"Giving Up": The Impact of Decreasing Housing Affordability on Consumption, Work Effort, and Investment*

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Abstract

Housing affordability has declined sharply in recent decades, leading many younger generations to give up on homeownership. Using a calibrated life-cycle model matched to U.S. data, we project that the cohort born in the 1990s will reach retirement with a homeownership rate roughly 9.6 percentage points lower than that of their parents' generation. The model also shows that as households' perceived probability of attaining homeownership falls, they systematically shift their behavior: they consume more relative to their wealth, reduce work effort, and take on riskier investments. We show empirically that renters with relatively low wealth exhibit the same patterns. These responses compound over the life cycle, producing substantially greater wealth dispersion between those who retain hope of homeownership and those who give up. We propose a targeted subsidy that lifts the largest number of young renters above the "giving-up threshold." This policy yields welfare gains that are 3.2 times those of a uniform transfer and 10.3 times those of a transfer targeted to the bottom 10% of the wealth distribution, while also increasing homeownership rate, raising work effort, and reducing reliance on the social safety net.

Keywords: Giving-Up, Homeownership, Life-Cycle Model, Consumption, Work Effort, Investment, Inequality

JEL Codes: D14, D15, E20, G51, R21

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1 Introduction

Households often pursue long-term objectives that require sustained effort over many years - such as purchasing a home, financing their children's education to enhance future opportunities, or accumulating retirement savings. Yet these goals have become increasingly difficult to attain. House prices continue to rise rapidly while wages stagnate, the cost of raising children has grown with escalating education expenses, and high inflation rates especially during the recent years have made it more difficult for households to build wealth. In response, households typically adjust by reducing consumption and increasing labor supply in order to stay on track toward their long-run objectives.

However, when such goals become exceedingly difficult and are perceived as beyond realistic reach, households may cross a threshold at which they begin to *give up* on them entirely. Unfortunately, this abandonment of major life goals is becoming increasingly common worldwide, particularly among younger generations. According to the Harris Poll's 2024 State of Real Estate Survey,[1] 42% of Americans and 46% of Gen Z respondents agreed with the statement, "No matter how hard I work, I will never be able to afford a home I really love." Similar trends appear globally. In South Korea, many young people describe themselves as the *Sampo* generation - "a generation that gave up on three things," referring to dating, marriage, and childbirth - largely due to high housing costs and unstable employment. Japan's *Satori* ("enlightened") generation and China's *Tangping* ("lying flat") movement likewise capture a growing belief among young people that hard work no longer guarantees upward mobility, leading many to withdraw from traditional ambitions in favor of minimal work and consumption.

In this paper, we examine the consequences that arise when a growing number of households give up on long-term financial goals, focusing specifically on the goal of homeownership. Housing plays a central role in household financial decision-making and wealth accumulation (Gomes, Haliassos and Ramadorai, 2021; Sodini et al., 2023; Bernstein and Koudijs, 2024), and the decline in housing affordability has become a pressing societal and policy concern.[2]

[1] See https://theharrispoll.com/wp-content/uploads/2024/03/State-of-Real-Estate-2024-March-2024.pdf for the full survey.

[2] Recent U.S. policy agendas have prioritized lowering the cost of renting and owning a home and expanding housing affordability. See, for example, Kamala Harris' Agenda to Lower Costs for American Families and

One advantage of studying homeownership is that the difficulty of attaining it can be quantified relatively straightforwardly by comparing household income and accumulated wealth to prevailing house prices - enabling more precise measurement of behavioral responses and specific policy proposals. We focus on the United States for two key reasons. First, it has experienced a well-documented decline in housing affordability in recent years. Second, the availability of rich microdata enables us to closely examine how different types of households - by their demographics or homeownership status - adjust their behavior as housing becomes increasingly unaffordable. While our empirical analysis centers on the U.S. housing context, the theoretical model we develop is more general and can be applied to other types of giving-up behavior in different countries.

We begin by documenting empirical patterns that reflect the sharp decline in housing affordability. The rapid rise in housing prices, alongside stagnant wage growth, has significantly eroded households' ability to purchase homes. The ratio of median house price to median household income increased from 3.57 in 1984 to 4.52 in 2010, reaching 5.81 by 2022. Using transaction data collected from county recorders' offices, we further show that the share of residential real estate transactions affordable to the median-income household in each county fell by 23 percentage points in 2023 compared to 2010. In response, many households - particularly younger generations - are giving up on homeownership altogether. Survey evidence supports this trend: increasing shares of respondents report that they view homeownership as financially out of reach, with especially high pessimism among minority households. This shift in attitude is reflected in their savings decisions as well. According to Apartment List's Millennial Homeownership Report, the share of Millennial renters saving nothing for a down payment rose from 48% in 2018 to 67% in 2023.

Because homeownership is one of the most consequential financial decisions households make, giving up that goal can trigger broader shifts in economic behavior. To examine these effects, we begin by using nationally representative data from MRI-Simmons to compare renters and homeowners with similar levels of net worth. We find that, among households with net worth below the median U.S. house price, renters tend to spend more on credit cards, exert less effort at work, and participate more in cryptocurrency markets relative to

Zohran Mamdani's Housing By and For New York.

homeowners with similar wealth. We observe similar patterns using individual-level bank and card account data, focusing on how renters adjust their behavior after experiencing changes in their local housing market affordability (i.e., houses in their county becoming less affordable). Following such changes, lower-wealth renters increase their spending - particularly on non-essential and entertainment goods - and increase exposure to risky investments, while higher-wealth households respond in the opposite directions.

The observed shifts in consumption, work efforts, and investment behavior in response to declining housing affordability are consistent with economic intuition. Consider renters who have been working diligently and saving with the long-term goal of purchasing a home. When house prices rise sharply and homeownership becomes increasingly out of reach, the incentive to continue saving toward that goal diminishes. In the absence of a tangible aspirational target, households may reallocate resources toward smoothing consumption over the life cycle as standard macroeconomic and household finance models would predict. This behavioral adjustment - coupled with the drawdown of savings originally earmarked for a down payment - can result in elevated consumption levels in the short term. Similarly, prior to giving up on homeownership, these households may have been willing to endure long hours of work in pursuit of that goal. Once that goal becomes out of reach, however, the marginal disutility of labor is no longer justified by the future benefit. As a result, households are likely to reduce labor supply until the marginal utility of additional consumption from wages equals the marginal disutility of work - implying a re-optimization toward better work-life balance.

The observed shifts in investment behavior are also intuitive. If steady saving and traditional asset accumulation no longer suffice to secure a home, some households may instead pursue high-risk, high-return strategies - such as investing in cryptocurrencies - as a last resort. For those priced out of the housing market, gambling on improbable but potentially transformative gains may appear rational, particularly among younger cohorts. Supporting this notion, Aiello et al. (2023*a*) find that cryptocurrency windfalls are often used to finance home purchases, while Hughes et al. (2024) document that ZIP codes with high crypto exposure in 2021 experienced the greatest subsequent increases in both mortgage and auto loan originations and balances. An alternative interpretation is that risk-taking capacity varies across renters depending on their proximity to the homeownership margin. Renters with a plausible path to homeownership may exhibit lower risk tolerance, as significant losses could derail their progress toward that goal. In contrast, those who have already given up on homeownership may perceive they have less to lose, and therefore engage more willingly in risky financial behavior.

We develop a dynamic life-cycle model to formalize and quantify the implications of households increasingly "giving up" on homeownership. In our model, households make forward-looking decisions over consumption, work efforts, investment, and housing in the presence of uncertainty in both wages and house prices. The model incorporates collateralized and unsecured borrowing, default risk, social safety nets, and bequest motives, allowing for rich endogenous responses to housing affordability shocks. A key innovation is that the model endogenously determines when households optimally give up on homeownership, enabling us to trace the causal impact of giving up on economic behavior across the life cycle. While such "giving up" is difficult to observe empirically, the model allows us to calculate the implied probability that households (correctly) expect by examining the future life trajectories implied by each household's optimized value function. We calibrate model parameters to match key moments from U.S. data, and solve the model by discretizing the state space and using backward induction to compute value functions, following the approach of Attanasio et al. (2012) and Low et al. (2018).

Using the calibrated life-cycle model, we simulate the life-cycle trajectories of households with different initial wealth and homeownership status and project how declining housing affordability would reshapes homeownership trajectories, household behavior, and long-run inequality. Simulations comparing the 1970 and 2010 cohorts reveal a sizable decline in lifetime homeownership: while 83.8% of the 1970 cohort eventually became homeowners, only 74.2% of the 2010 cohort are projected to do so - a 9.6 percentage point drop. The gap is wider before age 35, reflecting a delayed entry into homeownership due to rising house prices relative to income. The model also tracks each household's endogenous probability of becoming a homeowner, allowing us to classify individuals into "hopeful" renters (those with $\geq$ 50% probability of becoming a homeowner by retirement age) and "discouraged" renters (those with < 50%). Our model suggests that around 15% of 2010 cohort households have already given up by age 30. Nearly all of them - 98.26% - are projected to remain in that discouraged state by age 40, while the majority of hopeful renters either transition into homeownership or continue progressing toward it.

The model also shows that giving up on homeownership has significant behavioral and economic consequences. Discouraged renters consume more relative to their assets, work less, and invest more aggressively in risky assets - behaviors that erode their long-run financial stability. In contrast, hopeful renters adopt forward-looking behaviors: they reduce consumption, exert higher labor effort, and invest more cautiously to accumulate wealth for a future home purchase. At the aggregate level, we find that these behavioral shifts imply 6-8% drop in labor effort by 2010 cohort relative to that of 1970 cohort. Aggregate consumption is also projected to fall - by roughly 10-15% - mostly due to the higher savings of hopeful renters and the limited consumption capacity of discouraged renters. Taken together, these shifts reflect an economy gradually transitioning toward a "work less, spend less" equilibrium.

Such behavioral shifts associated with giving up on homeownership imply that declining housing affordability can have significant consequences for wealth inequality. To illustrate this, we simulate two renters who begin with nearly identical initial wealth—one just above the threshold to remain hopeful, and the other just below it, leading them to become discouraged. Despite their similar starting points, the discouraged renter quickly falls into a near-zero wealth trap, while the hopeful renter gradually accumulates assets and substantially narrows the gap with initial homeowners. When we simulate forward from an initial wealth distribution at age 20 that is tightly concentrated near zero and unimodal, we observe dramatic divergence in outcomes depending on which side of the threshold a household started with. By retirement age, this results in a strikingly bimodal wealth distribution. These dynamics underscore the powerful role of hope: belief in the attainability of homeownership shapes savings, work effort, and investment decisions in compounding ways over the life cycle, with profound implications for long-run wealth inequality.

We use these insights to evaluate some of the most common forms of government subsidies - universal transfer of the same amount and only bottom 10%. In addition, we propose a targeted subsidy that maximizes the number of households to get shifted above the *homeownership hope threshold*. Comparing three subsidies with equal total budget limit, we find that the targeted subsidy delivers the largest welfare gains. It improves lifetime utility by

3.31% (measured in consumption-equivalent variation), raises homeownership by 3.4 percentage points, increases labor effort by 5.49%, and reduces safety net reliance by 4.59 percentage points. Unlike the bottom 10% subsidy, which mostly reaches households too far below the threshold to respond, the targeted approach successfully shifts marginal households from discouragement to hope, triggering forward-looking behaviors with long-run compounding returns. This not only enhances household welfare, but also reduces the fiscal burden by increasing tax revenues and lowering government transfers.

The rest of the paper proceeds as follows. Section 2 reviews the related literature and outlines our contributions. Section 3 presents empirical evidence on younger generations giving up on homeownership and the consequences. Section 4 introduces our life-cycle model and describes its calibration to U.S. data. Section 5 uses the calibrated model to examine the household-level and aggregate effects of giving up, including its implications for wealth inequality. Section 6 proposes a targeted subsidy policy and compares its efficiency to other common forms of government support. Section 7 concludes.

2 Related Literature

Our paper contributes to four strands of literature. This paper is closely related to the literature on household responses to housing markets, including how changes in housing prices or mortgage rates affect household consumption (Attanasio et al., 2009; Mian, Rao and Sufi, 2013; Agarwal and Qian, 2017; Aladangady, 2017; Di Maggio et al., 2017; Ganong and Noel, 2020; Garriga and Hedlund, 2020; Kaplan, Mitman and Violante, 2020*b*; Atalay and Edwards, 2022; Deng et al., 2022; Benmelech, Guren and Melzer, 2023; Graham and Makridis, 2023; Sodini et al., 2023) and labor supply (Laamanen, 2017; Disney and Gathergood, 2018; Li et al., 2020; Bernstein, 2021; Favilukis and Li, 2023; Zator, 2024). We provide a unified framework to examine how households adjust their consumption, employment, and investment in response to declining housing affordability, ranging from moderate declines to severe deteriorations that ultimately lead households to abandon homeownership. For instance, Chopra, Roth and Wohlfart (2023) show that renters reduce their spending when they expect moderately higher home prices in the future. We find that when home prices rise to the point where renters can no longer afford to buy a house within the foreseeable future by saving their wages, renters give up on home purchases and instead use their savings to increase consumption. Our findings also provide a new perspective on the declining desire to work (Faberman, Mueller and Şahin, 2022; Abraham and Rendell, 2023) and recent notable rise in risky investments by retail investors (de Silva, Smith and So, 2023; Weber et al., 2023). Aiello et al. (2023*a*) demonstrate that cryptocurrency investors often use gains from their investments specifically for home purchases and Hughes et al. (2024) show that areas with high cryptocurrency exposure subsequently experience increases in mortgage balances, indicating that at least some aspects of risky investment motives are related to housing.

We use a life-cycle model to study the effects of declining housing affordability and the phenomenon of households "giving up," as homeownership is a long-term goal that requires sustained planning and has significant lifetime welfare implications. Our model contributes to the extensive literature on life-cycle decision-making (see Browning and Crossley (2001) and Attanasio and Weber (2010) for reviews), particularly in the context of housing choices (Cocco, 2005; Yao and Zhang, 2005; Bottazzi, Low and Wakefield, 2007; Campbell and Cocco, 2007; Li and Yao, 2007; Attanasio et al., 2012; Dotsey, Li and Yang, 2014; Li et al., 2016; Berger et al., 2018; Kaplan, Mitman and Violante, 2020*a*; Waxman et al., 2020; Guren et al., 2021; Kovacs and Moran, 2021; Mabille, 2023; Paz-Pardo, 2024). A key innovation in our framework is that it enables explicit calculation of the household-specific probability of attaining homeownership in the future, derived from the optimal housing trajectory implied by the value function - something that is difficult to observe directly in empirical data. This feature allows us to examine how household behavior changes based on forward-looking expectations of homeownership, and how crossing the threshold into "giving up" leads to systematically different decisions. These behavioral divergences accumulate over the life cycle and ultimately translate into substantial inequality in wealth and welfare.

Our work also contributes to the literature on economic inequality (see review articles by Corak (2013); Attanasio and Pistaferri (2016); Hoffmann, Lee and Lemieux (2020); Saez and Zucman (2020); Gomez (2025)), with a particular focus on the relationship between housing and inequality (Ioannides and Ngai, 2025). Housing influences inequality through multiple channels: it increases homeowners' wealth while reducing renters' disposable income through housing expenditures (Dustmann, Fitzenberger and Zimmermann, 2022); it shapes income inequality directly (Albouy, Ehrlich and Liu, 2016; Dustmann, Fitzenberger and Zimmermann, 2022); and it reinforces inequality indirectly, as rising income inequality drives up housing prices and deepens spatial segregation (Finlay and Williams, 2022; Liu, Lou and Xiang, 2024; Howard and Liebersohn, 2025). Housing also plays a key role in amplifying intergenerational inequality (Wold et al., 2024), particularly through parental transfers and dynastic wealth channels (Engelhardt and Mayer, 1998; Guiso and Jappelli, 2002; Kudlyak, Mondragon and Benetton, 2022; Allen et al., 2025; Brandsaas, 2025; Landén Mammos, 2025). Beyond these mechanisms, we introduce a novel "giving up" channel: when households abandon the goal of homeownership, they make behavioral adjustments that have long-run consequences for inequality. We further propose a targeted subsidy aimed at helping discouraged renters cross the hope threshold. This policy is significantly more effective than broad-based transfers in reducing abandonment of homeownership and improving aggregate welfare.

Finally, we highlight the role of "hope" in shaping households' economic behavior over the life cycle. As housing becomes less affordable, individuals who still aspire to homeownership increase their labor effort and exhibit disciplined behavior, while those who lose that hope reduce effort and shift toward less forward-looking choices. These findings contribute to the growing literature on the role of aspirations in economic decision-making (Diecidue and Van De Ven, 2008; Ray and Robson, 2012; Genicot and Ray, 2017); see Genicot and Ray (2020) for a broader discussion. In a corporate finance setting, this framework is also related to Jensen and Meckling (1976) which show that excessive debt can induce risk-shifting by firm management. Our findings on renters' risk-taking behavior are also consistent with insights from behavioral ecology's energy budget rule (Caraco, 1980; Caraco, Martindale and Whittam, 1980; Caraco, 1981*a*,*b*; Stephens, 1981; Real and Caraco, 1986; Stephens and Krebs, 1986; McNamara and Houston, 1992; Kacelnik and Bateson, 1996; Brito e Abreu and Kacelnik, 1999; Kacelnik and El Mouden, 2013; Lim, Wittek and Parkinson, 2015; Houston and Rosenström, 2024), which predicts risk-aversion when expected returns exceed a minimum threshold for survival and risk-seeking behavior otherwise. Similarly, when homeownership becomes nearly unattainable, renters may pursue high-risk investments in the hope of transformative gains, rationalized by a safety net that provides a floor on losses. This also aligns with ideas from prospect theory (Kahneman and Tversky, 1979) and ambiguity preferences (Brenner and Izhakian, 2018), where individuals become more tolerant of risk in pursuit of unlikely but impactful outcomes especially when downside is bounded below. We extend these ideas by modeling their dynamic implications: hope - or the loss thereof - fundamentally alters savings, labor, and investment behavior, with long-run consequences for both individual outcomes and broader society such as reduced aggregate labor supply and increased strain on social safety nets.

3 Giving Up Homeownership and Empirical Patterns

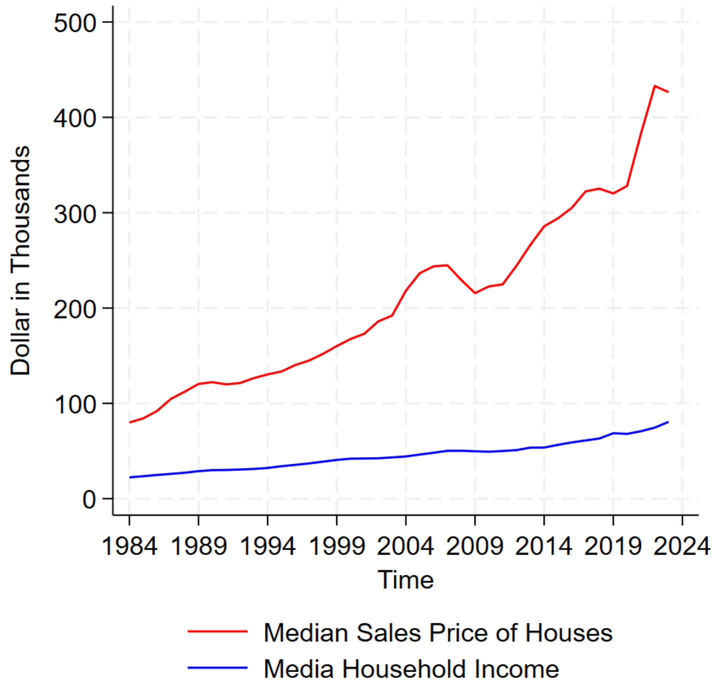
Homeownership has long represented financial stability and personal achievement - a central pillar of the American Dream (Goodman and Mayer, 2018). Yet for younger generations, this goal is becoming increasingly out of reach. In Section 3.1, we document the sharp decline in housing affordability and show that younger cohorts are increasingly abandoning the pursuit of homeownership. Section 3.2 examines cross-sectional patterns by comparing households with similar asset levels but different homeownership status, revealing how giving up on homeownership correlates with shifts in consumption, labor effort, and investment behavior. Section 3.3 explores how renters across the income distribution respond differently changes in local housing market prices.

3.1 Decreasing Affordability and Giving Up Homeownership

Figure 1 plots the median sales price of homes alongside median household income in the U.S. over time. While household income has grown modestly, housing prices have risen much more rapidly. As a result, the ratio of median house price to median household income has steadily increased - from 3.57 in 1984 to 4.52 in 2010, reaching 5.81 by 2022 - highlighting the growing disconnect between earnings and the cost of homeownership.

To examine housing affordability at a more granular level, we analyze trends in the share of residential property sales that are affordable to median-income households in each county. For every county, we calculate the proportion of transactions deemed affordable - defined as those with total monthly housing costs (including mortgage principal, interest payments,

Figure 1: Median Sales Price of Houses Sold and Median Household Income



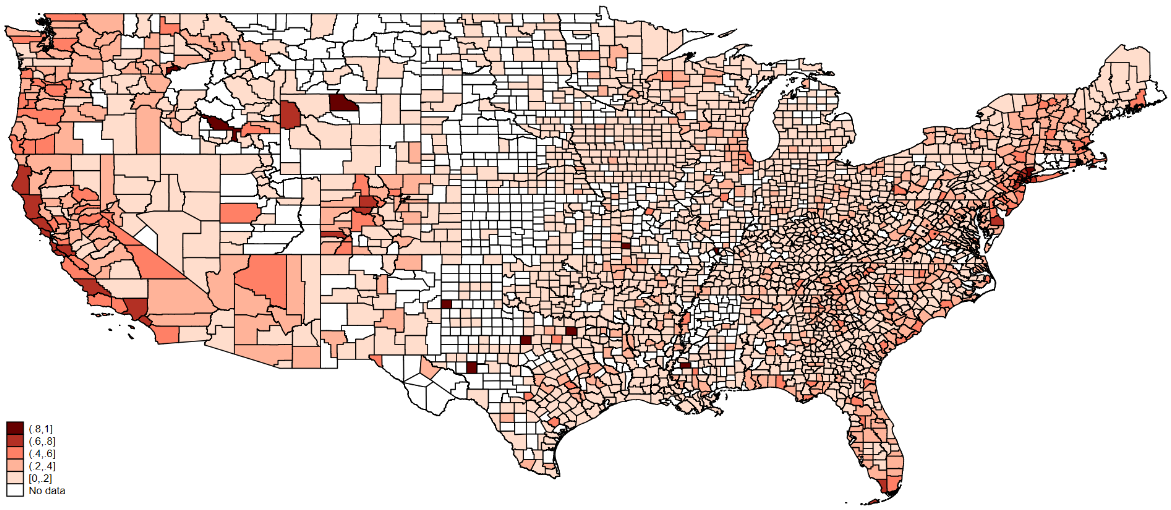
This figure plots median sales price of houses sold and median household income in the United States. Source: U.S. Census Bureau via FRED

and property taxes) amounting to less than 30% of the local median household income. We assume a 20% down payment and use county-level data on residential property transactions from ATTOM's Recorder dataset (collected from county recorders' offices), average 30-year fixed mortgage rates from Freddie Mac, property tax estimates from Baker, Janas and Kueng (2025) and the Tax Foundation, and median household income from the U.S. Census.

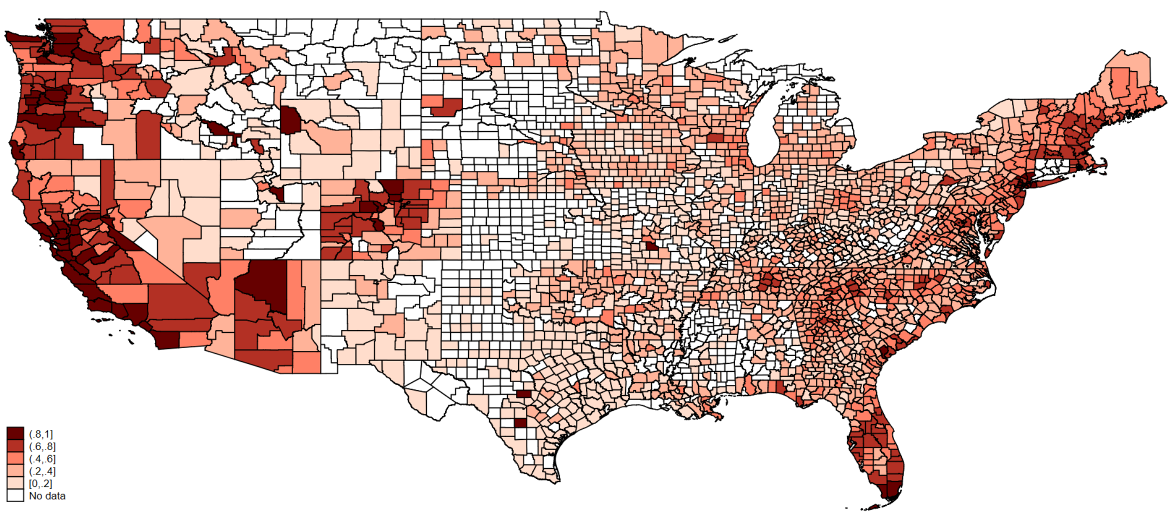
Figure 2 displays the share of residential property transactions deemed unaffordable for median-income households by county in 2010 and 2023. The decline in affordability is striking, with a growing concentration of unaffordable counties along the coasts—areas that account for a large share of the U.S. population and housing transactions. Nationally, the share of unaffordable transactions increased from 29% in 2010 to 52% in 2023. These figures likely understate the true extent of unaffordability, as the calculations exclude income taxes (due to data limitations on deductions and credits), homeowners insurance, and other recurring costs such as HOA fees and maintenance expenses.

The decline in housing affordability has been especially severe for younger generations,

Figure 2: Share of Unaffordable Residential Transactions by County in 2010 and 2023



(a) 2010



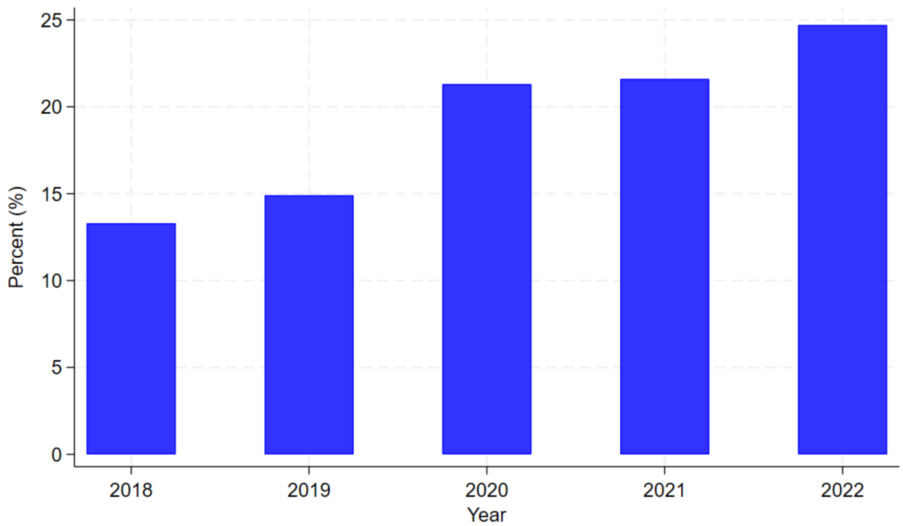
(b) 2023

This figure illustrates the share of unaffordable residential transactions for median-income households by county in 2010 and 2023. A transaction is unaffordable to a median-income household if the total costs (sum of principal, interest payments, and property taxes) exceed 30% of the median-income household's income in a county.

whose incomes are typically lower than those of the median household. Reflecting this, homeownership rates among young adults have been steadily falling. Mabille (2023) documents an unprecedented drop in young homeownership following the Great Recession, particularly in high-cost housing markets. Similarly, Paz-Pardo (2024) finds that younger cohorts today are significantly less likely to own homes compared to earlier generations at the same age.

These patterns are further reflected in rising ages of first-time homebuyers and an increasing share of young adults living with their parents.

Figure 3: Percentage of Millennial Renters Who "Expect To Always Rent"

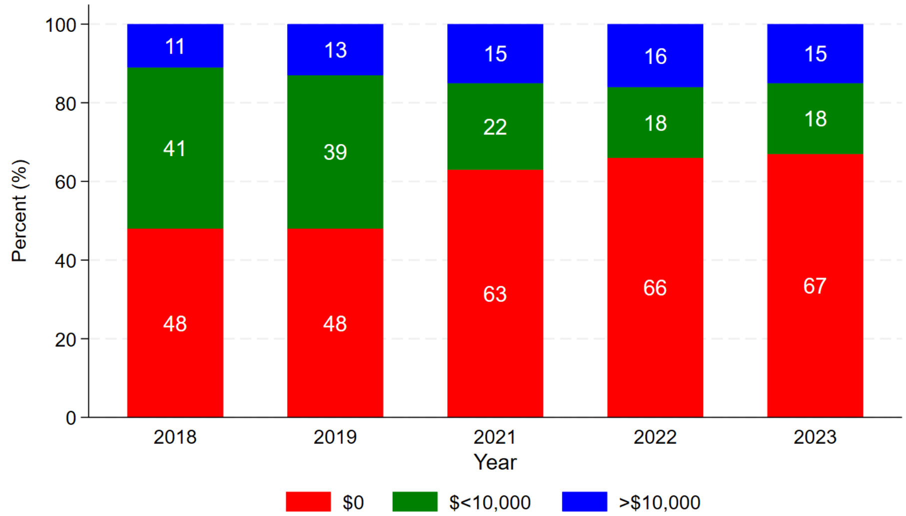


This figure plots the percentage of millennial returns who answered that they expect to always rent. Source: Apartment List's Millennial Homeownership Report.

A notable trend is that younger generations are not merely delaying homeownership—they are increasingly giving up on it altogether. While lifetime decisions cannot be directly observed in the data, survey responses provide compelling evidence of this shift in sentiment. According to Freddie Mac's Generation Z Study, 34 percent of respondents in 2022 reported that "owning a home at any point in their life seems out of reach financially," up from 29 percent in 2019. The trend is even more pronounced among minority groups; for example, 50 percent of Hispanic respondents said they had given up on homeownership. Similar patterns appear in Apartment List's Millennial Homeownership Report, which shows a growing share of millennials expecting to rent for life. Figure 3 illustrates this shift: the proportion of millennial renters who "expect to always rent" rose from 13.3 percent in 2018 to 24.7 percent in 2022, primarily due to financial constraints. Likewise, the 2024 State of Real Estate Survey by Harris Poll reports that 42 percent of respondents agree with the statement, "No matter how hard I work, I'll never be able to afford a home I really love."

As more individuals give up on homeownership, preparedness for a downpayment is declining. Figure 4 presents trends in downpayment savings among millennial renters, based

Figure 4: Trends in Down Payment Savings Amounts



This figure plots amounts of savings for downpayment by Millennial renters. Source: Apartment List's Millennial Homeownership Report.

on data from the annual Apartment List renter survey. Between 2019 and 2021 - a period characterized by sharp increases in housing prices and declining affordability - there was a marked rise in the share of renters who reported saving nothing for a downpayment. Importantly, this pattern does not appear to be driven by a general decline in savings, as overall household savings rose during this time due to stimulus payments.[3] These trends support the view that many renters are not merely postponing home purchases, but abandoning them entirely. They also suggest that those giving up are disproportionately households who had already been struggling to accumulate meaningful savings before the recent surge in housing prices.

3.2 Cross-Sectional Comparison: Empirical Patterns

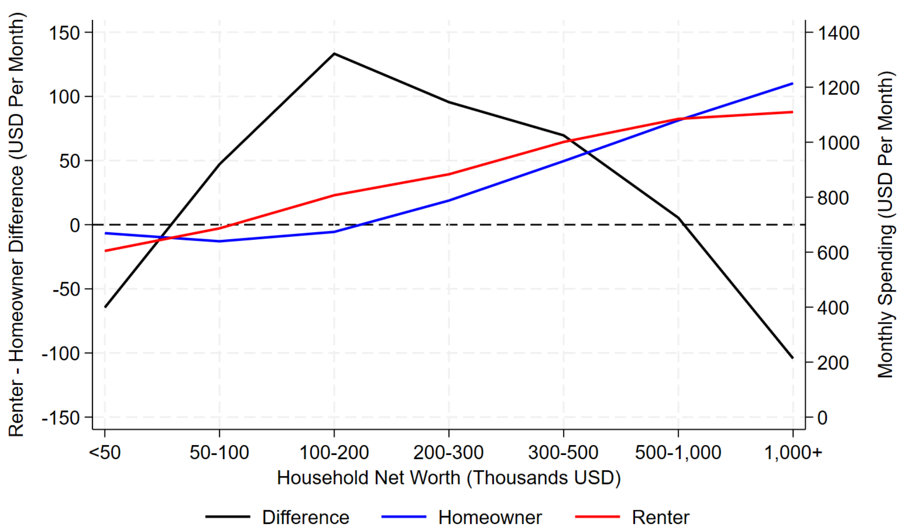
Homeownership is one of the most consequential financial decisions households make, and rising unaffordability - coupled with the growing tendency to *give up* on becoming a homeowner - can have meaningful spillover effects on other economic behaviors. To examine how households' choices would shift when they remain renters rather than transitioning into homeownership, a natural starting point is to compare key outcomes across renters and

[3] This period saw elevated aggregate household savings as a result of pandemic-related stimulus measures.

homeowners. Specifically, we examine differences in consumption, labor effort, and investment behavior, holding household net worth constant to isolate the role of homeownership from underlying wealth differences.

Our analysis utilizes data from the MRI-Simmons USA survey, which includes approximately 50,000 individuals aged 18 and older and provides sampling weights to ensure national representativeness. These weights adjust for selection probability, income strata, household composition, and non-response. MRI-Simmons is increasingly used in finance research (e.g., Wang (2025); Yoo (2025)) due to its ability to capture detailed household-level information on consumption, employment, and investment behavior alongside rich demographic variables. Yoo (2025) provides a thorough comparison of MRI-Simmons demographics with those in the U.S. Census and the Survey of Consumer Finances (SCF); Table A3 presents a subset of this comparison, showing the distribution of household net worth by homeownership status in both datasets. All analyses in this paper are based on the 2022 MRI-Simmons wave.

Figure 5: Monthly Credit Card Spending Across Household Net Assets



For each homeownership status (homeowner or renter), the average monthly credit card spending was computed across household net asset groups using MRI-Simmons survey weights. The numbers were calculated based on the respondents aged 25-54.

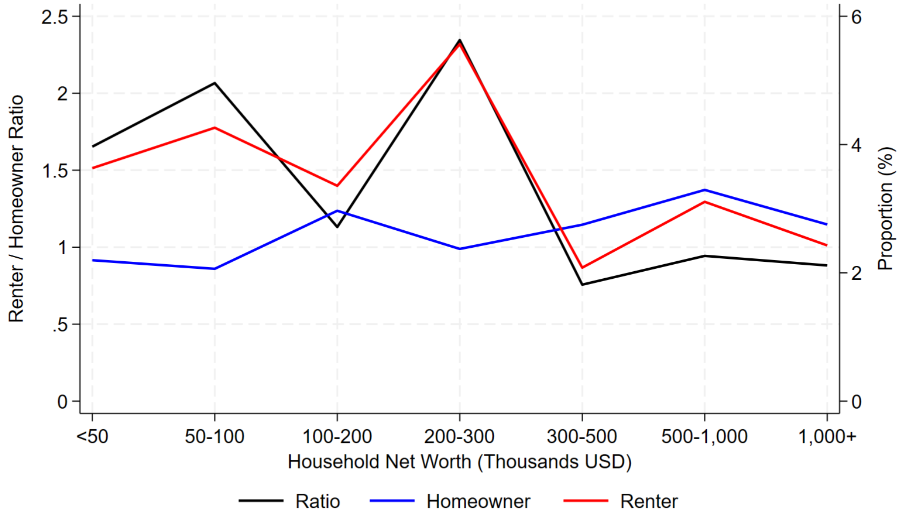
Figure 5 presents average monthly credit card spending across net worth groups by homeownership status. For both renters and homeowners, credit card spending increases with net worth, reflecting standard wealth effects. However, renters consistently spend more than homeowners in the lower net worth range: among households with less than $500,000 in net assets, renters spend roughly $100 more per month on credit cards. Given that average monthly credit card spending in this group is about $1,000, this implies a gap of around 10% which is significant. The spending difference disappears, and even reverses, at higher net worth levels.

Two mechanisms may account for this pattern. One possibility is the role of mortgage payments as a commitment device, as emphasized in Chetty and Szeidl (2007) and Kovacs and Moran (2021). Homeowners with active mortgages are required to make regular payments and hold a significant share of their wealth in illiquid housing equity, thereby suppressing discretionary consumption. Renters, in contrast, face no such constraint and have greater access to liquid assets. Once households reach net worth levels above approximately $500,000 - roughly the median house price in 2022 - many homeowners likely have fully paid off their mortgages, relaxing this liquidity constraint and narrowing the consumption gap.

A second explanation relates to the behavioral consequences of giving up on homeownership. Renters who no longer view homeownership as an attainable goal may reduce their savings and reallocate funds toward current consumption. The dissipation of future-oriented saving motives can raise current spending, especially among those who had previously earmarked assets for a down payment. This channel may also explain why the consumption gap persists despite growing access to home equity withdrawals, which attenuate the commitment device associated with mortgages. The interaction of these forces yields an inverted U-shape in the renter–homeowner consumption gap: as net worth declines from $500,000 to around $100,000, more renters appear to have "given up," leading to a growing difference in monthly credit card spending. While the absolute dollar gap increases over this range, the relative difference is even more striking when scaled by wealth - e.g., a $100 difference in monthly spending represents a much larger share of total assets for households with $100,000 in net worth than for those with $500,000. As net worth further decreases below $100,000, however, the gap narrows again - likely because households have depleted the savings previously earmarked for homeownership, leaving limited capacity to further boost consumption.

If the "giving up" channel is operative, we should observe changes not only in consumption but also in labor supply behavior. Prior to abandoning the goal of homeownership, renters

Figure 6: Perceptions Towards Not Working Hard Across Household Net Assets

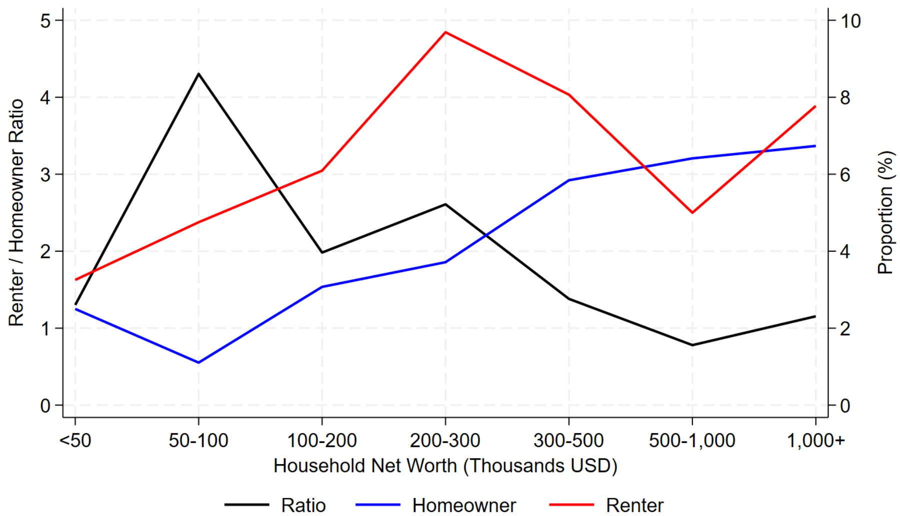


The plot reports the proportion of respondents who indicated "Not Important" in response to the GfK Roper Values question on "Working hard: Always giving my best effort" in the survey conducted by MRI-Simmons. For each homeownership status (homeowner or renter), the proportion was computed across household net asset groups using MRI-Simmons survey weights. The numbers were calculated based on the respondents aged 25-54.

would have worked as hard as homeowners (who are trying to pay off mortgages) to save for a future home. But once that aspiration is abandoned, the marginal utility of additional labor may decline, leading to a re-optimization of work effort by renters. To show this, Figure 6 reports the share of respondents who chose "not important" for the MRI-Simmons psychographic questions that ask the importance of "always giving my best effort" at work. While standard labor market outcomes such as hours worked or employment status may fail to capture effort margins (for instance, a full-time worker who is still formally employed may reduce discretionary effort - commonly referred to as "quiet quitting" - without any observable change in hours), this measure serves as a useful proxy for changing attitudes toward work.

Among homeowners, the proportion reporting low work effort remains low and relatively flat at 2–3% across all net worth levels. Among renters with net worth above $300,000 - those still plausibly on track to purchase a home - the proportions are similar or even slightly lower, possibly reflecting stronger motivation to work toward eventual homeownership. However, among renters with net worth below $300,000, the share reporting low work effort increases to 4-6%, nearly twice the rate observed among homeowners. This shift is consistent with a reallocation of time and effort by discouraged renters: as the perceived returns to labor (in terms of progressing toward homeownership) diminish, so does the value they place on maintaining high work effort.

Figure 7: Cryptocurrency Participation Rate Across Household Net Assets



For each homeownership status (homeowner or renter), the cryptocurrency participation rate was computed across household net asset groups using MRI-Simmons survey weights. The numbers were calculated based on the respondents aged 25-54.

A third margin of behavioral response emerges in investment decisions. For households facing limited prospects of achieving homeownership through work and savings alone, one remaining path is the pursuit of high-return, high-risk assets. Figure 7 shows cryptocurrency participation by net worth and homeownership status. Among homeowners, participation gradually increases with wealth. Among renters, participation follows a markedly different pattern. For those with net worth above \$300,000, renter-homeowner participation rates are roughly equal, consistent with the view that renters in this group are still within reach of homeownership and do not need to take excessive risks. As net worth declines below \$300,000, however, renter participation rises relative to that of homeowners, suggesting a “gambling for redemption” motive: risk-taking as a last resort to close the affordability gap. Yet this effect reverses at very low net worth levels - below \$50,000 - where the odds of success may be perceived as too low to justify even speculative investment.

Taken together, these patterns suggest a consistent narrative. Households who remain renters in the face of rising housing costs - and particularly those who have abandoned the goal of homeownership - are more likely to (i) increase consumption, (ii) reduce labor effort, and (iii) shift toward riskier investments. These patterns emerge clearly in cross-sectional comparisons between renters and homeowners after controlling for household net worth. In Section 3.3, we explore whether similar responses arise in response to changes in local housing affordability. In Section 5, we formalize these mechanisms in a life-cycle model that explicitly tracks when households give up on homeownership, allowing us to quantify its behavioral and welfare consequences.

3.3 Responses to Decreasing Housing Affordability

To further examine how declining housing affordability influences renters' broader economic behavior, we analyze how their responses to changes in local housing unaffordability vary by income. We construct a panel dataset of individuals using de-identified, proprietary account-level financial transaction data from a major U.S. financial aggregation and analytics firm.[4] A key strength of this dataset is its ability to track the same individuals over time, allowing us to observe changes in consumption, leisure-related spending (as a proxy for labor effort), and investment behavior, alongside residential location and housing tenure. The data consist of anonymized bank, credit card, and debit card transactions. Each transaction record includes the date, amount, and one of 43 spending categories; for most transactions, we also observe the merchant name and transaction description. While the dataset contains ZIP code-level residential information from 2014 onward, it does not include demographic characteristics such as age, gender, or race.

We define consumption based on the categories of transaction, as described in Appendix Table A4, following the definition of Baker et al. (2025). We classify a transaction as a risky investment if it falls under the "Securities Trades" category or is made with a known brokerage or trading platform for stocks and cryptocurrencies, as indicated by merchant names and

[4]This dataset has been widely used and shown to be broadly representative (Aiello et al., 2023*a*,*b*; Baker et al., 2024). Baker et al. (2025) further demonstrate that its patterns align closely with those found in other transaction datasets. See Baker and Kueng (2022) for a comprehensive review of research using transaction-level data.

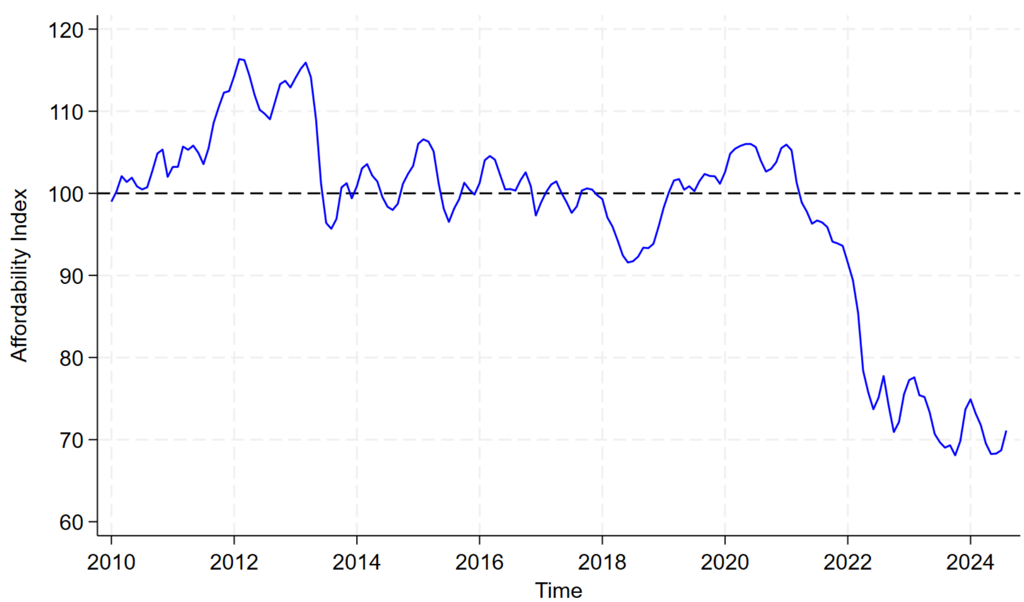
Table 1: Summary Statistics

	Obs.	Mean	Std. Dev	P5	P25	P50	P75	P95
Monthly Total Income	53,346,910	5,170	4,892	717	2,374	3,855	6,215	9,994
Monthly Total Spending	53,346,910	4,351	3,899	626	2,029	3,330	5,335	8,399
Monthly Non-ncessity Spending	53,346,910	3,216	3,369	293	1,287	2,287	3,890	6,467
Monthly Leisure Spending	53,346,910	243	436	0	20	88	256	626

This table presents summary statistics of monthly income and spending amounts of renters.

descriptions. Homeownership status is inferred from recurring mortgage payments. We focus on renters to examine how heterogeneously they respond to housing affordability. Table 1 reports summary statistics for spending and income of renters in the final dataset, which comprises monthly transaction data by category for 511,414 users.

Figure 8: Atlanta Fed's National Home Ownership Affordability Monitor Index



This figure plots the Federal Reserve Bank of Atlanta's National Home Ownership Affordability Monitor Index. An index below 100 indicates that median-priced houses are unaffordable for families with a median income. Source: Federal Reserve Bank of Atlanta

We measure local housing affordability using the Federal Reserve Bank of Atlanta's Home Ownership Affordability Monitor (HOAM), which provides a monthly county-level index incorporating median house prices, mortgage rates, property taxes, and homeowners' insurance. The index is normalized so that a value of 100 corresponds to housing costs equal to 30% of the median household's annual income—the standard affordability benchmark. Figure 8 shows the national HOAM index over time. Affordability has deteriorated sharply in recent years and remains well below the threshold, indicating that typical households face substantially higher cost burdens than in the past.

To analyze how the relationship between housing affordability and individual behavior varies by income level, we estimate the relationship between housing affordability and individuals' consumption, leisure, and investment activities using the following regression specification:

$$
\begin{aligned}
y_{i,c,t} = & \sum_{u=0}^{1} \sum_{q=1}^{5} \beta_{u,q} \; \mathbf{1}[\text{Unaffordable}_{c,t} = u] \times \mathbf{1}[\text{Income Quintile}_{i,c,t} = q] \\
& + \alpha_i \; + \delta_c \; + \gamma_t + \epsilon_{i,c,t}
\end{aligned}
$$

where $y_{i,c,t}$ is the outcome variable of individual i, living in county c in time t, $\text{Unaffordable}_{c,t}$ is an indicator that is 1 if a county c is below affordability threshold in time t, Income Quintile is defined in at the county among renters, and α_i, δ_c, and γ_t are the individual, county, and time fixed effects, respectively. Standard errors are clustered at the individual level.

Table 2 reports the estimated differences in behavior between unaffordable and affordable counties for each income quintile, measured as $\beta_{1,q} - \beta_{0,q}$. The results indicate that when a county becomes unaffordable, individuals in the lowest income quintile (Q1) increase their total spending by 3.03%, while those in the highest quintile (Q5) reduce their spending by 3.96%. The magnitude of spending responses declines monotonically across the income distribution: individuals in the second (Q2) and third (Q3) quintiles also increase their spending in unaffordable areas, whereas those in the fourth quintile (Q4) exhibit a reduction.

To identify the components driving the spending response, we examine non-necessity consumption separately. We find that the magnitude of the non-necessity response closely mirrors that of total spending. This suggests that when a county becomes unaffordable, the increase in consumption among lower-income individuals—and the decrease among higher-income individuals—is primarily driven by changes in non-necessity spending, rather than in necessity consumption.

Table 2: Relationships between Housing Affordability and Individuals' Behaviors

Differences by Income Quntile	Log Total Spending	Log Non-necessity Spending	Log Leisure Spending	Participate in Risky Investment
Q1	0.0303***	0.0303***	0.0254***	-0.0022***
	(0.0014)	(0.0015)	(0.0023)	(0.0005)
Q2	0.0120***	0.0132***	0.0203***	0.0011*
	(0.0013)	(0.0014)	(0.0023)	(0.0006)
Q3	0.0028**	0.0032**	0.0145***	0.0020***
	(0.0012)	(0.0014)	(0.0023)	(0.0006)
Q4	-0.0120***	-0.0113***	0.0041*	0.0017***
	(0.0013)	(0.0014)	(0.0023)	(0.0007)
Q5	-0.0396***	-0.0403***	-0.0231***	-0.0036***
	(0.0013)	(0.0015)	(0.0024)	(0.0007)
Individual FE	Y	Y	Y	Y
County FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
N	48,327,267	48,025,305	42,662,037	49,039,601

This table presents how households in different income quintiles respond to housing unaffordability through changes in consumption and investment. The coefficients capture, for each income quintile, the difference in consumption and investment between individuals residing in unaffordable counties and those in affordable counties. Standard errors clustered at the individual level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Furthermore, leisure spending - defined as expenditures on entertainment, recreation, and travel - exhibits a similar pattern across income quintiles. When a county becomes unaffordable, individuals in the lowest income quintile show the largest increase in leisure spending, while those in the highest quintile reduce it, with the response declining monotonically across the income distribution. Table A5 examines the spending responses scaled by income, and the results remain consistent.

Finally, we examine individuals' investment behavior - specifically, whether they participate in risky assets such as stocks or cryptocurrencies. We find that participation decreases for households in the lowest and highest income quintiles when their county becomes unaffordable, whereas those in the middle quintiles increase their risky investment. Given a mean participation rate of 11.36%, the observed changes of 0.11–0.36 percentage points are economically meaningful.

Taken together, the results align with the intuition outlined in Section 3.2. As housing becomes less affordable, individuals on the margin of homeownership respond by reducing consumption and cutting back on leisure to increase their chances of buying a home. In contrast, those for whom homeownership is financially out of reach are more likely to abandon the pursuit entirely, increasing consumption and decreasing work efforts. That said, the results offer a limited view of behavioral responses to changing housing affordability. Affordability tends to evolve gradually rather than as a sudden shock, and individual responses often unfold over time rather than as immediate adjustments. Moreover, we do not directly observe whether someone has given up on homeownership. To move beyond these correlational patterns and better understand the economic effects - especially of giving up - we formally introduce a model in Section 4 to analyze household decisions related to consumption, saving, employment, and investment.

4 Model

In this section, we present a life-cycle model of households operating in a dynamic stochastic environment. Section 4.1 outlines the model framework, and Section 4.2 describes how we calibrate the parameters using U.S. data. Appendix A1 provides additional details on how we solve the model numerically, following the typical approach used in Attanasio et al. (2012) and Low et al. (2018).

4.1 Setup

Time is discrete. Each household is born at period $t = 1$ and lives for T periods, consisting of T_r working periods followed by $T - T_r$ retirement periods. At the beginning of each period t, the household enters with a state vector that is endogenously determined by past choices

$$\boldsymbol{\theta}_t = (s_t, \lambda_t, h_t),$$

where s_t denotes liquid assets, λ_t is cumulative work experience, and $h_t \in \{0, 1\}$ is homeownership status. Two state variables are then realized: the wage rate $w_t(\lambda_t)$, which depends on the household's accumulated work experience λ_t, and the house price p_t, which follows an exogenous stochastic process. Given these realized states, the household makes decisions over consumption, labor effort, portfolio investment, and housing in order to maximize expected lifetime utility.

Consider first the case where the household is a renter ($h_t = 0$). It chooses a labor effort level $e_t \in [0, 1]$, earning after-tax income of $\hat{w}_t = w_t(\lambda_t)\, e_t\, (1 - \tau_w)$ where τ_w is the labor income tax rate. Rent is paid as a fraction ρ of the realized house price p_t, leaving total resources of $s_t + \hat{w}_t - \rho p_t$. From this, the household decides how much to consume (c_t) and whether to purchase a home ($h_{t+1} \in \{0, 1\}$) at price p_t. Letting $s_{t,post}$ denote post-decision liquid wealth, the budget constraint is given by:

$$s_{t,post} = s_t + w_t(\lambda_t)e_t(1 - \tau_w) - \rho p_t - c_t - p_t \mathbb{I}\{h_{t+1} = 1\}. \tag{1}$$

The household receives instantaneous utility

$$v_t = u_c(c_t) + u_h(h_t) - d(e_t),$$

where $u_c(\cdot)$ is utility from consumption, $u_h(h_t) = kh_t$ is housing utility, and $d(\cdot)$ is disutility from work. We assume $u_c(\cdot)$ is strictly increasing and concave, and $d(\cdot)$ is strictly increasing and convex on $(0, 1)$.

If the household is already a homeowner ($h_t = 1$), the structure of the decision problem is similar but differs in the following respects. Homeowners do not pay rent; instead, they pay property tax $\tau_h p_t$ and decide whether to sell their house at price p_t, setting $h_{t+1} \in \{0, 1\}$. In addition, homeowners receive a flow utility benefit k, reflecting non-monetary utility from homeownership such as housing stability, perceived social status, or reduced frictions from avoiding repeated rent negotiations, as in Attanasio et al. (2012). Their post-decision savings and instantaneous utility are given by

$$s_{t,post} = s_t + w_t(\lambda_t)e_t(1 - \tau_w) - \tau_h p_t + p_t \mathbb{I}\{h_{t+1} = 0\}, \quad v_t = u(c_t) + k - \psi(e_t). \tag{2}$$

Following consumption and housing decisions, the household allocates post-decision savings $s_{t,post}$ between a risky and a risk-free asset. It chooses S_t^r to invest in the risky asset, which yields stochastic return $R_t^r \sim F_t^r(\cdot)$, and places the remaining wealth (s_t^s) in a safe asset earning deterministic return R_t^s. After returns are realized, wealth at the start of the next period evolves according to:

$$s_{t+1} = s_t^r \cdot R_t^r + s_t^s \cdot R_t^s. \tag{3}$$

Together, the household's dynamic optimization problem can then be written recursively. Letting $V_t(\boldsymbol{\theta}_t)$ denote the value function at the beginning of time t, the Bellman equation is:

$$V_t(\boldsymbol{\theta}_t) = \max_{\{c_t, h_{t+1}, e_t, s_t^s, s_t^r\}} \Big\{ u_c(c_t) + kh_t - d(e_t) + \beta \mathbb{E}_t \big[V_{t+1}(\boldsymbol{\theta}_{t+1}) \big] \Big\},$$

subject to the budget constraints and the law of motion defined in 1, 2, and 3.

Bequest Motives

Without any bequest motives, households in the model would optimally sell their home and exhaust all remaining wealth as they approach the terminal period T. To make the model more realistic, we incorporate bequest motives. Specifically, let B_s denote the liquid savings that a household leaves behind at the end of period T, and let $B_h \in \{0, 1\}$ indicate whether the household chooses to bequeath its home. The household's bequest utility is defined as:

$$B(B_s, B_h) = b \times [u_c(B_s) + b_{house} B_h],$$

where b captures the household's overall strength of bequest preferences, and b_{house} represents the utility value of passing on a home. Households must pay back all of their remaining debt before leaving any bequests.

While our main focus is on households' consumption, labor, and investment decisions, incorporating bequest motives allows for meaningful extensions of the model. One such extension involves endogenizing fertility. Suppose households can choose whether or not to have children, and that having a child is strongly complementary to homeownership (van Doornik et al., 2024; Couillard, 2025). In such a setting, the bequest motive could be activated only if the household chooses to have a child. Then, if a household gives up on homeownership, it may also become less likely to have a child and, in turn, forgoes any bequest motive. The loss of bequest incentives would further reduce the household's incentive to accumulate wealth over time, amplifying the behavioral consequences of giving up: higher consumption and lower labor effort.

A second extension relates to the intergenerational transmission of wealth and the dynamics of rising inequality. In our baseline model, households begin with an initial wealth distribution calibrated to match that of 20-year-olds. We then simulate these cohorts forward over the life cycle to examine how wealth inequality evolves between those who give up and those who do not. Now consider a multi-generational extension in which the next generation inherits bequests from the previous one – including liquid savings and housing. As house prices continue to rise relative to wages, children of households that gave up in the previous generation start with fewer resources and are themselves more likely to give up. Conversely, children of homeowners inherit more wealth, including housing, and are more likely to stay as homeowners themselves. In this way, giving up homeownership can act as a transmission mechanism that entrenches and amplifies wealth inequality over generations, potentially leading to a society in which homeownership becomes increasingly out of reach for households without intergenerational transfers.

Mortgage, Debt, and Default

We allow households to take on collateralized debt using their home as collateral. Specifically, the maximum amount of debt a homeowner can incur in any period t is given by a fixed proportion of the house price, $l \cdot p_t$, where l represents the loan-to-value (LTV) ratio. Non-homeowners who purchase a home may also finance their purchase using debt up to this same limit at the time of purchase, so this can also be interpreted as a standard mortgage. For this debt, interest rates are charged at a rate of $R_t^s + \alpha_h$, where α_h is the spread over the risk-free rate for collateralized debt. In addition, non-homeowners who are not retired can access non-collateralized borrowing based on their earnings potential. Specifically, the maximum amount of unsecured debt they can take is $\eta w_t(\lambda_t)$, where η represents the multiple of income that lenders are willing to extend as credit. This is motivated by the practice of financial institutions using observable income as a basis for consumer credit. Because this form of borrowing lacks collateral, it incurs a higher interest rate of $R_t^s + \alpha_n$ where $\alpha_{nh} > \alpha_h$

While households may in principle hold both debt and risk-free savings simultaneously, it is never optimal to do so in equilibrium, since debt incurs a higher interest rate than what savings yield. Therefore, any available savings are optimally used to pay down outstanding debt first. For notational convenience, we thus model debt as negative safe asset holdings $s_t^s < 0$. Under this formulation, the law of motion for liquid wealth in period $t+1$ for a household that holds a house ($h_{t+1} = 1$) can be written as

$$s_{t+1} = s_t^r R_t^r + s_t^s (R_t^s + \alpha_h \mathbb{I}\{s_t^s < 0\}) \quad \text{subject to} \quad s_t^s \geq -lp_t.$$

For non-homeowners, a similar formulation applies, except the interest rate spread is α_{nh} and the borrowing constraint becomes

$$s_t^s \geq -\eta w_t(\lambda_t).$$

Households are allowed to default on their debt under certain conditions. In particular, default may occur when income realizations are unexpectedly low. For example, if a household had previously borrowed based on a higher expected wage but experiences a negative wage shock in period t, it may be unable to meet its repayment obligations. This is consistent with empirical evidence, such as Ganong and Noel (2023), which finds that negative life events are a leading cause of mortgage default. In the event of default, households are assumed to forfeit all liquid assets (or be unable to bequeath any remaining wealth if in the terminal period) and are restricted to consuming only the minimum guaranteed consumption level $c_{min,t}$ provided through the social safety net (discussed further below). Furthermore, debt is not forgiven upon default; any unpaid balance is carried forward to the next period. Until the household repays enough to bring debt within allowable limits, it cannot take on additional debt, accumulate assets, or consume more than $c_{min,t}$. In other words, households are forced to direct all available resources toward repaying debt in excess of the permitted borrowing limit. Despite these restrictions, the model admits a moral hazard problem: households that have fully given up may rationally choose to exert minimal labor effort, knowing that any earnings will be used first to pay down the debt before benefiting them directly. Indeed, we find such behavior emerging in equilibrium among households that permanently exit the path of wealth accumulation.

House Prices and Wages

Both house prices and wages evolve stochastically. Although households do not know the exact realizations of future wages and house prices, they are assumed to know the underlying stochastic processes, which they use to form rational expectations and make forward-looking decisions.

Following Attanasio et al. (2012), we model the log of house prices as an AR(1) process with a deterministic upward trend:

$$\log(p_{t+1}) = d_0 + d_1 \cdot t + \rho_h \log(p_t) + \epsilon_{p,t+1}, \quad \epsilon_{p,t+1} \sim \mathcal{N}(-0.5\sigma_p^2, \sigma_p^2).$$

Potential wages follow a similar AR(1) process in logs with a quadratic deterministic trend:

$$\log(w_{t+1}) = a_0 + a_1 t + a_2 t^2 + \rho_w \log(w_t) + \epsilon_{w,t+1}, \quad \epsilon_{w,t+1} \sim \mathcal{N}(-0.5\sigma_w^2, \sigma_w^2).$$

The quadratic profile (a_1, a_2) allows for realistic life-cycle wage patterns with initial growth and eventual flattening. The actual wage $w_t(\lambda_t)$ used in the household problem is constructed from w_t and the cumulative work experience λ_t according to the mapping in the appendix. Importantly, wages in our model depend on work experience rather than age, allowing for heterogeneous career paths across agents.

Work experience evolves dynamically according to:

$$\lambda_{t+1} = \lambda_t + \theta e_t$$

where $e_t \in [0, 1)$ is the labor effort exerted in period t, and θ determines the rate at which effort translates into accumulated experience. Thus, agents who exert more effort accumulate experience faster and receive higher wages over time. Upon retirement, households receive a fixed pension equal to a fraction ζ of their final working-period effective wage, so that $w_t = \hat{w}_{T_r} \cdot \zeta$ for $t > T_r$. This retirement income is deterministic and does not depend on subsequent effort or stochastic shocks.

This structure not only improves the realism of the model but also introduces a powerful mechanism through which giving up has long-term consequences, particularly for younger households. Agents who give up early in life reduce their labor effort, which slows the accumulation of work experience. As a result, if they later consider re-entering the labor market, they face a low wage due to insufficient experience. This makes re-entry less attractive given the disutility of labor, reinforcing reliance on the social safety net or minimal labor force participation. In contrast, agents who maintain aspirations for homeownership continue to exert effort, accumulate experience, and enjoy rising wages. This divergence amplifies over time, leading to widening gaps in income, wealth, and ultimately, life outcomes, thereby accelerating wealth inequality between those who give up and those who do not.

Social Safety Net

Most countries maintain some form of social safety net designed to support individuals who are unemployed or unable to sustain a minimum standard of living. These systems take many forms, such as income-based transfers or unemployment insurance, but share a common objective: to guarantee a minimum quality of life. We incorporate such a mechanism into the model. Specifically, in each period, households have access to a social safety net option that guarantees a minimum consumption level, denoted by $c_{min,t}$. This can be interpreted as the government ensuring a minimum utility level of $u_c(c_{min,t})$. To be eligible for this program, households must have non-positive liquid assets and cannot own a house, i.e., $s_t \leq 0$ and $h_t = 0$. Therefore, those with minimal (but still positive) savings may find it optimal to forgo those assets and enroll in the program if the guaranteed minimum consumption provides higher utility than self-financing through their limited wealth.

Including this feature not only makes the model more realistic but also serves two analytical purposes. First, it enables us to quantify the increase in fiscal cost of government welfare programs when more households resort to public support as a result of giving up. Second, the existence of a guaranteed minimum consumption level introduces moral hazard by making the downside of risky decisions less severe. When the worst possible outcome is limited to living on the safety net, households may optimally choose to take on greater financial risk by investing in high-variance assets with potentially large payoffs. If such investments fail, they can rely on the guaranteed consumption floor; if they succeed, they enjoy substantial gains and buy a house. As we will show, this mechanism leads some agents to take extremely risky positions that are privately optimal but socially costly, mirroring patterns increasingly observed among retail investors in recent years.

4.2 Calibration

We calibrate the model parameters using data from the United States. Some parameters are set externally based on values observed in the data or drawn from existing literature. The remaining parameters are internally calibrated to match key empirical moments. When selecting which cohort's moments to target, we focus on individuals who turned 20 in 1970. This cohort is the most recent one for which we can observe full life-cycle behavior, as they reach age 75, the terminal period in our model, by 2025. Table 3 summarizes the final set of calibrated parameters along with the corresponding model fit.

Externally Calibrated Parameters

In our model, households are born at $t = 0$ at age 20, which we interpret as the age at which individuals begin making independent decisions regarding consumption, employment, investment, and housing. Based on U.S. life expectancy and typical retirement patterns, we set the total life span to $T = 55$ years (up to age 75) and the time of retirement to $T_r = 45$ (up to age 65). We assume a standard CRRA utility function:

$$u_c(c) = \frac{c^{1-\gamma} - 1}{1 - \gamma},$$

and adopt parameter values from Laibson et al. (2024), with risk aversion $\gamma = 1.4663$ and discount factor $\beta = 0.9601$. Since $c_{min,t}$ represents the minimum level of consumption required for basic subsistence under the social safety net, we assume households incur extremely high disutility if consumption falls below this threshold. Thus, any household that can afford at least $c_{min,t}$ will always prioritize meeting this level before allocating resources elsewhere, while those unable to do so rely on the social safety net to obtain the minimum consumption.

The house price process parameters $(d_0, d_1, \rho_h, \sigma_p^2)$ are estimated using median U.S. house price data from the Census Bureau for the years 1980 to 2023. Rent is calibrated as 7% of the housing price, based on the Zillow Home Value Index (ZHVI) and the Zillow Observed Rent Index (ZORI). We set the loan-to-value ratio to $l = 0.8$, reflecting the typical 20% down payment requirement for U.S. mortgages, and property tax rate as 1%. The risk-free rate is fixed at 2%, based on the historical average 10-year Treasury yield from 1980 to 2023. We calibrate risky asset returns based on the empirical return distribution of cryptocurrency investors.[5] By calibrating the risky asset to cryptocurrency returns, households in the model can span the entire risk spectrum - from fully invested in cryptocurrencies to fully invested in the risk-free asset - by choosing the optimal portfolio weight between the two. The mortgage interest rate spread is set to $\alpha_h = 0.0184$, based on the historical spread between 30-year mortgage rates and the risk-free rate using data from Freddie Mac. For unsecured borrowing, we follow Fleckenstein and Longstaff (2022) and set the interest rate spread at $\alpha_{nh} = 0.05$. The borrowing limit as a multiple of labor income is calibrated as 1.076, which, when combined with the spread α_{nh}, matches the commonly used maximum debt-to-income (DTI) ratio of 40% for personal loans[6].

Wage process parameters $(a_0, a_1, a_2, \rho_w, \sigma_w^2)$ are estimated using PSID data for individuals aged 20-62. To capture after-tax earnings, we scale wages by a factor of 0.8 which is the average effective income tax rate in ths U.S. To isolate the deterministic trend in wages as a function of cumulative work experience, we control for education, race, and gender. We follow Karahan and Ozkan (2013) in setting the idiosyncratic wage shock variance to

[5] According to Hana Bank's 2023 financial report in South Korea - one of the countries with the highest Bitcoin retail investor penetration - approximately 70% of retail investors incurred losses, and only 30% earned gains. Because most investors do not buy and hold long-term due to volatility, we use Coinbase data which shows a median Bitcoin holding period of 100 days for retail investors. We calculate 100-day rolling returns to approximate annualized performance, which yields a return distribution of -20% with 70% probability and +60% with 30% probability.

[6] Assuming a 40% DTI cap and a 7.22% annual interest rate, a fully amortized three-year personal loan implies a present-value factor of 32.28 months, so the maximum loan equals roughly 1.076 times annual income

$\sigma_w^2 = 0.08$. The retirement income replacement rate is fixed at $\varphi = 0.64$, based on estimates from Munnell and Soto (2005). We assume the disutility of labor follows a standard convex form as in Holmstrom and Milgrom (1991) and Sannikov (2008):

$$\psi(e) = d\frac{e^{1+\eta}}{1+\eta},$$

with $\eta = 1$, so that marginal disutility increases in effort. The scaling parameter d is calibrated to match targeted empirical moments which will be described below. Finally, we set the minimum consumption level $c_{min,t}$ to 20% of realized effective wages in each period, consistent with the annualized value of average U.S. unemployment insurance benefits.

Internally Calibrated Parameters and Model Fit

After the exogenous calibration described above, the remaining five parameters from the model are k, b, b_{house}, d, and θ. These parameters are calibrated by matching model-generated moments to their empirical counterparts. Specifically, we first use the observed homeownership and wealth distribution of households at age 20 from Survey of Consumer Finance to initialize corresponding distributions at $t = 0$ in the model.[7] Then, for each given set of parameters, we solve optimal policy functions and simulate households' life-cycle trajectories 10,000 times to compute model-implied moments for each period t. We then compare these simulated moments with corresponding statistics from real-world data and choose the parameter vector that minimizes the sum of squared percentage differences between the model and data moments.

All model moments are functions of the full set of parameters, and there is no one-to-one mapping between individual parameters and specific moments. Nevertheless, it is most informative to associate each parameter with the moments to which it is most closely related. To calibrate b, which governs households' general preference for leaving bequests, we aim to capture the strength of bequest motives relative to lifetime consumption. Accordingly, we target the overall bequest rate out of total net wealth - including the value of house when it is bequested - as estimated in Kopczuk and Lupton (2007). For the parameter b_{house},

[7] We focus on the cohort that reached age 20 in 1970, unless specified otherwise.

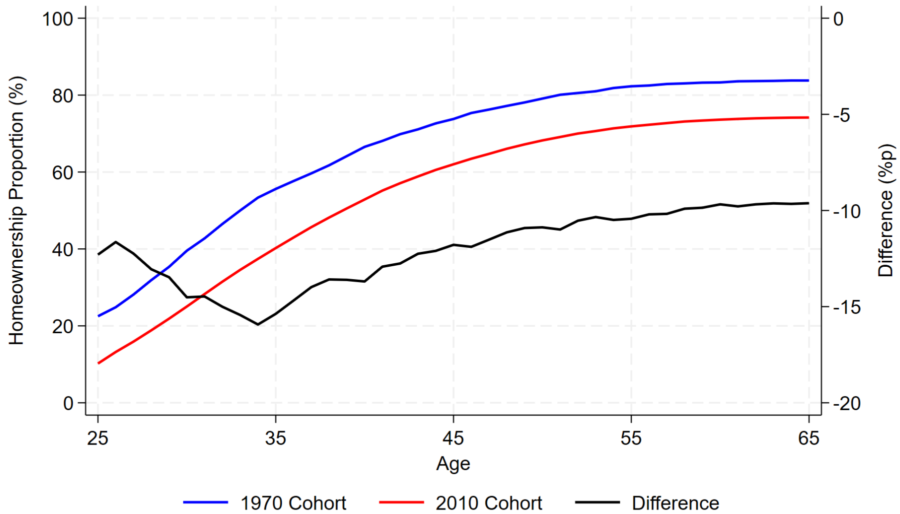
Table 3: Internally Calibrated Parameters and Moments

Parameter	Value	Moment	Model	Data
k	0.2	Homeownership Rate	0.838	0.821
b	7.8	Overall Bequest Rate	0.767	0.780
b_{house}	1.9	House Bequest Rate	0.730	0.752
d	1.0	Average Hours Worked	0.860	0.857
θ	1.1	Unemployment Rate	0.051	0.056

The bequest preference parameter b is calibrated using the overall bequest rate from Kopczuk and Lupton (2007), while the utility from bequesting a house b_{house} is calibrated to match the share of homeowners who bequest housing, based on Engelhardt and Eriksen (2025). The flow utility from homeownership k is targeted using the homeownership rate around the retirement age from U.S. Census Housing Vacancies and Homeownership statistics. The disutility of labor d and the work experience accumulation parameter θ are disciplined using average weekly hours worked and labor force participation rates for individuals aged 25–52, from the U.S. Bureau of Labor Statistics (BLS). Weekly hours are normalized by dividing by 40 to align with effort values in the model.

which represents the utility derived from bequesting a house specifically, we use the share of homeowners who leave their home as a bequest. This statistic is drawn from Engelhardt and Eriksen (2025), who estimate this moment using Health and Retirement Study (HRS) data. The flow utility from homeownership, k, is closely tied to the homeownership rates. We therefore target homeownership rates around the retirement age using data from the U.S. Census Housing Vacancies and Homeownership statistics. Finally, to calibrate the disutility from work d and the work experience accumulation rate θ, we target moments directly related to labor supply behavior. Specifically, we use the average weekly hours worked and the unemployment rate for prime-age individuals (ages 25-52), based on statistics from the U.S. Bureau of Labor Statistics (BLS). Since labor effort $e \in [0, 1]$ in the model, we normalize average weekly hours worked by dividing by 40, allowing for direct comparability with the model's effort scale. Table 3 reports the resulting calibrated parameter values, along with the corresponding empirical moments and their simulated model analogues.

Figure 9: Comparison of Homeownership Rates by Age



This figure shows model-implied homeownership rates for the cohort entering age 20 in 1970, along with homeownership rate projections for the cohort entering age 20 in 2010, based on simulated outcomes from the life-cycle model. In the simulations, the initial homeownership rates and wealth distributions for both cohorts are calibrated using data from the Survey of Consumer Finances. Initial wages and house prices are calibrated to match median values in 1970 and 2010, respectively, using U.S. Census Bureau data.

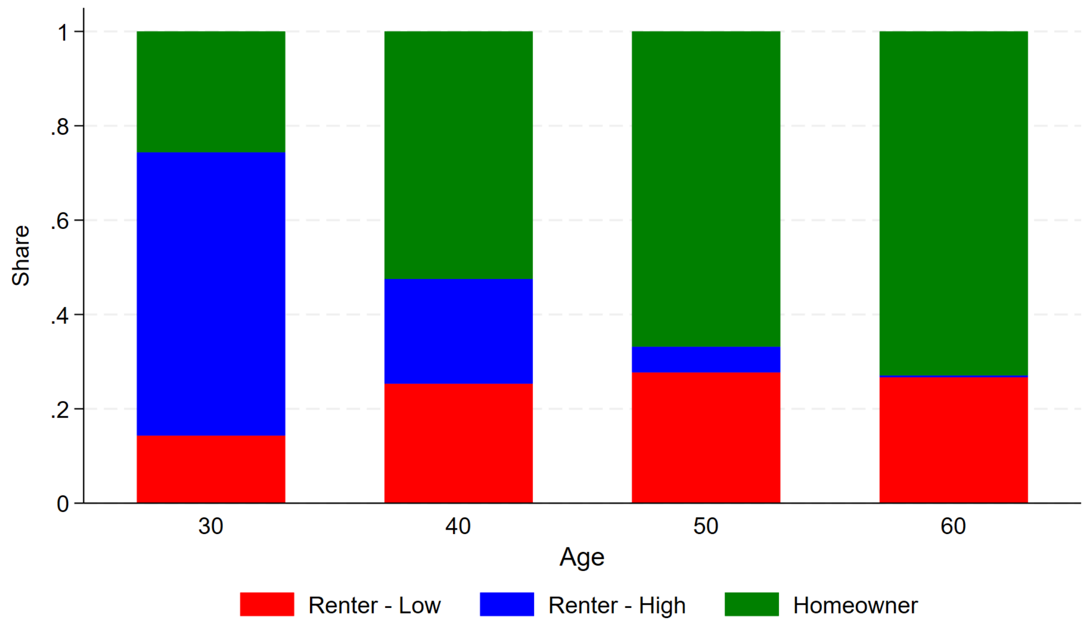
5 Model Results

5.1 Projected Homeownership Rate and Giving Up

Figure 9 compares homeownership rates by age for two cohorts: those who turned 20 in 1970 (hereafter, the 1970 cohort) and those who turned 20 in 2010 (the 2010 cohort). For the 1970 cohort, observed outcomes show that 83.8% of households eventually became homeowners by retirement. In contrast, model projections for the 2010 cohort suggest that only 74.2% will do so - a decline of 9.6 percentage points. Notably, the gap in homeownership rates between the two cohorts widens up to around age 35, then gradually narrows, ultimately stabilizing at the 9.6%p difference. This pattern reflects distinct affordability dynamics: for the 1970 cohort, housing prices were relatively attainable early in life, allowing many households to transition into homeownership at younger ages, leading to a steeper early-life increase in ownership rates. In contrast, for the 2010 cohort, elevated house prices relative to wages delayed home purchases even among those who eventually become homeowners, resulting in a slower increase in ownership at younger ages. Since most households make fertility decisions between ages 25 and 35, if homeownership is complementary to childbearing, this delay may also contribute to the observed decline in fertility rates over time.

Figure 10: Projected Housing Status Transition Throughout Life-Cycle

(a) Projected Housing Status Share by Age



(b) Housing Status Transition from Age 30 to Age 40

Age 40

Age 30	Homeowner	Renter - High	Renter - Low
Homeowner	100.00%	0.00%	0.00%
Renter - High	44.58%	37.25%	18.17%
Renter - Low	0.70%	1.04%	98.26%

Panel (a) displays the projected housing status at each age for the cohort entering age 20 in 2010, based on simulated outcomes from the life-cycle model. At each age, "Renter-Low" refers to households with less than a 50% probability of becoming homeowners before retirement, while "Renter-High" denotes those with a probability of 50% or higher. Panel (b) reports the transition probabilities in housing status between ages 30 and 40; each row sums to 100%. In the simulations, initial homeownership rates and wealth distributions are calibrated using the Survey of Consumer Finances. Initial wages and house prices are set to match 2010 median values, based on U.S. Census Bureau data.

An additional strength of the life-cycle model is its ability to capture households' forward-looking beliefs about their prospects for homeownership; something that is difficult to observe directly in real-world data without asking individuals explicitly whether they have "given up." In our model, households make decisions based on their (correctly anticipated) probability of becoming homeowners in the future, which we can recover from the simulated choice paths. Figure 10 illustrates projected housing status shares by age, categorizing households into three groups: "Homeowner," "Renter - High" (renters with at least a 50% probability of becoming a homeowner before retirement), and "Renter – Low" (renters with less than a 50% probability). We find that approximately 15% of the population has already given up on homeownership at early ages (by age 30). As panel (b) shows, 98.26% of those classified as "Renter – Low" at age 30 remain in that group by age 40, confirming that their expectations largely match their realized outcomes.

Among renters at age 30 with at least a 50% chance of becoming homeowners - roughly 60% of the population - 44.58% successfully transition to homeownership by age 40. However, 18.17% fall into the "Renter – Low" category by age 40, often due to adverse income shocks, housing price spikes, or poor investment outcomes. By age 40, most of the uncertainty around future housing tenure is resolved: renters with high perceived chances of transitioning into homeownership tend to realize those outcomes as they get older, while those with lower chances generally remain renters. These results suggest that policy interventions aimed at preserving households' belief in the attainability of homeownership may be most effective when targeted earlier in the life cycle - particularly before age 40 - when housing transitions and belief formation are most sensitive to realized shocks in income, housing prices, and other life events.

5.2 Effects of Giving Up on Household Choices

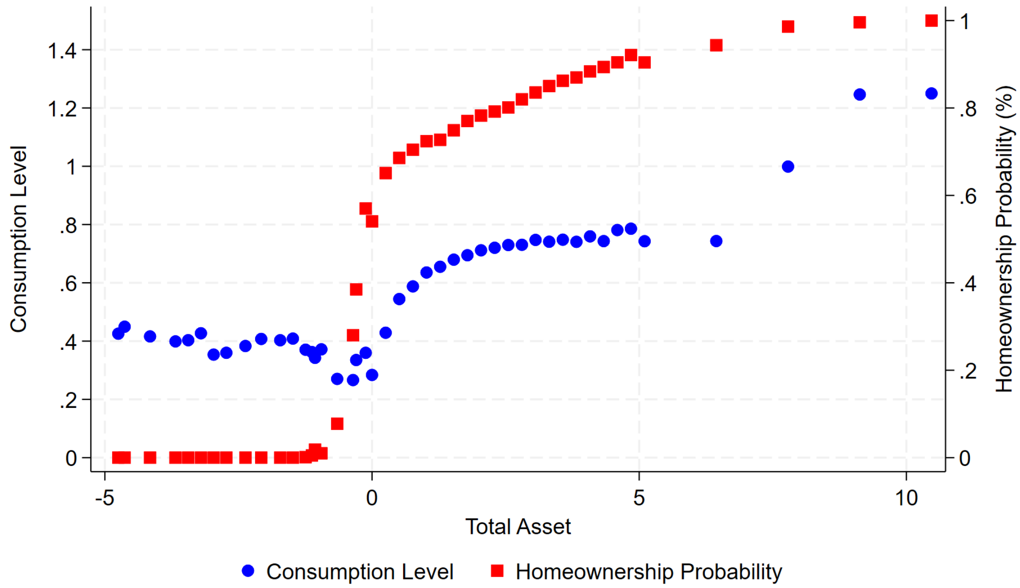
We presented suggestive evidence in Section 3 that giving up on homeownership may meaningfully affect households' consumption, work effort, and investment behavior. With the model, we can study these relationships more rigorously. Because the model provides each simulated household's probability of eventually becoming a homeowner given its current state variables and optimal choices, we can examine how behavior varies across households with different net worth levels and homeownership probabilities. To do so, we compare consumption, work effort, and portfolio risk-taking across the cross-section of households whose life trajectories are simulated using our calibrated life-cycle model.

Figure 11 shows the cross-sectional patterns for consumption. Panel (a) shows renters and panel (b) shows homeowners. Among homeowners, consumption increases monotonically with total wealth, reflecting a standard wealth effect. Among renters with a high probability of eventual homeownership (roughly 90% or above), consumption also rises with wealth. However, for renters whose probability lies between 50% and 90%, the positive relationship flattens considerably: these households continue to restrain consumption and save aggressively in order to make homeownership feasible. Once the probability falls below 50%, consumption becomes uncorrelated with net worth and even exhibits a slight negative relationship. The wealth effect essentially disappears around this point for two reasons. First, as discussed in Section 3, households that give up on homeownership lose a key motive for saving, increasing their current consumption and offsetting the usual wealth-consumption gradient. Second, there remains an incentive to accumulate wealth for the future even in the absence of homeownership aspirations for low-wealth renters who still have some savings, whereas renters with even lower wealth lack meaningful prospects of wealth accumulation. For them, the marginal benefit of high work effort and saving is too low relative to its disutility, leading to hand-to-mouth behavior or reliance on the safety net. Consequently, their consumption is temporarily higher at an relatively younger age, generating a slight reversal of the usual wealth effect.

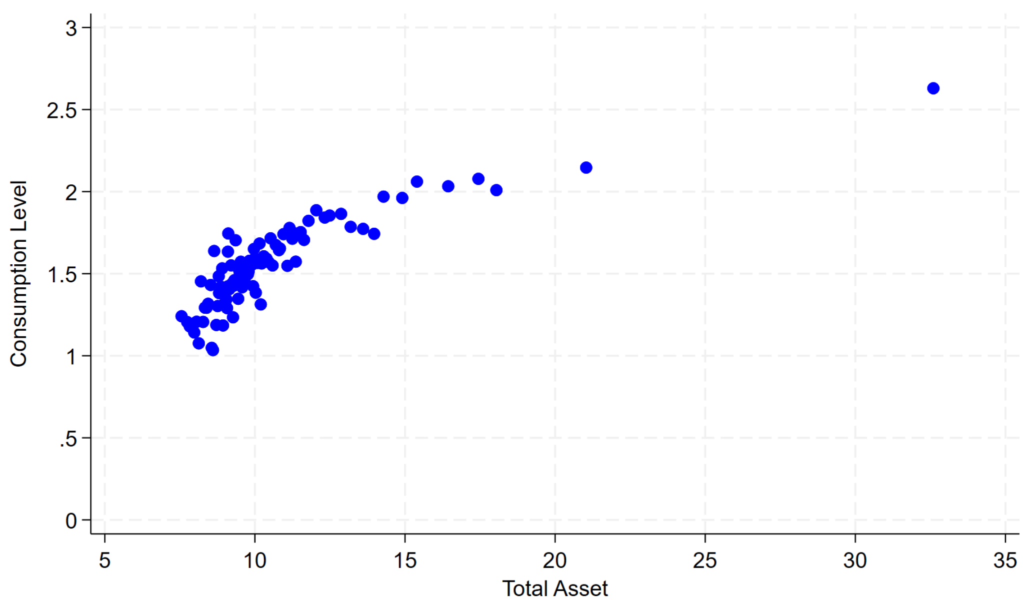
Figure 12 compares work effort across households. The pattern for homeowners again reflects a standard wealth effect: higher-wealth homeowners work less, while lower-wealth homeowners exert high effort to meet mortgage obligations and preserve the option of leaving a bequest. Among renters, work effort is high when the probability of future homeownership is still reasonably large (around 60% or higher), consistent with strong incentives to accumulate savings and improve their chances of purchasing a home. However, once that probability falls below roughly 60%, work effort declines sharply. It drops to about 0.5 for those near a 50% probability and approaches zero for those with probabilities of 20% or lower. This pattern aligns with the intuition from Section 3: once homeownership becomes unlikely, renters lose the incentive to save and can draw down previously accumulated assets, making the disutility

Figure 11: Projected Consumption Comparison by Housing Status

(a) Renters



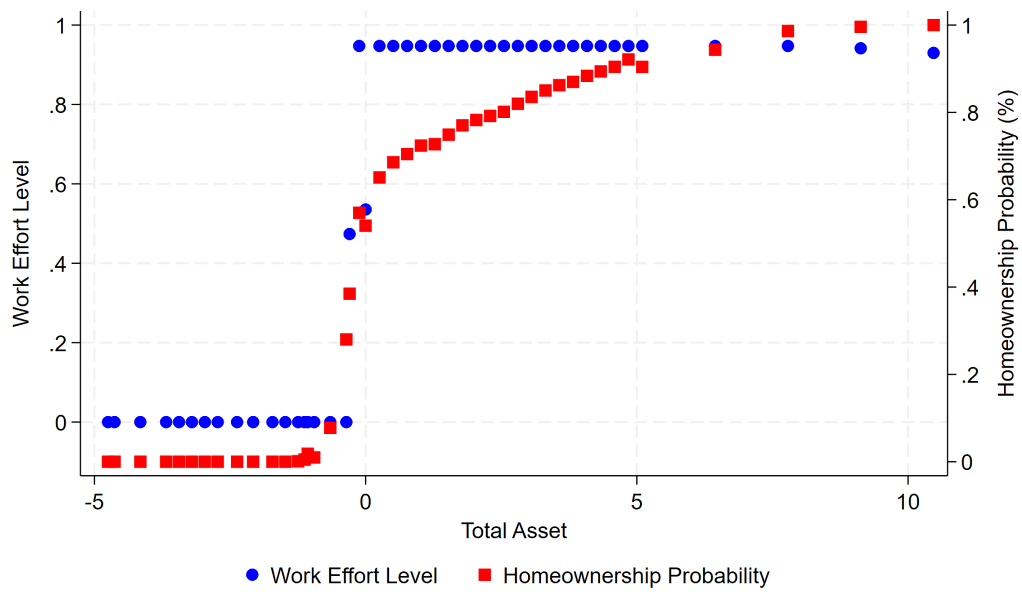
(b) Homeowners



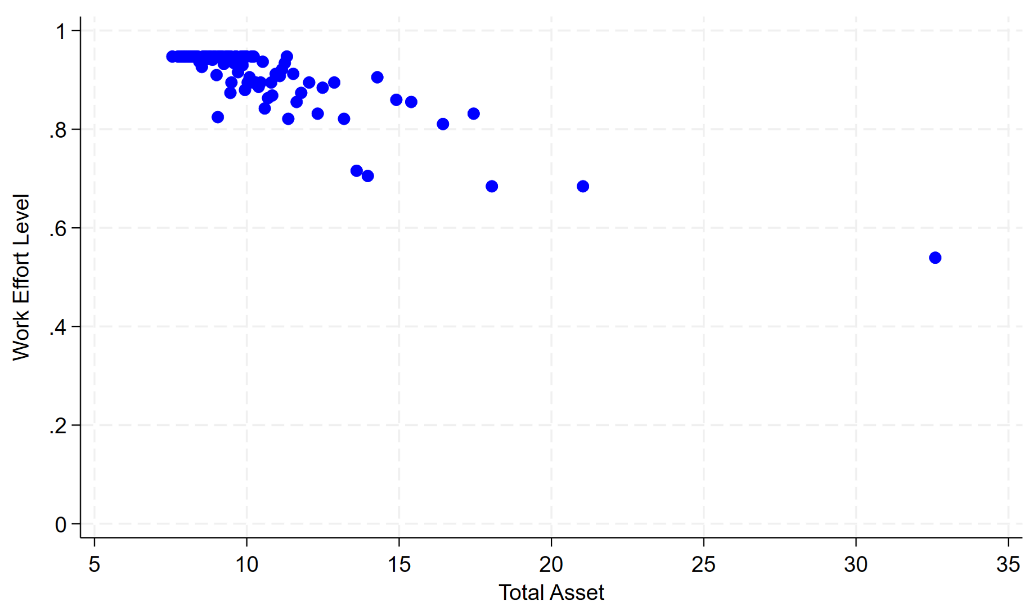
Panel (a) plots projected consumption at age 30 for renters in the cohort that entered age 20 in 2010, based on simulated outcomes from the life-cycle model. Panel (b) shows the corresponding results for households that are homeowners at age 30. For renters, "homeownership probability" refers to the model-implied probability of becoming a homeowner before retirement, conditional on their current state. Total asset includes liquid financial assets and, for homeowners, the value of the home. Total assets are binned, and both consumption and homeownership probability are averaged within each bin for visualization.

Figure 12: Projected Work Effort Comparison by Housing Status

(a) Renters



(b) Homeowners



Panel (a) plots projected work effort at age 30 for renters in the cohort that entered age 20 in 2010, based on simulated outcomes from the life-cycle model. Panel (b) shows the corresponding results for households that are homeowners at age 30. For renters, "homeownership probability" refers to the model-implied probability of becoming a homeowner before retirement, conditional on their current state. Total asset includes liquid financial assets and, for homeowners, the value of the home. Total assets are binned, and both work effort and homeownership probability are averaged within each bin for visualization.

of high work effort no longer worthwhile.

Figure 13 examines portfolio risk-taking by measuring the share of risky assets in total investment. Among homeowners, risk-taking declines monotonically with wealth, consistent with diminishing marginal utility of wealth: the downside risk becomes more painful for wealthier households, while the upside adds relatively little.[8] Renters, however, display a hump-shaped pattern, with the highest risky asset share among those with a 70–80% probability of becoming homeowners. This is consistent with the risky asset participation pattern documented in Section 3. Renters with very high homeownership probabilities avoid excessive risk to protect their near-certain transition into homeownership. Renters with very low wealth or very low probabilities of becoming homeowners also avoid risk: their investment amounts are too small to materially change their situation, even with good outcomes. Thus, it is the renters in the middle - those with a reasonably high chance of becoming homeowners but who need an extra boost from their investments to either secure homeownership or achieve it at an earlier age - who have the strongest incentive to "gamble" with risky assets.

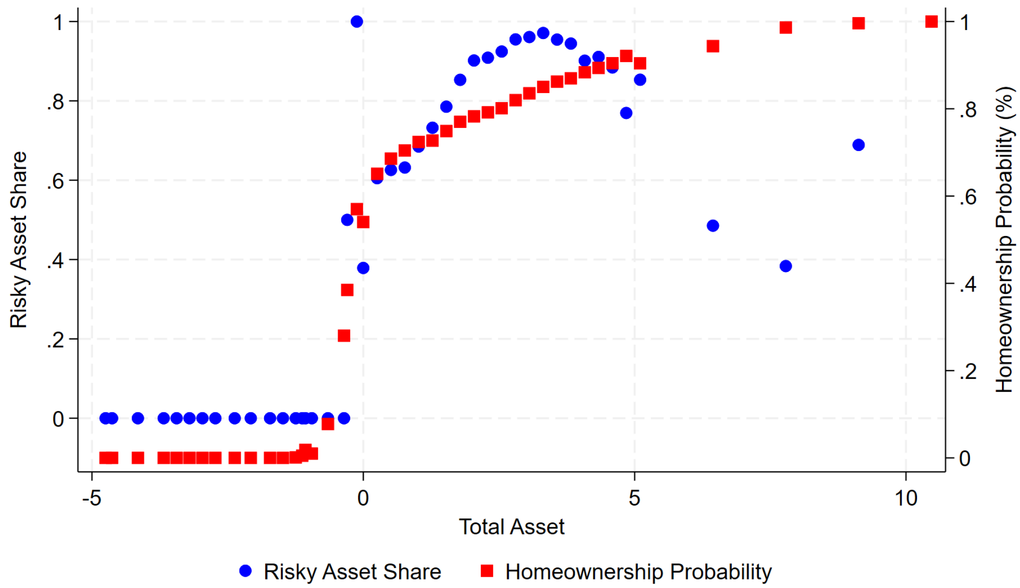
Having established the cross-sectional patterns, we next examine the aggregate implications of rising house prices and the increased prevalence of giving up on homeownership. On the labor margin, aggregate work effort declines. Homeowners experience stronger wealth effects due to higher housing values, while the growing number of discouraged renters reduces their labor effort as well. Although renters with high homeownership probabilities work harder early in life to afford increasingly expensive houses, most transition into either homeowners or the giving-up group by ages 40–50 (as shown in Figure 10). Figure 14 compares aggregate work effort between the 1970 and 2010 cohorts and shows that effort declines across the life cycle for the 2010 cohort - by about 6% at younger ages and roughly 8% at older ages - as incentives weaken after households sort into their long-run housing states.

The effects on consumption are more nuanced. Higher house prices strengthen wealth effects for homeowners, although diminishing marginal utility of consumption dampens the magnitude. Renters with high homeownership probabilities reduce consumption early in life

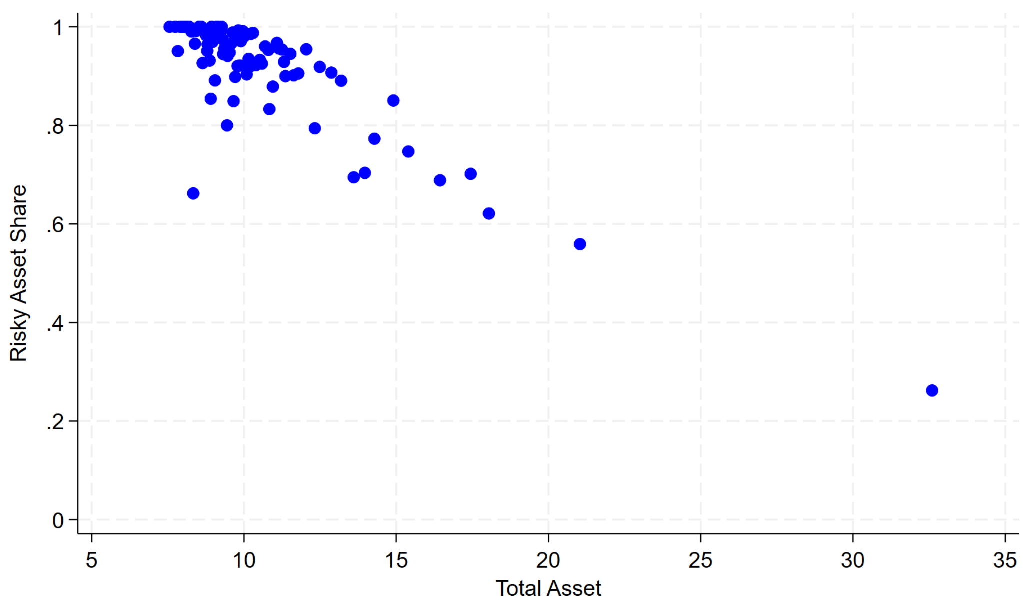
[8] Although their portfolio shares in risky assets fall, the absolute amount invested remains larger because their overall wealth is higher. In addition, for extremely wealthy households, actual risky portfolio shares may be higher in practice due to equity-based compensation (e.g., stock options) and private business ownership. Since our model abstracts from these channels, it likely underestimates the risky asset allocation for households in the right tail of the wealth distribution.

Figure 13: Projected Portfolio Risk Comparison by Housing Status

(a) Renters

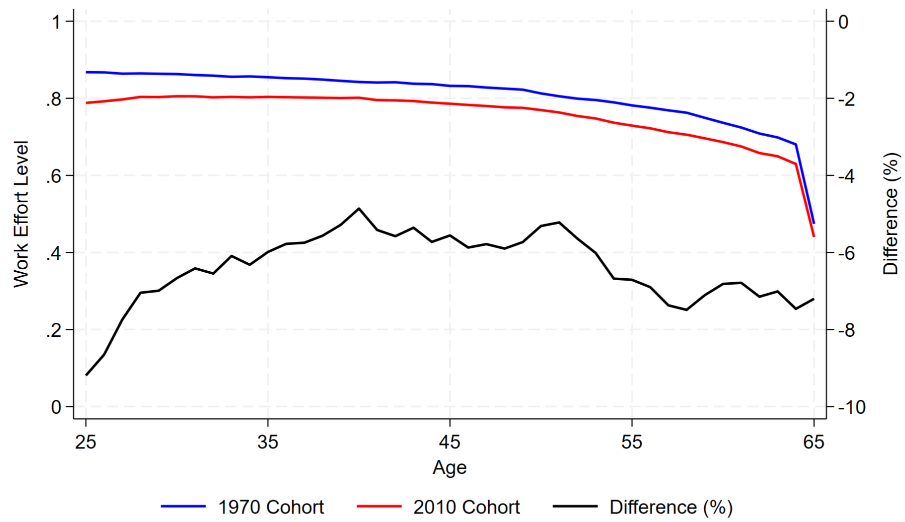


(b) Homeowners



Panel (a) plots projected share of risky asset in investment portfolio at age 30 for renters in the cohort that entered age 20 in 2010, based on simulated outcomes from the life-cycle model. Panel (b) shows the corresponding results for households that are homeowners at age 30. For renters, "homeownership probability" refers to the model-implied probability of becoming a homeowner before retirement, conditional on their current state. Total asset includes liquid financial assets and, for homeowners, the value of the home. Total assets are binned, and both risky asset share and homeownership probability are averaged within each bin for visualization.

Figure 14: Comparison of Aggregate Work Effort Levels



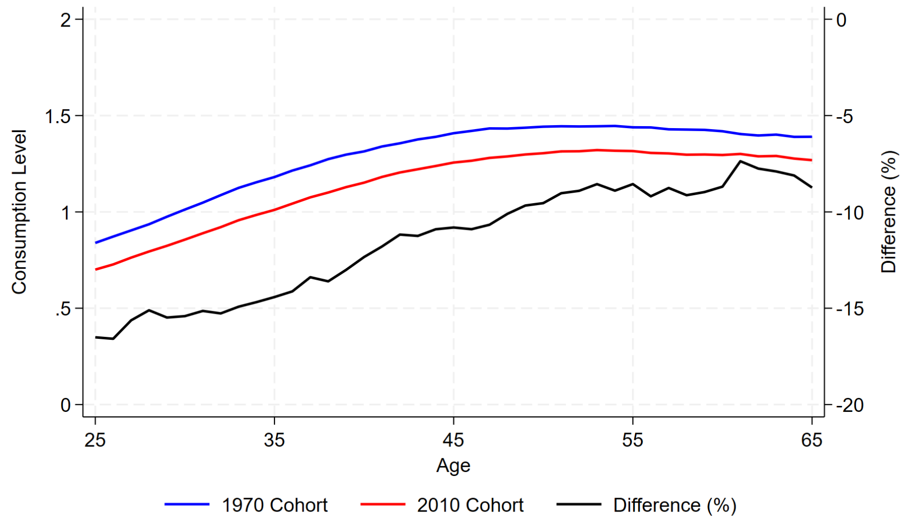
This figure shows model-implied average work effort at each age for the cohort entering age 20 in 1970, alongside projected work effort for the cohort entering age 20 in 2010, based on simulated outcomes from the life-cycle model. Differences are calculated as the percentage change in work effort from 1970 to 2010, using the 1970 cohort as the baseline.

to save for more expensive homes; once they transition into homeowners, their consumption rises with house prices due to wealth effects. At the same time, the higher prevalence of renters who give up on homeownership increases consumption among that group, but their low wealth levels and limited ability to sustain elevated consumption temper the aggregate impact. Thus, the net effect of declining housing affordability on aggregate consumption is a quantitative question that requires the model. Figure 15 presents the results: the 2010 cohort consumes 10–15% less than the 1970 cohort across most ages, with the largest declines occurring at younger ages due to lower consumption among high-probability renters who must save more to afford higher-priced homes.

5.3 Wealth Inequality

The consequences of giving up on homeownership documented in Section 5.2 imply that declining housing affordability can have substantial effects on wealth inequality. Households that give up tend to begin with relatively low wealth, and the behavioral responses that follow - reduced work effort, higher consumption relative to their resources (especially at younger

Figure 15: Comparison of Aggregate Consumption Levels

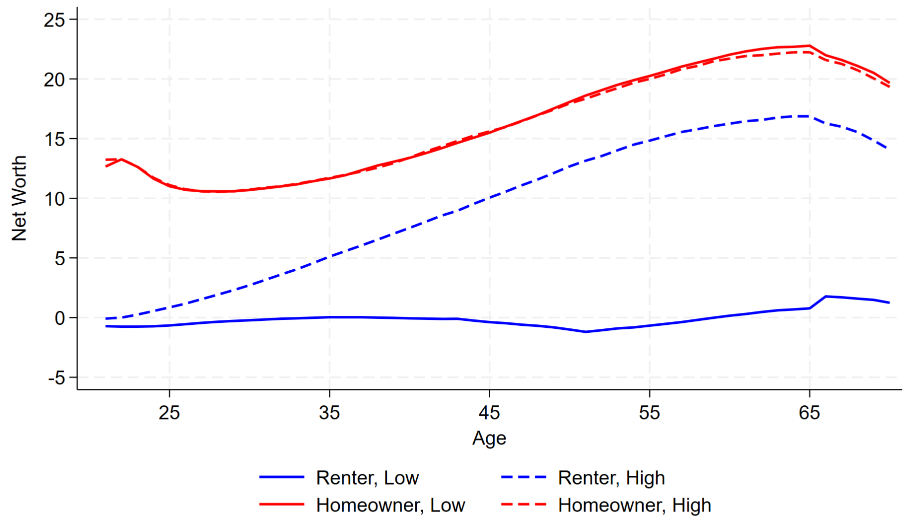


This figure shows model-implied average consumption level at each age for the cohort entering age 20 in 1970, alongside projected consumption level for the cohort entering age 20 in 2010, based on simulated outcomes from the life-cycle model. Differences are calculated as the percentage change in consumption levels from 1970 to 2010, using the 1970 cohort as the baseline.

ages), and excessively risky investment that often results in losses - make it even harder for them to escape low-wealth trajectories. By contrast, renters with higher probabilities of eventually becoming homeowners behave very differently: they work harder, save more, and take less risk, widening the gap between those who retain hope and those who do not. Moreover, high-probability renters ultimately purchase homes that appreciate in value, further amplifying differences in long-run wealth.

Figure 16 illustrates the power of the *hope* of homeownership in shaping households' net worth trajectories over the life cycle. The blue lines depict two renters who begin with nearly identical levels of initial wealth, just around the threshold of giving up. One renter starts slightly above the threshold and faces an 80% probability of becoming a homeowner, while the other starts just below, with only a 20% probability. Despite their similar starting points, their net worth paths (defined as the sum of liquid assets and housing equity for homeowners) diverge rapidly even before the higher-probability renter actually purchases a home. The "Renter-Low" household remains near zero net worth throughout much of life, effectively living hand-to-mouth with negligible asset accumulation. By contrast, the "Renter-High" household begins saving and working harder in anticipation of homeownership

Figure 16: Net Worth Dynamics of Renters and Homeowners with Similar Initial Wealth



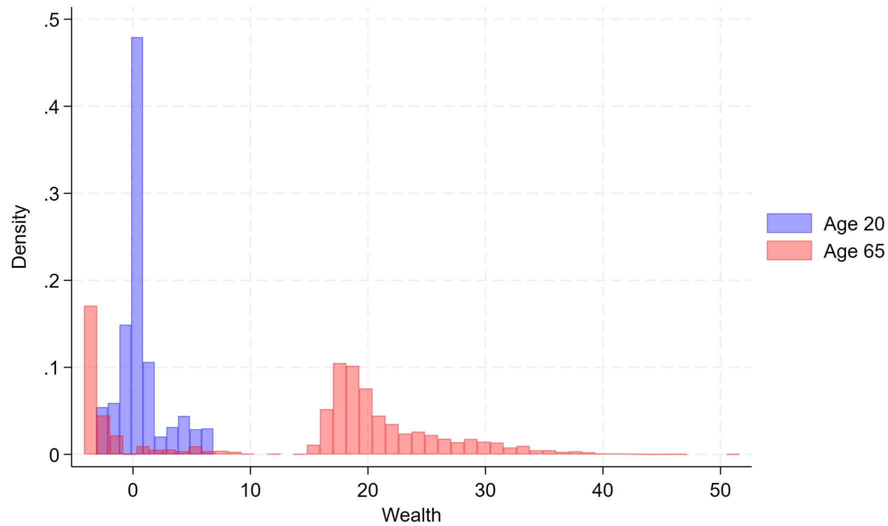
Blue lines show model-projected net worth dynamics over the life cycle for two renters. The solid line represents a household with slightly lower initial wealth and a 20% probability of homeownership at age 20, while the dashed line represents a renter with slightly higher initial wealth and an 80% probability. Net worth includes both liquid assets and, for homeowners, the value of house. Red lines depict similar projections for two homeowners, with the solid line corresponding to slightly lower initial wealth and the dashed line to slightly higher wealth. The difference in initial liquid wealth between the two homeowners is set to match that of the renters.

and eventually transitions into owning a home, which further accelerates wealth accumulation through housing appreciation.

For comparison, when we assign two homeowners the same set of initial liquid assets, their net worth trajectories remain virtually identical over time - indicating that the same initial wealth gap leads to far larger long-run divergence only when it determines whether a household gives up on homeownership. This underscores how powerful a small difference in starting conditions can be if it shifts a household across the giving-up threshold. Indeed, renters with a high probability of becoming homeowners not only accumulate more wealth than low-probability renters, but also substantially close the gap with initial homeowners. This is driven by greater effort throughout life relative to initial homeownes - through lower consumption and higher labor supply - both to reach the goal of homeownership and due to wealth effects.

If households follow such sharply different paths depending on whether they are above or below the giving-up threshold, then substantial divergence in long-run wealth is inevitable.

Figure 17: Wealth Distribution Dynamics of Initial Renters



This figure shows the distribution of total wealth (including both liquid assets and housing value for homeowners) for households that began as renters. The initial wealth distribution at age 20 (blue) is calibrated using data from the Survey of Consumer Finances. The wealth distribution at age 65 is projected using the life-cycle model, based on simulations that follow these households from their initial wealth distributions through retirement.

Figure 17 shows this clearly. The blue histogram depicts the 2010 cohort renter's initial wealth distribution at age 20 (calibrated from the Suvey of Consumer Finance), which is highly concentrated near zero. Projecting these individuals forward with the model produces the red histogram, which shows their wealth distribution at age 65. A striking bimodality emerges: one cluster remains near or slightly below zero wealth - corresponding to households that gave up on homeownership - while a second cluster centers around 15–25 (in normalized units), representing households that accumulated wealth and eventually became (or started as) homeowners. The compounding consequences of giving up on homeownership over the life cycle thus generate substantial and lasting increases in wealth inequality.

6 Policy Implications: Targeted Subsidy

Governments have adopted various forms of subsidy programs. The most common approach targets the poorest households, based on the rationale that, given diminishing marginal utility of wealth, transfers to those at the bottom generate larger welfare gains per dollar than equivalent transfers to wealthier households. An alternative approach that has gained traction - particularly in recent years - is broad-based transfers to nearly all households. For instance, in response to the COVID-19 shock in 2020, the U.S. government issued stimulus payments to nearly the entire population, excluding only high-income households. Similar proposals, such as flat transfers of approximately $2,000 to most households, are currently being discussed in policy debates. These universal transfers may be politically expedient: they are easier to administer, perceived as fairer by the public, and can generate broad-based political support.

Motivated by the results in this paper, we propose a different approach: a targeted subsidy that focuses on households near the margin of giving up on homeownership. Specifically, we identify a *hope threshold* - the wealth level at which a renter has at least an 80% model-implied probability of becoming a homeowner at age 20. Let this threshold be denoted by T. Using the distribution of initial wealth among renters at age 20 for 2010 cohort, we sort all renters with wealth below T in descending order, denoting their wealth levels as $W_1, W_2, \ldots$. We then allocate subsidies to push each of these households just above the threshold: the first household receives $T - W_1$, the second receives $T - W_2$, and so on, until the entire subsidy budget is exhausted. This method maximizes the number of renters who cross the homeownership threshold, thereby preserving their incentives and life-cycle trajectories.

Table 4: Comparison of Estimated Subsidy Effects

	Baseline (No Subsidy)	Uniform	Bottom 10%	Targeted
Welfare Improvement (Relative to No Subsidy)	0.00%	1.02%	0.32%	3.31%
Homeownership Rate	74.18%	74.96%	74.94%	77.58%
Labor Effort	0.783	0.791	0.789	0.826
Social Safety Net	14.30%	13.44%	13.66%	9.71%

This table compares counterfactual outcomes under three alternative subsidy plans to the baseline case with no subsidy. Welfare improvements are measured as changes in model-implied lifetime utility, converted into constant-consumption equivalents. Homeownership rates are reported at age 65. Labor effort is calculated as the time-series average between ages 25 and 54, corresponding to households' prime working years. Social safety net reflects the average proportion of households relying on public support at each age, also averaged over ages 25 to 54.

Table 4 compares the outcomes of three subsidy designs to a baseline of no subsidy. The first is a uniform transfer of \$1,000 to all individuals in the 2010 cohort at age 20. The second uses the same total budget but concentrates the transfer on the bottom 10% of households by wealth, effectively giving each of them 10 times the amount received in the uniform case. The third is our proposed targeted subsidy based on the threshold-based allocation described above. We evaluate each policy in terms of lifetime welfare gains (converted into constant-consumption equivalents)[9], homeownership rates at age 65, average labor effort between ages 25 and 54 (prime working years), and the average share of households relying on the social safety net over the same age range.

We find that the targeted subsidy yields by far the largest welfare gains. It improves overall welfare by 3.31% relative to the baseline - more than double the gains from either the uniform or bottom 10% subsidy, even though all three use the same total subsidy budget. Notably, the bottom 10% subsidy is less effective than the uniform transfer. This is because the poorest households are often so far below the giving-up threshold that the transfer is insufficient to change their trajectory; the subsidy is simply consumed, with little long-run impact. In contrast, even a modest uniform transfer is enough to push some near-threshold households above the cutoff, generating meaningful behavioral changes. The targeted subsidy consistently outperforms the other policies across all other outcomes: it increases homeownership by 3.4%p, raises average labor effort by 5.49%, and reduces reliance on the social safety net by 4.59%p.

Although all three subsidy plans are designed to use the same total transfer amount, our targeted policy would likely result in the lowest net fiscal cost if implemented in practice. Higher homeownership rates generate more property tax revenue, and increased labor effort leads to higher earned income and thus greater income tax revenue. At the same time, fewer households rely on the social safety net, reducing government expenditures on transfers. In short, the targeted subsidy not only delivers the greatest welfare improvements for

[9] To compare welfare across counterfactuals, we convert each model-implied lifetime value into a constant-consumption equivalent. Let V_1 denote the expected discounted lifetime utility at age 20. Given CRRA utility $u(c) = \frac{c^{1-\gamma}-1}{1-\gamma}$ and discount factor β, we compute the certainty-equivalent consumption level c^* that solves $\sum_{t=1}^{T} \beta^{t-1} u(c^*) = V_1$. Because utility is additively separable across consumption, housing, and effort, this mapping provides a single consumption-equivalent measure of overall lifetime welfare. We report the consumption-equivalent variation (CEV) as the proportional difference in c^* between policy and baseline simulations.

households, but also achieves the greatest long-run fiscal efficiency for the government.

7 Conclusion

Housing has become increasingly out of reach for younger generations, and many households are now abandoning the goal of homeownership altogether. This paper shows that giving up on homeownership is more than just a housing-market outcome - it reshapes how people consume, work, and invest, with long-lasting consequences for inequality and the broader economy.

Our empirical evidence demonstrates that renters who no longer expect to become homeowners behave very differently from those still trying to buy a home. They spend more of their income today, put in less effort at work, and are more likely to take on risky financial investments. These patterns appear both in cross-sectional comparisons and in empirical estimations that captures responses to local affordability changes. They suggest that losing the prospect of owning a home changes the way households think about the future, reducing the incentive to save or work toward long-term financial goals.

Our life-cycle model helps explain why these behavioral shifts arise and how they accumulate over time. When homeownership becomes out of reach, the future rewards from working hard, saving aggressively, and taking careful investment risks shrink dramatically. Households that give up shift toward living for the present - consuming more, working less, and sometimes gambling on high-risk assets - while those who still hope to buy a home continue to behave with long-term discipline. Over the life cycle, these differences widen. Even households that start with almost identical wealth can end up in completely different financial positions depending on whether they hold onto the possibility of owning a home. As housing affordability declines, more households fall into the discouraged group, producing a more polarized and unequal wealth distribution.

Finally, we propose policies that help households regain hope of becoming homeowners. A key lesson is that not all support is equally effective. Broad transfers to everyone or transfers targeted only to the poorest households do relatively little, because they rarely move people across the threshold where they start behaving differently. In contrast, a subsidy specifically designed to push the largest number of young renters above the "giving-up" threshold produces large and lasting benefits. It raises homeownership, increases labor effort, reduces reliance on the social safety net, and generates far higher welfare gains than more conventional policies with the same budget.

Overall, our findings highlight an important message: when housing becomes unattainable, people do not simply stay renters - they often change how they live, work, and plan for the future. These changes compound over time and can reshape the economy. Policies that preserve or restore households' ability to aspire to homeownership can therefore have meaningful long-run effects not only on housing outcomes, but also on aggregate labor supply, savings, investment behavior, and wealth inequality.

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Appendix

A1 Model Appendix

A1.1 Optimization Problem

A1.1.1 Household Problem

Households solve a finite-horizon dynamic programming problem over $T = 55$ periods, comprising 45 working years followed by 10 retirement years.

The state vector at time t is $\boldsymbol{\theta}_t = (s_t, p_t, w_t, \lambda_t, h_t)$, where s_t represents liquid assets, p_t is the house price level, w_t is the wage rate, λ_t is cumulative work experience, and $h_t \in \{0, 1\}$ indicates homeownership status.[10]

The household chooses consumption c_t, labor effort e_t, safe asset holdings s_t^s, risky asset holdings s_t^r, and next-period housing status $h_{t+1} \in \{0, 1\}$ to maximize expected lifetime utility subject to borrowing constraints and stochastic wage and house price processes.

For non-terminal periods $t < T$, the value function satisfies the Bellman equation:

$$V_t(\boldsymbol{\theta}_t) = \max_{c_t, e_t, s_t^s, s_t^r, h_{t+1}} \{u_c(c_t) + u_h(h_t) - d(e_t) + \beta \mathbb{E}[V_{t+1}(\boldsymbol{\theta}_{t+1})]\} \tag{4}$$

where β is the discount factor. At the terminal period $T = 55$, the household has a bequest motive and the value function becomes:

$$V_T(\boldsymbol{\theta}_T) = \max_{c_T, B_s, B_h} \{u_c(c_T) + u_h(h_T) + b \cdot [u_c(B_s) + b_{house} \cdot B_h]\} \tag{5}$$

subject to

$$c_T + B_s + p_T \cdot B_h = s_T + w_T + p_T \cdot \mathbb{1}\{h_T = 1\} \tag{6}$$

where B_s is the financial bequest, $B_h \in \{0, 1\}$ is the housing bequest, b is the general bequest utility, and b_{house} is the housing bequest utility.

The household's utility function is additively separable in consumption, housing, and

[10] All elements except h_t are indices over pre-defined, time-varying grids; the actual values can be recovered by mapping these indices to the corresponding grid points.

work effort:

$$u_c(c_t) = \begin{cases} \ln(c_t) & \text{if } \gamma = 1 \\ \frac{c_t^{1-\gamma}-1}{1-\gamma} & \text{if } \gamma \neq 1 \\ -\infty & \text{if } c_t \leq 0 \end{cases} \tag{7}$$

$$u_h(h_t) = k \cdot h_t \tag{8}$$

$$d(e_t) = \begin{cases} 0 & \text{if } e_t = 0 \\ d \cdot \frac{e_t^2}{2} & \text{if } 0 < e_t < 1 \\ +\infty & \text{if } e_t \geq 1 \end{cases} \tag{9}$$

where γ is the coefficient of relative risk aversion, k is the flow utility weight on homeownership, and d is the disutility of effort parameter.

A1.1.2 Constraints

The household problem differs between working periods ($t \leq 45$) and retirement periods ($45 < t < T$). During working periods, households choose labor effort $e_t \in [0, 1)$. During retirement periods, labor effort is fixed at zero ($e_t = 0$).

The effective wage rate depends on cumulative work experience λ_t according to:

$$w_t^{eff}(\lambda_t) = \begin{cases} \min\{w_{\lambda_t \cdot t}, w_t\} & \text{if } t \leq 45 \\ w_{45}^{eff}(\lambda_{45}) & \text{if } t > 45 \end{cases} \tag{10}$$

where w_t is the exogenous wage realization. Cumulative work experience evolves dynamically based on the household's effort choices:

$$\lambda_{t+1} = \begin{cases} e_1 & \text{if } t = 1 \\ \frac{\lambda_t \cdot (t-1) + \theta \cdot e_t}{t} & \text{if } t > 1 \end{cases} \tag{11}$$

where θ is the parameter that scales the contribution of current effort to future human capital.

Given the effective wage, after-tax labor income is determined as:

$$\hat{w}_t = w_t^{eff}(\lambda_t) \cdot e_t \cdot (1 - \tau_w) \tag{12}$$

where τ_w is the labor income tax rate. A fixed fraction of effective wage income is allocated to a mandatory consumption floor:

$$c_{min,t} = 0.2 \cdot w_t^{eff}(\lambda_t) \tag{13}$$

so that total consumption is $c_t = c_{min,t} + c_{above,t}$ where $c_{above,t} \geq 0$ represents discretionary consumption above the floor.

The household budget constraint links consumption and savings to available resources:

$$c_t + s_t^s + s_t^r = \text{COH}_t \tag{14}$$

where cash-on-hand COH_t depends on current liquid assets, labor income, and housing-related transactions and costs:

$$\text{COH}_t = \begin{cases} s_t + \hat{w}_t - (1+\rho) \cdot p_t & \text{if } h_t = 0, h_{t+1} = 1 \\ s_t + \hat{w}_t - \rho \cdot p_t & \text{if } h_t = 0, h_{t+1} = 0 \\ s_t + \hat{w}_t - \tau_h \cdot p_t & \text{if } h_t = 1, h_{t+1} = 1 \\ s_t + \hat{w}_t + (1 - \tau_h) p_t & \text{if } h_t = 1, h_{t+1} = 0 \end{cases} \tag{15}$$

Here, ρ is the rental yield (rent paid as a fraction of house price for non-homeowners) and τ_h is the property tax rate (paid by homeowners). When purchasing a home, the household pays both the downpayment *and* the rent, captured by the $(1 + \rho) \cdot p_t$ term.

Savings are allocated between safe and risky assets, which evolve over time according to their respective returns. Next-period liquid assets are:

$$s_{t+1} = s_t^s \cdot R_t^{s,adj} + s_t^r \cdot R_t^r \tag{16}$$

where R_t^r is the risky return and $R_t^{s,adj}$ is the adjusted safe return that depends on whether the household is borrowing and their homeownership status:

$$R_t^{s,adj} = \begin{cases} R_t^s + \alpha_{nh} & \text{if } s_t^s < 0 \text{ and } h_{t+1} = 0 \\ R_t^s + \alpha_h & \text{if } s_t^s < 0 \text{ and } h_{t+1} = 1 \\ R_t^s & \text{if } s_t^s \geq 0 \end{cases} \tag{17}$$

The parameters R_t^s denotes the safe return, α_{nh} is the borrowing spread for non-homeowners, and α_h is the borrowing spread for homeowners, with $\alpha_{nh} > \alpha_h > 0$ reflecting the collateral value of housing. Risky returns are realized stochastically according to:

$$R_t^r \sim \begin{cases} 0.8 & \text{with probability } 0.7 \\ 1.6 & \text{with probability } 0.3 \end{cases} \tag{18}$$

The household faces constraints on asset holdings. Safe asset holdings must satisfy borrowing limits that depend on both homeownership status and the household's lifecycle stage:

$$s_t^s \geq \begin{cases} -w_t^{eff}(\lambda_t) & \text{if } h_{t+1} = 0, t \leq 45 \\ 0 & \text{if } h_{t+1} = 0, t > 45 \\ -\max\{\eta \cdot w_t^{eff}(\lambda_t), l \cdot p_t\} & \text{if } h_{t+1} = 1, t \leq 45 \\ -l \cdot p_t & \text{if } h_{t+1} = 1, t > 45 \end{cases} \tag{19}$$

where η is the borrowing limit parameter and l is the loan-to-value ratio. Non-homeowners can borrow up to their effective wage during working years but cannot borrow in retirement. Homeowners can borrow against both their human capital and housing collateral during working years, but only against housing in retirement. Risky asset holdings must be non-negative: $s_t^r \geq 0$. Housing choices are freely reversible: households can choose $h_{t+1} \in \{0, 1\}$ regardless of current homeownership status h_t. Table A1 summarizes the notations for the key variables used in the model apart from the fixed environment parameters.

Table A1: Model Variables

Object	Symbol	Object	Symbol
State Variables			
Liquid assets	s_t	Wage	w_t
House price	p_t	Cumulative work experience	λ_t
Homeownership status	h_t	State vector	$\boldsymbol{\theta}_t$
Choice Variables			
Consumption	c_t	Labor effort	e_t
Safe asset holdings	s_t^s	Risky asset holdings	s_t^r
Next-period housing choice	h_{t+1}	Financial bequest	B_s
Housing bequest	B_h		
Value Functions and Utility Components			
Value function	$V_t(\boldsymbol{\theta}_t)$	Effort disutility	$d(e_t)$
Consumption utility	$u_c(c_t)$	Housing utility	$u_h(h_t)$
Income-Related Definitions			
Effective wage	$w_t^{eff}(\lambda_t)$	After-tax labor income	$\hat{w}_t$
Minimum consumption	$c_{min,t}$	Discretionary consumption	$c_{above,t}$

A1.2 Environment

A1.2.1 Stochastic Processes

Both house prices and wages follow AR(1) processes in logs with deterministic trends.

House prices evolve according to:

$$\log(p_{t+1}) = d_0 + d_1 \cdot t + \rho_h \log(p_t) + \epsilon_{p,t+1} \tag{20}$$

where $\epsilon_{p,t+1} \sim N(-0.5\sigma_p^2, \sigma_p^2)$.

Wages follow a similar process but with a quadratic time trend:

$$\log(w_{t+1}) = a_0 + a_1 t + a_2 t^2 + \rho_w \log(w_t) + \epsilon_{w,t+1} \tag{21}$$

where $\epsilon_{w,t+1} \sim N(-0.5\sigma_w^2, \sigma_w^2)$. The quadratic profile (a_1, a_2) allows for realistic life-cycle wage patterns with initial growth and eventual flattening, distinguishing it from the linear house price trend. The autocorrelation parameters $\rho_h, \rho_w \in (0, 1)$ govern persistence.

After recursive summation, the deterministic components are:

$$\text{House prices:} \quad d_0 \sum_{i=0}^{t-1} \rho_h^i + d_1 \sum_{i=0}^{t-1} \rho_h^i (t-i) + \rho_h^t \log(p_0) \tag{22}$$

$$\text{Wages:} \quad a_0 \sum_{i=0}^{t-1} \rho_w^i + a_1 \sum_{i=0}^{t-1} \rho_w^i (t-i) + a_2 \sum_{i=0}^{t-1} \rho_w^i (t-i)^2 + \rho_w^t \log(w_0) \tag{23}$$

In actual computation, both processes are discretized with equally-spaced grid points. For each process, the stochastic components have time-varying moments reflecting shock accumulation:

$$\mathbb{E}[x_t] = \frac{-0.5\sigma^2(1-\rho^t)}{1-\rho}, \quad \text{Var}[x_t] = \sigma^2 \frac{1-\rho^{2t}}{1-\rho^2} \tag{24}$$

Grid points are spaced over $[\mathbb{E}[x_t] - 2\sqrt{\text{Var}[x_t]}, \mathbb{E}[x_t] + 2\sqrt{\text{Var}[x_t]}]$, capturing 95% of probability mass. Realizations are recovered as $\exp(x_{j,t} + \text{trend}_t)$.

Both processes evolve following transition probabilities defined by Gaussian quadrature:

$$\begin{aligned} \Pr(X_{t+1} = j \mid X_t = i) = {} & \Phi\left(\frac{x_{j,t+1} + 0.5\Delta x - \rho x_{i,t} + 0.5\sigma^2}{\sigma}\right) \\ & - \Phi\left(\frac{x_{j,t+1} - 0.5\Delta x - \rho x_{i,t} + 0.5\sigma^2}{\sigma}\right) \end{aligned} \tag{25}$$

where X represents either house prices or wages, and $\Phi(\cdot)$ denotes the standard normal CDF.

The key difference between house price and wage processes emerge during retirement: house prices continue following their stochastic process, while wages become deterministic retirement income (or pension) $w_t = \hat{w}_{45} \cdot \zeta, \forall t \in [46, 55]$ where ζ represents the pension rate. Wage transition probabilities become identity matrices during retirement, reflecting this deterministic structure.

A1.2.2 Parameters

Table A2 reports baseline parameter values used in the quantitative analysis.

Table A2: Model Parameters

Parameter	**Symbol**	**Value**	**Description**
Time			
Working periods	n_t	45	Age from 21 to 65
Retirement periods	n_{tr}	10	Age from 66 to 75
Preferences			
Risk aversion	γ	1.4663	CRRA coefficient
Housing utility	k	0.2	Flow utility from house
Bequest	b	7.778	General bequest utility
Housing bequest	b_{house}	1.918	Housing bequest utility
Discount factor	β	0.9601	Time value
Effort disutility	d	1.0	Disutility of effort parameter
Human capital impact	θ	1.0	Cumulative effort impact parameter
Financial Environment			
Safe return	R_t^s	1.02	Annual safe rate
Risky returns	R_t^r	$\{0.8, 1.6\}$	Discrete risky asset returns
Return probabilities	π_t^r	$\{0.7, 0.3\}$	Probabilities for risky returns
Non-homeowner penalty	α_{nh}	0.0522	Borrowing cost when $s_t^s < 0$ and $h = 0$
Homeowner penalty	α_h	0.0184	Borrowing cost when $s_t^s < 0$ and $h = 1$
Rent ratio	ρ	0.07	Rent as fraction of house price
Property tax rate	τ_h	0.01	Property tax rate on housing
Income tax rate	τ_w	0.2	Labor income tax rate
Loan-to-value	l	0.8	Maximum LTV for mortgages
Borrowing limit factor	η	1.076	Income-based borrowing multiplier
House Price Process			
Intercept	d_0	0.4858187	Constant term
Linear drift	d_1	0.0046938	Time trend
Persistence	ρ_h	0.7586691	AR(1) coefficient
Initial price	$\log(p_0)$	2.759	Log initial price (as of 1970)
Innovation variance	σ_p^2	0.0017617747	Error term variance
Wage Process			
Intercept	a_0	0.181349	Constant term
Linear drift	a_1	0.0097371	Age coefficient
Quadratic drift	a_2	-0.0002147	Age-squared coefficient
Persistence	ρ_w	0.7246307	AR(1) coefficient
Initial wage	$\log(w_0)$	0.69314718056	Log initial wage
Innovation variance	σ_w^2	0.08	Error term variance
Pension rate	ζ	0.64	Pension rate in retirement
Grid Dimensions			
Asset levels	n_a	100	Liquid asset grid points
House price states	n_{hp}	15	Price level discretization
Wage states	n_w	15	Wage level discretization
Human capital states	n_{cume}	11	Cumulative effort levels

A1.3 Computation

A1.3.1 State Space Discretization

The continuous state space is discretized using adaptive grids designed to allocate resolution to regions that materially affect household decisions. Asset positions are indexed on separate grids for homeowners and non-homeowners. Each grid is anchored by six nodes to capture the borrowing constraint, intermediate debt, zero assets, typical down-payment levels, moderate savings, and high wealth. Twenty equally spaced points are placed between each pair of adjacent nodes, yielding approximately one hundred asset levels per period.

For homeowners, the anchor nodes are

$$\{-\ell \cdot p_{\max} - 0.01,\ -\ell \cdot p_{\max}/2,\ 0,\ 0.2 \cdot p_{\max},\ 0.5 \cdot p_{\max},\ 3 \cdot p_{\max}\}.$$

For non-homeowners, the nodes are

$$\{-w_{\max} - 0.01,\ -w_{\max}/2,\ -w_{\max}/4,\ 0,\ 0.5 \cdot p_{\max},\ 3 \cdot p_{\max}\}.$$

Cumulative work experience λ_t is discretized on eleven equally spaced points,

$$\{0.0,\, 0.1,\, 0.2,\, \ldots,\, 1.0\},$$

and continuous realizations by law of motion (Equation (8)) are projected to the nearest grid point.

A1.3.2 Solution Algorithm

The model is solved by backward induction over the finite horizon. At each date t, the algorithm computes optimal policies for every discretized state by exhaustive search over feasible choices.

In the terminal period, the household solves a static problem conditional on the housing bequest choice $B_h \in \{0, 1\}$. For each state, utility under both bequest options is evaluated in closed form, and the option delivering higher utility is selected.

For the nonterminal periods, consider each state (s, p, w, λ, h) and each possible housing transition h_{t+1}. Conditional on these, construct state-specific decision grids: 20 effort levels on $[0, 1]$, 30 safe-saving levels spanning the borrowing constraint to total available resources, and 30 risky-saving levels from zero to available resources.

The algorithm performs a full grid search over (e_t, s_t^s, s_t^r). For every candidate choice vector, the minimum-consumption constraint is checked. Feasible candidates generate consumption via the period budget constraint, and period utility is computed. Cumulative experience is updated and projected to the nearest point on the λ-grid. Next-period assets are computed for each realization of the risky return; continuation values are interpolated and averaged using the return distribution. The resulting expected value is added to current utility.

Among all feasible combinations (including housing transitions), the algorithm selects the one delivering the maximal value. Optimal policies and the corresponding value function are stored for use in earlier periods.

A2 Appendix Tables

Table A3: Household Net Worth Distribution by Homeownership Status

	Homeowners			
Household Net Worth	Unweighted	Weighted	Share	Share (SCF)
\$0 - \$49,999	463	2,139	2.70%	1.63%
\$50,000 - \$99,999	648	3,635	4.58%	1.75%
\$100,000 - \$199,999	2,240	11,051	13.93%	7.26%
\$200,000 - \$299,999	2,880	13,360	16.84%	13.56%
\$300,000 - \$499,999	4,176	19,159	24.15%	26.21%
\$500,000 - \$999,999	3,942	19,039	23.99%	24.50%
\$1,000,000 or Higher	2,284	10,965	13.82%	25.11%
Total	16,633	79,348	100.00%	100.00%
	Renters			
Household Net Worth	Unweighted	Weighted	Share	Share (SCF)
\$0 - \$49,999	5,665	23,760	52.23%	64.50%
\$50,000 - \$99,999	2,110	8,469	18.62%	15.81%
\$100,000 - \$199,999	1,622	6,851	15.06%	7.98%
\$200,000 - \$299,999	657	2,821	6.20%	3.91%
\$300,000 - \$499,999	407	1,826	4.01%	3.35%
\$500,000 - \$999,999	229	901	1.98%	2.46%
\$1,000,000 or Higher	202	865	1.90%	1.98%
Total	10,892	45,493	100.00%	100.00%

This table shows distribution of households' net worth distribution by their homeownership status in 2022. Column "Unweighted" reports the raw number of respondents from the MRI-Simmons survey. Column "Weighted" is in thousands and reports how many individuals aged 25-54 in U.S. are represented by each category, and the shares are calculated based on these weighted counts. Column "Share (SCF)" reports the share of respondent in each "net worth by homeownership" category according to 2022 Survey of Consumer Finance using the survey weights.
Source: Yoo (2025)

Table A4: Transaction Category Classification

Transaction Category	Total Spending	Necessity Spending	Total Income
ATM/Cash Withdrawals	Yes	No	No
Automotive/Fuel	Yes	Yes	No
Cable/Satellite/Telecom	Yes	Yes	No
Charitable Giving	Yes	No	No
Check Payment	Yes	No	No
Education	Yes	Yes	No
Electronics/General Merchandise	Yes	No	No
Entertainment/Recreation	Yes	No	No
Gifts	Yes	No	No
Groceries	Yes	Yes	No
Healthcare/Medical	Yes	Yes	No
Home Improvement	Yes	No	No
Insurance	Yes	Yes	No
Loans	Yes	No	No
Mortgage	Yes	Yes	No
Office Expenses	Yes	No	No
Other Expenses	Yes	No	No
Personal/Family	Yes	No	No
Pets/Pet Care	Yes	No	No
Postage/Shipping	Yes	No	No
Rent	Yes	Yes	No
Restaurants	Yes	No	No
Service Charges/Fees	Yes	No	No
Services/Supplies	Yes	No	No
Subscriptions/Renewals	Yes	No	No
Travel	Yes	No	No
Utilities	Yes	Yes	No
Credit Card Payments	No	No	No
Deposits	No	No	Yes
Expense Reimbursement	No	No	No
Interest Income	No	No	Yes
Investment/Retirement Income	No	No	Yes
Other Income	No	No	Yes
Refunds/Adjustments	No	No	No
Retirement Contributions	No	No	No
Rewards	No	No	No
Salary/Regular Income	No	No	Yes
Sales/Services Income	No	No	Yes
Savings	No	No	No
Securities Trades	No	No	No
Taxes	No	No	No
Financial Account Transfers	No	No	No

This table presents the transaction category classification.

Table A5: Relationships between Housing Affordability and Individuals' Behaviors Relative to Income

Differences by Income Quntile	$\frac{\text{Total Spending}}{\text{Total Income}}$	$\frac{\text{Non-necessity}}{\text{Total Income}}$	$\frac{\text{Leisure}}{\text{Total Income}}$
Q1	0.0125***	0.0083***	0.0012***
	(0.0007)	(0.0006)	(0.0001)
Q2	0.0030***	0.0031***	0.0007***
	(0.0007)	(0.0006)	(0.0001)
Q3	-0.0016**	-0.0005	0.0004***
	(0.0007)	(0.0006)	(0.0001)
Q4	-0.0028***	-0.0010*	0.0003***
	(0.0007)	(0.0006)	(0.0001)
Q5	-0.0017**	-0.0015**	-0.0001
	(0.0007)	(0.0006)	(0.0001)
Individual FE	Y	Y	Y
County FE	Y	Y	Y
Time FE	Y	Y	Y
N	49,022,910	49,022,910	49,022,910

This table presents how households in different income quintiles respond to housing unaffordability through changes in consumption relative to total income. The coefficients capture, for each income quintile, the difference in consumption relative to total income between individuals residing in unaffordable counties and those in affordable counties.. Standard errors clustered at the individual level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.