income by age (CPS ASEC 2020)
z_2	Empty-nester	1.0	Normalization
z_3	Retirees	0.47	Replacement ratio
Household finances			
λ	Loan-to-value limit	0.74	Boar et al. 2022 discounted by r
Housing			
$\delta(n)$	Yearly housing depreciation	0.015	$\delta(n) = \delta$, Kaplan et al. 2020
ω	Transaction costs	0.07	Kaplan et al. 2020
Taxes			
τ_p	Yearly property tax	0.01	Kaplan et al. 2020
τ_{sell}	Housing transfer tax	0.005	Average regional transfer tax
Production			
Θ_C	Total factor productivity	1.0	Normalization

Note: Annual values are converted to 20-year periods where applicable.

Demographics Each life stage spans 20 years: children are aged 0–19 ($j = 0$), young parents 20–39 ($j = 1$), empty-nesters 40–59, and retirees 60–79. Survival rates for young parents and empty-nesters are set according to the survival probabilities reported in the Actuarial Life Table of 2004. Retirees die deterministically at the end of their life stage. To determine the distribution of bequests across adult cohorts, we draw on data from the 2001–2019 Survey of Consumer Finances to examine inheritances received by different age groups. The majority, 61%, of inheritances accrue to individuals in the empty-nester stage, consistent with the age at which their parents typically pass away, while 26% go to retirees and 13% go to young parents.

Utility Preference parameters are set to standard values from the literature. We adopt a yearly discount factor of 0.98 and a coefficient of relative risk aversion of 1.5, following Attanasio et al. 2008. Consistent with Kaplan et al. 2020, we set the elasticity of substitution between goods to 0.8 and, in line with Aydilek 2013, assume no habit formation in non-durable consumption.

Labor Income and Household Finances Median household income by age group is constructed from the 2020 Current Population Survey (CPS) Annual Social and Economic Supplement (Table A-1, P60-273), which reports median income and household counts across six age-of-householder brackets (15–24, 25–34, 35–44, 45–54, 55–64, and 65+). To map these onto the three 20-year brackets used in this paper (15–40, 40–60, and 60–80), we split the two Census brackets that straddle our cutoffs (35–44 and 55–64) proportionally, assuming a uniform distribution of households within each bracket, and compute household-count-weighted averages of the bracket-level medians. Median household income is normalized to one for the 40–60 age group, and the incomes of the remaining age groups are expressed as ratios relative to this value. The social security tax is determined by the replacement rate during retirement and the equilibrium cohort shares. The annual interest rate is set to 1.5%, and the loan-to-value ratio is limited to 74% of the house value.

Housing and consumption We set the annual housing depreciation rate to 1.5% and the transaction cost of selling a house to 7%, following Kaplan et al. 2020. The annual property tax rate is calibrated to 1%, consistent with their specification. We set the housing transfer tax at 0.5 percent, the average of regional housing transfer taxes. Equivalence scales of non-housing consumption are based on values reported in Yang 2009. Table 13 contains the corresponding values for different sizes of families. We assume that the equivalence scale can be approximated by a linear function $e(n) = 1.0 + slope_e \cdot n$ with $slope_e = 0.64$.

The remaining parameters $(\kappa_v, \xi_h, \kappa_n, \psi, \kappa_h, \bar{H}, \gamma)$ are calibrated internally to match aggregate bequests, average house value over income, the differences between age groups in net house wealth as well as house size, the average fertility rate, and the elasticity of house size to the number of children. Table 2 reports the values of these internally calibrated parameters.

The model matches the targeted moments reasonably well, as summarized in Table 3. The average fertility rate of 1.62 closely replicates the U.S. target of 1.64, and the average home value-to-income ratio of 3.61 aligns with the empirical ratio of 3.88. The model also replicates a house-size elasticity with respect to the number of children of around 10 percent. Housing net wealth over income and relative house sizes across age groups are matched qualitatively. The model falls short in jointly matching wealth at death and house size over the life-cycle. Since households hold only one asset besides housing, they cannot simultaneously hold liquid assets and mortgage debt, whereas in the data, a substantial share of households die with outstanding mortgage debt alongside positive liquid asset holdings.

We validate the model against untargeted moments. Population shares are imprecisely matched.

Table 2: Internally calibrated parameters

Parameter	Interpretation	Value
γ	Degree of home crowding	-0.4830
κ_h	Strength of disutility of home crowding	0.0179
κ_n	Strength of warm glow utility	0.3730
κ_ν	Strength of bequest motive	0.5627
ψ	Relative preference for housing	0.2154
ξ_h	Habit in housing consumption	0.4751
$\bar{H}$	Housing supply shifter	0.1561

Note: The parameters are jointly calibrated to match the following moments: average fertility rate, wealth at death to retirement income, as well as house size, house value to income and net housing wealth to income over the life-cycle.

Since average fertility is below the reproduction rate and death probabilities are calibrated externally, the model underestimates the size of younger cohorts in the absence of migration. Despite this, the model closely replicates housing space per person across age groups. This can be explained by the absence of partner death in the model, which in the data raises housing space per capita among retirees. Finally, the model closely replicates the fertility response to house price changes, using the empirical estimate from Dettling and Kearney 2014 as a non-targeted moment.

6 Properties of the Economy: Two Main Trade-Offs

In this section, we describe the life-cycle patterns of the economy and highlight two key trade-offs shaped by housing frictions and preferences, which motivate the policy interventions studied in Section 7. The first trade-off arises in young parenthood: households choose the number of children under liquidity constraints and the utility cost of shared housing space with children. The second arises in old age: households must adjust housing consumption to a declining income profile, despite transaction costs and preference formation that hinder downsizing. The two trade-offs interact: elderly housing concentration affects fertility through house prices, while higher fertility shifts the population toward younger cohorts, in turn reducing elderly housing concentration. We examine the key channels underlying each trade-off and assess which can be targeted by policy to increase fertility.

6.1 Life-cycle Patterns in Consumption, Housing, and Housing Concentration

The model replicates the key features of life-cycle consumption patterns documented in the literature (Yang 2009). Figure 5 illustrates the per-capita life-cycle profiles of non-durable consumption and housing implied by the model. To track the evolution over the life-cycle, we normalize the per-capita non-durable consumption and housing space of young parents $j = 1$ to one. Non-durable consumption (Panel A) exhibits an inverse U-shape over the life-cycle,

Table 3: Model Calibration

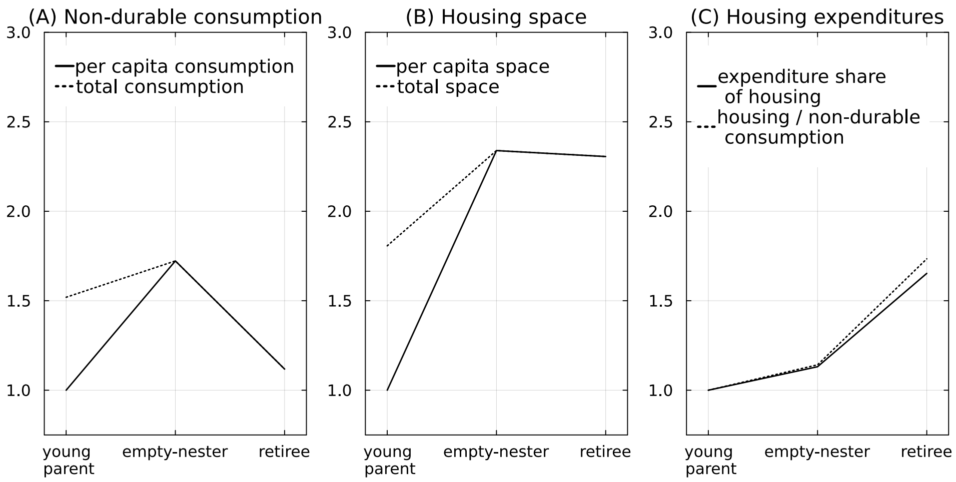
	Model	Data
Targeted moments		
Average fertility	1.62	1.64
House size elasticity	0.14	0.11
House value over income (mean)	3.61	3.88
Wealth at death / retirement income	5.33	3.37
Net house wealth over income		
Age 20-39	0.63	0.89
Age 40-59	2.54	1.49
Age 60-79	5.33	2.76
House size (normalized to 1 at age 40-59)		
Age 20-39	0.7725	0.9259
Age 60-79	0.9858	0.9506
Non-targeted moments		
Housing shares (in %)		
Young	14	16
Empty-nester	41	40
Retiree	45	44
Population shares (in %)		
Young	28	38
Empty-nester	34	37
Retiree	38	25
%Δ in fertility to +1% in house price	-0.2	-0.4

Note: Housing wealth and size over the life-cycle as well as the house size elasticity (with respect to family size) is based on pooled data from the AHS (2015-2019). The average fertility rate for 2020 is based on FRED. The ratio of median total wealth at death to median retirement income is constructed based on the HRS (see main text). Housing shares are calculated as a the percentage of housing (measured in square feet per person) occupied by age group, relative to the total housing per person. Population shares are based on the US 2020 Census. Estimates on the elasticity of fertility to changes in house prices are based on Dettling and Kearney 2014, who report that a $10,000 rise in house prices leads to a 2.4% decline in fertility among non-owners in the US. We impute the elasticity using the reported median house price of $162,356.

whereas housing consumption (Panel B) declines only marginally. Housing expenditure shares rise over the whole life (Panel C), in line with the empirically observed pattern documented by Yang 2009.

The shape of the life-cycle profile of non-durable consumption can be explained by changes in disposable income over the life-cycle and financial constraints. Young cohorts experience rising income profiles but face borrowing constraints that prevent them from accumulating uncollateralized debt, limiting early-life consumption. As disposable income increases, non-durable consumption gradually rises, but it eventually declines again upon retirement as income falls. By contrast, the shape of the housing consumption profile reflects additional trade-offs that explain the differences between the two life-cycle patterns. When agents are young, they typ-

Figure 5: Per-capita life-cycle profiles in non-durable consumption and housing



Note: Panel (A) and (B) plots non-durable consumption and housing space by age group j. It shows per capita non-durable consumption (c_j) and per capita housing space ($h_j/(1+n_j)$) as well as household level consumption ($e(n_j)c_j$) and house space (h_j). Panel (C) plots housing expenditures defined as maintenance costs and property taxes by age groups expressed in relation to total expenditures (the sum of non-durable consumption and housing expenditures), as well as non-durable consumption. We normalize the values of young parents $j = 1$ to one.

ically cannot afford the down payments and maintenance costs associated with larger homes, and with children in the household, per-capita housing consumption remains low. Over time, agents accumulate assets, receive bequests, and benefit from lower financial burdens as children leave the household. This enables them to increase housing consumption. Upon retirement, however, housing consumption declines only slowly, even though income falls, and household size decreases. In our model, several mechanisms contribute to this pattern: retirees remain in larger homes because of the motive to bequeath assets and habit formation, which increase the utility cost of downsizing. As a result, the life-cycle profiles of durable and non-durable consumption diverge.

6.2 The Fertility-Housing Trade-off for Young Parents

The housing-fertility relationship is ex-ante ambiguous but identified by empirical moments. In the data, we document that housing consumption rises with the presence of children. Recall Figure 4: housing demand is systematically higher among households with children. As we show in this section, the relationship between housing consumption and fertility is not mechanically assumed by our modeling assumption, but a result of our calibration.

To understand the fundamental trade-offs between fertility choices and housing consumption, it is illustrative to look at a static version of our main quantitative model. In this setting, a representative household optimally chooses non-durable consumption c, housing h and the number of children n optimally. The household derives utility from a CES aggregator over equivalized consumption and housing, as well as warm-glow utility from having children, and disutility from raising children in a given housing space. In this static setting, households do not form habits. The household is subject to the static budget constraint $e(n)c = y - (1 + \tau_p + \delta)ph$

and derives utility based on the following preferences:

$$u(c,h,n) = \frac{1}{1-\sigma}\left[(1-\psi)c^{1-\alpha} + \psi h^{1-\alpha}\right]^{\frac{1-\sigma}{1-\alpha}} - \kappa_h \frac{1}{1+\gamma}\left(\frac{n}{h}\right)^{1+\gamma} + \kappa_n \frac{n^{1-\sigma}}{1-\sigma}. \tag{17}$$

The household is endowed with income y, which is allocated between the numéraire consumption good c and housing h, purchased at a unit price p with a down-payment $(1-\lambda)ph$. The main trade-off associated with childbearing is straightforward: parents derive direct utility from children through the warm-glow motive, but children also increase resource demands. Specifically, they require additional consumption expenditures and introduce a disutility that declines with larger housing space. With this preference specification, we assume that h and n enter the utility function as complements.[10] However, how optimal housing demand changes with fertility depends on the sign of the cross derivative, where both income and substitution effect are at play.

Next, we define $Z \equiv (y - (1-\lambda+\tau_p+\delta)ph$ and the CES aggregator $M \equiv (1-\psi)(Z/e(n))^{1-\alpha} + \psi\, h^{1-\alpha}$. Substituting $c = Z/e(n)$ and differentiating with respect to n yields

$$\frac{\partial u(h,n)}{\partial n} = \underbrace{-M^{\frac{\alpha-\sigma}{1-\alpha}}(1-\psi)\left(\frac{Z}{e(n)}\right)^{1-\alpha}\frac{e'(n)}{e(n)}}_{\leq\, 0\,:\ \text{consumption channel}} \underbrace{-\kappa_h\left(\frac{n}{h}\right)^{\gamma}\frac{1}{h}}_{\leq\, 0\,:\ \text{crowding cost}} + \underbrace{\kappa_n\, n^{-\sigma}}_{\geq\, 0\,:\ \text{warm glow}}. \tag{19}$$

The first term reflects the opportunity cost of children through reduced consumption: raising n increases $e(n)$, which compresses c and lowers utility. The second term is the marginal crowding disutility, and the third term reflects the warm-glow motive.

Taking the derivative of (19) with respect to h, the cross derivative decomposes into two channels:

$$\frac{\partial^2 u(h,n)}{\partial h\,\partial n} = \underbrace{-\frac{\partial}{\partial h}\left[M^{\frac{\alpha-\sigma}{1-\alpha}}(1-\psi)\left(\frac{Z}{e(n)}\right)^{1-\alpha}\right]\frac{e'(n)}{e(n)}}_{\lesseqgtr\, 0\,:\ \text{consumption channel}} + \underbrace{\frac{\kappa_h(1+\gamma)}{h^2}\left(\frac{n}{h}\right)^{\gamma}}_{>\, 0\,:\ \text{crowding channel}}. \tag{20}$$

The crowding channel is unambiguously positive (since we assume $\gamma > -1$): a larger dwelling lowers the crowding ratio n/h, which raises the marginal utility of an additional child. The consumption channel involves two opposing forces. First, a higher h raises the user cost of housing and downpayment requirement $(1-\lambda+\delta+\tau_p)ph$, which reduces $Z(h)$ and hence c. This mechanically reduces the term $(Z/e(n))^{1-\alpha}$, diminishing the consumption cost of children and contributing positively to $\frac{\partial^2 u(h,n)}{\partial h\,\partial n}$. Second, and working in the opposite direction, a lower c raises the marginal utility of consumption. In other words, larger housing is costly and

10. Holding c fixed, we verify that the cross-partial derivative is positive; hence, housing and children enter as complements:

$$\frac{\partial^2 u(c,h,n)}{\partial n \partial h} = \kappa_h(1+\gamma)\frac{n^{\gamma}}{h^{2+\gamma}} > 0. \tag{18}$$

reduces consumption, which makes the consumption sacrifice of having children relatively cheaper—but simultaneously raises the value of each unit of foregone consumption, partially offsetting this effect. The sign of the overall consumption channel depends on the curvature parameters (σ, α), the housing share ψ, and the ratio of the budget residual to the housing user cost. Since we set σ, α and ψ externally, we use κ_h and γ to calibrate the model so that the crowding channel dominates the consumption channel, matching the empirically observed positive elasticity of house size with respect to the number of children. We estimate γ internally and find a value below zero, implying that crowding increases less than linearly with household size. In other words, each additional household member requires less incremental space than the previous one: a decreasing returns property that is both intuitive and consistent with standard adult-equivalent scale allowing for resource sharing.

How fertility responds to changes in house prices is ex-ante ambiguous and depends on the model calibration. Two opposing forces are at play. On the one hand, higher house prices reduce the optimal housing demand and, since housing and children are complements, depress fertility. On the other hand, higher house prices generate a negative income effect, reducing per capita consumption c. By lowering the marginal cost of children $e'(n)c$, this may encourage higher fertility. Which channel dominates depends on the strength of the complementarity, governed by κ_h and γ, relative to the income effect. Since we observe a negative fertility-house price elasticity in the data, the complementarity channel appears to dominate. empirically As reported in Table 3, the model closely matches this non-targeted, empirical moment.

Liquidity constraints of young households as a key driver of housing and fertility choices To illustrate the importance of liquidity constraints for young parents' housing and fertility decisions, we relax the loan-to-value limit from 0.74 to 0.85. This relaxation has sizable effects, summarized in Table 4: fertility rises by 3.63 percent and elderly housing concentration declines by 7.82 percent.

The direct effect operates through young parents, who are borrowing-constrained and fully exploit the higher LTV limit. By financing a larger home with a lower down payment, they can simultaneously increase housing demand and non-durable consumption. Since housing and children are complements, the larger home directly reduces the cost of children at the margin, driving the rise in fertility. The decline in housing concentration is driven by two reinforcing channels. First, the largest increase in housing demand occurs among the most liquidity-constrained group, young parents. This mechanically reduces the share of housing occupied by older cohorts. Second, because young parents borrow more under the new LTV limit, older cohorts begin retirement with lower liquid asset holdings. This induces retirees to downsize more aggressively, using home sale revenues to finance non-durable consumption rather than drawing on liquid savings (see Figure 6). The rise in fertility further amplifies the decline in concentration by reducing the share of retirees in the population.

Two general equilibrium effects can further explain the results. Higher fertility reduces the social security tax burden on the working population, generating positive income effects for

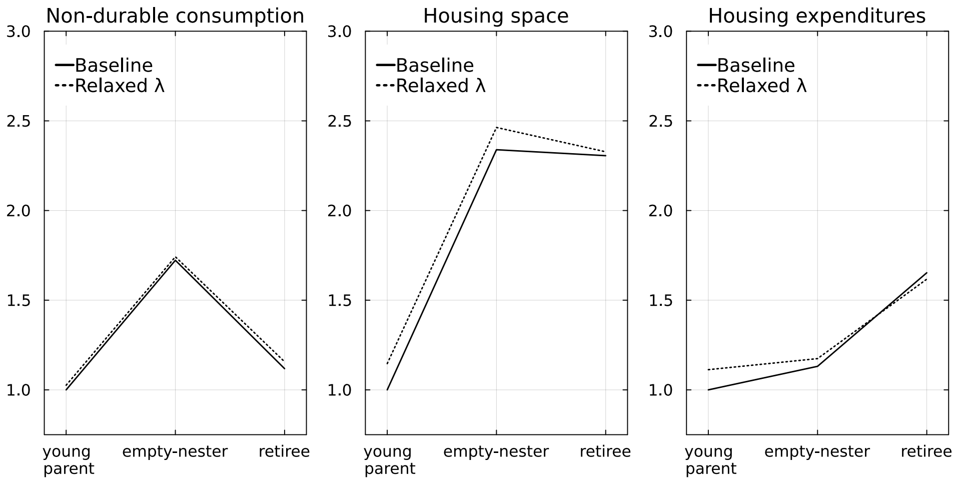
Table 4: The role of LTV constraints for housing and fertility

	Young Parent	Empty-Nester	Retiree
Fertility	+3.63%	-	-
Population shares	+3.97%	+0.33%	−3.19%
Housing shares	+14.23%	−0.35%	−7.82%
House size	+16.49%	+5.31%	+0.94%
Non-durable consumption (p.c.)	+2.58%	+1.13%	+3.44%
Assets	−34.60%	−36.06%	0.00%

Note: Changes are expressed in percentage deviation from the baseline steady state. In the counterfactual steady state, the loan-to-value limit is relaxed by 15%.

young parents and empty nesters alike. Additionally, habit formation amplifies the initial increase in housing demand: larger homes chosen in young parenthood raise the reference point for housing in later stages, sustaining higher housing consumption for empty-nesters and retirees.

Figure 6: Per-capita life-cycle profiles with a relaxed LTV limit



Note: Panel (A) and (B) plots non-durable consumption and housing space by age group j. It shows per capita non-durable consumption (c_j) and per capita housing space ($h_j/(1+n_j)$) for the baseline (solid line) and the counterfactual scenario with a relaxed LTV limit (dashed line). For both scenarios, Panel (C) plots housing expenditures defined as maintenance costs and property taxes by age groups expressed as shares of total expenditures. We normalize the value of young parent-s under the baseline scenario to 1.

6.3 The Housing Downsizing Trade-off for Old Agents

Limited downsizing of old households leads to elderly housing concentration. The second central trade-off in our model concerns the downsizing decision of older households. Although elderly households no longer have children and experience lower incomes (both of which should reduce housing demand) habit formation, bequest motives, and housing illiquidity limit their willingness and ability to downsize. Moreover, these households fail to internalize that limited downsizing constrains overall housing supply and, in turn, influences the fertility decisions of younger cohorts.

These dynamics give rise to a pronounced housing concentration among the elderly. The model closely replicates the empirical distribution of housing stock across age groups shown in Table 3. Measured as the square footage per person, the model matches the empirical finding that roughly 44% of total housing space per person is concentrated among retirees. It also captures the qualitative pattern that empty-nesters own more housing space than young households but less than retirees. Households' preferences, both the bequest motive and habit formation, as well as the transaction costs of housing sales, are likely to contribute to limited downsizing among the elderly and could be targeted via policy measures. We isolate their effects on elderly concentration and fertility rates by analyzing changes in households' choices in the absence of each feature.[11]

Without habit formation, consumption patterns of housing and non-durable consumption are more aligned with life-cycle income, and fertility increases. Eliminating habit formation leads to substantial changes in life-cycle consumption and savings, summarized in Table 5. Fertility rises by 5.67 percent, and elderly housing concentration falls by 46.51 percent.

The decline in housing concentration is driven by two reinforcing effects. Absent habit formation, retirees downsize sharply, freeing up home equity to finance non-durable consumption rather than holding onto large homes. The resulting fall in aggregate housing demand puts substantial downward pressure on house prices (-1.9%). Lower house prices allow young parents to afford the down payment on larger homes, increasing their mortgage debt and housing demand. Since housing and children are complements, a larger home directly reduces the marginal cost of children, driving fertility up.

Table 5: The role of habit formation for housing and fertility

	Young Parent	Empty-Nester	Retiree
Fertility	+5.67%	-	-
Population shares	+6.17%	+0.47%	−4.92%
Housing shares	+57.54%	+15.16%	−46.51%
House size	+49.46%	+15.45%	−43.33%
Non-durable consumption (p.c.)	−5.21%	−0.13%	+10.58%
Assets	−46.64%	−140.08%	0.00%

Note: Non-durable consumption and housing consumption is normalized to the consumption of young parents in the baseline steady state. In the counterfactual steady state, habit formation parameter ξ_h is set to zero.

Two general equilibrium effects partially offset each other. First, aggressive downsizing by retirees reduces inheritances by 46.5 percent, generating a negative income effect for empty-

11. Given the representative cohort framework, the bequest motive and habit formation cannot be separately identified; the analysis is therefore illustrative as opposed to a formal decomposition.

nesters, who are the primary recipients. Second, higher fertility lowers the social security tax burden on the working population by almost 8 percent, generating a positive income effect for young parents and empty-nesters. The net effect differs across age groups. For young parents who benefit from lower social security taxes but receive little in inheritances, disposable income rises by 1.3 percent. For empty-nesters and retirees, the decline in inheritances dominates, reducing disposable income by 2.1 percent and 0.8 percent respectively—with retirees affected only through lower inheritances not benefiting from the social security channel.

Figure 7 reveals an additional result: empty-nesters increase their housing demand substantially. Two channels drive this. First, without habit formation, empty-nesters no longer internalize that a larger home today raises their minimum housing requirement in retirement, removing the key reason that previously discouraged them from upsizing. Second, knowing that home equity can be used to finance consumption in retirement, empty-nesters accumulate fewer liquid assets during working life, freeing up resources to further increase housing demand. Together, these channels produce a life-cycle profile of both housing and non-durable consumption that closely tracks the income profile; a pattern that is absent in the baseline model with habits.

Figure 7: Per-capita life-cycle profiles without habit formation

Note: Panel (A) and (B) plots non-durable consumption and housing space by age group j. It shows per capita non-durable consumption (c_j) and per capita housing space ($h_j/(1+n_j)$) for the baseline with habits (solid line) and the counterfactual scenario without habit formation (dashed line). For both scenarios, Panel (C) plots housing expenditures defined as maintenance costs and property taxes by age groups expressed as shares of total expenditures. We normalize the value of young parents under the baseline scenario to 1.

Eliminating the transaction cost increases elderly housing concentration and is not effective in raising fertility. When transaction costs of selling a house are eliminated, adjusting housing consumption over the life cycle becomes less costly. Despite the sizable effects on life-cycle housing demand, we find that removing transaction costs has only minor effects on both aggregate fertility and elderly housing concentration.

The absence of an effect on housing concentration indicates that empty-nesters and retirees benefit symmetrically from the reform. Empty-nesters benefit directly: removing adjustment costs lowers the future cost of owning a larger home, encouraging them to upsize (+3%). Retirees benefit through two channels. First, the elimination of transaction costs represents a direct positive income effect. Hence, instead of downsizing, it allows them to even increase housing demand. Second, habit formation propagates the rise in empty-nester housing demand into retirement, further amplifying the increase.[12] Since both cohorts increase their housing demand proportionally, elderly housing concentration remains broadly unchanged.

Table 6: The role of transaction costs for housing and fertility

	Young Parent	Empty-Nester	Retiree
Fertility	−0.01%	-	-
Population shares	−0.01%	−0.00%	+0.00%
Housing shares	−2.00%	+1.35%	−0.07%
House size	+0.00%	+3.42%	+1.95%
Non-durable consumption (p.c.)	+4.03%	+4.39%	+6.78%
Assets	−0.82%	−9.31%	0.00%

Note: Non-durable consumption and housing consumption is normalized to the consumption of young parents in the baseline steady state. In the counterfactual steady state, transaction costs ω are set to zero.

Young parents do not directly benefit from the reform, as transaction costs are incurred upon selling rather than buying a home. They are instead affected by two opposing general equilibrium forces. First, the rise in aggregate housing demand puts upward pressure on house prices (+0.81%). Second, larger housing wealth of retirees increases aggregate bequests. For young parents, higher house prices raise the user cost of housing and incentivize a substitute away from housing toward non-durable consumption. At the same time, higher disposable income partially offsets this substitution effect by relaxing the budget constraint. These two forces broadly cancel each other out, leaving housing demand unchanged. Since housing and fertility are complements and house size remains flat, fertility does not respond to the reform.

Eliminating the bequest motive reduces elderly housing concentration, but the effect on fertility is negative. Eliminating the bequest motive substantially reduces the incentive for older households to hold large homes, as summarized in Table 7. Retirees reduce their housing consumption by 4.4 percent and reallocate their spending toward non-durable goods. Anticipating lower housing demand in retirement, empty-nesters also reduce their housing demand since holding a larger home today incurs habit formation costs tomorrow without the bequest-driven benefit of maintaining large assets. The resulting decline in aggregate housing demand

12. Note that the fact that removing transaction costs leads to *less* downsizing might be partially an artifact of the representative cohort structure. In a heterogeneous-agent model, transaction costs create an inaction region, where only a fraction of agents adjust their housing, while others remain inactive. Reducing transaction costs would narrow this inaction region, inducing more agents to downsize. In our representative-cohort framework, by contrast, the transaction cost is paid whenever the optimal house size differs between the empty-nester and retiree stages, meaning that all agents always adjust, and the extensive margin is absent by construction.

Table 7: The role of the bequest motive for housing and fertility

	Young Parent	Empty-Nester	Retiree
Fertility	-0.18%	-	-
Population shares	-0.20%	-0.02%	$+0.16\%$
Housing shares	$+2.54\%$	$+0.18\%$	-1.61%
House size	$+0.00\%$	-2.47%	-4.39%
Non-durable consumption (p.c.)	$+3.78\%$	$+3.42\%$	$+7.11\%$
Assets	$+0.99\%$	$+11.5\%$	0.00%

Note: Non-durable consumption and housing consumption is normalized to the consumption of young parents in the baseline steady state. In the counterfactual steady state, we set the strength of the bequest motive κ_ν equal to zero.

puts downward pressure on house prices (-1.0%), and elderly housing concentration falls by 1.6 percent.

Despite the fall in house prices, young parents do not increase their housing demand or fertility. Two forces are at play. First, eliminating the bequest motive reduces bequest income received by all age groups by almost 2 percent, generating a negative income effect. Second, with housing intrinsically less attractive as a store of value, households substitute toward non-durable consumption despite lower house prices. For young parents, higher non-durable consumption directly raises the marginal cost of children through the $e'(n)c$ channel. These two forces reinforce each other, and fertility declines by 0.18 percent despite the fall in house prices.

The contrast with the relaxed-LTV-limit experiment is instructive. In that case, the policy directly relaxed the binding constraint facing young parents. Here, the reform mainly affects older households and reaches young parents only through the house price and inheritance channels, with the latter dominating. This explains why eliminating the bequest motive reduces housing concentration but fails to raise fertility.

Taken together, both the bequest motive and the transaction cost of selling housing play a crucial role in explaining the limited downsizing behavior observed in the model. While eliminating these two channels leads to greater downsizing among older households, fertility does not rise in their absence. Only the elimination of habit formation lowers elderly housing concentration while raising fertility.

7 Policy Analysis

Motivated by the findings from the previous section, we examine three policy experiments. The first two target elderly downsizing. Habit formation hinders retirees from reducing their housing consumption, raising housing concentration and depressing fertility. To counteract this, we analyze a property tax increase that raises the user costs of housing and strengthens downsizing incentives. The bequest motive similarly raises elderly housing demand, but eliminating it also reduces inheritance income for younger households. We therefore introduce an inheritance tax with revenues redistributed lump-sum, which weakens the incentive to hold large housing assets while preserving the income transfer to younger cohorts. The third experiment targets young parents directly. Liquidity constraints prevent them from increasing housing demand, raising housing concentration, and reducing fertility. We therefore assess the effects of a targeted transfer to liquidity-constrained households. Based on the findings in the previous section, we do not target transaction costs as a policy margin, as removing them does not raise fertility.

7.1 Property Taxation

As we have shown in Section 6, habit formation is one key driver for elderly housing concentration. Increasing the property taxes on housing is one policy instrument to counteract the large per-person housing space. Therefore, we introduce a policy that uniformly raises property taxation from 1 percent to 1.25 percent. Although this policy is not specifically targeted at young households, they are likely to respond most in terms of housing demand due to the resulting lower house prices, thereby reducing the marginal costs of additional children and potentially raising fertility.

We find that a property tax increase effectively reduces elderly housing concentration but depresses fertility slightly, as summarized in Table 8. By raising user costs of housing, the property tax incentivizes empty-nesters and retirees to reduce their housing consumption by around 3 percent, reallocating toward non-durable consumption by less than one percent. Elderly housing concentration consequently declines by 0.4 percent and house prices fall by 0.86%.

For young parents, two opposing forces affect housing demand. On the one hand, lower house prices reduce the required down payment, and property tax revenues are redistributed lump-sum, both of which generate a positive income effect that would encourage greater housing consumption. On the other hand, higher user costs of housing directly discourage it. The latter effect dominates, leaving house size broadly unchanged while non-durable consumption declines slightly (-0.10%).[13] Since the house size is unchanged and the recurring cost of maintaining it has risen, the implicit cost of raising children in a given housing space increases, and fertility declines slightly (-0.07%).

Figure 8 summarizes the life-cycle patterns. Non-durable consumption remains largely unchanged across age groups. Rather than encouraging strong downsizing, the property tax shifts housing demand downward by a similar amount for both empty nesters and retirees. As a result, the main shape of the life-cycle profile stays largely intact. Unlike the elimination of habit formation, it does not generate a pronounced inverse U-shape in housing consumption.

13. It should be noted that the dominance of the user cost effect over the house price decline is likely an artifact of the coarse modelling periods: with shorter periods, lower house prices and the associated reduction in required down-payments would plausibly dominate, such that one should not necessarily conclude that this policy instrument is unable to boost fertility.

Table 8: Housing and fertility under higher property taxes

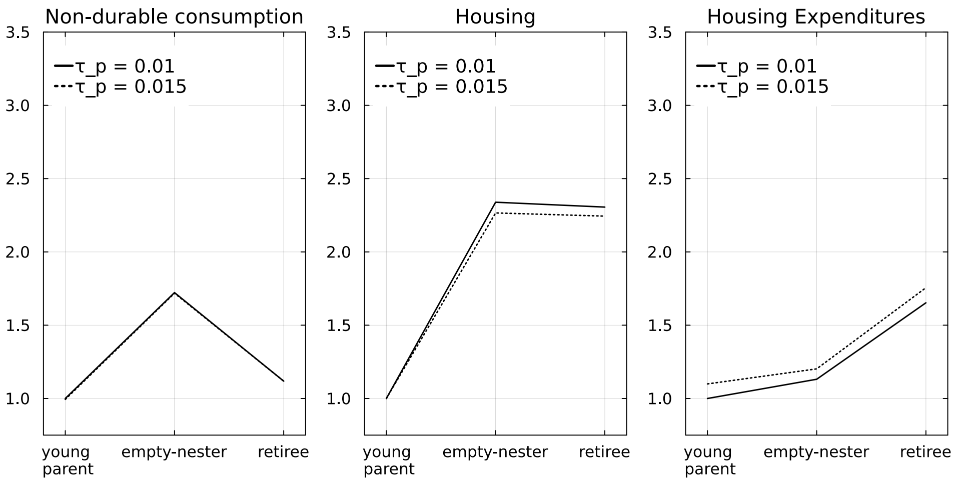
	Young Parent	Empty-Nester	Retiree
Fertility	−0.07%	-	-
Population shares	−0.08%	−0.01%	+0.07%
Housing shares	+2.18%	−0.94%	−0.41%
House size	+0.00%	−3.13%	−2.68%
Non-durable consumption (p.c.)	−0.10%	+0.22%	+0.68%
Assets	+0.85%	+9.88%	0.00%

Note: Changes are expressed in percentage deviation from the baseline steady state. In the counterfactual steady state, housing is taxed by a property tax of 1.25% (compared to 1% in the baseline steady state).

Housing expenditure shares rise for young parents, but this reflects higher user costs rather than an increase in housing space.

In summary, property taxes reduce elderly housing concentration by raising the cost of holding large homes for older households. However, it simultaneously raises the recurring housing costs for young parents, increasing the implicit cost of raising children in a given housing unit and slightly depressing fertility. The policy therefore achieves its concentration target but at the cost of a small negative fertility effect. This suggests that targeted property tax exemptions for parents—effectively shielding young families from higher user costs—could improve the fertility margin of this instrument.

Figure 8: Life-cycle profiles in non-durable consumption and housing - Property taxation



Note: Panel (A) and (B) plots non-durable consumption and housing space by age group j. It shows per capita non-durable consumption (c_j) and per capita housing space ($h_j/(1+n_j)$) for the baseline with habits (solid line) and the counterfactual scenario in which housing is taxed by a property tax of 1.5% (compared to 1% in the baseline steady state). For both scenarios, Panel (C) plots housing expenditures defined as maintenance costs and property taxes by age groups expressed as shares of total expenditures. We normalize the value of young parents under the baseline scenario to 1.

7.2 Inheritance Tax

In Section 6.3, we document that removing the bequest motive encourages retirees to downsize but reduces aggregate inheritances, generating a negative income effect that depresses fertility. To preserve the downsizing incentive while counteracting this income effect, we introduce an inheritance tax of ten percent with revenues redistributed lump-sum to the whole population.

Table 9: Housing and fertility under an inheritance tax

	Young Parent	Empty-Nester	Retiree
Fertility	+0.15%	-	-
Population shares	+0.17%	+0.02%	−0.14%
Housing shares	+0.42%	−0.17%	−0.09%
House size	0.00%	−0.43%	−0.20%
Non-durable consumption (p.c.)	+0.21%	−0.39%	+0.35%
Assets	+0.15%	+1.80%	0.00%

Note: Changes are expressed in percentage deviation from the baseline steady state. In the counterfactual steady state, inheritances are taxed by 10 percent (compared to no inheritance tax in the baseline) and tax revenues are redistributed lump-sum.

We find that the inheritance tax reduces elderly housing concentration by 0.09 percent while raising fertility by 0.15 percent, with responses by age group summarized in Table 9. Elderly housing concentration declines as retirees reduce their house size by 0.2 percent. As the inheritance tax lowers the marginal utility of additional bequests, retirees have a weaker incentive to hold large housing assets in retirement.

Fertility rises because young parents experience a net gain in disposable income through two channels. First, the lump-sum redistribution of inheritance tax revenues generates positive net transfers for young parents, who receive relatively small bequests and therefore gain more from the redistribution than they lose from the tax on inherited wealth. Their windfall income rises by more than 3 percent on a net basis. Empty-nesters, by contrast, are the primary recipients of large bequests and experience a net decline in windfall income of almost 3 percent despite the lump-sum transfer. This asymmetry is the key redistributive mechanism of the policy. Second, the decline in empty-nester housing demand (driven by their net income loss) puts downward pressure on house prices (-0.1%), generating an additional positive income effect for young parents through lower required down payments.

In summary, the inheritance tax simultaneously encourages elderly downsizing and redistributes resources from empty nesters to young parents, raising fertility while reducing housing concentration. Its effectiveness relative to the direct transfer policy analyzed above reflects the same redistributive logic, but achieved through the bequest channel rather than a direct fiscal transfer.

7.3 Transfer Payments to Young Parents

As documented in Section 6.2, relaxing the borrowing constraint for young parents has a substantial positive effect on fertility. We therefore simulate a policy in which young parents receive a transfer payment equivalent to 10 percent of the house value chosen in the initial steady state, with results summarized in Table 10.[14]

The transfer raises fertility by +0.53% and reduces elderly housing concentration. Young parents use the transfer primarily to finance higher non-durable consumption rather than to increase housing demand—adult equivalent consumption rises even though per capita consumption declines slightly, reflecting the mechanical effect of larger household size on the equivalence scale.

The decline in elderly housing concentration is driven primarily by a lower population share of retirees (-0.5%), as higher fertility shifts the population toward younger cohorts. Important second-round effects amplify this result. A younger population reduces the relative size of older cohorts, who disproportionately occupy large homes, putting downward pressure on house prices. Simultaneously, lower social security taxes, resulting from a larger working-age population, raise disposable income across all age groups. Together, these forces raise housing demand and non-durable consumption for older households, while lower house prices mechanically reduce the required down payment for young parents, allowing them to accumulate more liquid assets over the life cycle.

Interestingly, the fertility response is almost an order of magnitude smaller than in the LTV relaxation counterfactual, despite the two policies being of comparable size in terms of liquidity provision.[15] The difference lies in the mechanism. Relaxing the LTV constraint specifically changes the incentive for house size choice: young parents can afford a larger home without increasing their down payment, and since housing and children are complements, the larger home directly reduces the marginal cost of children. The transfer, by contrast, is a positive income effect that young parents optimally allocate across both housing and non-durable consumption. The resulting rise in non-durable consumption increases the marginal cost of children through the $e'(n)c$ channel, partially offsetting the fertility-boosting effect. In short, the LTV relaxation operates through the housing-fertility complementarity directly, while the transfer partially disperses into non-durable consumption, making it a less targeted instrument for raising fertility.

In summary, the transfer policy simultaneously raises fertility and reduces elderly housing concentration. Compared to the property tax increase, which reduced housing concentration but depressed fertility, liquidity-focused transfers are more effective at jointly targeting both outcomes. However, the comparison with the LTV counterfactual reveals that policies which directly expand housing access, rather than providing general income support, are more

14. The transfer is financed by adjusting the lump-sum government transfer that redistributes revenues from property taxation and the housing sales tax.

15. The LTV relaxation of 15 percent implies a reduction in the required down payment that is approximately equivalent in magnitude to the transfer payment, given young parents' housing choice in the baseline.

Table 10: Housing and fertility under transfer payments to young parents

	Young Parent	Empty-Nester	Retiree
Fertility	+0.53%	-	-
Population shares	+0.59%	+0.05%	−0.48%
Housing shares	+0.51%	+0.20%	−0.47%
House size	+0.00%	+0.23%	+0.09%
Non-durable consumption (p.c.)	+6.68%	−0.36%	−0.45%
Assets	+0.17%	+2.03%	0.00%

Note: Changes are expressed in percentage deviation from the baseline steady state. In the counterfactual steady state, young parents receive a transfer payment equivalent to 10 percent of the house value chosen by young parents in the initial steady state.

powerful at the fertility margin.

7.4 Welfare

The preceding analysis focused on fertility and elderly housing concentration. To support normative policy evaluation, we turn to the welfare implications of each intervention. We define two welfare metrics to evaluate the policy experiments. The first is the welfare of a newborn, defined as the value function of a household entering the economy in the new steady state:

$$\mathcal{W}_{Newborn} = V_0, \tag{21}$$

where V_0 denotes the value function of a newborn evaluated at the new steady state. The second is a utilitarian welfare measure, defined as the population-weighted sum of value functions across all cohorts alive:

$$\mathcal{W}_{Population} = \sum_j \mu_j V_j, \tag{22}$$

where μ_j denotes the equilibrium population share of cohort j and V_j the corresponding value function. We express both measures as consumption equivalent variation that represents the proportional change in non-durable consumption at every life stage that makes a household indifferent between the baseline and the counterfactual. Both measures compare long-run steady states and therefore abstract from transition dynamics.[16] In addition, $\mathcal{W}_{Newborn}$ is not redistribution-neutral and favors policies that benefit young households by construction. $\mathcal{W}_{Population}$ is more balanced but implicitly weights cohort welfare by population shares, which are themselves endogenous to the policy through the fertility response.

Table 11 summarizes the welfare, fertility, and elderly housing concentration effects of the three policy experiments. Two broad patterns emerge across both welfare measures. First,

16. We are aware that measuring welfare in models with endogenous fertility is highly complex. The literature provides alternative approaches, such as De La Croix and Doepke 2021 and Golosov et al. 2007, that incorporate the welfare of unborn individuals. As this remains an open methodological question and since we compare long-run steady states, we adopt standard consumption-equivalent welfare criteria.

the ranking of policies is consistent: the transfer to young parents dominates, followed by the inheritance tax, with the property tax ranking last. Considering the welfare of newborns, the two fertility-raising policies improve welfare while the property tax reduces it, suggesting that policymakers do not face a trade-off between fertility and welfare among these instruments. When welfare is instead measured across all age groups, however, only the transfer to young parents raises aggregate welfare, revealing that redistributional considerations shape the normative ranking.

Second, the two welfare measures differ substantially in magnitude, and the cohort-specific welfare results reveal why. The transfer to young parents generates a newborn welfare gain of +4.58% but a utilitarian welfare gain of only +1.24%. The cohort-specific results explain this gap: while young parents gain 4.58%, empty nesters lose 0.19%, and retirees lose 0.46%. The transfer therefore, involves a substantial redistribution from older to younger cohorts that the newborn metric ignores entirely.

The inheritance tax exhibits a similar but more modest pattern. The newborn welfare gain of +0.14% turns slightly negative under the utilitarian measure (-0.02%), as empty-nesters and retirees lose -0.18% and gain +0.34% respectively. The age-specific welfare effects reflect the fact that the inheritance tax redistributes from empty-nesters, who are the primary recipients of bequests, to young parents and retirees via a lump-sum transfer.

The property tax is the only instrument that reduces welfare under both metrics; welfare effects differ across age groups: young parents lose -0.27%, empty nesters lose -0.35%, and retirees gain +0.17%. Empty-nesters face the largest welfare losses, as they pay the largest share of property tax, which is redistributed to the whole population.

Two broader lessons emerge. First, policies that directly relax the liquidity constraint facing young parents—either through a transfer or through the inheritance tax redistribution mechanism—are more effective at raising fertility than policies that target elderly downsizing through price incentives alone. This reflects the central role of the housing-fertility complementarity: fertility responds most strongly when young parents can directly access larger housing, not when house prices fall as a side effect of elderly downsizing. Second, the welfare gains from the transfer are an order of magnitude larger than its fertility effect alone would suggest, reflecting the additional redistribution toward borrowing-constrained young households. However, the cohort-specific welfare decomposition shows that this gain comes at the expense of older cohorts, which experience welfare losses of up to 0.46%. Policymakers should therefore weigh the aggregate welfare gains against the distributional costs when evaluating these instruments.

8 Conclusion

Falling fertility and high housing costs are both prominent features of the U.S. economy. This paper investigates a link between the two that has received less attention: the intergenerational allocation of housing. Using a quantitative overlapping-generations model with endogenous

Table 11: Comparison of Policy Counterfactuals

	Raising property taxation	Introducing inheritance tax	Transfer to young parents
Fertility	−0.07%	+0.15%	+0.53%
Elderly housing concentration	−0.41%	−0.09%	−0.47%
Welfare $\mathcal{W}_{Newborn}$	−0.27%	+0.14%	+4.58%
Utilitarian welfare $\mathcal{W}_{Population}$	−0.14%	−0.02%	+1.24%
Welfare by age group			
Young parents	−0.27%	+0.14%	+4.58%
Empty-nester	−0.35%	−0.18%	−0.19%
Retiree	+0.17%	+0.34%	−0.46%

Note: The table compares three policy counterfactuals relative to the baseline steady state. Raising property taxation refers to a 0.025 ppt increase in the annual property tax rate. Introducing inheritance tax refers to a ten percent tax on inherited wealth, with revenues redistributed lump-sum to all households. Transfer to young parents refers to a transfer payment equivalent to ten percent of the baseline house value, financed by reducing the lump-sum government transfer to all households. Fertility, elderly housing concentration, and welfare are reported as percentage deviations from the baseline steady state. Elderly housing concentration is measured as the share of total housing space occupied by retirees. $\mathcal{W}_{Newborn}$ denotes the consumption equivalent variation of a newborn entering the new steady state. $\mathcal{W}_{Population}$ denotes the population-weighted average of consumption equivalent variations across all cohorts, with weights given by steady-state population shares. Note that the CEV of newborns equals that of young parents, since we assume that children neither make choices nor derive utility.

fertility, we ask whether the high concentration of housing among elderly households is a meaningful driver of low fertility among young households, and what policies could improve both outcomes simultaneously.

Our analysis gives a nuanced answer. The intergenerational housing channel is quantitatively important: habit formation discourages elderly downsizing, concentrating housing among older cohorts and putting upward pressure on house prices that constrains younger households. Indeed, eliminating habit formation entirely generates the largest fertility and concentration responses of any experiment in the paper. However, this does not imply that policies targeting elderly downsizing are effective. Habit formation is a deep preference parameter that cannot be directly targeted by policy, and our property tax experiment—one potential instrument for strengthening downsizing incentives—proves largely ineffective at raising fertility and reduces welfare. The intergenerational housing channel therefore matters, but it is not easily exploitable through conventional policy instruments. Our results instead suggest that liquidity constraints facing young parents are the more effective tool. Relaxing borrowing constraints or providing targeted transfers generates fertility and welfare gains of comparable or larger magnitude, through a more direct channel. The welfare decomposition by cohort points to a distributional trade-off. Policies that effectively raise fertility do so partly by redistributing resources toward young borrowing-constrained households at the expense of older cohorts. Policymakers should therefore weigh aggregate welfare gains against these distributional costs.

Going forward, we plan to distinguish between homeowners and renters in our model, as the literature has documented distinct income and substitution effects across ownership statuses.

We also intend to introduce income heterogeneity to capture how housing affordability, and consequently fertility choices, vary across the income and wealth distribution. One dimension currently absent from the framework, but likely to matter once heterogeneity is introduced, is the role of parental transfers. Brandsaas 2025 and Wold et al. 2023 provide structural evidence that such transfers are an economically significant channel through which parental wealth translates into children's housing outcomes. In our current representative-cohort framework, this channel is not a first-order concern: with homogeneous households, the intergenerational transfer is already embedded in the aggregate bequest motive and in retirees' downsizing decisions. However, once income and wealth heterogeneity are introduced, the distribution of parental transfers will become a meaningful source of cross-sectional variation in both homeownership timing and completed fertility. Incorporating this channel explicitly is, therefore, a priority for future work. Finally, we aim to use our framework to study cross-country differences in fertility arising from heterogeneities in housing frictions and policy environments.

References

Acolin, Arthur, Jesse Bricker, Paul Calem, and Susan Wachter. 2016. "Borrowing Constraints and Homeownership." *American Economic Review* 106 (5): 625–629.

Ang, Geer, Ya Tan, Yingjia Zhai, Fan Zhang, and Qinghua Zhang. 2024. "Housing wealth, fertility and children's health in China: A regression discontinuity design." *Journal of Health Economics* 97:102915.

Atalay, Kadir, Ang Li, and Stephen Whelan. 2021. "Housing wealth, fertility intentions and fertility." *Journal of Housing Economics* 54:101787.

Attanasio, Orazio, Renata Bottazzi, Hamish W. Low, Lars Nesheim, and Matthew Wakefield. 2012. "Modelling the demand for housing over the life cycle." *Review of Economic Dynamics* 15 (1): 1–18.

Attanasio, Orazio, Hamish Low, and Virginia Sánchez-Marcos. 2008. "Explaining Changes in Female Labor Supply in a Life-Cycle Model." *American Economic Review* 98 (4): 1517–1552.

Aydilek, Asiye. 2013. "Habit formation and housing over the life cycle." *Economic Modelling* 33:858–866.

Blackburn, Keith, and Giam Pietro Cipriani. 2002. "A model of longevity, fertility and growth." *Journal of Economic Dynamics and Control* 26 (2): 187–204.

Boar, Corina, Denis Gorea, and Virgiliu Midrigan. 2022. "Liquidity Constraints in the U.S. Housing Market." *The Review of Economic Studies* 89 (3): 1120–1154.

Brandsaas, Eirik Eylands. 2025. "Illiquid Homeownership and the Bank of Mom and Dad." *Finance and Economics Discussion Series,* nos. 2025-094.

Chiocchio, Francesco. 2024a. "Marital Decline: The Role of House Prices and Parental Coresidence." *Unpublished Manuscript, CEMFI.*

Chiocchio, Francesco. 2024b. "Why Not Tax It? The Effects of Property Taxes on House Price and Homeownership." *SSRN Working Paper.*

Cocco, João F, and Paula Lopes. 2020. "Aging in Place, Housing Maintenance, and Reverse Mortgages." *The Review of Economic Studies* 87 (4): 1799–1836.

Coeurdacier, Nicolas, Pierre-Philippe Combes, Laurent Gobillon, and Florian Oswald. 2023. "Fertility, Housing Costs and City Growth." *Unpublished Manuscript, Toulouse School of Economics.*

Couillard, Ben. 2026. "Build, Baby, Build: How Housing Shapes Fertility." *Unpublished Manuscript, University of Toronto.*

Coven, Joshua, Sebastian Golder, Arpit Gupta, and Abdoulaye Ndiaye. 2024. "Property Taxes and Housing Allocation Under Financial Constraints." *SSRN Working Paper. Available at SSRN: https://ssrn.com/abstract=4880480.*

Cumming, Fergus, and Lisa Dettling. 2024. "Monetary Policy and Birth Rates: The Effect of Mortgage Rate Pass-Through on Fertility." *Review of Economic Studies* 91 (1): 229–258.

Day, Creina, and Ross Guest. 2016. "Fertility and female wages: A new link via house prices." *Economic Modelling* 53:121–132.

Daysal, N. Meltem, Michael Lovenheim, Nikolaj Siersbæk, and David N. Wasser. 2021. "Home prices, fertility, and early-life health outcomes." *Journal of Public Economics* 198:104366.

De La Croix, David, and Matthias Doepke. 2021. "A soul's view of the optimal population problem." *Mathematical Social Sciences* 112:98–108.

De Nardi, Mariacristina, and Fang Yang. 2014. "Bequests and heterogeneity in retirement wealth." *European Economic Review* 72:182–196.

Dettling, Lisa J., and Melissa S. Kearney. 2014. "House prices and birth rates: The impact of the real estate market on the decision to have a baby." *Journal of Public Economics* 110:82–100.

Doepke, M., and M. Tertilt. 2016. "Families in Macroeconomics." In *Handbook of Macroeconomics,* 2:1789–1891.

Doepke, Matthias. 2004. "Accounting for Fertility Decline During the Transition to Growth." *Journal of Economic Growth* 9 (3): 347–383.

Doornik, Bernardus van, Dimas Fazio, Tarun Ramadorai, and Janis Skrastins. 2025. "Housing and Fertility." *Unpublished Manuscript, University of Utah.*

Elgin, Ceyhun. 2012. "A Theory of Economic Development with Endogenous Fertility." *Macroeconomic Dynamics* 16 (5): 686–705.

Favilukis, Jack, Pierre Mabille, and Stijn Van Nieuwerburgh. 2023. "Affordable Housing and City Welfare." *The Review of Economic Studies* 90 (1): 293–330.

Ferreira, Fernando, Joseph Gyourko, and Joseph Tracy. 2010. "Housing busts and household mobility." *Journal of Urban Economics* 68 (1): 34–45.

Fuster, Andreas, and Basit Zafar. 2016. "To Buy or Not to Buy: Consumer Constraints in the Housing Market." *American Economic Review* 106 (5): 636–640.

Golosov, Mikhail, Larry E. Jones, and Michèle Tertilt. 2007. "Efficiency with Endogenous Population Growth." *Econometrica* 75 (4): 1039–1071.

Heer, Burkhard, and Alfred Maußner. 2024. *Dynamic General Equilibrium Modeling: Computational Methods and Applications.* Springer Texts in Business and Economics. Cham.

Hilber, Christian A.L., and Teemu Lyytikäinen. 2017. "Transfer taxes and household mobility: Distortion on the housing or labor market?" *Journal of Urban Economics* 101:57–73.

Hock, Heinrich, and David N. Weil. 2012. "On the dynamics of the age structure, dependency, and consumption." *Journal of Population Economics* 25 (3): 1019–1043.

İmrohoroğlu, Ayşe, Kyle Matoba, and Şelale Tüzel. 2018. "Proposition 13: An Equilibrium Analysis." *American Economic Journal: Macroeconomics* 10 (2): 24–51.

Jones, Larry E., and Alice Schoonbroodt. 2016. "Baby busts and baby booms: The fertility response to shocks in dynastic models." *Review of Economic Dynamics* 22:157–178.

Kaplan, Greg, Kurt Mitman, and Giovanni L. Violante. 2020. "The Housing Boom and Bust: Model Meets Evidence." *Journal of Political Economy* 128 (9): 3285–3345.

Lovenheim, Michael F., and Kevin J. Mumford. 2013. "Do Family Wealth Shocks Affect Fertility Choices? Evidence from the Housing Market." *Review of Economics and Statistics* 95 (2): 464–475.

Meng, Lina, Lu Peng, and Yinggang Zhou. 2023. "Do housing booms reduce fertility intentions? Evidence from the new two-child policy in China." *Regional Science and Urban Economics* 101:103920.

Moreno-Maldonado, Ana, and Clara Santamaria. 2024. "Delayed Childbearing and Urban Revival: A Structural Approach." *Discussion Paper Series – CRC TR 224, Discussion Paper No. 550.*

Paz-Pardo, Gonzalo. 2024. "Homeownership and Portfolio Choice over the Generations." *American Economic Journal: Macroeconomics* 16 (1): 207–237.

Ravn, Morten, Stephanie Schmitt-Grohe, and Martin Uribe. 2006. "Deep Habits." *Review of Economic Studies* 73 (1): 195–218.

Saiz, Albert. 2010. "The Geographic Determinants of Housing Supply *." *Quarterly Journal of Economics* 125 (3): 1253–1296.

Shan, Hui. 2010. "Property taxes and elderly mobility." *Journal of Urban Economics* 67 (2): 194–205.

Sommer, Kamila, and Paul Sullivan. 2018. "Implications of US Tax Policy for House Prices, Rents, and Homeownership." *American Economic Review* 108 (2): 241–274.

Tracey, Belinda, and Neeltje Van Horen. 2025. "Credit constraints and the redistribution of housing wealth." *Bank of England Working Papers 1147, Bank of England.*

Wold, Ella Getz, Knut Are Aastveit, Eirik Eylands Brandsaas, Ragnar Enger Juelsrud, and Gisle James Natvik. 2023. "The housing channel of intergenerational wealth persistence." *Working Paper 16, Norges Bank.*

Yang, Fang. 2009. "Consumption over the life cycle: How different is housing?" *Review of Economic Dynamics* 12 (3): 423–443.

Yi, Junjian, and Junsen Zhang. 2010. "The effect of house price on fertility: Evidence from Hong Kong." *Economic Inquiry* 48 (3): 635–650.

A Additional Stylized Facts

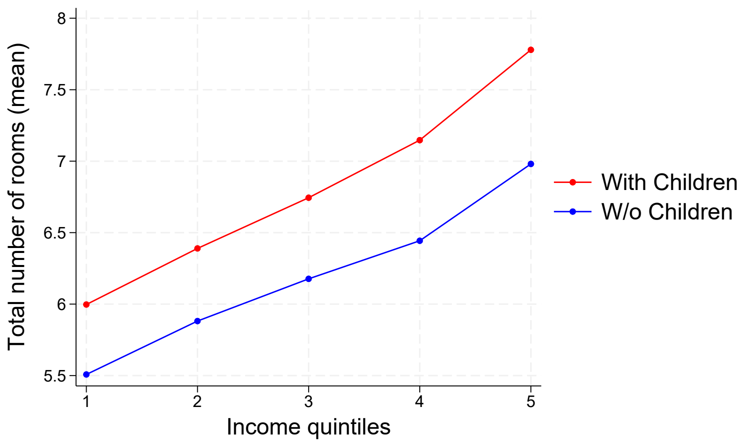
Table 12: Elderly housing concentration and fertility

	Fertility Rate
% of housing space occupied by elderly homeowners	-0.557^{***}
	(-4.03)
Median age	-0.784^{*}
	(-2.11)
Constant	105.4^{***}
	(9.65)
Adjusted R squared	0.589
N	37

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

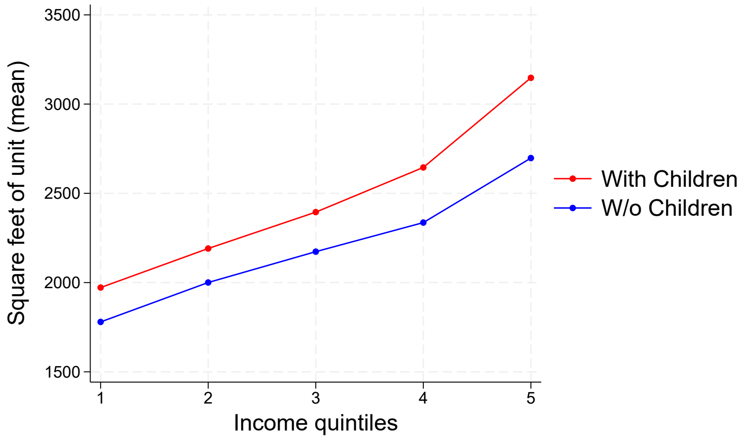
Note: Regression based on MSA-level data from American Housing Survey 2015-2019 and American Community Survey (2015-2019). Housing space is measured in square feet per unit.

Figure 9: Fertility and Housing Choices (Number of Rooms)



Note: Figures are based on pooled data from AHS 2015-2019. We exclude households younger than 20 and only include owner-occupied housing. Averages per income quintiles are calculated using sample weights.

Figure 10: Fertility and Housing Choices (Square Feet of Unit)



Note: Figures are based on pooled data from AHS 2015-2019. We exclude households younger than 20 and only include owner-occupied housing. Averages per income quintiles are calculated using sample weights.

A.1 Details on the Calibration

Table 13: Equivalence scales of non-durable consumption and housing

Family Size N	1	2	3	4	5	6	7
Fertility n	0	0.5	1	1.5	2	2.5	3
Non-housing $e(N)$	1	1.34	1.65	1.97	2.27	2.57	2.87

Note: This table represents the equivalence scale of non-durable consumption reported in Yang 2009. Assuming that a household consists of two parents, we impute the implied fertility n from total family size N.