A dynamic model of the racial wealth gap*

Sylvain Catherine† Ellen Jiayang Lu‡ James D. Paron§

December 16, 2025

Abstract

What explains wealth and portfolio differences between Black and White Americans? We find that disparities in economic factors explain portfolios well, but only partly explain the wealth gap. In a dynamic setting, economic factors often change optimal saving rates in ways that offset their effects on income and returns. Consequently, their net wealth effect is often limited, making the wealth gap harder to explain. We estimate that differences in income levels, income risk, family structures, mortality, health expenditures, property taxes, mortgage rates, and asset returns explain half of the differential between the racial wealth gap and the racial income gap.

Keywords: Household finance, Labor income risk, Portfolio choices, Life-cycle models, Wealth inequality, Racial inequality

JEL codes: G11, G12, D14, D91, J24, H06

---

*Previously circulated under the title: *What explains wealth and portfolio differences between Black and White Americans?*

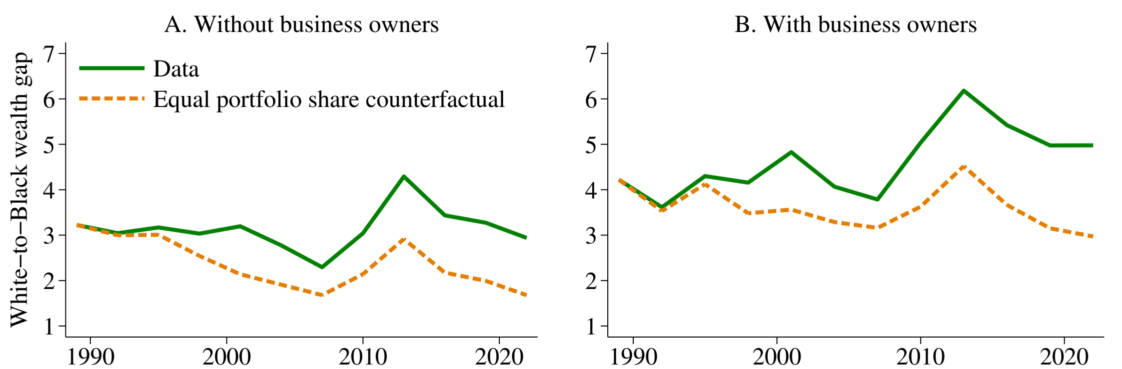
†University of Pennsylvania, Wharton, Finance department. Email: scath@wharton.upenn.edu

‡University of Pennsylvania, Wharton, Finance department. Email: ellenlu@wharton.upenn.edu

§Stanford University, Graduate School of Business. Email: jparon@stanford.edu

Over the past three decades, the wealth gap between Black and White Americans has widened. The fact that it remains much larger than the income gap implies that saving rates and portfolio returns play decisive roles in its existence. The importance of portfolios can be illustrated by comparing the historical evolution of the racial wealth gap with a counterfactual in which Black households had invested their wealth in stocks and housing in the same proportions as White households. Figure 1 shows that, in such a counterfactual, the wealth gap would have narrowed substantially from 1989 to 2022. A comparable convergence would have occurred had equity returns not outpaced house prices over this period (Derenoncourt et al., 2023).

Figure 1: Contribution of portfolio shares to the evolution of the racial wealth gap



This figure displays the evolution of the White-to-Black wealth gap, defined as the ratio of mean per-household net worth between White and Black Americans. The solid green line represents the observed wealth gap in the Survey of Consumer Finances (SCF) dataset. The dashed orange line represents a counterfactual in which Black households invested equal shares of their wealth in stocks and housing as White households, in every survey years. We exclude the top 1% of the wealth distribution from the data. We report a version without business owners on the left and report the full population version on the right. Appendix A details the construction of this figure.

In this paper, we study whether economic factors can explain differences in the portfolio decisions and consumption choices of Black and White households and, consequently, why the racial wealth gap greatly exceeds the income gap. To this end, we analyze the implications of various racial disparities through the lens of a life-cycle model. Besides the earnings gap, we consider disparities in economic factors such as income risk, intergenerational transfers, household structure, medical spending, mortality, borrowing costs, and asset returns. We also model the system of taxes and transfers, including progressive government programs providing retirement income, health insurance, and protection against poverty. The focus of our analysis is what we call the *excess* racial wealth gap: the portion of wealth inequality that cannot be mechanically accounted for by the earnings gap.

In the model, disparities in economic factors are exogenous and calibrated to match data and estimates from the literature. However, their effect on wealth accumulation is not limited to their direct monetary cost, but also depends on the endogenous response of households, who optimally and dynamically adjust their portfolios and consumption behaviors in response to their circumstances. In principle, these endogenous responses can either amplify or mitigate the effects of racial disparities on wealth accumulation. Modeling these responses allows us to quantify the multiple mechanisms through which any single economic factor shapes wealth accumulation and its net overall effect.

The first takeaway of our study is that economic factors explain well why Black and White households hold different portfolios. The second takeaway is that, for many economic factors, the net effect on wealth accumulation is smaller than one would expect. On the one hand, adverse economic conditions can make it difficult to build wealth; but on the other hand, in the face of such adversity, households can respond by adjusting their savings. These competing forces make it harder for any one factor to explain a significant share of the racial wealth gap. When we consider all channels jointly, we find that the dozen economic disparities in our model together explain roughly half of the excess racial wealth gap.[1] Among these, the earnings gap, the gap in intergenerational transfers, differences in expected returns to wealth, and health expenditures are the most important, but each of these factors accounts for only about 11–13% of the total.

The earnings gap contributes to differences in wealth-to-earnings ratios because lower incomes limit access to asset markets—particularly homeownership—and because progressive social programs create a positive relationship between income and optimal saving

[1]The channels explain a much larger fraction—over two-thirds—of the *total* racial wealth gap, because closing the earnings gap mechanically closes a large part of the wealth gap. This is why we focus instead on the *excess* wealth gap.

rates. Differences in expected returns to wealth also matter: higher returns could, in principle, induce White households to consume more, since the return gap makes them effectively richer (an income effect). However, this offsetting force is balanced by a stronger incentive to save when returns are higher (a substitution effect). Finally, disparities in health expenditures widen the wealth gap because White households face higher out-of-pocket medical costs later in life, which raises their optimal saving rate earlier in life.

Our findings show that the impact of any single economic disparity on the racial wealth gap is difficult to assess. A natural approach for empirical researchers would be to estimate its effect based on its lifetime monetary cost, but our results demonstrate that such static calculations can be misleading. In a dynamic setting, households adjust their consumption and saving behavior in response to economic conditions, which can substantially offset the direct effects of these disparities. As a result, the excess wealth gap represents a deeper puzzle than such calculation would suggest. We illustrate this point quantitatively: in our model, the economic factors explaining differences in portfolio returns have limited effects on the wealth gap, because the resulting loss in returns is offset by changes in consumption behaviors.

To understand the intuition behind this result, consider as an example the role of stock market returns over the past forty years. As Figure 1 shows, Black households invested less in equities, and thus earned lower portfolio returns. We find that a primary explanation for the gap in equity investment is that Black workers are more likely to lose their jobs during recessions, and therefore should invest less in stocks (Catherine, 2022; Derenoncourt et al., 2024). This slows wealth accumulation by lowering returns. But at the same time, higher income risk increases precautionary savings (Zeldes, 1989). Because portfolio and consumption responses move wealth in opposite directions, matching the equity investment gap only explains a small fraction of the wealth gap.

The inheritance gap offers a second example. White families are far more likely to receive sizable bequests. This advantage unambiguously increases the racial gap in lifetime income. However, if intergenerational transfers are even partly anticipated, White families should choose to save less for retirement. This reduction in White savings rates reduces the incidence of bequests on the racial wealth gap. The inheritance gap therefore amplifies wealth inequality only to the extent that the timing and size of bequests are uncertain, preventing households from fully smoothing consumption in anticipation of future transfers.

For some economic disparities, adjustments in consumption and portfolio choices can also amplify the incidence on wealth. An important example is differences in rates of return on the same asset class. A lower rate of return not only slows down the growth of a given portfolio, but it can also discourage households from saving and from building higher-risk, higher-return portfolios. For instance, higher mortgage rates (Ghent et al., 2014) and higher property taxes (Avenancio-León and Troup, 2022) reduce the optimal homeownership rate and leverage of Black households, further reducing their accumulation of wealth. Conversely, the lower price-to-rent ratios in Black neighborhoods (Diamond and Diamond, 2024) make homeownership more affordable and more profitable, increasing Black wealth and even dominating these effects quantitatively.

We also consider the role of progressive social programs, which can act as substitutes to private wealth and play a greater role in the lower part of the income distribution. We explicitly model Social Security, Medicare, Medicaid, and various parts of the social safety net. With the exception of Medicare, the benefit formulas of these programs favor low-income and/or low-wealth families, and therefore reduce their need to save for retirement, unexpected income losses, or medical expenditures. They therefore reduce savings rates in the lower part of the income distribution, amplifying the effect of the racial income gap on the wealth gap. Using counterfactual policy experiments, we find that the progressive design of these programs can explain only a small share of the wealth gap in excess of the earnings gap.

Of course, our study does not explore the entire set of potential causes of the racial wealth gap. However, our findings shed light on an important distinction between measuring the monetary and welfare costs of economic disparities to Black Americans and explaining the racial wealth gap. We argue that, despite the extensive list of documented disparities, the racial wealth gap is hard to explain within the framework of a life-cycle model. By contrast, we find that differences in the *composition* of wealth between Black and White Americans can be rationalized using a standard portfolio choice model. Importantly, the fact that an economic factor has a limited effect on the racial wealth gap does not mean that its welfare cost is also small. A second contribution of our paper is to quantify these welfare costs and show that they are unambiguously substantial.

Related literature Our paper contributes to the large literature on racial wealth inequality in the United States. In a recent study, Derenoncourt et al. (2023) find that the racial gap in market wealth has widened over the past four decades, a trend that they attribute to differences in the composition of Black and White portfolios. Inspired by their findings, one goal of our paper is to explain these portfolio differences. In doing so, we bridge the gap between studies on racial wealth inequality and the household finance literature on portfolio choices. In particular, we show that models with countercyclical income risk (Catherine, 2022; Lynch and Tan, 2011; Storesletten et al., 2007) can explain why Black workers invest relatively less in stocks. In the data, higher income risk has been associated with lower equity investment (Betermier et al., 2012; Bonaparte et al., 2014; d'Astous and Shore, 2024; Fagereng et al., 2018). In particular, workers facing more tail risk during economic downturns—like Black workers—invest less in stocks (Catherine et al., 2024b).

In a contemporaneous study, Derenoncourt et al. (2024) also argue that unemployment risk can explain the equity investment gap. Unlike these authors, we find the overall effect on the wealth gap to be small because higher income risk also increases precautionary savings.[2] Our emphasis on endogenous consumption responses links the literature on racial wealth inequality to theoretical (Aiyagari, 1994; Carroll, 1997; Gourinchas and Parker, 2002; Zeldes, 1989) and empirical studies (Banks et al., 2001; Bertola et al., 2005; Carroll and Samwick, 1998; Fagereng et al., 2017) on precautionary savings in the presence of

[2] Derenoncourt et al. (2024) show that higher countercyclical unemployment rate reduces optimal portfolio holdings for Black Americans but estimate their counterfactual wealth using a simple accounting approach assuming a constant savings rate.

uninsurable risk. We argue that findings from this literature make the racial wealth gap harder to explain. As existing papers have shown, low precautionary savings among Black households make it more difficult for them to smooth consumption (Ganong et al., 2023) and take advantage of retirement savings incentives (Choukhmane et al., 2024).[3]

Our analysis also points to the important but conflicting roles of heterogeneous returns on wealth. Recent studies have underlined the importance of the positive relationship between wealth and returns in the evolution of wealth inequality in recent decades (Bach et al., 2020; Catherine et al., 2023; Fagereng et al., 2021; Greenwald et al., 2021). We show that portfolio rebalancing can amplify the effect of disparities in rates of returns. Black Americans may earn lower returns on wealth due to higher mortgage rates (Ghent et al., 2014), higher property taxes (Avenancio-León and Troup, 2022) and discounts when selling properties in distress (Kermani and Wong, 2024). On the other hand, Diamond and Diamond (2024) find that Black Americans benefit from higher total returns on housing thanks to higher implicit rental yields. Their ability to become homeowners and capture these returns may, however, be hindered by higher financial constraints and lower access to credit (Charles and Hurst, 2002; Gupta et al., 2024). Beliefs regarding returns can also play an important role: Boerma and Karabarbounis (2023) find that a lack of knowledge regarding returns to entrepreneurship could explain the racial gap in private business ownership.

Roadmap The remainder of this paper is organized as follows. Section 1 describes our life-cycle model and Section 2.1 discusses our data. In Section 2, we calibrate the model and, in particular, economic disparities between Black and White households. We estimate preference parameters and assess the model's ability to match the data in Section 3. In Section 4, we conduct counterfactual experiments to assess the effect of each economic factor on the balance sheet of Black Americans and the wealth gap. We consider potential model extensions in Section 5. Section 6 concludes.

[3] Ganong et al. (2023) also find that, in a standard consumption model, a substantially negative interest rate must be assumed for the Black population to explain this lack of liquid wealth.

1 Model

This section lays out the assumptions of our life-cycle model. Households are indexed by i and differ in demographic characteristics including age $a \in \{1, \ldots, a_{\max}\}$, race $j \in \{\mathrm{B}, \mathrm{W}\}$, number of adults $n_A \in \{1, 2\}$, number of earners $k \in \{1, 2\}$, number of children n_{Ct}, and household size $N_{it} = n_A + n_{Ct}$. Let ω_j denote the percentage of the population in racial group j.

1.1 Asset returns

Riskfree bond Households can invest in a riskless one-period bond. The gross return on this bond, denoted R_{fj}, is constant and depends on race j. As expected returns on all assets (bonds, stocks, and housing) depend on the riskfree return, any difference between R_{fB} and R_{fW} applies to all asset classes.

Stock market The stock market delivers risky return R_{St}. The log return is the sum of two components:

$$r_{Sjt} = r_{fj} + s_{1t} + s_{2t}. \tag{1}$$

The term s_{2t} represents i.i.d. normal noise with variance $\sigma^2_{s_2}$. The term s_{1t} represents the cyclical component of returns, which is correlated with the condition of the labor market. With probability p_s, s_1 is likely to be low, representing a stock-market crash. Mathematically, this is summarized by the normal mixture distribution

$$s_{1t} = \begin{cases} s^-_{1t} \sim \mathcal{N}(\mu^-_s, \sigma^2_{s_1}) & \text{with probability} \quad p_s, \\ s^+_{1t} \sim \mathcal{N}(\mu^+_s, \sigma^2_{s_1}) & \text{with probability} \quad 1 - p_s, \end{cases} \tag{2}$$

where μ^-_s is the average excess return in a crash and, of course, $\mu^+_s > \mu^-_s$.

House prices Households face stochastic local house prices and choose whether to own or rent. One unit of housing has local market price P_t, implying gross return $R_{Ht} =$

P_t/P_{t-1}. Log housing returns (price changes) follow

$$r_{Hjt} = p_{jt} - p_{j,t-1} = r_{fj} + \mu_p + \varepsilon_{pt}, \tag{3}$$

where ε_{pt} is i.i.d. normally distributed with variance σ_p^2. Because the correlation between housing and equity returns is almost zero in the data (Flavin and Yamashita, 2002), we assume that shocks to these asset prices are uncorrelated.

1.2 Labor income

Before retirement, household i receives labor income $L_{it} = L_{1t} \cdot L_{2it}$, the product of the national wage index L_{1t} and an idiosyncratic income component L_{2it}.

Aggregate labor income As in the data, the growth in the national wage index L_1 is correlated with both stock-market and housing returns. Specifically, we assume that its log growth rate is

$$l_{1t} - l_{1,t-1} = \mu_l + \lambda_{ls} s_{1t} + \lambda_{lp} \varepsilon_{pt} + \varepsilon_{lt}, \tag{4}$$

where ε_{lt} are normally distributed shocks with variance σ_l^2; μ_l is the growth rate of aggregate income; and λ_{ls} and λ_{lp} govern the sensitivity of income growth to stock-market crashes and house-price shocks, respectively.

Idiosyncratic labor income The idiosyncratic component L_{2it} is the product of a deterministic trend f_{it}, a persistent component z_{it}, and a transitory component η_{it}:

$$L_{2it} = \exp\{f_{it} + z_{it} + \eta_{it}\}. \tag{5}$$

The deterministic component f_{it} is a function of the household's age a_t, race j, and structure $\{n_A, k\}$ — that is, $f_{it} = f(a_t, j, n_A, k)$.

The persistent component z_{it} captures the fact that workers face long-lived shocks to their labor income from negative events, like job loss, and positive events, like promotions.

We assume z_i evolves as an AR(1) with cyclical skewness,

$$z_{it} = \rho_{z,k} z_{it-1} + \zeta_{it}, \tag{6}$$

where shocks arrive according to a mixture of normals:

$$\zeta_{it} = \begin{cases} \zeta_{it}^- \sim \mathcal{N}\left(\mu_{z,jkt}^-, \sigma_{z,k}^{-2}\right) & \text{with probability} \quad p_{z,k}, \\ \zeta_{it}^+ \sim \mathcal{N}\left(\mu_{z,jkt}^+, \sigma_{z,k}^{+2}\right) & \text{with probability} \quad 1 - p_{z,k}. \end{cases} \tag{7}$$

With probability $p_{z,k} < 0.5$, the average household of demographic $\{j, k\}$ experiences a persistent permanent-income shock $\mu_{z,jkt}^-$. Unconditional cross-sectional skewness is negative, so these shocks tend to be negative. Bad shocks tend to be more negatively skewed in bad macroeconomic states, so we assume that $\mu_{z,jkt}^-$ is lower when aggregate income falls, including during stock-market crashes. The sensitivity of $\mu_{z,jkt}^-$ to aggregate income depends on the number of earners k, because multiple incomes diversify risk, and on race j, because Black and White individuals have different labor-income cyclicality. These conditions are captured by letting the mean negative income shock be an affine function of wage-index growth:

$$\mu_{z,jkt}^- = \overline{\mu_{z,k}^-} + (\alpha_j - 1)(l_{1t} - l_{1,t-1}) + \lambda_{zl,k}\alpha_j(l_{1t} - l_{1,t-1}). \tag{8}$$

The coefficients α_j are "racial income betas" and govern the excess cyclical skewness of each racial group—their population-weighted average is $\sum_j \omega_j \alpha_j = 1$. The more negative is $\mu_{z,jkt}^-$, the more skewed is the cross-sectional distribution; the larger is α_j, the more cyclical is this skewness for racial group j. To ensure that idiosyncratic shocks ζ_{it} are mean-zero in the population of households, we impose the condition that $\mu_{z,jkt}^+$ satisfies

$$p_{z,k}\mu_{z,jkt}^- + (1 - p_{z,k})\mu_{z,jkt}^+ = (\alpha_j - 1)(l_{1t} - l_{1,t-1}) \tag{9}$$

for each j and k.[4] Finally, we assume $\sigma^{-}_{z,k} \gg \sigma^{+}_{z,k}$ such that "big events" like unemployment and promotions occur principally in the ζ^{-}_{it} state.

The final component of idiosyncratic income is the transitory shock η_{it}, which represents short-lived noise in income. It is also drawn from a mixture of normals:

$$\eta_{it} = \begin{cases} \eta^{-}_{it} \sim \mathcal{N}\left(0, \sigma^{-2}_{\eta,k}\right) & \text{if} \quad \zeta_{it} = \zeta^{-}_{it}, \\ \eta^{+}_{it} \sim \mathcal{N}\left(0, \sigma^{+2}_{\eta,k}\right) & \text{if} \quad \zeta_{it} = \zeta^{+}_{it}. \end{cases} \tag{10}$$

The occurrence of each state coincides with the occurrence of the persistent income shock, capturing the idea that large persistent and transitory shocks may happen at the same time.

1.3 Health expenditures and benefits

In addition to income risk, households face exogenous shocks to their health that require medical expenditures

$$M_{it} = \exp\{g_{it} + \delta_{it}\} L_{1t}, \tag{11}$$

where $g_{it} = g(a_t, j, n_A)$ is a deterministic function and δ_{it} is a stochastic component following

$$\delta_{it} = \rho_\delta(j, n_A)\delta_{i,t-1} + \sigma_\delta(j, n_A)\epsilon_{\delta it}, \tag{12}$$

where $\epsilon_{\delta it} \sim N(0, 1)$.

Households are partially insured against these medical expenses either privately or through government programs. Let M^{OOP}_{it} denote the portion of M_{it} not covered by insurance or transfers, i.e. the out-of-pocket expenditure.

Before retirement, households are covered by Medicaid if eligible or insured by private insurance. Private insurance requires an annual premium of $\Phi_{Mt} = 0.1 L_{1t}$[5] and covers

[4] Aggregating over j implies that the right-hand side of this expression is zero, confirming that these shocks are truly idiosyncratic in the population and that shocks to z_i are uncorrelated with asset returns.

[5] The premium is estimated based on average annual worker and employer contributions in 2014, 2019, and 2024, in the KFF Employer Health Benefits Survey. The out-of-pocket formula combines medical expenditure data and average maximum out-of-pocket expenses.

most medical expenses, leaving an out-of-pocket payment

$$M_{it}^{\text{OOP}} = \min\{0.3M_{it}, 0.15L_{1t}\}.$$

In retirement, households are covered by Medicare and, if eligible, Medicaid. Appendix B.2 provides the details regarding the computation of these benefits, which we only summarize here. We assume retirees pay an annual premium $\Phi_{Mt} = 0.03n_A L_{1t}$ for Medicare Plan B, which covers 66% of their medical expenses as in De Nardi et al. (2016).

Households can be eligible for Medicaid through two pathways: "categorically needy" or "medically needy." First, households with income below 138% of the federal poverty line $\varrho(N)$ during working period or with eligibility for Supplemental Security Income (SSI) benefits during retirement qualify for Medicaid under "categorically needy." They thus receive benefits equal to total medical expenditure $B_{it}^{\text{M}} = M_{it}$. Second, households can be eligible based on the "medically needy" rule if their medical expenses (net of Medicare payments if in retirement) exceed a combined fraction of their income and non-housing wealth. In this case, households pay out-of-pocket expenses until they cross the eligibility threshold. The remainder of their expenses is then covered by Medicaid.

1.4 Taxes, benefits, and inheritances

To account for the effects of taxes and transfers in the U.S., we model the Social Security system, the largest social safety net programs, and taxes.

Social Security Before retirement, households pay 12.4% of their earnings towards the Social Security system, up to the maximum taxable earnings cap, which represents 2.5 times the wage index L_{1t} per earner. Thus payroll tax expenses are:

$$T_{it}^{\text{SS}} = 0.124 \min\{L_{it}, (2.5k)L_{1t}\} \tag{13}$$

Households retire at a full-retirement age a_{ret}. Social Security benefits are a function of lifetime income, summarized by the average indexed yearly earnings (AIYE) at age 60. The AIYE is the average of past taxable earnings, adjusted for growth in the wage index. Mathematically, it is defined as:

$$\text{AIYE}_{it} = \frac{1}{t - t_0} \sum_{s=t_0}^{t} \min \{L_{is}, (2.5k)L_{1s}\} \frac{L_{1t_{60}}}{L_{1s}}, \tag{14}$$

where t_{60} denotes the year the household reaches age 60.

Benefits are a concave, piece-wise linear function of the AIYE and indexed to inflation. The concavity of the benefit function offers higher replacement rates to workers with lower lifetime earnings. Specifically, a single-adult household receives benefits

$$B_{it}^{\text{SS}} = \begin{cases} 0.9\text{AIYE}_{it_{60}} & \text{if AIYE}_{it_{60}}/L_{1t_{\text{ret}}} < 0.2, \\ 0.116L_{1t_{\text{ret}}} + 0.32\text{AIYE}_{it_{60}} & \text{if } 0.2 \le \text{AIYE}_{it_{60}}/L_{1t_{\text{ret}}} < 1.25, \\ 0.286L_{1t_{\text{ret}}} + 0.15\text{AIYE}_{it_{60}} & \text{if AIYE}_{it_{60}}/L_{1t_{\text{ret}}} \ge 1.25. \end{cases} \tag{15}$$

where t_{ret} denotes the retirement year.

For a double-income household, the formula (15) needs to apply to the first and second earner separately because (i) the benefits of the higher earner are capped at 2.5 times the average wage and (ii) the lower earner is guaranteed a minimum benefit equal to one-half of the higher earner's benefit (the "spousal benefit"). Thus, if the higher earner accounts for a fraction w_1 of total household income, then that earner's benefits $B_{i_1 t}^{\text{SS}}$ are calculated from (15) using $\min\{w_1\text{AIYE}_{it_{60}}, 2.5L_{1t_{\text{ret}}}\}$ instead of just $\text{AIYE}_{it_{60}}$. The lower earner's benefits $B_{i_2 t}^{\text{SS}}$ are then the maximum of $0.5B_{i_1 t}^{\text{SS}}$ and the benefit calculated from (15) using $(1 - w_1)\text{AIYE}_{it_{60}}$.

Social safety net Poorer households receive additional support through two government welfare programs: the Supplemental Nutrition Assistance Program (SNAP, or food stamps) during working life, and the Supplemental Security Income (SSI) program during retirement.

Households are eligible for SNAP benefits if they meet two criteria, laid out in full in Appendix B.1. The *gross income test*, stipulates that "gross income"—defined as $L_{it}^{\mathrm{g}} \equiv L_{it}/0.85$—must fall below 130% of the poverty threshold $\varrho(N)L_{1t}$ for a household of size N.[6] The *net income test*, requires that "net income" remain below the poverty line. Net income equals gross income minus a standard deduction (which depends on family size), an earned-income deduction, and a shelter-cost deduction (accounting for rent, property taxes, or mortgage payments). Households meeting both criteria receive SNAP benefits equal to a fraction $b^{\mathrm{SN}}(N)$ of the wage index minus 30% of net income.

SSI benefits support retirees with very low Social Security benefits. Eligible one-adult households receive a supplement ensuring that total retirement income reaches at least 17.74% of the wage index in that year, provided that their wealth remains below approximately 3% of the wage index. For two-adult households, the wealth threshold rises to 4.17%, and SSI guarantees total retirement income of at least 26.62% of the wage index.

In summary, welfare benefits from the social safety net are

$$B_{it}^{\mathrm{SN}} = \begin{cases} \left(b^{\mathrm{SN}}(N_{it})L_{1t} - 0.3L_{it}^{\mathrm{n}}\right)^{+} & \text{if } L_{it}^{\mathrm{g}} \leq 1.3\varrho(N_{it})L_{1t}, L_{it}^{\mathrm{n}} \leq \varrho(N_{it})L_{1t}, \text{ and } t < t_{\mathrm{ret}}, \\ \left(0.1774L_{1t} - B_{it}^{\mathrm{SS}}\right)^{+} & \text{if } W_{it} < 0.0314L_{1t}, t \geq t_{\mathrm{ret}}, \text{ and } n_A = 1, \\ \left(0.2662L_{1t} - B_{it}^{\mathrm{SS}}\right)^{+} & \text{if } W_{it} < 0.047L_{1t}, t \geq t_{\mathrm{ret}}, \text{ and } n_A = 2. \end{cases} \tag{16}$$

Income taxes and tax credits Households pay income taxes on labor income and Social Security benefits. The U.S. has a progressive income tax system: marginal tax rates increase in taxable income. Let T_{it}^{inc} denote the total income tax payments. We also model the earned income tax credit (EITC), a program through which households earning low labor income receive a gradual benefit. We denote this benefit as B_{it}^{EITC}. Finally, Medicare is funded by a tax on labor income T_{it}^{M}. The computations of income taxes and tax credits are detailed in Appendix B.3.

[6] Appendix B.1 reports the poverty thresholds $\varrho(N)$ used in the calculations.

Disposable income Disposable income Y_{it} is the sum of its labor income L and non-medical benefits $B = B^{\text{SS}} + B^{\text{SN}} + B^{\text{EITC}}$ net of taxes $T = T^{\text{SS}} + T^{\text{inc}} + T^{\text{M}}$:

$$Y_{it} = L_{it} + B_{it} - T_{it}. \tag{17}$$

Households also pay out-of-pocket medical expenses M_{it}^{OOP} (i.e., net of payments by private insurance, Medicare, and Medicaid) and medical premiums Φ_{Mt}.

Inheritance Households receive inheritances over the life cycle. The arrival rate and size of inheritance are functions of age a_t, race j, and income $\hat{y}_{it}$ (which equals the permanent income shock ζ_{it} in working life or Social Security benefits B_{it}^{SS} in retirement). In summary, inheritance is distributed according to

$$I_{it} = \begin{cases} I_{it}^{+} \sim \text{lognormal}(\mu_I(a_t, j, \hat{y}_{it}), \sigma_I(j)^2) & \text{with prob. } p_I(a_t, j, \hat{y}_{it}), \\ 0 & \text{otherwise.} \end{cases} \tag{18}$$

The probability $p_I(a_t, j, \hat{y}_{it})$ and mean $\mu_I(a_t, j, \hat{y}_{it})$ are race-dependent polynomials of age and income and the variance $\sigma_I(j)^2$ is a race-dependent constant. In making this assumption, we capture the fact that inheritances are both more frequent and conditionally larger for White and high-income households in the data.

1.5 Housing market

Households can either rent or own a house. Let H_{it} denote the size of the house they choose to occupy and $P_t H_{it}$ its value. Renters must pay $P_t H_{it}/\Upsilon_j$ to occupy a house of size H_{it}, whereas homeowners must pay property taxes $P_t H_{it} \tau_j^H$. The cost of occupying a house is therefore:

$$X_{it} = \begin{cases} P_t H_{it}/\Upsilon_j & \text{if renter,} \\ P_t H_{it} \tau_j^H & \text{if homeowner,} \end{cases} \tag{19}$$

where Υ_j is the price-to-rent ratio, τ_j^H is the property tax rate, and both depend on race.

When purchasing a property, households are subject to two constraints. First, the property price must be above a minimum value as in Cocco (2005), which represents a multiple $\kappa_{\min}$ of the wage index. Second, the purchase can be financed by a one-year renegotiable mortgage, but borrowers are subject to a downpayment constraint, such that the property cannot be worth more than a multiple $\kappa_{\max}$ of their net worth. Overall, the house value must respect the condition:

$$\underbrace{\kappa_{\min} L_{1t}}_{\text{minimum house value}} \leq P_t H_{it} \leq \underbrace{\kappa_{\max} W_{it}}_{\text{downpayment constraint}}. \tag{20}$$

Borrowers must pay a spread between the mortgage rate r_{Mit} and the riskfree interest rate r_{fj}. This spread depends on household's disposable income, leverage (debt-to-value ratio), and race. Because of leverage, wealth can become negative when a of large negative house price shock occurs. In this case, the agent defaults, gives up all assets, and starts the next period with zero wealth, housing, and debt.

When selling a property, households incur proportional transaction costs equal to a percentage c_H of the property value. In addition, households selling in distress sell at a discount $\theta_j > 0$. We define a distress sale as any transaction occurring in the large-income-shock state ($\zeta_{it} = \zeta_{it}^-$). The overall transaction cost is:

$$\Phi_{Hit} = \begin{cases} c_H P_t H_{it} + \theta_j \mathbb{I}_{\zeta_{it}=\zeta_{it}^-} P_t H_{it-1} & \text{if selling} \\ 0 & \text{otherwise.} \end{cases} \tag{21}$$

1.6 Other frictions

Liquidity constraint in large-income-shock state In the large-income-shock state ($\zeta_{it} = \zeta_{it}^-$), a household can only finance its consumption against income and the liquid part of its wealth, which we assume to be a fraction ϖ of W_{it}. This amounts to the constraint

$$(Y_{it} + \varpi W_{it} - C_{it}) \mathbb{I}_{\zeta_{it}=\zeta_{it}^-} \geq 0, \tag{22}$$

where Y_{it} is disposable (i.e., post-transfer) income, defined below. Homeowners can fully liquidate their wealth by selling their house but are then subject to the distress sale discount.

Stock market participation costs and short-sale constraint Participation in the stock market results in two forms of cost. The first is a fixed cost that grows in proportion to the aggregate wage:

$$\Phi_{\pi it} = \begin{cases} c_\pi L_{1t} & \text{if } \pi_{it} > 0 \\ 0 & \text{otherwise.} \end{cases} \tag{23}$$

The second is a proportionate cost of capital-gains taxation. To account for these taxes, we will consider post-tax equity returns in the data. A household cannot short-sell or borrow against future earnings.

1.7 Households

Evolution of wealth Wealth W_{it} is defined as the sum of asset holdings before receipt of income and before expenditures on consumption, housing, medical costs, and participation costs. Hence, wealth evolves as follows:

$$W_{it+1} = \left(W_{it} + Y_{it} + I_{it} - C_{it} - X_{it} - M_{it}^{\text{OOP}} - \Phi_{Mit} - \Phi_{Hit} - \Phi_{\pi it}\right) R_{Wi,t+1}, \tag{24}$$

where the gross return on wealth equals

$$R_{Wi,t+1} = R_{fj} + \pi_{it}(R_{Sj,t+1} - R_{fj}) + h_{it}(R_{Hj,t+1} - R_{fj}) - (h_{it} - 1)^+(R_{Mit} - R_{fj}). \tag{25}$$

In this wealth-return expression, π_{it} is the equity share and h_{it} is the housing share. The term $(h_{it} - 1)^+(R_{Mit} - R_{fj})$ represents the fact that, if $h_{it} > 1$, the household requires a mortgage and must pay the premium on it.

Preferences and objective Household have constant relative risk aversion preference and choose goods consumption C_{it}, housing consumption H_{it}, equity share π_{it}, and homeownership status $\mathbb{I}_{\text{own},it}$ to maximize expected lifetime utility:

$$V_{it} = \max_{\{C,H,\pi,\mathbb{I}_{\text{own}}\}} \left\{ \frac{1}{1-\gamma} \left(\frac{C_{it}^{1-\nu} H_{it}^{\nu}}{\sqrt{N_{it}}} \right)^{1-\gamma} + (1 - m_{it})\beta \mathbb{E}_t V_{it+1} \right\} \tag{26}$$

where γ is the coefficient of relative risk aversion, ν captures the preference weight on housing relative to goods, β is the subjective discount factor, and $m_{it} = m(a_t, j, n_A)$ is the period mortality rate that depend on age, race, and household composition. Total household consumption is divided by $\sqrt{N_{it}}$ to account for synergies within the family.[7]

We abstract from modeling bequest motives explicitly. Introducing such motives would add flexibility to match the wealth accumulation profile over the life cycle. However, differences in estimated bequest motives and discount factors between Black and White households can both be interpreted as differences in their effective preference for the present. We therefore summarize this heterogeneity using a single structural parameter, which offers a more parsimonious and transparent interpretation of the unexplained component of the racial wealth gap. Importantly, even without bequest motives, the model accurately reproduces the wealth trajectory of Black households during retirement, the population for which we conduct all our counterfactual analyses.

2 Model calibration

This section reviews the ways in which the economic conditions faced by Black and White households differ, and how these differences are reflected in the model calibration.

2.1 Data

Our calibration and estimation rely mainly on three public data sources. First, we use the Survey of Consumer Finances (SCF) to analyze the empirical composition of balance

[7] C and H denote total household consumption for all members. Absent consumption synergies, the term would scale with $1/N_{it}$ instead of $1/\sqrt{N_{it}}$. For example, one television can be used by multiple people.

sheets. Second, we use the Current Population Survey (CPS) to study the dynamics of wage earnings over the life cycle and over the business cycle. Lastly, we use the Medical Expenditure Panel Survey (MEPS) to calibrate the medical expenditure process.

Survey of Consumer Finances For household portfolio data, we use the Survey of Consumer Finances (SCF), a repeated cross-section of household finances in the United States. We use waves from 2016 to 2022 to calculate the moments of wealth and portfolios. We apply the SCF survey weights to adjust for the oversampling of high-wealth households. Because the SCF does not provide the genders of both the reference person and the spouse, we define the race of the household by its reference person alone. We also restrict the sample to households who are not business owners and are between 22 and 85 years old.

We define wealth using the SCF net worth variable (*networth*), which is the value of financial and non-financial assets, net of all debts.[8] Equity holdings (*equity*) are defined as the value of publicly traded stock, held either directly or through mutual funds, retirement accounts, trusts, or managed portfolios. Housing (*houses*) is defined as the value of the primary residence. The equity and housing shares are then defined as the shares of these variables in wealth, for households with positive wealth. The equity participation rate is the percentage of households with positive equity holdings. The conditional equity share is equity divided by net worth among only those households with positive equity holdings.

Current Population Survey To compare income profiles between Black and White households, we use the Current Population Survey (CPS). The CPS contains repeated cross-sections of labor force statistics in the U.S., including income and demographic information. We use the CPS waves from 1978 to 2021. We restrict our sample so that observations belong to the household's main family unit (*famunit=1*), the head of the family is between 22 and 65 years old, and the race is Black or White. The households must have at least one

[8] Financial assets (*fin*) includes liquid and quasi-liquid assets, certificates of deposit, directly held pooled investment funds, equity, bonds, whole life insurance, and other financial assets. Non-financial assets (*nfin*) includes vehicles, the value of residential real estate, net equity in nonresidential real estate, the value of business interests, and other non-financial assets. Debt (*debt*) includes mortgages and HELOCs for residential properties, credit card debt, installment loans, and other debt.

adult (the head). Wage income (*incwage*) is aggregated at the household level and scaled by the Social Security wage index (*SSWI*).

Medical Expenditure Panel Survey For medical expenditures, we use the Medical Expenditure Panel Survey (MEPS). The MEPS is a nationally representative survey that provides detailed information on medical expenditure, insurance coverage, and other health-related questions. Participants of MEPS are interviewed in five rounds over the course of two full calendar years. The longitudinal design allows us to examine the persistence of health shocks. We use waves from 1996 to 2022 and restrict our sample to adults aged 22 to 85. The main variable of interest is *exptot*, which captures the total medical expenditure incurred during the year.

2.2 Macroeconomic environment

Eleven parameters summarize the dynamics of stock-market returns, aggregate income shocks, and house prices. The estimation process and results follow from Catherine (2022).

Table 1 reports the result of the estimation. The house price growth rate (μ_p) is estimated using the 1977–2013 Case-Shiller indices, and the volatility (σ_p) is set to 14%, following Flavin and Yamashita (2002). The stock-market dynamics are characterized by the crash probability p_s, the expected returns during crashes and normal times (μ_s^- and μ_s^+), and the standard deviations in cyclical and noise components of returns (σ_{s_1} and σ_{s_2}). Aggregate income parameters include the growth rate μ_l, the sensitivity to stock and housing markets (λ_{ls} and λ_{lp}), and the standard deviation σ_l. These moments and correlation coefficients are estimated by SMM from yearly S&P 500 returns (1900–2015) and from average wage growth time series (1978–2010).

Table 1: Estimated Parameters: Market returns, aggregate income shocks, and house prices

Stock-market returns					Aggregate income shocks				House prices	
p_s	μ_s^-	μ_s^+	σ_{s_1}	σ_{s_2}	μ_l	λ_{ls}	λ_{lp}	σ_l	μ_p	σ_p
.146	-.245	.115	.077	.114	.008	.161	.053	.017	.01	.14

The table reports estimates for our return and aggregate-income processes. The S&P 500 log return in year t is $r_{st} = r_f + s_{1t} + s_{2t}$, where $s_{2,t} \sim \mathcal{N}(0, \sigma_{s_2}^2)$. With probability p_s, the stock market crashes in year t and $s_{1,t} = s_{1,t}^- \sim \mathcal{N}(\mu_s^-, \sigma_{s_1}^2)$. With probability $1 - p_s$, $s_{1,t} = s_{1,t}^+ \sim \mathcal{N}(\mu_s^+, \sigma_{s_1}^2)$. The log growth rate of aggregate wage index is $l_{1t} - l_{1,t-1} = \mu_l + \lambda_{ls} s_{1t} + \lambda_{lp} \epsilon_{pt} + \epsilon_{lt}$, where $\epsilon_{lt} \sim (0, \sigma_l^2)$. The estimation uses SMM and is detailed in Catherine (2022).

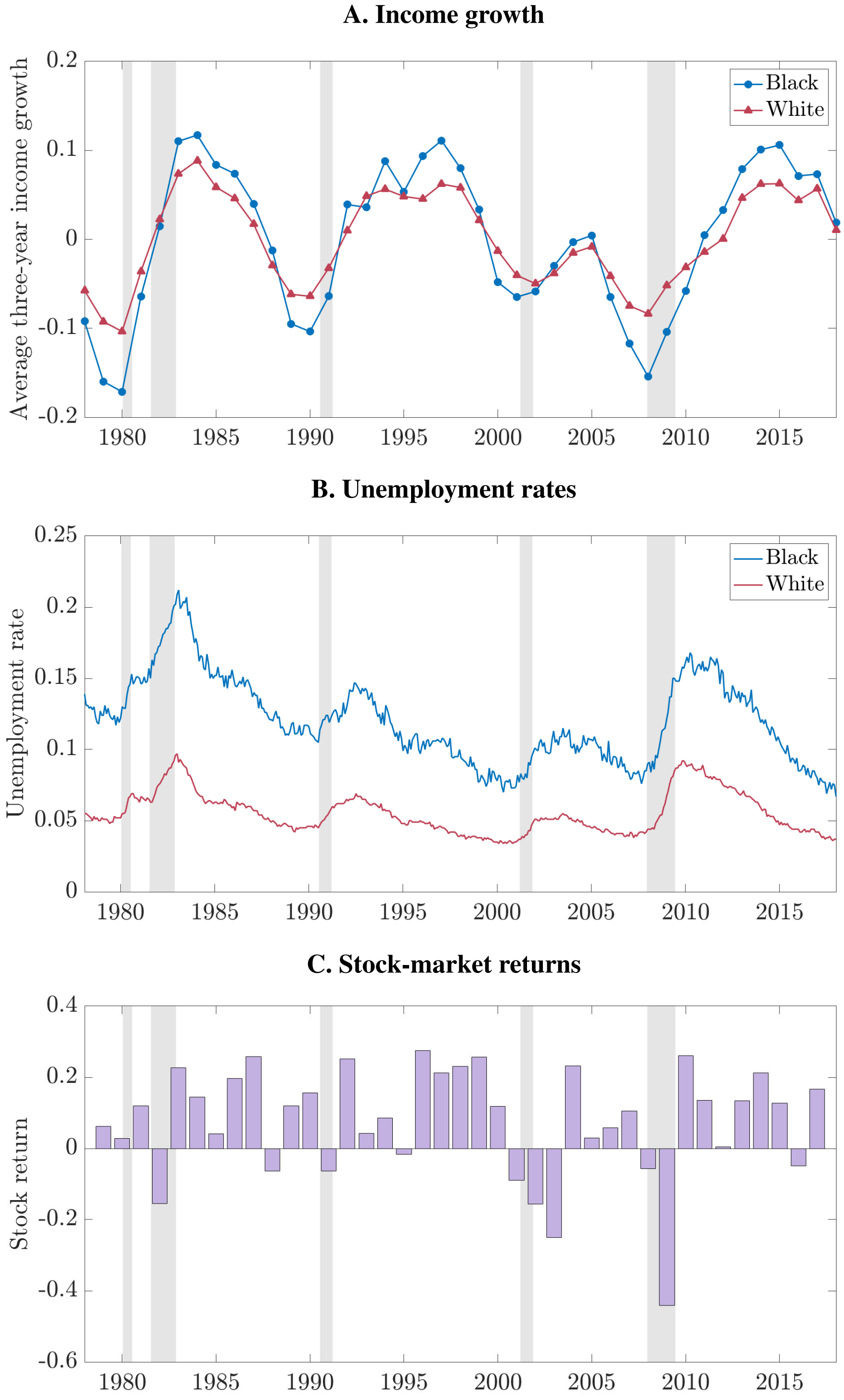
2.3 Differences in business-cycle exposure

We use income data from the CPS to measure the extent to which Black and White Americans experience differences in countercyclical income risk.

Panel A of Figure 2 plots average three-year income growth for each racial group. Average Black income is much more cyclical than White income, falling by more in recessions and rising by more in moderations. This suggests that, within the cross-section of Black households, income growth is more cyclically skewed.[9] These differences in the cyclicality of income arise largely from differences in unemployment rates, as illustrated by Panel B. The Black unemployment rate is not only persistently higher than the White unemployment rate, but also more countercyclical. It tends to rise by more (in percentage points) in recessions and fall by more in moderations. To showcase the consequence of these differential labor-income dynamics for equity investing and wealth returns, Panel C plots annual returns on the stock market over the same period. Evidently, returns are cyclical, falling when average income falls and unemployment rises.

[9] Ideally, one would measure cross-sectional skewness by racial group directly from a large panel of households. Unfortunately, such a panel does not exist. We therefore identify these moments by inferring them from group aggregates.

Figure 2: Cyclicality of labor income and the stock market



Panel A plots the three-year growth rate of average income for each racial group, demeaned by the group average. Panel B plots the Black and White unemployment rates. Panel C plots annual log returns on the S&P 500, assuming dividends are reinvested each month. NBER recessions are shaded in gray. Data for Panels A and B are from the Current Population Survey (CPS) and data for Panel C are from Robert Shiller's website.

2.4 Idiosyncratic income risk

We use eight parameters to describe the distribution of idiosyncratic labor-income shocks: p_z, ρ_z, $\overline{\mu_z^-}$, λ_{zl}, σ_z^-, σ_z^+, σ_η^-, and σ_η^+. Table 2 reports the estimated parameters for both single- and double-earner processes.

The labor-income process for single earners follows from Catherine (2022), which employs SMM to estimate parameters. This estimation targets the empirical moments of individual earnings growth from 1978 to 2010 using Social Security Administration data from Guvenen et al. (2014). Targeting the cross-sectional mean, variance, and skewness at 1-, 3-, and 5-year horizons allows for disentangling between transitory and persistent shocks. To address the overestimation of income persistence, potentially due to different life-cycle income profiles that workers face ex ante (Guvenen, 2009), parameters σ_α and σ_φ are introduced to capture heterogeneity in levels and trends.

For the double-earner income process, we first generate simulated data for couples using the single-earner process by randomly pairing two earners. We then recompute the target moments as the sum of both incomes, taking into account that the highest earner typically earns 70% of the combined salaries. Using SMM, we estimate the double-earner income process by targeting moments specific to double earners, analogous to the method used for single earners. The values of targeted and simulated moments are detailed in Appendix C.2.

Within a double-earner household, the probability of experiencing a significant career shock increases to $p_z = 0.188$, compared to $p_z = 0.136$ in a single-earner household. Since every earner is subject to this labor income shock, it is intuitive that it is more likely for households to experience this shock if there are two earners. However, due to diversification, the standard deviation of this shock for a double-earner household is nearly halved ($\sigma_z^- = 0.290$) compared to single earners ($\sigma_z^- = 0.562$). Similarly, the magnitude of a transitory shock under a large career shock also decreases from $\sigma_\eta^- = 0.895$ to 0.588. Additionally, diversification provides several benefits. First, it reduces the negative skewness of income shocks at the household level: $\overline{\mu_z^-}$ decreases from -0.086 to -0.031. Second, it reduces cyclicality, with λ_{zl} decreasing from 4.291 to 3.146.

Table 2: Estimated parameters: Idiosyncratic labor-income shocks

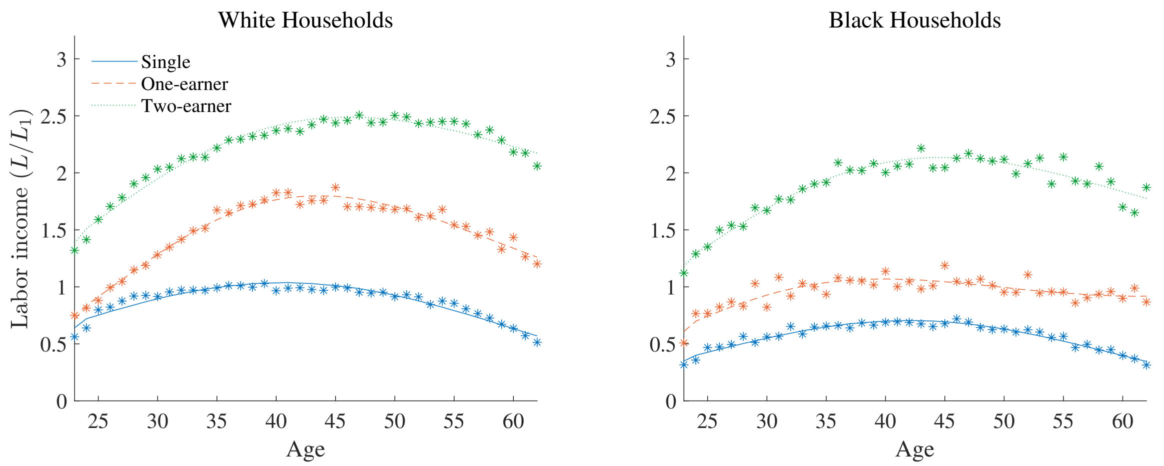
		Persistent shocks					Transitory shocks		Heterogeneous profiles	
Earners	p_z	ρ_z	$\overline{\mu_z^-}$	λ_{zl}	σ_z^-	σ_z^+	σ_η^-	σ_η^+	σ_α	σ_φ
Single	.136	.967	-.086	4.291	.562	.037	.895	.089	.280	.004
Double	.188	.984	-.031	3.146	.290	.047	.588	.113	.295	.024

This table reports parameter estimates for the idiosyncratic income process, conditional on the group-level aggregate shock. The single-earner process is estimated as in Catherine (2022) by targeting the time-series of cross-sectional moments of individual income log growth rates in the SSA administrative data from Guvenen et al. (2014). To estimate the double-earner process, we first simulate data for couples using the single-earner process and recompute the target moments using the sum of two incomes. We assume a 30% gap between the highest and lowest earner and no assortative matching. Appendix C.2 provides details regarding our estimation and reports the values of targeted and simulated moments.

2.5 Life-cycle income profiles

We estimate the deterministic income profiles f_{it} as a cubic polynomial of age, which we calibrate to match the observed mean income path of each race×family type in the CPS. We report the coefficients for each group in Appendix C.1. Figure 3 plots the fit of income profile using stochastic returns across age for six types of households.

Figure 3: Income profile fit



This figure reports, for each family type and race, the life-cycle profile of labor income, relative to the National Average Wage Index, in the CPS from 1978 to 2021 and in the model.

2.6 Health expenditures

We estimate the deterministic and stochastic components of health expenditures, (11) and (12), using the MEPS data. For each combination of race j and number of adults n_A, the deterministic component is a polynomial function of age. The persistence $\rho_\delta(j, n_A)$ and volatility $\sigma_\delta(j, n_A)$ of the autoregressive component are then inferred from the residuals. Persistence is similar between Black and White households, but volatility is higher for Black households, implying more uncertain and larger health expenditures.[10] Appendix C.3 reports coefficient estimates and gives details about the procedure.

2.7 Housing market

Preference for housing We calibrate preference for housing ν to be 0.3, following Catherine (2022).

Mortgage rate The mortgage rate R_{Mit} depends on a household's income, debt-to-value ratio, and race. Appendix C.4 provides details on this relationship. In SCF data, Black

[10]By Jensen's inequality, higher volatility of log expenditures increases the average expenditure in levels.

households pay on average 44 basis points more. Controlling for income and debt-to-value, Black borrowers still pay 23.7 basis points more than similar White households. Our estimate is close to the 29 basis-point estimate of Ghent et al. (2014).

Distress sales Kermani and Wong (2024) document that, during a distressed sale, Black and White homeowners sell their houses at a discount θ_j of 36.9% and 26.4%, respectively. Following Catherine et al. (2020), we set the liquid wealth share that households can access without selling their house to $\varpi = 0.024$.

Property tax We set property taxes to be 1.4% for White households, the median tax rate reported in Avenancio-León and Troup (2022), and 1.582% for Black households, reflecting their finding that Black households pay a 13% higher tax.

Other parameters We set the price-to-rent ratio χ_j at 24 for White homeowners and 16.9 for Black homeowners, to match that minority homeowners earn a 1.3% higher rental yield on housing (Diamond and Diamond, 2024).[11] Similar to Catherine (2022), the transaction cost c_H is 10%, the minimum house size coefficient $\kappa_{\min}$ is 1.75, and the maximum house size coefficient $\kappa_{\max}$ is 10 (a 10% down payment).

2.8 Demographic parameters

Family structures In a comparison limited to Black and White households, Black families represent 17% of the overall population. Table 3 categorizes households into six types of family structures and reports the proportions within each racial group.

Family size We model family size N_{it} as a cubic polynomial of household head's age. Appendix C.6 details the coefficients and the fit.

[11] Aaronson et al. (2021) find evidence that redlining led to persistently lower house prices and rents in predominately Black areas. These long-lived effects may in part explain these differences in house values.

Table 3: Family structure

	Single	Couple	
		One earner	Two Earners
Black	0.62	0.08	0.29
White	0.34	0.16	0.49

This table reports the within-race population share of three family types. We obtain this table using 2016 to 2022 SCF surveys and limit to individuals aged 30 to 50.

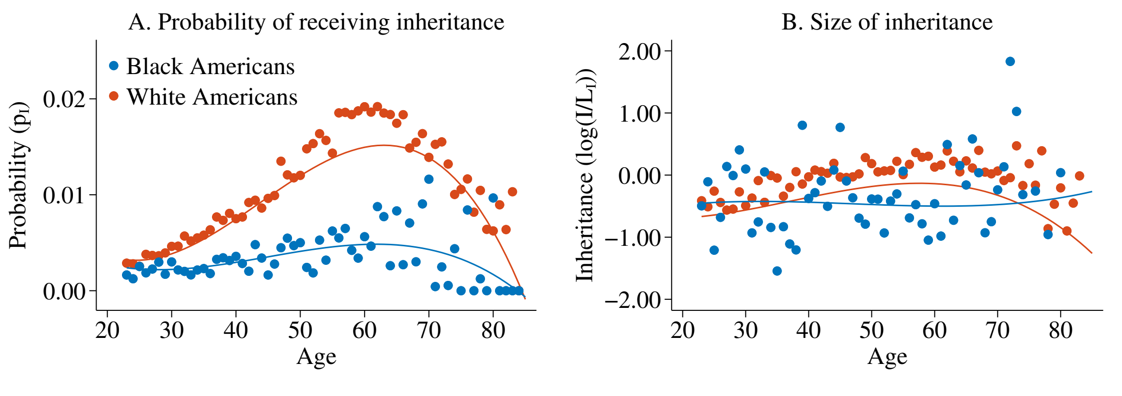
Mortality We use the National Vital Statistics Reports published by the Centers for Disease Control and Prevention (CDC) as our source of mortality rate by racial group and gender.

2.9 Other calibrated parameters

Inheritance The probability and conditional expected value of receiving an inheritance over the life cycle are estimated from regressions on age, race, and income using the SCF. Figure 4 plots the fitted values for both the average probability of inheritance receipt $p_I(a_t, j, \hat{y}_{it})$ and the average log inheritance size $\mu_I(a_t, j, \hat{y}_{it})$, normalized by the wage index, across age and race. Inheritances are both more frequent and, on average, larger for White households throughout most of the life cycle. We also find that the variance of log inheritance, $\sigma_I(j)^2$, is higher for White than for Black households. By Jensen's inequality, this greater variance further increases the expected inheritance in levels.[12] Full details of this calibration are provided in Appendix C.5.

[12] Within each racial group, inheritance amounts are approximately lognormal. Because of limited sample size, particularly among older households, we estimate the variances $\sigma_I(j)^2$ by race only.

Figure 4: Inheritance fit



This table plots the probability of receiving inheritance and the mean of log inheritances per adult for Black and White households from ages 23 to 85. Inheritances are normalized by the wage index. The points represent the empirical averages calculated from 1989–2022 SCF surveys, and the lines are fitted values.

Financial market We set the riskfree rate $r_{f\text{W}}$ to 1% for White households. For Black households, we use the estimate of Petach and Tavani (2021) that $R_{f\text{B}} = R_{f\text{W}} - 0.0055$, implying $r_{f\text{B}} \approx 0.45\%$. The combination of fees and capital income taxes totals to 2%.

3 Estimation and validation

This section presents the results of our structural estimation of the model. We validate the model by comparing non-targeted moments from the data to their simulated counterparts.

3.1 Estimation

We structurally estimate three parameters using the most recent three waves (2016, 2019, and 2022) of the SCF. The three parameters are the subjective discount factor β, the coefficient of relative risk aversion γ, and the participation cost c_π of entering the stock market. Three moment conditions identify these parameters:

1. *Mean wealth* – Average wealth identifies the discount factor β. As households become more patient, they save at higher rates and accumulate more wealth.

2. *Equity share of wealth* – The allocation of wealth to stocks is falling in risk aversion, identifying γ.

3. *Stock-market participation rate* – A higher stock-market participation cost c_π reduces the number of households willing to enter the stock market.

Table 4 reports the results of this estimation under two different approaches. The "Pooled" condition assumes that Black and White households have identical preferences and participation costs; accordingly, these estimates target pooled data moments. The pooled parameter estimates fall in a reasonable range: $\beta = 0.96$ and $\gamma = 6.0$. They agree with the estimates of Catherine (2022), for instance. Alternatively, the "White" and "Black" conditions separately estimate the three parameters for each racial group using race-specific data moments. Compared to White households, Black households have lower β and γ. Since, in the model, Black households have more precautionary savings (for instance, in response to countercyclical labor-income risks), we need a lower discount factor β to match the data. Panel B confirms that all three sets of estimates explain the data well.

Table 4: Estimated parameters and moments

Panel A: Estimated parameters

		Pooled	White	Black
β	Discount factor	0.956	0.968	0.942
		(.003)	(.004)	(.010)
γ	Relative risk aversion	6.014	6.129	4.959
		(.065)	(.073)	(.361)
c_π	Stock-market participation cost	0.026	0.026	0.022
		(.001)	(.001)	(.003)

Panel B: Identifying moments

	Model			SCF		
	Pooled	White	Black	Pooled	White	Black
Mean wealth	6.59	7.55	2.34	6.59	7.57	2.34
Cond. equity share	0.41	0.40	0.52	0.41	0.40	0.52
Participation rate	0.53	0.57	0.29	0.52	0.58	0.29

This table reports all estimated parameters and their identifying moments. Panel A presents the three structurally estimated parameters and their standard errors for Black and White households. Panel B lists the identifying moment conditions and compares the model-produced moments with the 2016–2022 SCF moments. The "Pooled" specification assumes the same parameters for Black and White households and targets moments from the joint population of Black and White households. Parameters are estimated using the algorithm of Catherine et al. (2024a).

3.2 Model fit

We validate the model by comparing additional dimensions of portfolio differences between Black and White households. First, we compare the model predictions for the composition of balance sheets by category of households and race. Second, we report the life-cycle profiles of wealth, stock holdings, homeownership rates, and housing shares for Black Americans in the model and in the data.

3.2.1 Balance sheet by race and household type

Table 5 reports average portfolio decisions in the data within the two racial groups using SCF waves from 2016 to 2022. We disaggregate these statistics by single-earner, double-earner, and retired households, and by homeowners and renters. Table 6 is the model-implied counterpart.

Despite targeting only three aggregated moments for each racial group, the model does remarkably well at explaining wealth and portfolio differences in the disaggregated data. Broadly, the model captures the fact that equity shares, housing shares, and wealth tend to be lower among single-earner households than among double-earner households, not only within racial groups but also within the subsets of renters and homeowners. While the model slightly underestimates the overall level of homeownership for both Black and White households, it correctly captures that White households are 55% more likely to be homeowners. The model also matches the fact that renters invest less in equity, which Catherine (2022) shows is difficult to explain without countercyclical labor-income risk. The model generates differences in wealth and portfolio choices between narrow subsets of Black and White households (e.g., double-earner homeowners). The model slightly underestimates the wealth of retirees, but this could be explained by the inclusion of a bequest motive without much consequence for the overall population or our main results.

The model slightly underestimates stock-market participation among renters. However, this discrepancy has limited quantitative implications for wealth accumulation. When renter equity shares are adjusted to match the data, lifetime wealth rises by less than 1% for both Black and White households. The effect is small because renters hold much less wealth than homeowners, and many eventually transition into homeownership, making the underestimation of renter equity shares only a temporary distortion over the life cycle.

The model also matches homeownership decisions within sub-groups, which is especially important for our objective of quantifying the relevance of housing-market differences. Black families are less likely to be homeowners than White families, and, within each racial group, double-earner households are less likely to rent. Conditional housing shares of the Black homeowner population are also very close, at 189% in the model and 181% in the data. The higher leverage of Black homeowners increases expected returns to wealth since returns to housing are higher than mortgage interest rates.

Finally, we report Social Security wealth—defined as the net present value of expected benefits net of future payroll taxes—in both the model and the data. Our computations follow Catherine et al. (2025). The presence of Social Security reduces workers' optimal saving rates, so it is important to model the program realistically in order to capture saving incentives accurately. We find similar net present values in the data and in the model.

Table 5: SCF statistics

	Black households				White households			
	Single earners	Double earners	Retirees	All	Single earners	Double earners	Retirees	All
Homeowners								
Population share	0.20	0.13	0.14		0.21	0.25	0.26	
Housing share	1.86	2.23	1.36	1.81	1.54	1.54	0.78	1.26
Equity share	0.17	0.32	0.06	0.18	0.22	0.31	0.19	0.24
Participation rate	0.47	0.59	0.25	0.44	0.63	0.79	0.63	0.69
Cond. equity share	0.36	0.53	0.25	0.41	0.35	0.39	0.30	0.35
Wealth	3.55	4.91	5.44	4.47	6.92	9.46	12.61	9.82
Renters								
Population share	0.36	0.10	0.07		0.15	0.07	0.05	
Equity share	0.12	0.17	0.03	0.12	0.21	0.25	0.12	0.21
Participation rate	0.15	0.23	0.05	0.15	0.30	0.35	0.23	0.30
Cond. equity share	0.82	0.74	0.60	0.79	0.72	0.72	0.49	0.69
Wealth	0.41	0.79	0.40	0.48	1.05	2.08	2.84	1.63
All								
Homeownership rate	0.36	0.55	0.66	0.47	0.58	0.78	0.85	0.73
Housing share	0.83	1.39	0.97	1.00	1.02	1.29	0.68	1.00
Equity share	0.14	0.25	0.05	0.15	0.22	0.29	0.18	0.23
Participation rate	0.27	0.43	0.18	0.29	0.49	0.69	0.57	0.58
Cond. equity share	0.53	0.58	0.28	0.52	0.45	0.43	0.32	0.40
Wealth	1.53	3.08	3.74	2.34	4.45	7.83	11.09	7.57
Social Security wealth	3.12	5.35	5.07	4.00	4.22	7.01	6.51	5.82

This table decomposes the balance sheets of Black and White households in the 2016–2022 SCF waves. We categorize each racial groups into single earners, double earners, and retirees. Wealth is scaled by the average wage index in the economy in the survey year. Social Security wealth is obtained from Catherine et al. (2025).

Table 6: Model statistics

	Black households				White households			
	Single earners	Double earners	Retirees	All	Single earners	Double earners	Retirees	All
Homeowners								
Population share	0.26	0.13	0.14		0.16	0.35	0.30	
Housing share	2.03	2.11	1.41	1.89	1.60	1.76	1.08	1.48
Equity share	0.21	0.41	0.29	0.28	0.18	0.35	0.25	0.28
Participation rate	0.40	0.71	0.65	0.54	0.46	0.74	0.79	0.70
Cond. equity share	0.52	0.57	0.45	0.51	0.39	0.48	0.32	0.40
Wealth	2.91	6.03	5.39	4.32	5.65	8.67	11.84	9.26
Renters								
Population share	0.31	0.06	0.11		0.07	0.07	0.01	
Equity share	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01
Participation rate	0.00	0.01	0.02	0.01	0.01	0.01	0.02	0.01
Cond. equity share	0.64	0.72	0.67	0.67	0.43	0.56	0.67	0.45
Wealth	0.11	0.19	0.35	0.17	0.25	0.40	0.35	0.45
All								
Homeownership rate	0.46	0.66	0.57	0.52	0.69	0.82	0.86	0.81
Housing share	0.93	1.40	0.80	0.99	1.09	1.45	0.94	1.19
Equity share	0.10	0.27	0.17	0.15	0.12	0.29	0.22	0.23
Participation rate	0.18	0.47	0.37	0.29	0.32	0.61	0.68	0.57
Cond. equity share	0.52	0.58	0.45	0.52	0.39	0.48	0.32	0.40
Wealth	1.39	4.05	3.22	2.34	3.96	7.21	10.34	7.55
Social Security wealth	1.87	5.36	4.53	3.18	3.00	6.59	6.98	5.89

This table reports the average model-implied balance sheets of Black and White households in different subgroups. The data are generated using the separate "Black" and "White" estimated parameters from Table 4. Social Security wealth is the net present value using the same discounting method as in Catherine et al. (2025) but with a discount rate of 1%. It is a model counterpart to Table 5.

3.2.2 Balance sheets of Black Americans over the life cycle

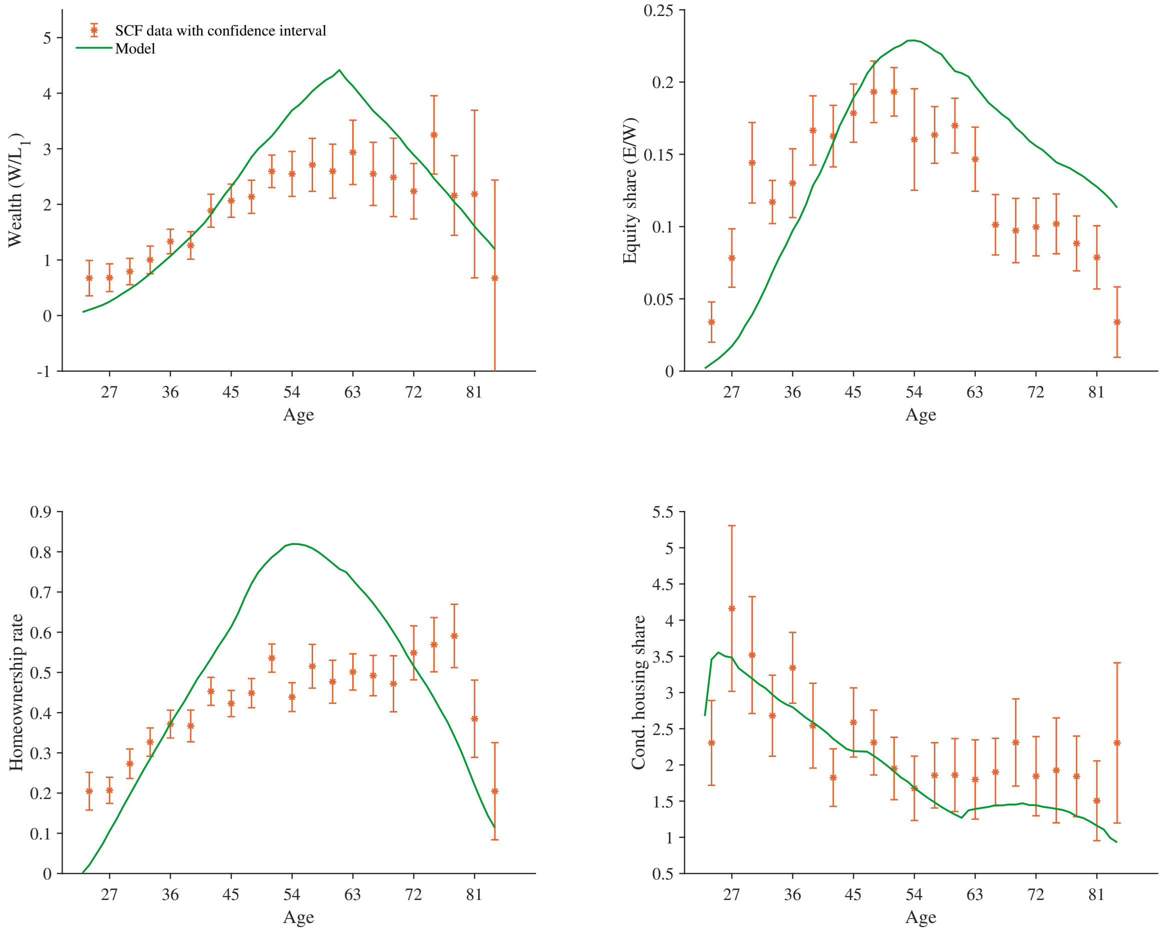
As a second way of validating the model, we consider the life-cycle profiles of Black wealth and holdings of different assets. Figure 5 plots these profiles for four key outcomes in the model and SCF data: wealth, equity share, homeownership rate, and conditional housing share. For all four series, the model generates quantitatively realistic life-cycle patterns.

We obtain the empirical life-cycle profiles of Black wealth and portfolios using SCF surveys from 1989 to 2022. We estimate life-cycle profiles after correcting for year and cohort effects using the methodology of Deaton and Paxson (1994), as detailed in Catherine (2022).[13]

We find that our model matches the evolution of wealth very well. Both in the model and in the data, wealth peaks around retirement and then decreases. Although our model does not specifically target housing moments, it also matches the life-cycle pattern of home-ownership rates and conditional housing share well. Both in the data and in the model, the value of the equity share increases with age until retirement, similar to Catherine (2022), and decreases afterwards.

[13] Specifically, we run ordinary least squares (OLS) regressions with the assumptions that year dummies sum to zero and are orthogonal to a time trend.

Figure 5: Life-cycle profiles of Black wealth and portfolios in the model and data



These figures plot Black households' life-cycle profiles of wealth, equity share, home ownership rate, and conditional housing share in the model and in the data. Our baseline sample excludes business owners, but former entrepreneurs are hard to identify in the retired population, creating a discontinuity around retirement age. To correct this problem, we adjust the SCF demographic weights for the probability of being an entrepreneur conditional on wealth. Specifically, we group Black households aged from 55 to 62 into 10 groups based on their wealth level and we calculate the probability of not being an entrepreneur within each wealth group. Lastly, we multiply retirees' demographic weights by this wealth-group conditional probability. We report 95% confidence intervals estimated by bootstrapping the data. Wealth is scaled by the national average wage index.

4 Discussion

4.1 Interpretation of heterogeneous discount factors

To fully account for the wealth differences between Black and White households, the estimated model requires a lower subjective discount factor β for Black households. This finding can be interpreted in several complementary ways.

The first interpretation takes the structural estimation at face value: Black households have a higher intrinsic preference for the present. In Appendix G.3, we use survey data from the Health and Retirement Study (HRS) and the Understanding America Survey (UAS) to assess this hypothesis. These surveys ask respondents about their willingness to trade today's money for future money at various interest rates, allowing us to infer their implied discount rates. Consistent with earlier evidence from Huffman et al. (2019), we find that Black respondents report having a greater preference for present cash flows. Importantly, these differences in effective subjective discount rates may reflect not only intrinsic time preferences but also the economic and social circumstances respondents face at the time of the survey.

A second interpretation is that this difference reflects not intrinsic impatience, but distinct social norms around consumption. For instance, Charles et al. (2009) document that minorities devote larger shares of their budgets to status goods. In a status-signaling model, households from lower-income reference groups must spend more on such goods to convey the same social standing. In this view, the lower estimated β captures behavioral patterns driven by social context rather than pure time preference.

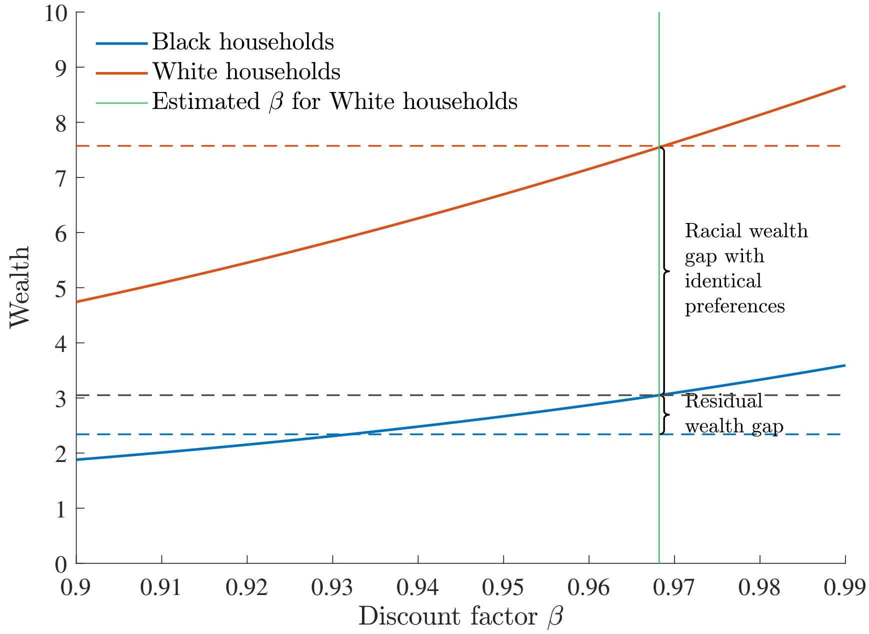
A third possibility is that lower β arises from cognitive discounting of the future, stemming from disparities in financial literacy or advice and confidence in making financial decisions. A large literature on economic decision-making shows that inattention to future states of the world leads to cognitive discounting, which in turn manifests as a lower effective discount factor (see, e.g., Gabaix (2014)). In our context, this inattention would arise naturally if households are either lacking in financial education and advice, in which case it may be more difficult to plan for future states; or if households feel discomfort making financial decisions, in which case they will choose to spend less time attending to future-oriented decisions. In Appendix G.2, we show empirically that Black households tend to report significantly less confidence making day-to-day financial decisions than White households of the same age, composition, and income, supporting this channel.

Finally, the estimated β differential may simply act as a residual term capturing omitted mechanisms that depress Black savings rates. To the extent that our model does not include all relevant economic or institutional frictions, these omitted channels will be absorbed into the estimated discount factor.

One final question that arises from heterogeneous discount factors is how much of the wealth gap is being explained by these differences in preferences versus the economic disparities we feed into the model. Figure 6 plots the average wealth of Black and White households under different values of β.[14] Along with these wealth curves, the figure plots the average levels of wealth in the data and the hypothetical level of Black wealth under the assumption that Black households have White discount factors. Two facts become clear from this comparative static. First, even when Black and White households have identical discount factors, economic disparities explain most of the wealth gap: the White-Black gap is $2.52\times$ with identical β compared to the full gap of $3.24\times$. The economic factors we consider therefore explain about $(2.52 - 1)/(3.24 - 1) = 68\%$ of the total wealth gap under identical preferences. Second, Black wealth is not very sensitive to the value of β: as we decrease β to values lower than the White estimate, Black wealth decreases relatively slowly. This is why the Black β must ultimately be non-negligibly lower.

[14]To make the comparison clear, we assume that both Black and White households have the same risk aversion γ and stock-market participation costs c_π, equal to the White estimates in Table 4. Households thus differ only in economic factors.

Figure 6: Comparative statics with respect to discount factor



This figure plots average wealth (as a multiple of the average wage) for Black and White households as a function of the subjective discount factor β. Both solid curves assume that Black and White risk aversion and equity participation costs are the same and equal to the "White" parameter estimates from Table 4. The green vertical line marks the estimated White subjective discount factor β_W from Table 4. The blue and red horizontal dashed lines show the empirical average wealth for White and Black households, respectively; the black dashed line between them shows the level of Black wealth implied by setting the Black subjective discount factor equal to the White subjective discount factor. The region labeled "Racial wealth gap with identical preferences" spans the wealth gap if Black households had White discount factors; the region labeled "Residual wealth gap" spans the portion of the wealth gap explained by a lower Black β.

4.2 Decomposing the sources of balance-sheet differences

We use the life-cycle model to decompose racial differences in portfolio composition and wealth into distinct economic channels, including the earnings gaps, income risk, distressed home sales, house prices, mortgage rates, property taxes, inheritances, race-specific returns, health expenditures, mortality, family structure, and preferences.

In the CPS data, the average Black household earns 51.7% of the income of the average White household. We are particularly interested in the portion of the wealth gap that cannot be attributed to this earnings disparity. To quantify it, we define the excess wealth gap as the difference in wealth-to-earnings ratios between White and Black households:

$$\chi = \frac{\overline{W}_{\mathrm{W}}}{\overline{L}_{\mathrm{W}}} - \frac{\overline{W}_{\mathrm{B}}}{\overline{L}_{\mathrm{B}}}, \tag{27}$$

where $\overline{W}_j$ and $\overline{L}_j$ are the average wealth and average earnings of racial group j.

To evaluate how much of the excess wealth gap is explained by a given economic factor F, we conduct a counterfactual experiment. Starting from the Black calibration ($F = F_{\mathrm{B}}$), we "turn off" factor F by setting its parameters to the White calibration ($F = F_{\mathrm{W}}$), while keeping all other parameters fixed at their Black values. We define this counterfactual excess wealth gap as $\chi(F; \mathrm{B})$, where the first argument denotes the calibration of factor F (either F_{B} or F_{W}) and the second argument indicates which group's calibration applies to all other parameters (B for Black, W for White). The contribution of factor F is then measured as the change in the wealth-to-earnings ratio relative to the excess wealth gap:

$$\Delta\chi(F; \mathrm{B}) = \frac{\chi(F_{\mathrm{B}}; \mathrm{B}) - \chi(F_{\mathrm{W}}; \mathrm{B})}{\chi}. \tag{28}$$

In words, $\Delta\chi(F; \mathrm{B})$ isolates the marginal effect of F on Black households, holding constant all other disparities.

We also compute the reverse experiment, in which we start from the White calibration and switch factor F to its Black value:

$$\Delta\chi(F; \mathrm{W}) = \frac{\chi(F_{\mathrm{B}}; \mathrm{W}) - \chi(F_{\mathrm{W}}; \mathrm{W})}{\chi}. \tag{29}$$

The difference between $\Delta\chi(F; \mathrm{W})$ and $\Delta\chi(F; \mathrm{B})$ captures the interaction effects of factor F with all other economic differences between the two groups.

Table 7 details the results of these experiments. Column (0) reports the total differences in portfolio composition and wealth between Black and White households. Each subsequent column turns off one channel at a time to quantify its individual contribution to

Black households' portfolio choices, wealth, and expected lifetime utility. The last three rows report the aggregate interaction terms, with the final row reporting $\Delta\chi(F; \mathrm{W})$ and $\Delta\chi(F; \mathrm{B})$, as discussed above.

Earnings gap Column (1) quantifies the effect of the earnings gap—the fact that Black workers earn substantially less labor income on average. Lower income directly limits wealth accumulation and indirectly reduces participation in asset markets. In our model, the earnings gap lowers the Black stock-market participation rate by 9.01 pp and the homeownership rate by 7.67 pp. These effects arise because fixed costs—such as the stock-market participation cost and the minimum house size—restrict access to these markets when income is low. We find that the earnings gap explains roughly 13% of the excess wealth gap. Because the excess wealth gap is defined relative to earnings, this result indicates that wealth grows proportionally more than earnings. This is explained in part by the fact that social programs benefit lower-income Americans more. If Black households earned the same as their White counterparts, they would need higher savings rates to prepare for retirement and self-insure against out-of-pocket medical expenditures and income fluctuations. Additionally, higher earnings raise excess wealth by increasing access to high-return asset markets (i.e., stocks and housing).

One potential mechanism not captured in our analysis is a non-homothetic bequest motive. If the willingness to leave bequests increases with income and wealth, closing the earnings gap could have an even larger impact on the excess wealth gap (Aliprantis et al., 2025).

Income risk Black workers face greater countercyclical income risk than White workers, and this affects the racial wealth gap through two opposing channels. On the one hand, because equity returns are procyclical, higher income risk discourages stock-market participation and reduces equity exposure. In the model, these effects lower stock-market participation by 4.25 percentage points and equity shares by 3.81 percentage points. Since equities outperformed other assets over the sample period, the smaller allocation to stocks widened the wealth gap. On the other hand, greater income volatility strengthens the precautionary saving motive, leading Black households to accumulate more wealth and thereby narrowing the gap. On net, the first channel dominates, so that higher income risk increases the (excess) racial wealth gap. However, this conclusion depends on the fact that recent equity returns were higher than the longer historical average.[15]

Income risk also interacts strongly with other economic factors. Its impact on wealth is amplified when Black households have higher wealth levels, for two reasons. First, the fixed cost of stock-market participation becomes less likely to bind, allowing for greater adjustments in portfolio choice. Second, reductions in equity shares then apply to larger portfolios. These amplification effects are again stronger in periods when equity returns exceed expectations, as they did over the past thirty years.

Distress sales Kermani and Wong (2024) document that Black households face a higher probability of distressed home sales and lower selling prices during distressed sales. While this channel intuitively reduces Black homeownership rates and housing shares, we find that it has a small effect on life-cycle portfolio choices and wealth accumulation. The reason is that, in the population, distressed sales are exceedingly rare. In a given year, they affect only the subset of households who get hit with an unemployment shock, currently own a home, and cannot wait to sell due to financial constraints. To be clear, our findings do not invalidate the empirical evidence presented in Kermani and Wong (2024). Rather, our model shows that explaining why households end up in situations in which they must sell their house in distress at a deep discount is difficult in a rational, dynamic setting.

House prices Diamond and Diamond (2024) document that Black households earn rental yields (rent-to-price ratios) that are 1.3 percentage points higher than those of White households. Because owning is relatively more affordable for them, Black households are more likely to purchase homes. In our model, this higher affordability raises Black homeown-

[15]Specifically, we find that, if asset returns had been as expected in our sample period, the net effect of income risk on Black wealth would have been positive, not negative. Appendix Table F.1 shows this by re-computing Table 7 assuming that the distribution of returns was as expected.

ership rates by 21.48 percentage points and conditional housing shares by 40.17 percentage points, implying that Black homeowners choose larger dwellings on average. Higher rental yields and housing shares also translate into substantially higher expected returns to wealth—by 2.02 percentage points.[16] This response to lower price-to-rent ratios increases average Black wealth by roughly $12,000 per adult (in 2022 dollars). As a result, lower house prices narrow the racial wealth gap, accounting for a sizable and negative share (-14.66%) of the existing excess wealth gap.

The interaction effect with other channels, however, is large and of opposite sign. If Black households were closer to their White counterparts in income and wealth, housing affordability would play a smaller role in enabling homeownership.

Mortgage rate and property taxes Columns (5) and (6) report the effect of higher mortgage rates and property taxes on Black households. Not surprisingly, these housing frictions reduce Black housing shares. These two frictions together lower the expected return on wealth by about one-third of a percentage point; their combined effect is even larger, about 1 pp. These frictions explain 0.8% and 2.2% of the excess wealth gap, respectively.

Inheritance On average, White Americans receive $88,000 per person in inheritance over their lifetime, almost five times as much as their Black counterparts. This inheritance gap explains roughly 15% of the racial wealth gap in excess of the earnings gap. If we model inheritance deterministically rather than stochastically, meaning that people know exactly when and how much they will receive, then the effect of the inheritance gap on the wealth gap is significantly muted. This is because individuals can adjust their savings in anticipation of the inheritance and will choose to save less for retirement when they know they will receive it later in life.

[16] The housing return used to compute total wealth returns includes the imputed rental yield on owner-occupied housing, as recommended by Diamond and Diamond (2024).

Race-dependent return Petach and Tavani (2021) estimate that Black households earn a 0.55 percentage points lower return on assets on average. This further reduces wealth returns because slower wealth accumulation makes it harder for Black households to enter high-return asset markets. The return difference decreases the Black homeownership rate by 5.76 percentage points and the housing share by 15.41 percentage points.

Health expenditures and mortality rates White households face higher health expenditures later in life and therefore have stronger incentives to save earlier in the life cycle. If Black households faced the same expected health costs, they would save slightly more, reducing the excess wealth gap by 5.6%. Health expenditures also exhibit sizable interaction effects with other economic factors, explaining an additional 7.5% of the gap. This occurs because changes in income, wealth, or other characteristics reduce eligibility for Medicaid and thereby increase the need to self-insure against medical expenses in retirement.

Finally, differences in mortality rates also contribute to the gap. If Black households had the same survival probabilities, they would save somewhat more to finance longer expected retirements, accounting for 2.9% of the excess wealth gap.

Family structure Differences in family structure—namely, the fact that more Black households tend to be single and/or have only one earner—reduce Black equity and housing shares. A primary reason for this is that a double income raises household wealth and makes entry into these markets more likely. Equity allocations are also lower for Black households because a single income is more exposed to countercyclical risk than two incomes, which are partially diversified against such shocks. The consequence of this is a 0.91% lower expected wealth return for Black households. To compute the share of the excess wealth gap explained by family structure, we make an adjustment to income when we shut off this channel to reflect the fact that creating more two-income Black households will mechanically increase income without necessarily leading to higher rates of wealth accumulation per person. Specifically, we adjust the wage so that the average wage per person remains the same after changing the family structure.

Preferences and overall effect of economic factors In the model, preferences account for 43% of the excess wealth gap and interact with other factors to generate an additional 11.7% of the gap. This implies that the remaining factors, taken together, explain 100% – 43% – 11.7% = 45.3% of the gap on their own. If we attribute half of the interaction effect to each side, preferences contribute about 49% in total, while the combined contribution of the other economic factors rises to roughly 51%.

General-equilibrium spillovers Importantly, Table 7 reports the effect of economic factors in partial equilibrium. In general equilibrium, changing mortgage rates and property taxes, for instance, may affect house prices for all households. Insofar as these spillovers exist, our decomposition will not capture them directly.[17] That said, these equilibrium effects are unlikely to be large, since we are taking a relatively small subset of the population (Black households) and making their conditions more like the majority (White households). In equilibrium, such changes are unlikely to substantially affect the majority group, and thus the aggregate economy, even if the effect is substantial within the smaller group.

4.3 Decomposing effects on wealth

Because households adjust their consumption and portfolios, economic disparities can have smaller effects on wealth than their direct cash flow effects would suggest. To illustrate this point, Table 8 decomposes the effect of selected economic channels into four parts: first, its (i) direct and (ii) indirect (i.e., post-transfer) cash flow effects, and then its effect induced by changes in (iii) portfolios and (iv) consumption choices.

To disentangle these channels, we compare simulated data from our baseline and counterfactual models. We reconstruct the evolution of each household's wealth, taking into account, in order, direct cash flow effects, changes in taxes and benefits, changes in portfolios, and changes in consumption. Specifically, we iterate over equation (24) and progressively replace baseline simulated variables with their counterfactual values. To establish general

[17] One should therefore take caution in using these results to design policy without also modeling equilibrium labor and housing markets.

Table 7: Effect of economic channels on Black balance sheet

	Effect of channel on Black households						
	(0) Black–White difference	(1) Earnings gap	(2) Income risk	(3) Distressed sale	(4) House price	(5) Mortgage rate	(6) Property tax
Balance sheet composition:							
Stock market part. (%)	−28.18	−9.01	−4.25	−0.03	−0.40	−0.14	−0.15
Equity share (%)	−7.89	−4.68	−3.81	−0.01	−1.29	−0.15	0.02
Cond. equity share (%)	11.68	−0.10	−4.93	0.01	−3.75	−0.26	0.35
Homeownership rate (%)	−28.27	−7.67	0.02	−0.05	21.48	−1.69	−1.84
Housing share (%)	−20.24	−9.46	2.40	−0.05	52.87	−5.98	−5.24
Cond. housing share (%)	41.03	8.35	4.52	0.09	40.17	−5.19	−3.28
Exp. return on wealth (%)	−1.10	−0.74	−0.23	0.00	2.02	−0.28	−0.33
Welfare:							
Welfare (%)		−10.95	−0.74	−0.03	8.14	0.01	0.01
Wealth, standalone effect:							
Wealth per adult	−2.55	−0.55	−0.05	0.00	0.19	−0.01	−0.03
Wealth per household	−5.20	−0.71	−0.07	0.00	0.24	−0.01	−0.04
Share of excess wealth gap (%)		13.14	4.10	0.20	−14.66	0.79	2.18
Wealth, interaction with other channels:							
Wealth per adult		−0.35	−0.24	0.00	−0.12	0.00	−0.02
Wealth per household		−0.85	−0.44	−0.01	−0.12	0.00	−0.04
Share of excess wealth gap (%)		−0.29	9.15	0.14	10.83	−0.29	0.25

This table decomposes the effect of each economic factor on Black households' portfolio composition, wealth, and welfare in the model. Column (0) reports the total difference between Black and White households; negative values indicate that the variable is lower for Black households. Columns (1) through (12) report the difference between a Black household and a counterfactual Black household in which the parameters associated with one economic factor are set to their White values. For example, column (1) compares Black households to otherwise identical Black households with the same earnings level as White households. Wealth is expressed in units of the national wage index. The expected return to wealth is the portfolio-weighted sum of returns on bonds, equities, housing, and mortgage costs. Housing returns can be further decomposed into changes in house prices, implicit rental yields, distress-sale costs, and property taxes. Welfare measures the change in lifetime consumption (in percentage points) associated with exposure to each factor; a negative welfare change indicates that the factor lowers equivalent lifetime consumption. Welfare gains are computed under the stochastic return specification (rather than actual historical returns).

Table 7: **Effect of economic channels on Black balance sheet, cont.**

	Effect of channel on Black households					
	(7) Inheritance	(8) Race-dep. return	(9) Health exp.	(10) Mortality rate	(11) Family structure	(12) Preference
Balance sheet composition:						
Stock market part. (%)	−1.55	−0.87	−0.75	−0.34	−8.19	9.61
Equity share (%)	−0.54	−0.15	−0.20	−0.21	−4.61	7.92
Cond. equity share (%)	0.86	1.02	0.65	−0.13	−1.07	15.63
Homeownership rate (%)	−0.27	−5.76	−0.74	−2.69	−5.41	−16.75
Housing share (%)	2.03	−15.41	0.23	−6.49	−12.03	−17.51
Cond. housing share (%)	4.82	−7.84	3.07	−2.58	−3.17	20.38
Exp. return on wealth (%)	0.01	−0.97	−0.01	−0.29	−0.91	−0.21
Welfare:						
Welfare (%)	−0.37	−0.19	0.06			
Wealth, standalone effect:						
Wealth per adult	−0.20	−0.12	−0.07	−0.04	0.19	−0.56
Wealth per household	−0.25	−0.15	−0.09	−0.04	−0.50	−0.71
Share of excess wealth gap (%)	15.33	8.96	5.59	2.93	−12.64	42.99
Wealth, interaction with other channels:						
Wealth per adult	−0.01	−0.08	−0.17	−0.01	0.01	−0.44
Wealth per household	−0.11	−0.20	−0.32	−0.02	−1.20	−1.00
Share of excess wealth gap (%)	−3.70	2.10	7.54	−0.59	0.88	11.71

The *standalone* wealth effects are obtained by turning off each economic factor while keeping all other model parameters at their calibration for Black households. The *interaction with other channels* is defined as the difference between the effect of an economic factor when all other parameters are calibrated for White households and the standalone effect. In column (2), the income risk channel is adjusted so that the expected wage remains constant when varying the volatility of log earnings.

results, we conduct this exercise using stochastic returns (as opposed to historical ones as in Table 8).[18]

The direct cash flow effects measure how much returning the direct monetary cost of each disparity to Black households increases their mean wealth. It is computed by adding this cost to the baseline level of income and iterating over equation (24), holding other variables at their baseline values. For example, in column (1), we increase Black workers' earnings to eliminate the racial wage gap. In columns (6) and (7), we adjust interest payments and property tax payments to what Black households would have paid on the same houses if there were no difference in loan terms or property tax rates. These direct cash flow effects compound over time based on baseline rates of return to wealth.

Indirect cash flow effects account for other changes in disposable income—taxes and benefits. For example, in column (1), if the racial earnings gap disappeared, part of the gains for Black workers would be offset by increases in taxes and losses of social benefits. Hence, in this case, indirect cash flow effects tend to moderate the negative effect of the earnings gap on the wealth gap.

In a third stage, we replace baseline housing choices and financial portfolio weights by their counterfactual values. The incremental change in mean wealth measures how economic factors increase Black households' wealth through portfolio rebalancing effects. For example, column (2) shows that the greater exposure of Black workers to countercyclical risk reduces their wealth by $0.145\times$ average income through that channel. As previously discussed, this is because exposure to the business cycle discourages investment in stocks.

Finally, in the last step, we replace the baseline consumption expenditure by its counterfactual value. For example, if the earnings gap disappeared, Black workers would not save all of their additional income: a large proportion would be consumed, attenuating the impact of the earnings gap on the wealth gap. Combined with the indirect effect, this means that, overall, closing the earnings gap raises Black wealth by roughly 30%, which is close in magnitude to the earnings gap itself. In column (2), we see that higher income risk in-

[18]Note that we cannot conduct this exercise for the family structure counterfactual, as this counterfactual would change the shares of household types in the population, as opposed to changing their environment.

creases wealth through precautionary savings: due to the increased desire to save a buffer stock, households do not consume the extra (indirect) income. Under stochastic returns, this effect dominates the portfolio effect, so income risk increases Black wealth.[19]

Overall, Table 8 demonstrates why studying the racial wealth gap in the context of a household's full life-cycle problem is important. After considering changes in portfolio and consumption behaviors, the net effect of disparities in economic factors on wealth are quite different, and often smaller, than their direct cash flow effects.

[19]By contrast, in Table 7, the portfolio channel dominates because we use actual returns from a period where stocks performed above the historical average.

Table 8: Decomposition of the wealth effect of economic disparities

	(1) Earnings gap	(2) Income risk	(3) Distressed sale	(4) House price	(5) Mortgage rate	(6) Property tax	(7) Inheritance	(8) Race-dep. return	(9) Health exp.
Direct cash flow effect	−4.440	0.000	0.000	0.000	−0.051	−0.125	−0.531	−0.478	0.036
Indirect income effect	1.316	0.333	0.000	−0.001	0.000	0.000	0.000	−0.001	0.000
Portfolio effect	−0.170	−0.145	0.001	0.209	0.020	0.032	0.009	0.075	−0.017
Consumption effect	2.573	−0.002	0.006	−0.011	0.021	0.063	0.298	0.280	−0.105
Total	−0.721	0.186	0.007	0.197	−0.010	−0.030	−0.224	−0.124	−0.086

This table decomposes the effect of each economic disparity on the mean wealth of Black households into four components: (i) the *direct cash flow effect*, obtained by adding the direct monetary loss from each disparity to baseline income; (ii) the *indirect income effect*, capturing the resulting changes in taxes and transfer benefits; (iii) the *portfolio effect*, reflecting adjustments in portfolio shares and housing choices; and (iv) the *consumption effect*, reflecting adjustments in consumption expenditures.

To identify these components, we use simulated data from the baseline specification and iterate over equation (24), which defines the evolution of wealth between t and $t + 1$. At each stage, we sequentially replace one element of the wealth accumulation equation with its counterpart from the relevant counterfactual simulation, while holding all other variables fixed.

(i) We first add the monetary cost of the economic disparity to baseline income, keeping taxes, consumption, and portfolio shares at their baseline values.

(ii) Next, we adjust income for the associated changes in taxes and transfers, again holding consumption and portfolio shares fixed.

(iii) We then replace baseline portfolio shares and housing choices with their counterfactual values to capture portfolio rebalancing effects.

(iv) Finally, we incorporate counterfactual consumption choices to account for behavioral adjustments in saving and spending.

At each step, we record the resulting change in average household wealth. This sequential replacement isolates how each mechanism—income, fiscal transfers, portfolio reallocation, and consumption—contributes to the total wealth effect of the disparity.

4.4 Pairwise interaction effects between economic factors

In the previous sections, we examined the impact of each economic factor both in isolation and in combination with all other factors. Here, we turn to pairwise interactions between mechanisms. Overall, these interactions are limited in magnitude, reinforcing a central insight of our analysis: interactions also generate offsetting effects. We illustrate this intuition with three representative examples, for which we provide further quantitative details in Appendix Table D.1.

Consider, for example, the interplay between family structure and income risk. Black families are more likely to rely on a single earner, which increases their exposure to unemployment risk during recessions. This lack of a secondary income source amplifies the adverse effect of countercyclical income risk on equity holdings and thus on returns to wealth. At the same time, it also strengthens the precautionary motive for saving, which works in the opposite direction. As a result, the net impact of this interaction on wealth accumulation is limited.

A second example is the interaction between the earnings gap and health risk. Due to the progressive nature of Medicaid, increasing Black earnings means that a larger share of Black households will no longer be covered by the program. On the one hand, this means that Black households will have higher out-of-pocket medical expenditures, making saving harder. But on the other hand, they will respond to this by increasing precautionary savings. Thus, the interaction is small. This is consistent with what we find in the next subsection.

One exception is when we consider an economic factor that households did not anticipate: for instance, the fact that the stock market performed better than average over the past three decades. We find that, given the actual distribution of returns over the past thirty years, Black workers' higher exposure to unemployment risk during recession lowered their wealth because the positive effect on precautionary savings was insufficient to fully offset the loss of returns from a lower equity share. However, when we consider more representative paths for stock returns, the net effect on wealth of higher income risk flips sign and the increase in precautionary savings now outweighs the lower return to wealth.

In other words, in the model, higher income risk for Black workers increased the racial wealth gap because stock returns were higher than expected over the past thirty years.

4.5 Role of Social Security and welfare programs

In previous sections, we decompose the effects on wealth of economic factors that are calibrated differently for Black and White households. Although progressive social programs such as Social Security, EITC, SNAP, and SSI serve Americans regardless of their racial groups, the benefits they offer depend on income and wealth, which themselves differ substantially between Black and White households. In this section, we explore whether the progressivity of Social Security and the existence of the social safety net contribute to the racial wealth gap.

Social Security benefits are concave in lifetime earnings and thus offer higher replacement rates to low earners. In our first experiment, we remove this progressivity by setting benefits at 40% of each individual's AIYE. As column (2) of Table 9 shows, since Black households typically have lower lifetime earnings and thus gain more from the progressive formula, eliminating it encourages them to save more to offset reduced retirement income, raising their wealth from 2.34 to 2.42 $\times$ the wage index. Conversely, White households receive higher benefits under the flat rate and, therefore, reduce savings, lowering their wealth from 7.55 to 7.47 $\times$ the wage index. Overall, Social Security's progressivity accounts for about 4% of the excess racial wealth gap.

In the second experiment, we cut benefits from safety net programs (SNAP and SSI) and the EITC by 90%. Black wealth rises by 15.3% and White wealth by 7.74%. Column (3) of Table 9 reports our findings. Since safety net programs serve as an insurance for low-income households against negative events such as unemployment, they reduce the need for precautionary savings. Moreover, their means-tested nature discourages low earners from saving so they can remain eligible. Consistent with the finding of Hubbard et al. (1995) and De Nardi et al. (2010), these effects are stronger for low-income Black households and thus exacerbate the racial wealth gap.

Finally, in column (4) of Table 9, we simultaneously remove Social Security progressivity and cut safety net and EITC benefits by 90%. Together, these changes explain about 4% of the excess racial wealth gap. Since lower-income Black households benefit from these social programs more, the reduction in progressivity and benefit levels encourages Black households to increase savings proportionally more than White households. This partially narrows the racial wealth gap relative to the baseline.

Overall, we conclude that the progressivity of these programs explains only a small part of the racial wealth gap. Importantly, Social Security taxes and replaces earnings only up to 2.5 times the national wage index. This means that, even under a non-progressive benefit formula, workers earning above that threshold must save more privately for retirement. Since these workers are disproportionately White, the existence of Social Security may have a larger effect on the racial wealth gap than what is implied by the progressivity of the benefit formula alone.

Table 9: Racial portfolio gap and social programs

	(1) Baseline			(2) Remove SS progressivity			(3) Cut SN and EITC by 90%			(4) All		
	B	W	B − W	B	W	B − W	B	W	B − W	B	W	B − W
Stock market part. (%)	28.58	56.76	−28.18	31.21	60.01	−28.80	28.27	58.55	−30.28	31.36	63.39	−32.03
Equity share (%)	14.73	22.61	−7.89	15.86	23.99	−8.13	13.36	22.26	−8.90	14.55	23.33	−8.78
Cond. equity share (%)	51.52	39.84	11.68	50.80	39.97	10.83	47.26	38.02	9.24	46.40	36.80	9.60
Homeownership rate (%)	52.30	80.56	−28.27	55.18	82.88	−27.71	57.90	88.43	−30.53	63.79	90.13	−26.34
Housing share (%)	98.61	118.84	−20.24	101.92	119.34	−17.42	90.12	119.79	−29.67	98.33	96.69	1.64
Cond. housing share (%)	188.55	147.52	41.03	184.71	143.98	40.73	155.66	135.46	20.20	154.15	107.28	46.87
	B	W	B/W	B	W	B/W	B	W	B/W	B	W	B/W
Wealth per adult	1.83	4.39	0.42	1.89	4.34	0.44	2.11	4.73	0.45	2.22	5.10	0.44
Wealth per household	2.34	7.55	0.31	2.42	7.47	0.32	2.70	8.14	0.33	2.83	8.78	0.32
Share of excess wealth gap (%)			0			4.11			6.81			4.00

This table presents the model-implied racial balance sheet and wealth under various social program scenarios. Scenario (1) is our baseline model, with real-life levels of Social Security, safety net, and EITC benefits. In scenario (2), we remove the progressivity of Social Security. Specifically, we replace baseline Social Security cash flow with 40% of lifetime income, measured by average indexed yearly earnings (AIYE) at age 60 defined in equation (14). In scenario (3), we cut down safety net and EITC programs by 90%; eligible households will receive only 10% of the baseline benefits. In scenario (4), we both remove the progressivity of Social Security and cut down safety net and EITC simultaneously. The term "share of excess wealth gap" refers to the portion of the wealth gap that cannot be explained by the income gap and is defined in equation (28).

5 Model extensions

We explore three more potential economic factors that could further contribute to the lower wealth accumulation of Black Americans: pessimistic beliefs about stock returns, inertia in mortgage refinancing, and a stronger preference for tangible assets, such as real estate. While these forces are likely present in the data, we omit them from our baseline model because they are difficult to calibrate directly.

5.1 Beliefs about returns

We first examine whether differences in subjective expectations of stock returns can explain part of the racial wealth gap. Such differences may arise from disparities in financial literacy or from distinct historical experiences with financial markets. Boerma and Karabarbounis (2023) highlight this mechanism for entrepreneurship, and similar reasoning may apply to stock market participation.

Appendix H provides suggestive evidence from the Health and Retirement Study (HRS) consistent with this hypothesis. However, the survey responses imply negative expected returns for both groups, which makes them unsuitable for calibration: if taken literally, no household would invest in equities. Moreover, because households cannot short sell stocks, the heterogeneity of beliefs would also be important to predict the average equity share. For these reasons, our baseline model assumes rational expectations.

To quantify the potential importance of beliefs, we re-solve the model for Black households under alternative expected stock returns, varying the mean of the stock return process (μ_s^+ and μ_s^-) while keeping all other parameters constant. We adjust only the ex-ante expectations under which portfolios are chosen, not the realized distribution of returns. Figure 7 (a) shows that more pessimistic beliefs about equity returns lower stockholding and, consequently, the rate of return on wealth. A one–percentage-point lower expected stock return increases the racial wealth gap by 6.3%.

5.2 Inertia in mortgage refinancing

Gerardi et al. (2023) document that White households are substantially more likely than Black households to refinance or move when interest rates fall. This refinancing inertia implies that Black homeowners pay persistently higher mortgage rates, even after controlling for observable characteristics. To quantify the potential effect of this inertia, we model a higher effective mortgage premium for Black households. Figure 7 (b) shows that a higher premium reduces wealth accumulation by discouraging homeownership and lowering average returns to housing. A one–percentage-point increase in the mortgage premium widens the racial wealth gap by 3.3%.

5.3 Preference for tangible assets

Evidence suggests that households have a preference for "tangible" assets such as housing. Gomes et al. (2021) argue that this preference strengthens when households view financial markets as less trustworthy or efficient. Given historical experiences in the U.S., Black households may plausibly exhibit greater mistrust in financial institutions, translating into a stronger preference for tangible assets.[20]

In our model, housing is the primary tangible asset. We therefore allow for a utility premium on owner-occupied housing:[21]

$$u(C, H, N) = \frac{1}{1-\gamma}\left(\frac{C^{1-\nu}\left[(1+\mathbb{I}_{\text{own}}\xi)H\right]^{\nu}}{\sqrt{N}}\right)^{1-\gamma}, \tag{30}$$

where $\mathbb{I}_{\text{own}}$ indicates homeownership and $\xi \geq 0$ measures the intensity of the tangibility preference. For example, with $\xi = 0.1$, a homeowner perceives their house as providing 10% more housing services than an equivalent rental unit.

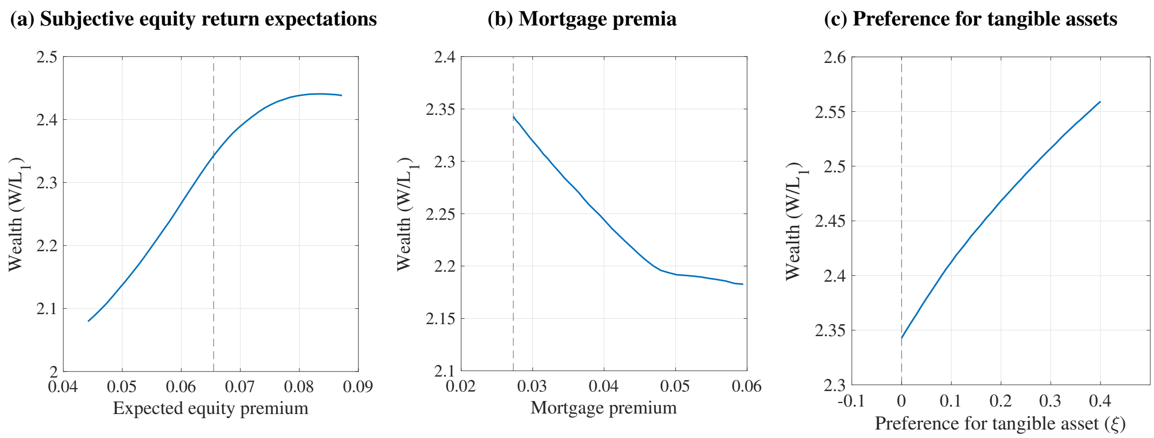
Figure 7 (c) shows that as ξ increases, wealth accumulation rises. The main mecha-

[20] Several historical episodes have fueled this distrust, including the collapse of the Freedman's Savings Trust (Osthaus, 1976) and the Tuskegee experiment (Alsan and Wanamaker, 2018).

[21] A tangible asset preference may also mean that households prefer to hold cash instead of interest-bearing assets. Insofar as this is the case, we will have captured this by assuming that Black households earn lower average riskless returns r_{fj}.

nism is that stronger tangibility preferences encourage households to save for and attain homeownership. Higher homeownership and leverage raise average wealth returns, since housing yields exceed mortgage rates. However, greater investment in housing crowds out equity holdings, which partly offsets this effect (Cocco, 2005; Yao and Zhang, 2005). On balance, the first channel dominates: with $\xi = 0.1$, the racial wealth gap shrinks by 2.8% relative to the baseline.

Figure 7: Black wealth under different frictions and beliefs



This panel shows how Black wealth varies with subjective expectations of the equity premium (the expected excess return on equities), inertia in mortgage refinancing, and preference for tangible assets (housing) ξ. In figure (a), we shift the mean of the stock return process (μ_s^-, μ_s^+) while keeping all other parameters fixed. Expectations, not realized returns, are altered. In figure (b), a higher mortgage premium reflects Black households' relative inertia in refinancing or moving to secure a lower mortgage rate. In figure (c), the tangibility preference enters utility as in equation (30). The vertical dashed lines marks the baseline calibration in each panel.

6 Conclusion

A large empirical literature has documented substantial differences in the economic factors between Black and White Americans. This paper studies the extent to which these disparities can account for differences in the size and composition of households' balance sheets. Our findings offer a nuanced perspective.

On the one hand, disparities in economic factors can fully explain the observed differences in portfolio composition between Black and White households. On the other hand, within a dynamic life-cycle framework, these same factors fail to fully explain the magnitude and persistence of the racial wealth gap. We identify a general rule: the direct effects of economic factors on wealth accumulation are substantially attenuated by households' endogenous adjustments in consumption and portfolio choices over time.

This insight highlights why the racial wealth gap remains a challenging empirical puzzle. A key takeaway from our structural analysis is that empirical studies of wealth inequality must account for these dynamic behavioral responses.

Importantly, we do not explore all of the many socioeconomic disparities documented in the broader literature. Our general insight is likely to apply to many of these disparities and our framework can be used to evaluate their effect on wealth in a dynamic setting.

Finally, and critically, wealth is not welfare. In our model, many economic disparities have limited consequences on the racial wealth gap because of offsetting forces. However, these forces do not offset the welfare cost of these disparities, which should remain the primary focus of policymakers.

References

Aaronson, Daniel, Daniel Hartley, and Bhashkar Mazumder, "The Effects of the 1930s HOLC "Redlining" Maps," *American Economic Journal: Economic Policy*, November 2021, *13* (4), 355—92.

Aiyagari, S. Rao, "Uninsured Idiosyncratic Risk and Aggregate Saving," *The Quarterly Journal of Economics*, 1994, *109* (3), 659–684.

Aliprantis, Dionissi, Daniel R. Carroll, and Eric R. Young, "The Dynamics of the Racial Wealth Gap," July 2025. Working paper.

Alsan, Marcella and Marianne Wanamaker, "Tuskegee and the Health of Black Men," *The Quarterly Journal of Economics*, 02 2018, *133* (1), 407–455.

Avenancio-León, Carlos F and Howard Troup, "The Assessment Gap: Racial Inequalities in Property Taxation*," *The Quarterly Journal of Economics*, 02 2022, *137* (3), 1383–1434.

Bach, Laurent, Laurent E. Calvet, and Paolo Sodini, "Rich Pickings? Risk, Return, and Skill in Household Wealth," *American Economic Review*, September 2020, *110* (9), 2703–47.

Banks, James, Richard Blundell, and Agar Brugiavini, "Risk Pooling, Precautionary Saving and Consumption Growth," *The Review of Economic Studies*, 2001, *68* (4), 757–779.

Bertola, Giuseppe, Luigi Guiso, and Luigi Pistaferri, "Uncertainty and Consumer Durables Adjustment," *The Review of Economic Studies*, 10 2005, *72* (4), 973–1007.

Betermier, Sebastien, Thomas Jansson, Christine Parlour, and Johan Walden, "Hedging labor income risk," *Journal of Financial Economics*, 2012, *105* (3), 622–639.

Boerma, Job and Loukas Karabarbounis, "Reparations and Persistent Racial Wealth Gaps," *NBER Macroeconomics Annual*, 2023, *37*, 171–221.

Bonaparte, Yosef, George M. Korniotis, and Alok Kumar, "Income hedging and portfolio decisions," *Journal of Financial Economics*, 2014, *113* (2), 300–324.

Carroll, Christopher D., "Buffer-Stock Saving and the Life Cycle/Permanent Income Hypothesis," *The Quarterly Journal of Economics*, 1997, *112* (1), 1–55.

Carroll, Christopher D. and Andrew A. Samwick, "How Important is Precautionary Saving?," *The Review of Economics and Statistics*, 1998, *80* (3), 410–419.

Catherine, Sylvain, "Countercyclical Labor Income Risk and Portfolio Choices over the Life Cycle," *The Review of Financial Studies*, 2022. hhab136.

Catherine, Sylvain, Max Miller, and Natasha Sarin, "Relaxing household liquidity constraints through social security," *Journal of Public Economics*, 2020, *189*.

Catherine, Sylvain, Max Miller, and Natasha Sarin, "Social Security and Trends in Wealth Inequality," *The Journal of Finance*, 2025, *80* (3), 1497–1531.

Catherine, Sylvain, Max Miller, James D. Paron, and Natasha Sarin, "Interest-rate risk and household portfolios," 2023.

Catherine, Sylvain, Mehran Ebrahimian, David Sraer, and David Thesmar, "Robustness Checks in Structural Analysis," 2024. Working paper.

Catherine, Sylvain, Paolo Sodini, and Yapei Zhang, "Countercyclical Income Risk and Portfolio Choices: Evidence from Sweden," *The Journal of Finance*, 2024, *79* (3), 1755–1788.

Charles, Kerwin Kofi and Erik Hurst, "The Transition to Home Ownership and the Black-White Wealth

Gap," *The Review of Economics and Statistics*, 2002, *84* (2), 281–297.

Charles, Kerwin Kofi, Erik Hurst, and Nikolai Roussanov, "Conspicuous Consumption and Race," *The Quarterly Journal of Economics*, 2009, *124* (2), 425–467.

Choukhmane, Taha, Jorge Colmenares, Cormac O'Dea, Jonathan Rothbaum, and Lawrence D.W. Schmidt, "Who Benefits from Retirement Saving Incentives in the U.S.? Evidence on Gaps in Retirement Wealth Accumulation by Race and Parental Income," 2024. Working paper.

Cocco, João F., "Portfolio Choice in the Presence of Housing," *The Review of Financial Studies*, 2005, *18* (2), 535–567.

d'Astous, Philippe and Stephen H. Shore, "Human capital risk and portfolio choices: Evidence from university admission discontinuities," *Journal of Financial Economics*, 2024, *154*, 103793.

Davis, Morris A., Andreas Lehnert, and Robert F Martin, "The Rent-price ratio for the aggregate stock of owner-occupied housing," *Review of Income and Wealth*, 2008, *54* (2).

De Nardi, Mariacristina, Eric French, and John B. Jones, "Why Do the Elderly Save? The Role of Medical Expenses," *Journal of Political Economy*, 2010, *118* (1), 39–75.

De Nardi, Mariacristina, Eric French, and John Bailey Jones, "Medicaid Insurance in Old Age," *American Economic Review*, November 2016, *106* (11), 3480–3520.

Deaton, Angus S. and Christina Paxson, "Saving, Growth, and Aging in Taiwan," in David Wise, ed., *Studies in the Economics of Aging*, National Bureau of Economic Research, 1994, pp. 331–362.

Derenoncourt, Ellora, Chi Hyun Kim, Moritz Kuhn, and Moritz Schularick, "Wealth of Two Nations: The U.S. Racial Wealth Gap, 1860–2020*," *The Quarterly Journal of Economics*, 09 2023, p. qjad044.

Derenoncourt, Ellora, Chi Hyun Kim, Moritz Kuhn, and Moritz Schularick, "Unemployment Risk, Portfolio Choice, and the Racial Wealth Gap," November 2024, (265).

Diamond, Rebecca and William Diamond, "Racial Disparities in the Total Rate of Return on Owner-Occupied Housing," 2024. Working paper.

Fagereng, Andreas, Luigi Guiso, and Luigi Pistaferri, "Firm-Related Risk and Precautionary Saving Response," *The American Economic Review*, 2017, *107* (5), 393–397.

Fagereng, Andreas, Luigi Guiso, and Luigi Pistaferri, "Portfolio Choices, Firm Shocks, and Uninsurable Wage Risk," *Review of Economic Studies*, 2018, *85* (1), 437–474.

Fagereng, Andreas, Martin Blomhoff Holm, Benjamin Moll, and Gisle Natvik, "Saving Behavior Across the Wealth Distribution: The Importance of Capital Gains," 2021. NBER Working Paper No. 26588.

Flavin, Marjorie and Takashi Yamashita, "Owner-Occupied Housing and the Composition of the Household Portfolio," *American Economic Review*, March 2002, *92* (1), 345–362.

Gabaix, Xavier, "A Sparsity-Based Model of Bounded Rationality," *The Quarterly Journal of Economics*, 09 2014, *129* (4), 1661–1710.

Ganong, Peter, Jones Damon, Pascal Noel, Diana Farrell, Fiona Greig, and Chris Wheat, "Wealth, Race, and Consumption Smoothing of Typical Labor Income Shocks," *Working paper*, 2023.

Gerardi, Kristopher, Paul S. Willen, and David Hao Zhang, "Mortgage prepayment, race, and monetary policy," *Journal of Financial Economics*, 2023, *147* (3), 498–524.

Ghent, Andra C., Rubén Hernández-Murillo, and Michael T. Owyang, "Differences in subprime loan pricing across races and neighborhoods," *Regional Science and Urban Economics*, 2014, *48*, 199–215.

Gomes, Francisco, Michael Haliassos, and Tarun Ramadorai, "Household Finance," *Journal of Economic*

Literature, September 2021, *59* (3), 919–1000.

Gourinchas, Pierre-Olivier and Jonathan A. Parker, "Consumption Over the Life Cycle," *Econometrica*, 2002, *70* (1), 47–89.

Greenwald, Daniel, Matteo Leombroni, Hanno N. Lustig, and Stijn van Nieuwerburgh, "Financial and Total Wealth Inequality with Declining Interest Rates," 2021. Stanford University Graduate School of Business Research Paper.

Gupta, Arpit, Christopher Hansman, and Pierre Mabille, "Financial Constraints and the Racial Housing Gap," 2024. Working paper.

Guvenen, Fatih, "An Empirical Investigation of Labor Income Processes," *Review of Economic Dynamics*, 2009, *12* (1), 58–79.

Guvenen, Fatih, Serdar Ozkan, and Jae Song, "The Nature of Countercyclical Income Risk," *Journal of Political Economy*, 2014, *122* (3), 621 – 660.

Hubbard, R. Glenn, Jonathan Skinner, and Stephen P. Zeldes, "Precautionary Saving and Social Insurance," *Journal of Political Economy*, 1995, *103* (2), 360–399.

Huffman, David, Raimond Maurer, and Olivia S. Mitchell, "Time discounting and economic decision-making in the older population," *The Journal of the Economics of Ageing*, 2019, *14*, 100121.

Kermani, Amir and Francis Wong, "Racial Disparities in Housing Returns," 2024. Working Paper.

Lynch, Anthony W. and Sinan Tan, "Labor income dynamics at business-cycle frequencies: Implications for portfolio choice," *Journal of Financial Economics*, 2011, *101* (2), 333–359.

Osthaus, Carl R., *Freedmen, Philanthropy, and Fraud: A History of the Freedman's Savings Bank*, Champaign, IL: University of Illinois Press, 1976.

Petach, Luke and Daniele Tavani, "Differential Rates of Return and Racial Wealth Inequality," *Journal of Economics, Race, and Policy*, 2021, *4*, 115–165.

Storesletten, Kjetil, Chris Telmer, and Amir Yaron, "Asset Pricing with Idiosyncratic Risk and Overlapping Generations," *Review of Economic Dynamics*, October 2007, *10* (4), 519–548.

Yao, Rui and Harold H. Zhang, "Optimal Consumption and Portfolio Choices with Risky Housing and Borrowing Constraints," *The Review of Financial Studies*, 2005, *18* (1), 197–239.

Zeldes, Stephen P., "Optimal Consumption with Stochastic Income: Deviations from Certainty Equivalence," *The Quarterly Journal of Economics*, 1989, *104* (2), 275–298.

INTERNET APPENDIX

A Details on empirical construction of racial wealth gap

A.1 Computation of the racial wealth gap

This section details the construction of Figure 1. Let W_{jt} denote the average net worth of households in racial group $j \in \{\mathrm{W}, \mathrm{B}\}$ at time t. The White-to-Black wealth gap is then the ratio $W_{\mathrm{W}t}/W_{\mathrm{B}t}$. Net worth includes the values of equity (E_{jt}), housing (H_{jt}), and mortgages (M_{jt}), as well as a residual for other assets for which we account below.[22]

For our counterfactual with equal portfolio shares, we need to compute (i) portfolio shares and (ii) returns on each asset between survey waves. Let $r_{k,t,t+3}$ denote the cumulative net return on asset k from year t to year $t+3$. By definition, average wealth must evolve as

$$W_{j,t+3} = W_{jt}\left(1 + \frac{E_{jt}}{W_{jt}} r_{E,t,t+3} + \frac{H_{jt}}{W_{jt}} r_{H,t,t+3} - \frac{M_{jt}}{W_{jt}} r_{M,t,t+3} + \theta_{j,t,t+3}\right), \tag{A.1}$$

where $\theta_{j,t,t+3}$ is a residual. We use this identity to first back out these residuals from the data. Then, to do our counterfactual, we compute Black wealth assuming everything about this identity remains the same except for the portfolio weights. In particular, the counterfactual black wealth equals

$$W^{\mathrm{CF}}_{\mathrm{B},t+3} = W^{\mathrm{CF}}_{\mathrm{B}t}\left(1 + \frac{E_{\mathrm{W}t}}{W_{\mathrm{W}t}} r_{E,t,t+3} + \frac{H_{\mathrm{W}t}}{W_{\mathrm{W}t}} r_{H,t,t+3} - \frac{M_{\mathrm{W}t}}{W_{\mathrm{W}t}} r_{M,t,t+3} + \theta_{\mathrm{B},t,t+3}\right), \tag{A.2}$$

starting from the initial condition $W^{\mathrm{CF}}_{\mathrm{B}t_0} = W_{\mathrm{B}t_0}$ in the first year t_0. The counterfactual White-to-Black wealth gap is then the ratio $W_{\mathrm{W}t}/W^{\mathrm{CF}}_{\mathrm{B}t}$.

[22] We depart from the notation in the main paper in this section to simplify exposition.

A.2 Data

We use real equity price data from Robert Shiller's website for equity returns $r_{E,t,t+3}$.[23] To compute housing returns $r_{H,t,t+3}$, we include both house-price growth and imputed rental yields. We use real residential property price in the United States (QUSR628BIS) from FRED for housing-price growth rates.[24] Rental yields come from Davis et al. (2008), who update the time series of rent-to-price ratios of owner-occupied housing in the U.S. starting in 1960 using Decennial Census of Housing (DCH) survey, which we extend to 2022 using the same method.[25] Finally, mortgage rates $r_{M,t,t+3}$ equal the 30-year fixed-rate mortgage average in the United States, adjusted for inflation.[26]

The variables W_t, E_t, H_t, and M_t above are listed as *networth*, *equity*, *houses*, and *mrthel* in the Survey of Consumer Finances (SCF) extract.

B Model appendix

B.1 SNAP eligibility criteria

As discussed in Section 1.4, SNAP-eligibility requires that the household pass two income tests.[27] The first is that "gross income" is lower than 130% of the poverty line for a family of that size. In reality, SNAP gross income includes both earned and unearned income, such as rental income and dividend and interest income. Since we do not model unearned income explicitly, we use SCF data and find that earned income is on average 85% of earned plus unearned income; hence, we model gross income as

$$L_{it}^{\mathrm{g}} \equiv \frac{L_{it}}{0.85}. \tag{B.1}$$

[23] https://shillerdata.com/, Access time: 06/12/2023.
[24] https://fred.stlouisfed.org/series/QUSR628BIS, Access time: 06/12/2023.
[25] https://www.aei.org/historical-land-price-indicators/, Access time: 06/12/2023
[26] https://fred.stlouisfed.org/series/MORTGAGE30US, Access time: 06/12/2023
[27] Note that most states do not have an asset test for SNAP after Broad-Based Categorical Eligibility (BBCE), so we consider only these two income criteria.

The poverty line for a family of size $N = n_A + n_C$ equals $\varrho(N)L_{1t}$ and takes the following values relative to the wage:

$$\varrho(N) = \begin{cases} 0.23 & \text{if } N = 1, \\ 0.32 & \text{if } N = 2, \\ 0.40 & \text{if } N = 3, \\ 0.48 & \text{if } N = 4, \\ 0.57 & \text{if } N = 5, \\ 0.65 & \text{if } N = 6, \\ 0.73 & \text{if } N = 7, \\ 0.81 & \text{if } N \geq 8. \end{cases} \tag{B.2}$$

Because we model the number of children n_C as a continuous variable over the life cycle, we linearly interpolate the poverty line between these points. The second test is that "net income" is below 100% of the poverty line. Net income is defined as

$$\begin{aligned} L^{\text{n}}_{it} \equiv L^{\text{g}}_{it} - \underbrace{d(N_{it})L_{1t}}_{\substack{\text{standard} \\ \text{deduction}}} - \underbrace{0.2L_{it}}_{\substack{\text{earned-income} \\ \text{deduction}}} \\ - \underbrace{\min\{0.1123L_{1t}, \max\{0, \text{Shelter}_{it} - 0.5 \times (L^{\text{g}}_{it} - d(N_{it})L_{1t} - 0.2L_{it})\}\}}_{\text{shelter deduction}}, \end{aligned} \tag{B.3}$$

which is gross income, less a standard deduction, earned-income deduction, and a shelter deduction. The standard deduction depends on family size as

$$d(N) = \begin{cases} 0.0333 & \text{if } N \leq 3, \\ 0.0346 & \text{if } N = 4, \\ 0.0404 & \text{if } N = 5, \\ 0.0463 & \text{if } N \geq 6, \end{cases} \tag{B.4}$$

where, again, we linearly interpolate between points for N. The shelter deduction defines shelter cost as either rent expense (for renters) or property tax and mortgage payments (for homeowners):

$$\text{Shelter}_{it} \equiv \begin{cases} X_{it} & \text{if renter,} \\ T^{\text{H}}_{it} + (R_{Mit} - 1)(P_t H_{it} - W_{it})^+ & \text{if homeowner.} \end{cases} \tag{B.5}$$

In words, net income deducts any shelter costs in excess of the household's post-standard-deduction income, up to a cap of 11.23% of the wage index.

If a household passes these income tests, then it receives size-dependent benefits $(b^{\text{SN}}(N_{it})L_{1t} - 0.3L^{\text{n}}_{it})^+$, where the maximum benefit percentage is given by

$$b^{\text{SN}}(N) = \begin{cases} 0.053 & \text{if } N = 1, \\ 0.087 & \text{if } N = 2, \\ 0.138 & \text{if } N = 3, \\ 0.176 & \text{if } N = 4, \\ 0.209 & \text{if } N = 5, \\ 0.250 & \text{if } N = 6, \\ 0.277 & \text{if } N = 7, \\ 0.316 & \text{if } N \geq 8, \end{cases} \tag{B.6}$$

with linear interpolation between points.

B.2 Details of Medicare and Medicaid

As described in the main text, Total medical benefits B^{M}_{it} are the sum of Medicare benefits B^{M1}_{it} and Medicaid benefits from being categorically needy B^{M2}_{it} or medically needy B^{M3}_{it}. In retirement, households pay the Medicare premium if they are not eligible for Medicaid

$$\Phi_{Mt} = \begin{cases} 0.03 n_A L_{1t} & \text{if } B^{\text{M2}}_{it} + B^{\text{M3}}_{it} = 0, \\ 0 & \text{if } B^{\text{M2}}_{it} + B^{\text{M3}}_{it} > 0, \end{cases} \tag{B.7}$$

and they receive benefits

$$B_{it}^{\mathrm{M1}} = 0.66 M_{it} \quad \text{if } t < t_{\mathrm{ret}}. \tag{B.8}$$

A household receives Medicaid benefits by way of being categorically needy if it meets the following criteria:

$$B_{it}^{\mathrm{M2}} = \begin{cases} M_{it} & \text{if } L_{it} \leq 1.38\varrho(N_{it}) L_{1t} \text{ and } t < t_{\mathrm{ret}}, \\ M_{it} - B_{it}^{\mathrm{M0}} & \text{if } B_{it}^{\mathrm{SN}} > 0 \text{ and } t \geq t_{\mathrm{ret}}, \end{cases} \tag{B.9}$$

where $\varrho(N)$ is the poverty line for a household of size N, defined in Appendix B.1. Alternatively, a household receives Medicaid benefits by way of being medically needy if it meets the following criteria:

$$B_{it}^{\mathrm{M3}} = \begin{cases} (M_{it} - (L_{it} - 0.104 L_{1t})^{+} - (W_{it} - P_t H_{it} - 0.3 L_{1t})^{+})^{+} \\ \qquad \text{if } B_{it}^{\mathrm{M2}} = 0, n_A = 1, \text{ and } t < t_{\mathrm{ret}}, \\ (M_{it} - (L_{it} - 0.141 L_{1t})^{+} - (W_{it} - P_t H_{it} - 0.564 L_{1t})^{+})^{+} \\ \qquad \text{if } B_{it}^{\mathrm{M2}} = 0, n_A = 2, \text{ and } t < t_{\mathrm{ret}}, \\ (M_{it} - B_{it}^{\mathrm{M1}} - (B_{it}^{\mathrm{SS}} - 0.104 L_{1t})^{+} - (W_{it} - P_t H_{it} - 0.3 L_{1t})^{+})^{+} \\ \qquad \text{if } B_{it}^{\mathrm{M2}} = 0, n_A = 1, \text{ and } t \geq t_{\mathrm{ret}}, \\ (M_{it} - B_{it}^{\mathrm{M1}} - (B_{it}^{\mathrm{SS}} - 0.141 L_{1t})^{+} - (W_{it} - P_t H_{it} - 0.564 L_{1t})^{+})^{+} \\ \qquad \text{if } B_{it}^{\mathrm{M2}} = 0, n_A = 2, \text{ and } t \geq t_{\mathrm{ret}}. \end{cases} \tag{B.10}$$

The total Medicare and Medicaid benefit is then $B_{it}^{\mathrm{M}} = B_{it}^{\mathrm{M1}} + B_{it}^{\mathrm{M2}} + B_{it}^{\mathrm{M3}}$.

B.3 Income tax rates and EITC

Federal income taxes In working life, the marginal income tax rates paid on labor income L_{it} are as follows:

$$\text{Marginal Tax Rate}_{it} = \begin{cases} 0.10 & \text{if } L_{it} < 0.18 L_{1t}, \\ 0.12 & \text{if } 0.18 L_{1t} < L_{it} < 0.72 L_{1t}, \\ 0.22 & \text{if } 0.72 L_{1t} < L_{it} < 1.54 L_{1t}, \\ 0.24 & \text{if } 1.54 L_{1t} < L_{it} < 2.94 L_{1t}, \\ 0.32 & \text{if } 2.94 L_{1t} < L_{it} < 3.73 L_{1t}, \\ 0.35 & \text{if } 3.73 L_{1t} < L_{it} < 9.32 L_{1t}, \\ 0.37 & \text{if } L_{it} > 9.32 L_{1t}. \end{cases} \tag{B.11}$$

In retirement, the exact same marginal tax rates and tax brackets are applied to Social Security benefits B_{it}^{SS} instead of labor income.

Medicare tax Medicare taxes in working life are determined according to the following thresholds, where k is number of earners:

$$T_{it}^{\text{M}} = \begin{cases} 0.029 L_{it} & \text{if } L_{it} \leq 3.135 L_{1t},\ k = 1, \text{ and } t < t_{\text{ret}}, \\ 0.029(3.135 L_{1t}) + 0.009(L_{it} - 3.135 L_{1t}) & \text{if } L_{it} > 3.135 L_{1t},\ k = 1, \text{ and } t < t_{\text{ret}}, \\ 0.029 L_{it} & \text{if } L_{it} \leq 3.918 L_{1t},\ k = 2, \text{ and } t < t_{\text{ret}}, \\ 0.029(3.918 L_{1t}) + 0.009(L_{it} - 3.918 L_{1t}) & \text{if } L_{it} > 3.918 L_{1t},\ k = 2, \text{ and } t < t_{\text{ret}}. \end{cases} \tag{B.12}$$

Earned Income Tax Credit (EITC) The Earned Income Tax Credit (EITC) provides a refundable benefit to low-income households. For a one-parent, one-child household, the EITC gives a benefit of 34 cents for each dollar of income earned up to 19% of the wage index. For income between 19% and 35% of the wage index, the benefit remains fixed at this level. Then, for each additional dollar of income earned beyond this amount, the benefit decreases by 16 cents, until a benefit of zero is received. In units of the wage index, this one-child benefit formula is[28]

$$B_{it}^{\text{EITC}} = \begin{cases} 0.34L_{it} & \text{if } L_{it}/L_{1t} < 0.19, \\ 0.065L_{1t} & \text{if } 0.19 < L_{it}/L_{1t} < 0.35, \\ (0.065L_{1t} - 0.16(L_{it} - 0.35L_{1t}))^{+} & \text{if } L_{it}/L_{1t} > 0.35. \end{cases} \tag{B.13}$$

For a two-parent, two-child household, the formula is

$$B_{it}^{\text{EITC}} = \begin{cases} 0.40L_{it} & \text{if } L_{it}/L_{1t} < 0.27, \\ 0.108L_{1t} & \text{if } 0.27 < L_{it}/L_{1t} < 0.45, \\ (0.108L_{1t} - 0.21(L_{it} - 0.45L_{1t}))^{+} & \text{if } L_{it}/L_{1t} > 0.45. \end{cases} \tag{B.14}$$

In the data (see Appendix Figure C.3), we find that, before retirement and regardless of race, the typical single-adult household ($n_A = 1$) has one child while the typical two-adult household ($n_A = 2$) has two children. Thus, which of the above formulas applies depends only on the state n_A.

B.4 Solving the model

To solve the model, we first rescale the household's problem to reduce its dimensionality. Denote variables scaled by the aggregate wage index with hats: $\hat{Z} \equiv Z/L_1$. To see how the problem rescales, we first note the following facts. First, the utility function can be rewritten in terms of scaled variables as

$$u(C_t, H_t, N_t) = L_{1t}^{1-\gamma} P_t^{-\nu(1-\gamma)} u(\hat{C}_t, \hat{P}_t H_t, N_t). \tag{B.15}$$

Likewise, the budget constraints scale so that

$$\hat{W}_{t+1} = (\hat{W}_t + \hat{Y}_t - \hat{C}_t - \hat{X}_t - \hat{\Phi}_{Ht} - c_\pi) R_{W,t+1} \frac{L_{1t}}{L_{1,t+1}}, \tag{B.16}$$

[28] The values in this formula correspond to the EITC in 2020, when the wage index was \$55,629.

where, for renters,

$$\hat{X}_t = \frac{\hat{P}_t H_t}{\chi_j} \tag{B.17}$$

and, for house sellers,

$$\hat{\Phi}_{Ht} = c_H \hat{P}_t H_t + (1-\theta_j)\mathbb{I}_{\zeta_{it}=\zeta_{it}^-}\hat{P}_t H_{t-1}. \tag{B.18}$$

The house size constraints can be rescaled

$$\hat{P}_t H_t \leq \kappa_{\max}\hat{W}_t \quad \text{and} \quad \hat{P}_t H_t \geq \kappa_{\min}. \tag{B.19}$$

Finally, the liquidity constraint can be rescaled

$$(\hat{Y}_t + \varpi\hat{W}_t - \hat{C}_t)\mathbb{I}_{\zeta_{it}=\zeta_{it}^-} \geq 0. \tag{B.20}$$

What is particularly important to note about these rescaled constraints is that they are all independent of the level of L_{1t} and, instead of depending on P_t, now depend on $\hat{P}_t H_t$ and $\hat{P}_t H_{t-1}$.

Because the utility function rescales as (B.15), a reasonable conjecture is that the value function can similarly be rescaled as

$$V(P_t, H_{t-1}, L_{1t}, z_t, \eta_t, \text{AIYE}_t, W_t) = L_{1t}^{1-\gamma}P_t^{-\nu(1-\gamma)}V(1, \hat{P}_t H_{t-1}, 1, z_t, \eta_t, \text{AIYE}_t, \hat{W}_t).$$

Henceforth, we will use the shorthand $V_t = L_{1t}^{1-\gamma}P_t^{-\nu(1-\gamma)}\hat{V}_t$. We prove this conjecture by induction. The conjecture is true at the maximum time period $t_{\max}$, since $V_{t_{\max}} = u_{t_{\max}}$, and so

$$\hat{V}_{t_{\max}} = u(\hat{C}_{t_{\max}}, \hat{P}_{t_{\max}} H_{t_{\max}}, N_{t_{\max}}).$$

For the induction step, suppose that the conjecture is true at time $t+1$ (i.e., $V_{t+1} =$

$L_{1,t+1}^{1-\gamma} P_{t+1}^{-\nu(1-\gamma)} \hat{V}_{t+1})$. Then

$$V_t = \max_{\{C_t, \pi_t, H_t, \mathbb{I}_{\text{own},t}\}} \left\{ L_{1t}^{1-\gamma} P_t^{-\nu(1-\gamma)} u(\hat{C}_t, \hat{P}_t H_t, N_t) + \beta \mathbb{E}_t \left[L_{1,t+1}^{1-\gamma} P_{t+1}^{-\nu(1-\gamma)} \hat{V}_{t+1} \right] \right\}. \tag{B.21}$$

Note that the maximum this function over $\{C_t, \pi_t, H_t, \mathbb{I}_{\text{own},t}\}$ is identical to the maximum over $\{\hat{C}_t, \pi_t, \hat{P}_t H_t, \mathbb{I}_{\text{own},t}\}$. Thus, we can change the arguments of the maximization and factor out $L_{1t}^{1-\gamma} P_t^{-\nu(1-\gamma)}$ to see that

$$\begin{aligned} V_t &= L_{1t}^{1-\gamma} P_t^{-\nu(1-\gamma)} \\ &\quad \times \max_{\{\hat{C}_t, \pi_t, \hat{P}_t H_t, \mathbb{I}_{\text{own},t}\}} \left\{ u(\hat{C}_t, \hat{P}_t H_t, N_t) + \beta \mathbb{E}_t \left[\left(\frac{L_{1,t+1}}{L_{1t}} \right)^{1-\gamma} \left(\frac{P_{t+1}}{P_t} \right)^{-\nu(1-\gamma)} \hat{V}_{t+1} \right] \right\} \\ &= L_{1t}^{1-\gamma} P_t^{-\nu(1-\gamma)} \hat{V}_t. \end{aligned}$$

The function collapsed into $\hat{V}_t$ is independent of L_{1t} and P_t, so the conjecture is also true at time t.[29] This proves the conjecture by induction.

C Calibration appendix

C.1 Income profile fit

We model the income profiles f_{it} as a cubic polynomial of age. There are six types of households, and Table C.1 reports the coefficients.

[29] To be more precise, $\hat{V}$ is independent of L_1 and P because, given the household's choices, both rescaled preferences and budget constraints are independent of L_1 and P. We changed the household's choice variables from C_t and H_t to $\hat{C}_t$ and $\hat{P}_t H_t$. Hence, given choices, the dynamic budget constraint (B.16) shows that the distribution of next period's rescaled wealth depends only on the time-t states in $\hat{V}_t$. Likewise, given choices, the rescaled housing constraints depend only on scaled wealth $\hat{W}_t$. Thus, this rescaled problem with rescaled choice variables yields identical policies to the original problem, but without explicit dependence on L_1 and P.

Table C.1: Coefficient estimates for income profiles

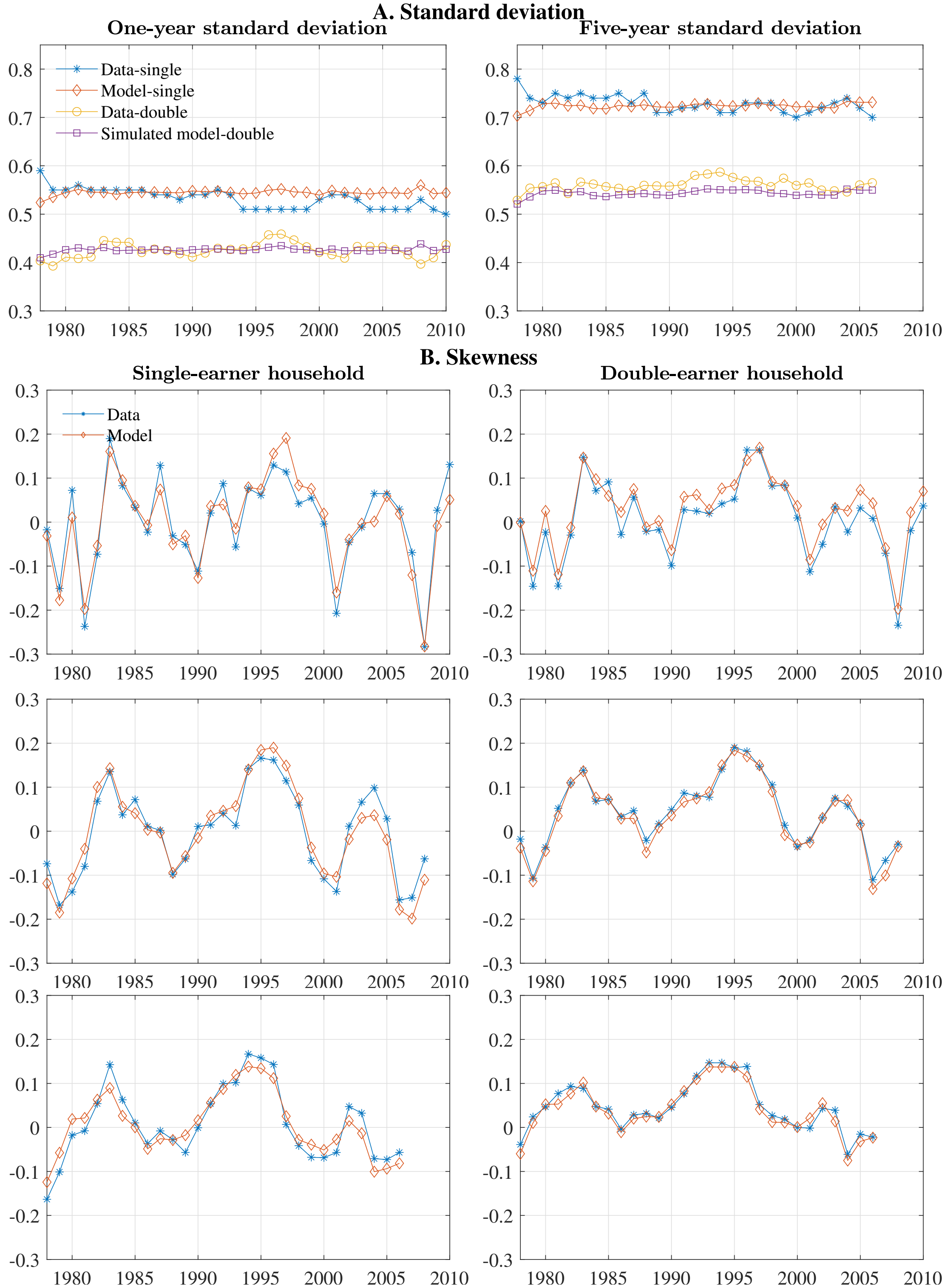
	Single (W)	One-earner (W)	Two-earner (W)	Single (B)	One-earner (B)	Two-earner (B)
age	-0.018	0.19	0.109	0.012	0.16	0.126
$\text{age}^2/10$	0.015	-0.03	-0.017	0.010	-0.036	-0.023
$\text{age}^3/100$	-0.002	0.001	0.001	0.002	0.002	0.001
Constant	-0.58	-3.28	-1.43	-1.64	-2.61	-1.69

This table reports the OLS coefficients of household size as a function of age. There are six categories of households. We use CPS from 1978 to 2021 to obtain the results.

C.2 Estimation of income process

Figure C.1 presents the values and fit of targeted and simulated moments from the estimation of the idiosyncratic labor income shocks. Single-earner's income processes are targeted on empirical cross-sectional moments from Social Security Administration data computed by Guvenen et al. (2014). We generate simulated data for couples using simulated single earner process. Then, we compute cross-sectional moments from the simulated double-earners' data and use those moments as targeting moments.

Figure C.1: Fitness of idiosyncratic labor income risk model



This figure reports the empirical and simulated values of moments targeted in the idiosyncratic labor income risk process. The cross-sectional empirical moments of the distribution of labor income log growth are from (Guvenen et al., 2014). We generate cross-sectional moments for double-earners from simulated data for couples. Panel A reports the fit of the standard deviation for one- and five-year horizon for single- and double-earner households. Panel B reports the fit of the skewness for one-, three-, and five-year horizon. The results for single- and double-earner households are presented on the left and right side, respectively.

C.3 Medical expenditure

We estimate the process for medical expenditures in two steps. First, to estimate the deterministic component $g(a_t, j, n_A)$, we run the regressions

$$\log M_{it} = \beta_0(j, n_A) + \beta_1(j, n_A)a_{it} + \beta_2(j, n_A)\frac{a_{it}^2}{10} + \beta_3(j, n_A)\frac{a_{it}^3}{100} + \delta_{it}, \tag{C.1}$$

for each combination of race and age $(j, n_A) \in \{\mathrm{B}, \mathrm{W}\} \times \{1, 2\}$. Panel A of Table C.2 reports the coefficient estimates.

Table C.2: Coefficient estimates for medical expenditure

	White		Black	
	One adult	Two adults	One adult	Two adults
Panel A: Deterministic component				
Age	−0.059	−0.138	−0.085	−0.175
	(0.006)	(0.007)	(0.011)	(0.020)
Age^2 / 10	0.017	0.033	0.022	0.040
	(0.001)	(0.001)	(0.002)	(0.004)
Age^3 / 100	−0.001	−0.002	−0.001	−0.002
	(0.0001)	(0.0001)	(0.0001)	(0.0003)
Constant	−2.897	−1.350	−2.564	−0.954
	(0.100)	(0.116)	(0.177)	(0.316)
Observations	104,464	123,498	38,377	17,101
Adjusted R^2	0.143	0.179	0.118	0.146
Panel B: Stochastic component				
ρ_δ	0.5381	0.4953	0.5430	0.4768
σ_δ	0.9399	0.9837	0.9651	1.0218

The table reports estimates for the health expenditure process by race and number of adults. The data source is the 1996–2022 Medical Expenditure Panel Study (MEPS). Panel A reports the result of OLS regression of log medical expenditure on age. Panel B reports the persistence and volatility of the residuals from these regressions.

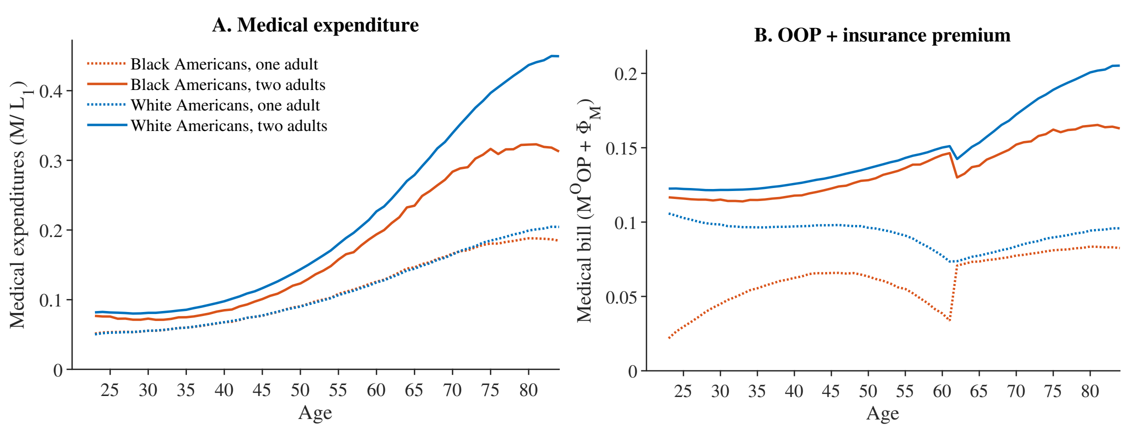
Second, we take the residuals $\delta_{it} = \log M_{it} - \log \hat{M}_{it}$ and directly compute estimators for the persistence and volatility of the stochastic component. Specifically, we invert the two moments var$(\delta_{it}|j, n_A)$ and var$(\delta_{i,t+1} - \delta_{it}|j, n_A)$ to get

$$\rho_\delta(j, n_A) = 1 - \frac{\text{var}(\delta_{i,t+1} - \delta_{it}|j, n_A)}{2\text{var}(\delta_{it}|j, n_A)}, \tag{C.2}$$

$$\sigma_\delta(j, n_A)^2 = \text{var}(\delta_{it}|j, n_A)(1 - \rho_\delta(j, n_A)^2). \tag{C.3}$$

Panel B of Table C.2 reports these values. Figure C.2 A shows model-simulated medical expenditures incurred by Black and White American households over the life cycle. Figure C.2 B displays the total medical bill, defined as the sum of out-of-pocket medical payments and insurance premiums. The discontinuity around retirement arises from switching from private insurance to Medicare and from tighter Medicaid eligibility at retirement. For higher-earning two-adult households, the total medical bill declines at retirement because Medicare premiums are lower than private insurance premiums. In contrast, low-earning single Black households are more likely to rely on Medicaid. As Medicaid eligibility tightens at retirement, many become ineligible and face higher medical costs. The hump-shaped pattern in medical expenditures during working years also reflects Medicaid eligibility: younger and older workers are more likely to receive Medicaid coverage, while middle-aged households are more likely to rely on private insurance.

Figure C.2: Distribution of health costs in model



These two figures show the distribution of model-simulated total medical expenditures incurred and medical bill paid (including out-of-pocket payment and insurance premium) for White and Black households by the household head's age. Out-of-pocket payments represent the amounts households pay after coverage from private insurance, Medicare, and Medicaid.

C.4 Mortgage spread

We estimate the mortgage spread as a function of a household's wage-indexed income, debt-to-value ratio, and race. Specifically, we run the regression[30]

$$\log(R_{M,it} - R_{ft}) = \beta_0 - \beta_1 \log(\text{income}_{it}) + \beta_2 \mathbb{I}_{\mathrm{B}it} + \beta_3 \log\left(\frac{\text{debt}_{it}}{\text{value}_{it}}\right),$$

where $\mathbb{I}_{\mathrm{B}it}$ equals one if the household is Black. Table C.3 reports the main results (specification (4)), along with results for each individual regressor.

We use all waves of SCF surveys from 1989 to 2022 to estimate the coefficients. Our analysis is restricted to White or Black households that own only one residential property. The mortgage spread is defined as the ratio between the weighted average of initial mortgage and refinancing rates and the 10-year Treasury bill rate. We scale household income, which is the sum of labor income and benefits including Social Security, by the wage index. Debt-to-value is calculated as the sum of initial mortgage and refinancing amounts divided by initial price of the property.

Table C.3: Coefficient estimates for mortgage spread

	(1)	(2)	(3)	(4)
Log income	−0.119			−0.110
	(0.005)			(0.005)
Log debt-to-value		0.075		0.070
		(0.007)		(0.007)
Race (Black)			0.157	0.111
			(0.011)	(0.011)
Constant	0.723	0.685	0.660	0.710
	(0.004)	(0.003)	(0.004)	(0.005)
Observations	47,505	48,562	48,677	47,404
Adjusted R^2	0.014	0.002	0.004	0.015

The table reports the result of regression of the log mortgage spread on log income (scaled by the wage index), log debt-to-value ratio, and a race indicator (0 if White and 1 if Black). The data include 12 waves of SCF surveys from 1989 to 2022. Standard errors are reported in parentheses.

[30] Note that, in the data, we estimate mortgage spreads relative to the riskfree rate. In the model, differences in implicit riskfree rates (i.e., $r_{f\mathrm{B}} < r_{f\mathrm{W}}$) are an additional, separate spread over these estimates.

C.5 Inheritance

The SCF asks respondents about their three largest inheritances received and the years in which they received them. Using this information, we compute the probability and the cross-sectional distribution of inheritances that Black and White households receive at each age. The probability $p_I(a_t, j, \hat{y}_t)$ and conditional mean inheritance size $\mu_I(a_t, j, \hat{y}_t)$ are polynomials of age a_{it}, race j, and log income $\hat{y}_{it}$, defined in the data as either labor income or Social Security benefits. Let $\mathbb{I}_I$ and $\mathbb{I}_{\text{B}}$ denote indicators that equal one if the household received inheritance and is Black, respectively. The regression for the probability of receiving inheritance is then

$$\mathbb{I}_{Iit} = \beta_0+\beta_1 a_{it}+\beta_2 \frac{a_{it}^2}{10}+\beta_3 \frac{a_{it}^3}{100}+\beta_4 \mathbb{I}_{\text{B}it}+\beta_5 a_{it}\times\mathbb{I}_{\text{B}it}+\beta_6 \frac{a_{it}^2}{10}\times\mathbb{I}_{\text{B}it}+\beta_7 \frac{a_{it}^3}{100}\times\mathbb{I}_{\text{B}it}+\beta_8 \hat{y}_i+\varepsilon_{Iit},$$

and the regression for the mean of log inheritance, conditional on receiving it, is analogous, with $\log I_{it}^+$ as the dependent variable. The variance $\sigma_I(j)^2$ of log inheritance, conditional on receiving it, is simply estimated by race, using the residuals from the regression on $\log I_{it}^+$. Table C.4 reports the results of these two regressions.

C.6 Family size

We model family size as polynomial of household head's age. We categorize Black and White households into single adult, two adults with one earner, and two adults with two earners, resulting in 6 types of households. We use the CPS from 1978 to 2021 to obtain the family size profile. Table C.5 reports the model coefficients from OLS regression. Figure C.3 plots the distribution of household size over age for the six types of households.

Table C.4: Coefficient estimates for inheritance profiles

	Probability p_I	Mean μ_I	Volatility σ_I
age (a)	-0.0019	-0.049	
	(0.0001)	(0.020)	
Black ($\mathbb{I}_{\mathrm{B}}$)	-0.0128	-0.521	1.58
	(0.0033)	(1.130)	(0.0234)
age $\times\, \mathbb{I}_{\mathrm{B}}$	0.0012	0.087	
	(0.0002)	(0.078)	
age$^2/10$	0.0005	0.0189	
	(0.0000)	(0.0042)	
(age$^2/10) \times \mathbb{I}_{\mathrm{B}}$	0.0002	-0.0088	
	(0.0000)	(0.0167)	
age$^3/100$	-0.0004	-0.0017	
	(0.0000)	(0.0003)	
(age$^3/100) \times \mathbb{I}_{\mathrm{B}}$	-0.0001	0.0006	
	(0.0000)	(0.0012)	
Income ($\hat{y}$)	0.0001	0.108	
	(0.0000)	(0.008)	
Constant	0.0237	-0.326	1.72
	(0.0013)	(0.307)	(0.0062)
Observations	5,007,370	40,715	
R^2	0.0026	0.0172	

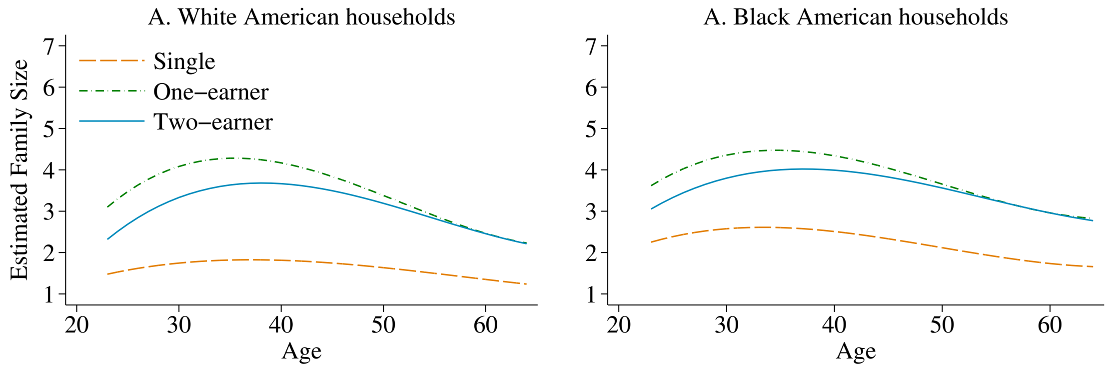
This table reports OLS estimates for the probability of receiving inheritance (p_I) and the average log inheritance amount (μ_I), modeled as polynomials of age, race, and income. Income $\hat{y}$ is defined as either labor income in working life and Social Security benefits in retirement. The indicator $\mathbb{I}_{\mathrm{B}}$ equals 1 if the household is Black. Standard errors are in parentheses.

Table C.5: Coefficient estimates for household size

	White households			Black households		
	Single	One-earner	Two-earner	Single	One-earner	Two-earner
age	0.20	0.90	0.75	0.37	0.75	0.59
	(0.04)	(0.06)	(0.07)	(0.06)	(0.09)	(0.07)
age$^2/10$	-0.04	-0.19	-0.15	-0.08	-0.17	-0.12
	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)
age$^3/100$	0.002	0.13	0.009	0.006	0.01	0.008
	(0.0007)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Constant	-1.33	-8.92	-8.05	-2.49	-6.18	-5.03
	(0.54)	(0.78)	(0.97)	(0.74)	(1.23)	(0.09)
Observations	42	42	423	42	42	42
Adjusted R^2	0.88	0.98	0.95	0.93	0.93	0.93

This table reports the OLS coefficients of household size as a function of age. There are six categories of households. We use the CPS from 1978 to 2021 to obtain the results. Standard errors are reported in parentheses.

Figure C.3: Distribution of household size



These two figures show the implied distribution of White and Black household size relative to the household head's age. We use CPS data and we focus on three types of households: single adult, two adults with one earner, and two adults with two earners.

D Interaction effects between economic channels

In this section, we report the interaction effects on portfolio and wealth between pairs of economic channels. The discussion of these tables is in Section 4.4.

Table D.1: Interaction effects between economic channels

Panel A: Income risk × stochastic asset returns

	Equity share (%)	Wealth
Black baseline	14.73	2.34
With White income risk	+3.80	+0.07
With stochastic return realization	+0.48	+0.16
Interaction: income risk × stochastic asset return	**−1.67**	**−0.43**
Joint total effect	+2.61	−0.20

Panel B: Earnings gap × health risk

	Equity share (%)	Wealth
Black without health risks	16.38	2.13
With White earnings level	+5.11	+0.78
With health risks	−1.65	+0.21
Interaction: earnings × health risks	**−0.43**	**−0.08**
Joint total effect	+3.03	+0.91

Panel C: Family structure × house prices

	Housing share (%)	Wealth
Black baseline	98.60	2.34
With White family structure	+12.05	+0.50
With White house prices	−52.07	−0.24
Interaction: family structure × house prices	**+2.57**	**−0.05**
Joint total effect	−37.45	+0.21

This table documents the interaction effects between pairs of economic channels. The baseline reports the model-simulated Black equity share and wealth (indexed by the wage index) under all existing economic disparities. We then turn off each channel individually to observe how equity or housing shares and wealth respond. A positive value indicates an increase in the variable to the baseline when that specific economic channel is turned off. The joint total effect measures the change in equity share and wealth when both channels are turned off simultaneously, compared to the baseline. The interaction effect captures the differences between joint effects and the sum of two individual effects.

E Effect of economic channels on White households

In this section, we perform a complementary counterfactual analysis to the one presented in Section 4.2. Whereas the earlier exercise began with Black households and replaced their economic channels with those of White households, we now start with White households and substitute each channel with its Black household counterpart. This approach allows us to examine how adopting Black-specific economic characteristics, such as lower earnings or higher income risks, would affect White households' portfolios, wealth, and welfare. Table E.1 shows the results and the effects of these channels on White households are similar to those in Table 7, confirming the robustness of our findings.

Table E.1: Effect of economic channels on White balance sheet

	Effect of channel on White households						
	(0) Black–White difference	(1) Earnings gap	(2) Income risk	(3) Distressed sale	(4) House price	(5) Mortgage rate	(6) Property tax
Balance sheet composition:							
Stock market part. (%)	−28.18	−8.34	−12.73	−0.09	−0.25	−0.13	−0.15
Equity share (%)	−7.89	−3.24	−7.67	−0.03	−0.27	−0.17	0.08
Cond. equity share (%)	11.68	0.16	−5.90	0.01	−0.30	−0.21	0.25
Homeownership rate (%)	−28.27	−6.78	−0.25	−0.07	6.67	−0.82	−1.01
Housing share (%)	−20.24	−6.64	2.08	−0.02	12.61	−3.88	−3.63
Cond. housing share (%)	11.68	0.16	−5.90	0.01	−0.30	−0.21	0.25
Exp. return on wealth (%)	−1.10	−0.47	−0.54	0.00	2.01	−0.18	−0.29
Welfare:							
Welfare (%)		−16.24	−2.47	−0.07	9.19	−0.04	−0.06
Wealth, standalone effect:							
Wealth per adult	−2.55	−0.91	−0.29	−0.01	0.07	−0.01	−0.04
Wealth per household	−5.20	−1.56	−0.50	−0.01	0.12	−0.02	−0.08
Share of excess wealth gap (%)		12.85	13.24	0.34	−3.83	0.50	2.44

This table decomposes the effect of each economic factor on White portfolio composition, wealth, and welfare in the model. Column (0) reports the total difference between Black and White households; a negative value means the variable is lower for Black than for White households. Each subsequent column (1) through (12) reports the difference between a White household and a White household with the parameters controlling a given economic factor set to their value for Black households. For example, (1) reports the difference between White households and White households with the same earnings level as Black households. Wealth is reported in units of the national wage index. The expected return to wealth is the portfolio weighted sum of bond returns, equity returns, mortgage costs, and housing returns. Housing returns can be further decomposed into changes in house prices, implicit rental yield, distress costs, and property tax. The excess wealth gap is defined in Eq. 28. Welfare measures how Black households' lifetime consumption would change due to exposure to each channel. A negative welfare change indicates that that an economic factor adversely affects Black households, lowering their equivalent lifetime consumption by the reported percentage points.

Table E.1: **Effect of economic channels on White balance sheet, cont.**

	Effect of channel on White households					
	(7) Inheritance	(8) Race-dep. return	(9) Health exp.	(10) Mortality rate	(11) Family structure	(12) Preference
Balance sheet composition:						
Stock market part. (%)	−0.70	−1.02	−1.98	−13.39	−0.17	3.93
Equity share (%)	−0.09	0.08	−0.16	−5.86	−0.14	10.02
Cond. equity share (%)	0.33	0.87	1.14	−1.22	−0.13	13.94
Homeownership rate (%)	0.07	−3.93	−1.32	−6.84	−0.91	−14.10
Housing share (%)	1.29	−11.44	2.82	−9.46	−2.59	−10.84
Cond. housing share (%)	1.47	−7.36	6.03	0.85	−1.56	14.99
Exp. return on wealth (%)	0.01	−0.79	0.01	−0.82	−0.11	0.34
Welfare:						
Welfare (%)	−0.34	−0.48	−0.72			
Wealth, standalone effect:						
Wealth per adult	−0.21	−0.20	−0.24	0.20	−0.05	−0.99
Wealth per household	−0.36	−0.35	−0.41	−1.70	−0.05	−1.71
Share of excess wealth gap (%)	11.63	11.06	13.13	−11.76	2.34	54.70

In column (2), the income risk channel is adjusted so that the expected wage remains constant when varying the volatility of log earnings. This table is comparable to Table 7 but starts with White households.

F Results under stochastic returns

Consider the alternative assumption that asset returns in the simulated data are drawn from the ex-ante expected distribution. We call these "stochastic returns" and contrast them with the realized "historical returns" of the past decades. Historical returns on stocks in the last half-century were better-than-expected, so this alternative assumption is mainly studying the consequence of lower realized equity returns. Table F.1 reports how economic disparities affect Black portfolios, wealth, and welfare if housing and equity returns are stochastic. Table F.2 reports how social programs influence balance sheets and wealth accumulation under the stochastic return assumption.

Table F.1: Effect of economic channels on Black balance sheet

	Effect of channel on Black households						
	(0) Black–White difference	(1) Earnings gap	(2) Income risk	(3) Distressed sale	(4) House price	(5) Mortgage rate	(6) Property tax
Balance sheet composition:							
Stock market part. (%)	−20.82	−8.41	−2.58	−0.03	−0.01	−0.14	−0.12
Equity share (%)	−5.28	−4.45	−3.02	−0.01	−1.17	−0.13	0.05
Cond. equity share (%)	11.09	−0.21	−5.26	0.02	−3.98	−0.20	0.39
Homeownership rate (%)	−26.22	−8.67	1.37	−0.08	17.28	−1.36	−1.43
Housing share (%)	−25.77	−12.59	2.84	−0.12	45.89	−5.77	−4.96
Cond. housing share (%)	33.25	7.33	0.36	0.06	38.08	−6.15	−4.26
Exp. return on wealth (%)	−0.70	−0.65	−0.13	−0.01	1.70	−0.24	−0.29
Welfare:							
Welfare (%)		−10.95	−0.74	−0.03	8.14	0.01	0.01
Wealth, standalone effect:							
Wealth per adult	−1.73	−0.57	0.14	−0.00	0.16	−0.01	−0.02
Wealth per household	−3.84	−0.72	0.18	−0.00	0.20	−0.01	−0.03
Share of excess wealth gap (%)		19.57	−13.82	0.40	−17.63	0.89	2.55
Wealth, interaction with other channels:							
Wealth per adult		−0.19	−0.02	−0.00	−0.10	−0.00	−0.01
Wealth per household		−0.57	0.03	−0.01	−0.10	−0.01	−0.02
Share of excess wealth gap (%)		−2.94	2.99	0.16	12.31	−0.13	0.14

This table decomposes the effect of each economic factor on Black portfolio composition, wealth, and welfare in the model. Column (0) reports the total difference between Black and White households; a negative value means the variable is lower for Black than for White households. Each subsequent column (1) through (12) reports the difference between a Black household and a Black household with the parameters controlling a given economic factor set to their value for White households. For example, (1) reports the difference between Black households and Black households with the same earnings level as White households. Wealth is reported in units of the national wage index. The expected return to wealth is the portfolio weighted sum of bond returns, equity returns, mortgage costs, and housing returns. Housing returns can be further decomposed into changes in house prices, implicit rental yield, distress costs, and property tax. The excess wealth gap is defined in Eq. 28. Welfare measures how Black households' lifetime consumption would change due to exposure to each channel. A negative welfare change indicates that that an economic factor adversely affects Black households, lowering their equivalent lifetime consumption by the reported percentage points. This table is under the stochastic return assumption and is comparable to Table 7.

Table F.1: Effect of economic channels on Black balance sheet, cont.

	Effect of channel on Black households					
	(7) Inheritance	(8) Race-dep. return	(9) Health exp.	(10) Mortality rate	(11) Family structure	(12) Preference
Balance sheet composition:						
Stock market part. (%)	−1.39	−0.72	−0.77	−0.33	−7.67	9.92
Equity share (%)	−0.51	−0.05	−0.21	−0.22	−4.37	8.20
Cond. equity share (%)	0.70	1.10	0.64	−0.15	−1.03	15.75
Homeownership rate (%)	−0.64	−4.64	−0.70	−2.00	−7.43	−12.91
Housing share (%)	1.17	−15.02	0.42	−5.59	−18.07	−15.11
Cond. housing share (%)	4.80	−11.07	3.54	−3.33	−6.36	16.00
Exp. return on wealth (%)	−0.00	−0.87	−0.03	−0.23	−0.80	−0.11
Welfare:						
Welfare (%)	−0.37	−0.19	0.06			
Wealth, standalone effect:						
Wealth per adult	−0.17	−0.10	−0.07	−0.03	0.17	−0.47
Wealth per household	−0.22	−0.12	−0.09	−0.03	−0.58	−0.60
Share of excess wealth gap (%)	19.49	10.85	7.67	3.29	−18.14	52.54
Wealth, interaction with other channels:						
Wealth per adult	−0.01	−0.05	−0.13	−0.00	0.00	−0.29
Wealth per household	−0.10	−0.12	−0.25	−0.01	−0.84	−0.70
Share of excess wealth gap (%)	−3.48	1.47	9.35	−0.86	1.99	12.85

The *standalone* wealth effects are obtained by turning off each economic factor while keeping all other model parameters at their calibration for Black households. The *interaction with other channels* is defined as the difference between the effect of an economic factor when all other parameters are calibrated for White households and the standalone effect. In column (2), the income risk channel is adjusted so that the expected wage remains constant when varying the volatility of log earnings.

Table F.2: Racial portfolio gap and social programs under stochastic returns

	(1) Baseline			(2) Remove SS Progressivity			(3) Cut SN and EITC by 90%			(4) All		
	B	W	B − W	B	W	B − W	B	W	B − W	B	W	B − W
Stock market part. (%)	29.23	50.04	−20.82	31.25	52.52	−21.27	28.08	51.11	−23.03	30.35	55.25	−24.90
Equity share (%)	115.21	20.49	−5.28	16.12	21.71	−5.58	13.47	20.04	−6.57	14.38	21.33	−6.94
Cond. equity share(%)	52.03	40.94	11.09	51.59	41.33	10.26	47.99	39.22	8.77	47.39	38.60	8.79
Homeownership rate (%)	49.57	75.79	−26.22	51.97	78.20	−26.23	53.25	82.91	−29.66	57.70	85.58	−27.88
Housing share (%)	96.37	122.14	−25.77	99.41	124.00	−24.60	85.96	124.35	−38.39	92.77	99.64	−6.87
Cond. housing share (%)	194.41	161.16	33.25	191.29	158.58	32.71	161.44	149.99	11.46	160.79	116.44	44.36
	B	W	B/W	B	W	B/W	B	W	B/W	B	W	B/W
Wealth per adult	1.96	3.69	0.53	1.98	3.64	0.54	2.19	3.95	0.55	2.24	4.23	0.53
Wealth per household	2.51	6.35	0.39	2.52	6.26	0.40	2.80	6.80	0.41	2.86	7.28	0.39
Share of excess wealth gap(%)			0			2.12			4.24			−0.57

This table presents the model-implied racial balance sheet and wealth under various social program scenarios. Scenario (1) is our baseline model, with real-life levels of Social Security, safety net, and EITC benefits. In scenario (2), we remove the progressivity of Social Security. Specifically, we replace baseline Social Security cash flow with 40% of lifetime income, measured by average indexed yearly earnings (AIYE) at age 60 defined in equation (14). In scenario (3), we cut down safety net and EITC programs by 90%; eligible households will receive only 10% of the baseline benefits. In scenario (4), we both remove the progressivity of Social Security and cut down safety net and EITC simultaneously. The term ”share of excess wealth gap” refers to the portion of the wealth gap that cannot be explained by the income gap and is defined in equation (28).This table is under the stochastic return assumption and is comparable to Table 9

G Empirical evidence of differences in savings behavior

G.1 Survey evidence on savings behavior

To corroborate our finding that the discount factor β is on average lower for Black households, we examine survey data on savings behavior. The survey we consider is the 2019-2024 National Financial Capability Study (NFCS), which asks American households questions about their saving patterns and beliefs. Two survey questions serve as proxies for whether households are saving at high rates out of income. The first question (`J3`) asks, "Over the past year, would you say your [household's] spending was less than, more than, or about equal to your [household's] income?" The possible answers are "Spending less than income," "Spending more than income," "Spending about equal to income," "Don't know," and "Prefer not to say." The second question (`J4`) asks, "In a typical month, how difficult is it for you to cover your expenses and pay all your bills?" with possible responses "Very difficult," "Somewhat difficult," "Not at all difficult," "Don't know," and "Prefer not to say."

Our model says that, controlling for age, family structure, and income, a household's savings rate (and spending rate) out of income is a function of preferences: its discount factor β and precautionary saving demand. Under the null hypothesis that Black and White households have identical discount factors β, we should see that households with the same age, family structure, and income have the same savings rates out of income on average.[31] Thus, if after controlling for these characteristics we still see a significant effect of race on savings rates, then it suggests that group has a lower β.

To estimate the relative response rate of Black versus White households, we run multinominal logit regressions of survey responses Y_i on race k_i and control characteristics X_i (including a constant). Specifically, letting $Y_i \in \{0, 1, \ldots, J\}$ denote the categorical out-

[31] Indeed, we should actually expect to find higher savings rates out of income for Black households, for two reasons. First, the need for precautionary savings is higher for Black households. And second, income in the NFCS includes both labor and capital income, and Black households have lower capital returns. If a Black household has the same total income from labor and capital as a comparable White household, it will on average have higher wealth due to the lower yield on savings.

come for household i's response to the question, we estimate

$$\mathrm{P}(Y_i = j | k_i, X_i) = \frac{\exp\{\Gamma_{kj} k_i + \Gamma_{Xj}^{\top} X_i\}}{1 + \sum_{j'=1}^{J} \exp\{\Gamma_{kj'} k_i + \Gamma_{Xj'}^{\top} X_i\}} \tag{G.1}$$

The controls X_i include bins for gender-age (A3B), marital status (A7A), and income (A8), as reported in the NFCS. The NFCS categorizes race (A4A_new_w) as either White and non-White. This poses a potential problem, as the majority of non-White Americans are not Black. To address this, we run the same regressions on only those households residing in states in which Black individuals account for more than 25% and 50% of the non-White population. For the 25% threshold, this subset includes 25 of the 50 states and D.C.; for the 50% threshold, this includes 14 of 51. All regressions are weighted using the survey weights.

Table G.1 reports the results of these regressions for the question: "Over the past year, would you say your [household's] spending was less than, more than, or about equal to your [household's] income?" The reference response ($Y_i = 0$) is "Spending less than income." The specifications (1), (2), and (3) correspond to Black-in-non-White proportions greater than 0%, 25%, and 50%, respectively. The coefficient reported is then the estimated relative-risk ratio for non-White versus White:

$$\frac{\widehat{\mathrm{P}}(Y_i = j | k_i = \text{non-White}, X_i) / \widehat{\mathrm{P}}(Y_i = 0 | k_i = \text{non-White}, X_i)}{\widehat{\mathrm{P}}(Y_i = j | k_i = \text{White}, X_i) / \widehat{\mathrm{P}}(Y_i = 0 | k_i = \text{White}, X_i)} = \exp\{\hat{\Gamma}_{\text{non-White},j}\}, \tag{G.2}$$

which is the relative likelihood that a non-White household with characteristics X will choose that response over "Spending less than income," compared to an otherwise equivalent White household. For example, the interpretation of the coefficient 1.092 in regression (1) of Table G.1 is that a non-White household is 9.2% more likely to respond with "Spending more than income" over "Spending less than income" than a White household with the same age, composition, and income.

Table G.1 shows that, across all three regression specifications, non-White households are between 9% and 12% more likely to report that they spent more than their income over the past year. This higher rate of spending (lower rate of saving), controlling for age and income, is suggestive of a lower β for Black households. Table G.2 shows the analogous regression results for the question “In a typical month, how difficult is it for you to cover your expenses and pay all your bills?” Non-White households are 3% to 8% more likely to say that saving is very difficult than that it is not difficult at all.

Table G.1: Race and rate of spending more than income

	(1)	(2)	(3)
Spending less than income			
Non-White	1	1	1
	-	-	-
Spending more than income			
Non-White	1.092***	1.097***	1.124***
	(0.0164)	(0.0199)	(0.0258)
Spending about equal to income			
Non-White	0.873***	0.861***	0.891***
	(0.0112)	(0.0136)	(0.0181)
Don’t know			
Non-White	1.003	0.992	1.009
	(0.0307)	(0.0360)	(0.0490)
Prefer not to say			
Non-White	1.186**	1.147	1.111
	(0.0840)	(0.100)	(0.130)
Controls			
Gender-age	Yes	Yes	Yes
Marital status	Yes	Yes	Yes
Income bin	Yes	Yes	Yes
Observations	158,500	93,390	61,480
Black threshold	$> 0\%$	$> 25\%$	$> 50\%$

The table reports the estimated relative-risk ratio (G.2) for non-White versus White households in the multinomial logit regression (G.1) for the question “Over the past year, would you say your [household’s] spending was less than, more than, or about equal to your [household’s] income?” See the text for interpretation of coefficients. The “Black threshold” conditions on only the subset of households residing in states (and D.C.) in which the percentage of the Black population in the total non-White population exceeds that threshold. Standard errors are in parentheses. *** denotes significance at the 5% level against the null hypothesis that the coefficient equals 1.

Table G.2: Race and perceived difficulty saving

	(1)	(2)	(3)
Very difficult			
Non-White	1.061***	1.075***	1.034
	(0.0191)	(0.0232)	(0.0286)
Somewhat difficult			
Non-White	1.076***	1.079***	1.051**
	(0.0138)	(0.0168)	(0.0210)
Not at all difficult			
Non-White	1	1	1
	-	-	-
Don't know			
Non-White	1.172***	1.097*	1.042
	(0.0501)	(0.0571)	(0.0732)
Prefer not to say			
Non-White	1.177***	1.224***	1.068
	(0.0716)	(0.0897)	(0.108)
Controls			
Gender-age	Yes	Yes	Yes
Marital status	Yes	Yes	Yes
Income bin	Yes	Yes	Yes
Observations	158,500	93,390	61,480
Black threshold	$> 0\%$	$> 25\%$	$> 50\%$

The table reports the estimated relative-risk ratio (G.2) for non-White versus White households in the multinomial logit regression (G.1) for the question "In a typical month, how difficult is it for you to cover your expenses and pay all your bills?" See the text for interpretation of coefficients. The "Black threshold" conditions on only the subset of households residing in states (and D.C.) in which the percentage of the Black population in the total non-White population exceeds that threshold. Standard errors are in parentheses. *** denotes significance at the 5% level against the null hypothesis that the coefficient equals 1.

G.2 Survey evidence on financial literacy and confidence

As discussed in the main text, one possible cause of a lower discount factor β is cognitive discounting due to neglect of future states of the world. This could follow from a lack of financial education and literacy or from a discomfort with making financial decisions that causes an individual to think less about the future. The NFCS also asks respondents questions to assess their confidence making future-oriented financial decisions. We consider the question (M1_1), "How strongly do you agree or disagree with the following statements? - I am good at dealing with day-to-day financial matters, such as checking accounts, credit and debit cards, and tracking expenses." The responses range from 1 to 7, with 1 corresponding to "Strongly Agree," 4 to "Neither Agree nor Disagree," and 7 to "Strongly Disagree."

We estimate the same multinomial logit regressions as in the previous section, and the results are in Table G.3. Across all three regression specifications, non-White households are 27% to 34% more likely to report that they strongly disagree with the statements, compared to otherwise similar White households.

Table G.3: Race and confidence making financial decisions

	(1)	(2)	(3)
1 – Strongly Disagree			
Non-White	1.338***	1.308***	1.273***
	(0.0417)	(0.0489)	(0.0605)
2			
Non-White	1.111***	1.011	0.956
	(0.0417)	(0.0461)	(0.0557)
3			
Non-White	1.078***	0.981	0.975
	(0.0312)	(0.0348)	(0.0431)
4 – Neither Agree nor Disagree			
Non-White	1.171***	1.090***	1.052*
	(0.0203)	(0.0227)	(0.0281)
5			
Non-White	1.057***	1.006	0.967
	(0.0180)	(0.0209)	(0.0257)
6			
Non-White	0.986	0.937***	0.933***
	(0.0147)	(0.0172)	(0.0222)
7 – Strongly Agree			
Non-White	1	1	1
	-	-	-
Don't know			
Non-White	1.476***	1.429***	1.257**
	(0.0882)	(0.102)	(0.123)
Prefer not to say			
Non-White	1.376***	1.269***	1.227*
	(0.0952)	(0.107)	(0.140)
Observations	158,500	93,390	61,480

The table reports the estimated relative-risk ratio (G.2) for non-White versus White households in the multinomial logit regression (G.1) for the question "How strongly do you agree or disagree with the following statements? - I am good at dealing with day-to-day financial matters, such as checking accounts, credit and debit cards, and tracking expenses." See the text for interpretation of coefficients. The "Black threshold" conditions on only the subset of households residing in states (and D.C.) in which the percentage of the Black population in the total non-White population exceeds that threshold. Standard errors are in parentheses. *** denotes significance at the 5% level against the null hypothesis that the coefficient equals 1.

G.3 Survey evidence on time discounting

To further evaluate our finding of a lower discount factor β among Black households, we use survey evidence about time discounting from Health and Retirement Study (HRS) and Understanding America Study (UAS). HRS 2014 module 5 (time inconsistency), HRS 2020 module 2 (time discounting), and UAS module 603 each give respondents a sequence of binary choices between receiving a dollar amount today versus a greater dollar amount in 12 months. The delayed amount escalates across nodes until the respondent switches from "today" to "in 12 months."

We identify the dollar amount at which each respondent switches answers and use these switching points to construct a semi-annual discount rate following Huffman et al. (2019). Huffman et al. (2019) call this the internal rate of return (IRR). A higher discount rate means that the respondent has a lower discount factor and is less patient. To test whether Black households have a comparatively higher discount rate, we run the regression

$$\mathrm{IRR}_i = \Gamma_{\mathrm{B}} \mathbb{I}_{\{j_i = \mathrm{B}\}} + \Gamma_X^\top X_i + \epsilon_i,$$

where $\mathbb{I}_{\{j_i = \mathrm{B}\}}$ is the indicator variable that takes a value of 1 if the respondent is Black. The controls X_i include marital status, gender, age, income, and a constant. Table G.4 shows that, in the HRS, Black household have a discount rate 13 to 16 percentage points higher than otherwise similar White respondents. Table G.5 shows a very similar magnitude of difference in discount rate for Black and White households in the UAS data (about 13 to 19 percentage points).

Table G.4: Black-White differences in time discounting (discount rate), HRS

	(1)	(2)	(3)
Black	0.164***	0.166***	0.132***
	(0.030)	(0.031)	(0.032)
Married		-0.022	0.033
		(0.021)	(0.023)
Age		0.002**	0.000
		(0.001)	(0.001)
Male		-0.025	-0.017
		(0.021)	(0.022)
Log income			-0.067***
			(0.011)
Constant	0.551***	0.417***	1.245***
	(0.011)	(0.080)	(0.164)
Observations	1171	1171	1063
R^2	0.024	0.032	0.061

This table reports the estimated semi-annual time-discount rate (IRR) implied by the Health and Retirement Study (HRS) 2014 time discounting module and 2020 time inconsistency module. The module asks respondents whether they are willing to trade off today's money for next year's (e.g., "Would you rather receive \$100 today or \$154 in 12 months?"), and we back out the implied semi-annual IRR following Huffman et al. (2019). All regressions are weighted, and standard errors are in parentheses. Higher IRR indicates greater impatience (a lower annual discount factor β in our model's notation). *** denotes significance at the 1% level against the null that the coefficient equals zero.

Table G.5: Black-White differences in time discounting, UAS

	Predictors of time discount rate		
	(1)	(2)	(3)
Black	0.188***	0.161***	0.129***
	(0.009)	(0.009)	(0.009)
Married		-0.043***	-0.009
		(0.006)	(0.006)
Age		-0.003***	-0.002***
		(0.000)	(0.000)
Male		-0.041***	-0.035***
		(0.006)	(0.006)
Log income			-0.098***
			(0.005)
Constant	0.453***	0.634***	0.834***
	(0.003)	(0.011)	(0.014)
Observations	10485	10474	10448
R^2	0.044	0.076	0.112

This table reports the estimated semi-annual time-discount rate (IRR) implied by the Understanding America Survey module 603 The module asks respondents whether they are willing to trade off today's money for next year's (e.g., "Would you rather receive $1,000 today or $1,300 in 12 months?"), and we back out the implied semi-annual IRR following Huffman et al. (2019). Higher IRR indicates greater impatience (a lower annual discount factor β in our model's notation). *** denotes significance at the 1% level against the null that the coefficient equals zero.

H Survey expectations of stock returns by race

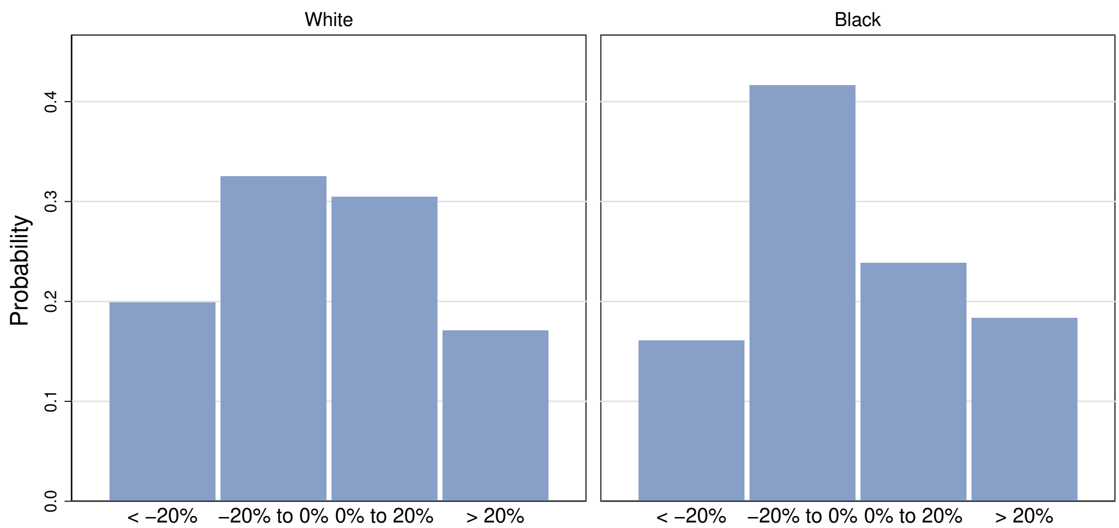
In Section 5.1, we study the effect of differences in expected stock returns on Black wealth. To evaluate whether Black and White households have different expectations of stock returns, we look to survey data from the Health and Retirement Study (HRS), which asks respondents questions about their financial beliefs. Specifically, the HRS elicits three probabilities from respondents: the probability that the stock return is positive next year (`ppr`), the probability that it will be less than -20% (`pdown20`), and the probability that it will be greater than 20% (`pup20`). These probabilities imply intermediate probabilities that the return will be between -20% and 0% (`ppr−pup20`) and that it will be between 0%

and 20% ($1-\texttt{ppr}-\texttt{pdown20}$). We compute these implied intermediate probabilities and drop all individuals whose reported probabilities imply negative probabilities (i.e., those for whom $\texttt{pup20}>\texttt{ppr}$ or $\texttt{ppr}+\texttt{pdown20}>1$).

Figure H.1 plots the average stated probability for each group in the 2010–2020 HRS waves. Assessed probabilities of extreme outcomes ($< -20\%$ or $> 20\%$) are similar between races. The most notable difference is that, on average, Black households assign a significantly higher probability to a negative return, between -20% and 0%, than do White households; and, conversely, White households assign a much higher probability to a positive return between 0% and 20%. This suggests more pessimism in the mean return by the typical Black household.

We emphasize that this evidence is at best suggestive, and should be interpreted with caution. These survey data are quite noisy, and many respondents report probabilities that sum to more than one (though, as mentioned, we do exclude these individuals from the computations above). If one were to take these distributions literally—say, by fitting normal distributions to them—then they would imply overly pessimistic expectations that do not align with actual portfolio choices. In particular, the implied expected return for Black households would be negative, creating a puzzle as to why they invest in stocks at all.

Figure H.1: Subjective probability distribution of stock returns by race



This figure shows the average probability distribution of stock returns by Black and White respondents to the Health and Retirement Study (HRS). Each bar represents the average stated probability that the stock return next year will be within the stated range. See the text for details of computation.