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Unemployment Risk, Portfolio Choice, and the Racial Wealth Gap

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Unemployment risk, portfolio choice, and the racial wealth gap

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Black Americans face higher cyclical unemployment risk than white Americans: job-finding rates during recessions are lower and the risk of becoming long-term unemployed is higher. Differences in unemployment risk across Black and white Americans imply that Black Americans optimally invest less in risky assets. We show that differences in unemployment risk can explain up to 90% of the gap in the stock market shares of Black and white portfolios, resulting in lower returns on wealth for Black Americans. Through this portfolio channel, adverse labor market conditions for Black Americans translate into lower wealth returns and exacerbate racial wealth inequality.

Capital returns play a significant role in the recent dynamics of wealth inequality (Piketty and Zucman, 2015; Saez and Zucman, 2016; Kuhn et al., 2020; Smith et al., 2021). In particular, starting in the 1980s, the equity market boom has accelerated wealth accumulation through high capital gains, leading to a large wealth gap between those who own equity and those who do not. Such dynamics have not been neutral with respect to racial wealth inequality in the US, as Black Americans hold on average far less equity than white Americans. According to the Survey of Consumer Finances (SCF), the white-to-Black stock market participation gap amounts to around 20 percentage points, and the equity share of Black financial wealth portfolios is 10 percentage points lower than that of white portfolios.[1] These differences in equity holdings have contributed significantly to the recent growth in the white-to-Black wealth gap (Derenoncourt et al., 2022). Understanding why Black Americans invest less in equity and which policy designs efficiently close the equity gap is thus critical for stemming widening racial wealth disparities.

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[1] For a detailed visualization of the SCF data, see Appendix A.

In this study, we highlight the role played by differences in unemployment risk on Black and white differences in risky asset investment decisions. A large literature already confirms the relationship between labor market dynamics and portfolio choices: households that are exposed to labor market shocks will prefer to save in safer, more liquid assets to mitigate the economic consequences of labor market downturns (Guiso et al., 1996; Bremus and Kuzin, 2014; Palia et al., 2014; Basten et al., 2016; Chang et al., 2018; Catherine et al., 2022).[2] During economic downturns, unemployment and unemployment duration in the labor market increase and expand the left tail of the income growth distribution (Kocherlakota and Pistaferri, 2009; Guvenen et al., 2014; Hall, 2017; Hubmer, 2018; Catherine, 2021; Busch et al., 2022; Guvenen et al., 2022). Black Americans are more exposed to worse and worsening labor market conditions in recessions, with Black unemployment rates being consistently higher than those of white workers especially during the past several recessions (Figure 1). In particular, the racial unemployment gap increases during recessions (shaded area), suggesting stronger cyclical unemployment risk and income losses for Black Americans compared to white Americans over the business cycle.[3] Therefore, we hypothesize that the large gap in equity shares between Black and white wealth portfolios is at least partly attributed to rational portfolio decisions that minimize risk exposure over the life cycle.[4]

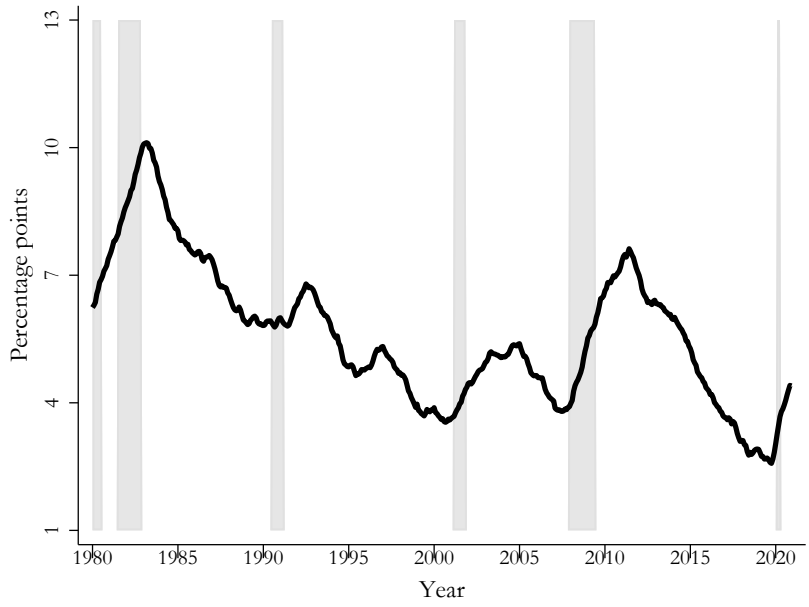
Our analysis has two parts. First, we provide empirical insights into racial differences in unemployment risk between 1980 and 2020 – a period when equity markets started to play a major role for wealth accumulation in the US (Saez and Zucman, 2016, 2020; Kuhn et al., 2020). Using data from the Current Population Survey (CPS), we analyze the dynamics of Black and white labor market flows during recessions and boom periods (Shimer, 2012; Fujita and Ramey, 2009). We show that Black Americans are more likely to transition into (and to remain in) long-term unemployment than their white counterparts. Afterwards, we utilize data from the Panel Study of Income Dynamics (PSID) to quantify the effects of unemployment risk on income growth over the business cycle. We investigate the response of the lower tail of the income growth distribution to changes in stock market returns and find that the lower tail expands more during recessions. This higher skewness of income growth confirms that Black Americans' unemployment risk is more countercyclical than that of white Americans.

[2]Fewer studies investigate this relationship separately by race. Blau and Graham (1990) and Altonji et al. (2000) are two pioneering studies that show how income differences across Black and white Americans can be related to differences in their portfolio composition.

[3]Conditional on unemployment, Black Americans are also exposed to discrimination in hiring (Kline et al., 2022) and receive lower unemployment insurance benefits than their white counterparts (Skandalis et al., 2022).

[4]We abstract from other factors that can also explain the differences in portfolio choices between Black and white Americans, such as financial literacy (Cole and Shastry, 2009; Van Rooij et al., 2011; Bucher-Koenen and Ziegelmeyer, 2014; Almenberg and Dreber, 2015), trust in the financial markets (Guiso et al., 2008; Malmendier and Nagel, 2011; Sapienza and Zingales, 2012; Balloch et al., 2015; Andersen et al., 2019; Laudenbach et al., 2020), and network effects (Hong et al., 2004; Brown et al., 2008; Boerma and Karabarbounis, 2021). The difference between unemployment risk and these alternative explanations is that while the latter would imply that Black Americans are under-invested in risky assets due to their inefficiencies, unemployment risk makes it optimal for Black households to hold less risky assets than white.

Figure 1: Black-to-white absolute unemployment gap, 1980-2020



Notes: This figure presents the absolute gap in the US Black and white unemployment rates during January 1980 to December 2020. The shaded areas represent the five recessionary periods of the sample period (1980-1982 with some gaps, 1990, 2001, 2007-2008, and 2020). *Data sources*: CPS.

In the second part of the paper, we demonstrate the contribution of racial differences in cyclical unemployment risk to the racial equity gap by studying a life cycle model of portfolio choices in the spirit of Bremus and Kuzin (2014) and Catherine (2021). Black and white agents in the model are identical except for their labor market risk over the business cycle that we calibrate to Black and white transition rates across employment states measured using CPS data. The different employment stages are employment, short-term unemployment, and long-term unemployment. In addition, during unemployment, Black individuals receive lower unemployment insurance benefits than white, as documented in Skandalis et al. (2022). Our model simulation suggests that racial differences in unemployment risk is a substantial driver of the racial equity gap, explaining up to 90% of the equity share gap between Black and white wealth portfolios. In terms of stock market participation, unemployment risk is able to explain around 20% of the average white-to-Black gap. Finally, we quantify the consequence of these foregone capital gains due to lower optimal equity investment for Black Americans on the racial financial wealth gap after 1980. Our analysis shows that if Black and white workers had same cyclical unemployment risk, the racial wealth gap would have only increased by 3% between 1980-2020. In the data, we observe a 15% increase in the wealth gap during this period.

Our findings highlight the interdependence between the labor market and investment choices, a relationship that has also been highlighted in earlier seminal studies by Blau and Graham (1990) and Altonji et al. (2000), who investigate the role of socioeconomic characteristics in determining the racial wealth gap. This link between labor market outcomes and wealth inequality is increasingly important due to the dimmed prospects of racial income convergence. Despite rapid income convergence during the civil rights era, today the racial income gap is as large as in 1950 (Bayer and Charles, 2018; Chetty et al., 2020; Derenoncourt and Montialoux, 2021). Additionally, the COVID-19 pandemic in 2020 led to severe job losses for Black Americans, emphasizing once again the vulnerability of this group from business cycle fluctuations. Our analysis shows how labor market conditions can perpetuate the racial wealth gap by making it optimal for Black Americans to stay away from risky – though high-return – equity markets.

The remainder of this paper is organized as follows. Section I presents our empirical analysis, where we provide stylized facts on racial differences in the cyclicality of unemployment risk. Based on the empirical findings, in Section II we study a life-cycle model of portfolio choices and quantify the contribution of racial differences in cyclical unemployment risk on the racial equity gap. Section III concludes.

I Racial differences in cyclical unemployment risk

Data sources and key variables We use the January 1980 to December 2020 waves of harmonized CPS micro-data from Flood (2015) to investigate racial differences in employment status and labor market flows. The CPS is a representative monthly survey of households

conducted by the US Census Bureau that gathers information on education, labor force status, and other socioeconomic characteristics of the US population. The CPS also features a short panel dimension that allows researchers to follow individuals over time.[5] This allows us to calculate not only unemployment rates for Black and white Americans, but also their labor market transition rates, at a monthly frequency (Shimer, 2012; Fujita and Ramey, 2009; Fallick and Fleischman, 2004).[6] In addition, the CPS provides information on the duration of unemployment, which allows us to distinguish between the risk of being short-term unemployed and long-term unemployed. We focus on unemployed individuals and employed individuals who are between 25 and 64 years old.

To estimate the effects on labor income dynamics of Black and white US household heads, we use waves of the PSID covering the 1980-2019 period. The survey provides annual data until 1997 and biennial data from 1997 onwards. Labor income includes individuals' wage and salary (pre-tax and pre-government transfers) for the year prior to the survey year.[7] The PSID is a nationally representative, longitudinal study of US families, where the unit of observation is a household (a group of people living together as a family). Besides a broad range of socioeconomic variables – such as gender, race, age, marital status, etc. – the PSID also provides rich information on households' total income, such as wage earnings, social security income, and capital income. We restrict our sample to household heads who are between 25 and 64 years old.

Empirical analysis As a first step, we analyze in detail racial differences in unemployment risk. Using the CPS, we present Black and white labor market flows during boom and recessionary periods (Table 1).[8] In particular, we focus on the Employed-to-Unemployed (EU) and Unemployed-to-Employed (UE) transition rates, as these are the labor market flows that largely determine US unemployment dynamics (Shimer, 2012; Fujita and Ramey, 2009; Fallick and Fleischman, 2004; Elsby et al., 2009). For UE flows, we further distinguish between short-term and long-term duration of unemployment. We define short-term unemployment as being unemployed for less than one year and long-term unemployment as being unemployed for longer.

Overall, we observe consistently worse labor market conditions for Black workers, irrespective of macroeconomic conditions. Black Americans are more likely to become unemployed (higher EU transition rates) and have a lower likelihood of finding a new job after unemployment (lower UE transition rates) compared to their white counterparts, consistent with the literature documenting racial gaps in transition rates (Couch and Fairlie, 2010; Daly et al., 2020). In particular, Black Americans' labor market conditions worsen more during recessions, particularly in terms of their

[5]The CPS follows a rotating panel structure, where individuals are interviewed for four consecutive months, followed by an eight month break, and then interviewed for four further months before they exit the survey.

[6]The white and Black racial groups here are defined as white only and Black only, excluding other ethnic groups such as Asian or Hispanic Americans.

[7]We do not include salary from self-employment (business and farm income).

[8]The average labor market flows over 1980 to 2020 are provided in Appendix B.

likelihood of finding a job from unemployment. During recessions, Black workers' UE rates decrease from 19.7% to 18.0% (absolute difference of -1.7 p.p.), while white UE rates decrease from 27.9% to 26.7% (absolute difference of -1.2 p.p.). This absolute decline is equivalent to Black workers' probability of finding a job falling twice as much as it does for white workers when entering a recession (a -8.7% decrease in Black UE rates compared to a -4.3% decrease for white). When we further decompose UE rates by the duration of unemployment, we observe that large racial differences in UE rates are concentrated among the long-term unemployed. Both Black and white short-term unemployed workers are less likely to find employment during recessions, with Black workers' UE rates declining by 50% more than their white counterparts (-9.1% vs. -6.3%). However, when looking at long-term unemployment, Black Americans' UE rate decreases by -11.4% from booms to recessions and the change is almost twice as large as for white UE rates (which decrease by -5.9% when entering a recession). Similar to UE rates, EU rates also worsen during recessions for both racial groups. In absolute terms, Black EU rates increase more than for white workers (0.4 p.p. vs. 0.3 p.p.), but the relative change is only about one-third larger (17.0% vs. 23.5%). Hence, the relative worsening of unemployment rates for Black workers stems from the differences in UE rate dynamics.

Table 1: Black and white labor market flows: recessions vs. booms

	Black				White			
			Change (recession to boom)				Change (recession to boom)	
	Boom	Recession	Absolute	Percentage	Boom	Recession	Absolute	Percentage
Employed-to-Unemployed (EU)	2.1%	2.5%	0.4 p.p.	17.0%	1.2%	1.5%	0.3 p.p.	23.5%
Unemployed-to-Employed (UE)	19.7%	18.0%	-1.7 p.p.	-8.7%	27.9%	26.7%	-1.2 p.p.	-4.3%
Unemployed-to-Employed (UE)								
$\leq$ 1 year unemployed	22.2%	20.2%	-2.0 p.p.	-9.1%	30.0%	28.1%	-1.9 p.p.	-6.3%
$>$ 1 year unemployed	11.5%	10.2%	-1.3 p.p.	-11.4%	13.5%	12.7%	-0.8 p.p.	-5.9%

Notes: Labor market flows during booms and recessions by racial group, from January 1980 to December 2020. We define recessionary periods using the definition from the NBER. In addition to this, we also include the 2020 COVID-19 pandemic as a recession period. The first column presents Black Americans' labor market transition rates during boom periods and the second column those during recession periods. In columns 3 and 4, we present the absolute and percentage change in Black labor market transition rates between recession and boom periods, respectively. The fifth column presents white Americans' labor market transition rates during boom periods and the sixth column those during recession periods. In columns 7 and 8, we present the absolute and percentage change in labor market transition rates of white workers between recession and boom periods, respectively. *Data source*: CPS.

Given these facts on worker flows, we next study the income dynamics associated with the cyclicality of Black and white unemployment risk. For income, we use data from the PSID, as it provides a long panel structure that allows us to estimate changes in income over time. Following the method of Busch et al. (2022), we measure income changes from unemployment risk using the left tail of individuals' labor income growth across survey years. This part of the income growth distribution reflects downside risk in the labor market: if the left tail expands, this comes from the higher likelihood of job loss and/or increased duration of unemployment. We calculate income growth $\Delta_s y_t$ between year $t-s$ and t, with y_t being the natural log of income Y_t. We then define the difference between the 50th percentile and 10th percentile of the labor income growth distribution (L5010) to represent unemployment risk.[9]

In a first step, we corroborate the findings on unemployment risk cyclicality from the CPS in the PSID data focusing on Black and white household heads. Consistent with the CPS, the PSID also shows that Black household heads are unemployed for longer periods of time than white household heads. During 1980-2019, the average annual unemployment duration of Black Americans was 5.1 months, while for white Americans it was 3.9 months. Additionally, Black Americans are more exposed to long-term unemployment: among the unemployed, 31% of Black household heads reported to have been fully unemployed throughout the year, while only 17% of white Americans were fully unemployed for the same duration. Further, conditional on being unemployed in the current year, around 50% of Black Americans reported to have also been unemployed in the previous year (and only 25% of white individuals).[10]

The racial gaps in unemployment dynamics can be seen clearly in the L5010 ratio in Figure 2. Supporting the finding of increasing unemployment risk during recessions, we observe an expansion in the left tail for both Black and white households around the beginning of recessions, which then decreases with the start of expansionary periods. Nevertheless, the expansion of Black L5010 is much stronger than white. For example, during the peak of the Global Financial Crisis, the difference between the 50th and 10th percentile of the white income growth distribution amounts to almost 60 percentage points, while the difference for Black Americans is greater than 80 percentage points.

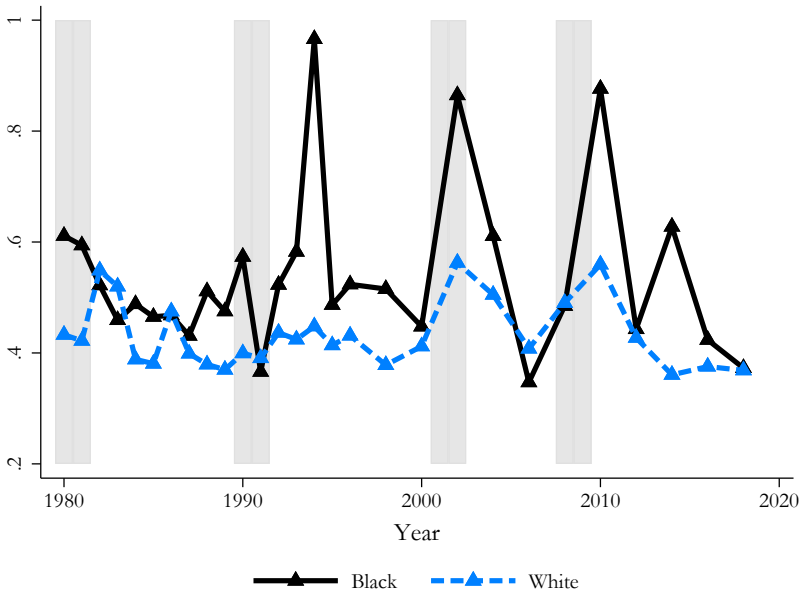
Using this measure, we can also conduct a regression analysis to provide a statistical measure for the degree of cyclicality in Black and white unemployment risk. The regression model is as follows:

$$L5010_t^i = \alpha + \gamma t + \beta^i \times R_t^{equ} + u_t, \tag{1}$$

[9]The PSID has yearly data until 1997 and biennial data afterwards. Therefore, for the pre-1997 period, $s = 1$, and $s = 2$ for the post-1997 period. See Appendix C for more details of the data.

[10]The results on 2-year unemployment duration can only be conducted until 1997, as afterwards the PSID only provides data at a biennial frequency. In Appendix Figure C.1, we present the distribution of unemployment duration by race.

Figure 2: The bottom tail of the Black and white income distribution



Notes: The difference between the 50th and 10th percentile of individual labor income growth, by racial group. Shaded areas represent recessionary periods. *Data sources*: PSID.

where R_t^{equ} represents stock market returns and $i = [Black, White]$. The coefficient β^i captures the extent of cyclicality in labor market income risk. Once we run Equation 1 separately for the Black and white samples, we obtain $\beta^{Black} = -0.67$ and $\beta^{White} = -0.32$, which are both significant at the 1% level. The negative coefficients for both racial groups imply how the left tail (L5010) contracts during periods of increasing stock market returns, which is in line with the visual evidence from Figure 2. In addition, Black unemployment risk increases twofold compared to that of white workers. This result demonstrates that Black Americans are more exposed to the risk of losing their equity investment and job at the same time, which serves as a rational reason for not investing in equity (Catherine, 2021; Catherine et al., 2022).[11]

In summary, our empirical analysis on the cyclicality of unemployment risk faced by Black and white Americans reveals that compared to white Americans, Black Americans' unemployment risk increases much more during recessions and is therefore more highly correlated with the dynamics of the equity market. Investigating labor market flows, we document that these dynamics mostly stem from Black Americans' higher risk of not being able to find a job during recessions, especially when they have been unemployed for longer durations. Given these empirical findings, we next investigate the consequences of higher unemployment risk faced by Black Americans for their portfolio choices.

[11] In Appendix C.1, we provide robustness checks for this regression exercise.

II Unemployment risk and the racial equity gap

To quantify the implications of racial gaps in cyclical unemployment risk for the racial gap in equity and overall wealth, we build a stylized life-cycle model of portfolio choices as in Catherine (2021) and Bremus and Kuzin (2014). This model also distinguishes between short-term and long-term unemployment. This distinction in employment duration is key, as our empirical analysis highlights that unemployment duration is an important determinant of the higher exposure of Black Americans to cyclical unemployment risk (Table 1). We also introduce business cycle states (booms and recessions). In a recession, the probability of job loss is higher and the probability of finding a job is lower. At the same time, stock market returns are lower and more volatile in recessions compared to booms. Finally, we include stock market participation costs and let individuals decide whether to participate in the stock market or to only invest in riskless assets (Bertaut and Haliassos, 1997; Haliassos and Michaelides, 2003; Gomes and Michaelides, 2005).

A Key features of the model

Here we summarize the key features of the model.

Agents Agents are born 20 and live for a maximum of 80 periods and face mortality risk in each period of life t. Each individual will work until they reach retirement age, which we define as age 65. Individual i maximizes expected discounted lifetime utility

$$E_t \sum_{t=20}^{100} \delta^{t-1} \left[\prod_{k=1}^{t} p_k \right] \frac{C_t^{1-\gamma}}{1-\gamma}, \tag{2}$$

where δ is the discount factor, p_t is the conditional probability of survival from age t to $t+1$, C_t consumption at age t, and γ the relative risk aversion.

Labor market Individuals can have three distinct employment states $s \in S = \{e, u_s, u_l\}$, which are employment ($e$), short-term unemployment (u_s), and long-term unemployment (u_l). The transition matrix for these three employment states is given by the matrix $\Pi(S', S) = [\pi_{ij}]$, with $i, j = e, u_s, u_l$:

$$\Pi(S', S) = \begin{pmatrix} \pi_{ee} & \pi_{eu_s} & \pi_{eu_l} \\ \pi_{u_s e} & \pi_{u_s u_s} & \pi_{u_s u_l} \\ \pi_{u_l e} & \pi_{u_s u_l} & \pi_{u_l u_l} \end{pmatrix}. \tag{3}$$

In case of employment, individuals earn a labor income Y_t:

$$Y_t = \begin{cases} f_t P_t \Theta_t & \text{for } t = 1, \ldots, K-1 \text{ if } s = e, \\ \lambda_k f_{t-\tau} P_{t-\tau} & \text{for } t = 1, \ldots, K-1 \text{ if } s = u_k, k = s, l, \end{cases} \tag{4}$$

where $f_t = f(Z_{it})$ is a function of a vector Z_{it} that contains individual characteristics age, family, marital status, and household composition (Cocco et al., 2005). Labor income (that agents earn in the employment state) consists of a transitory component Θ, which is an i.i.d. shock to labor income distributed as $\Theta_t \sim LN(-\sigma_\theta/2, \sigma_\theta^2)$ and a permanent component that evolves according to

$$P_{t+1} = \begin{cases} U_{t+1} P_t & \text{for } t = 1, \ldots, K-1 \text{ if } s = e, \\ P_t & \text{for } t = 1, \ldots, K-1 \text{ if } s = u_k, k = s, l, \end{cases} \tag{5}$$

where U_{t+1} is a log-normally distributed shock to the permanent component of labor income with $U_t \sim LN(-\sigma_u/2, \sigma_u^2)$.

In case of employment ($s = e$), individuals receive stochastic income that consists of a transitory component Θ_t and a permanent component P_t. In case of unemployment ($s = u_k, k = s, l$), individuals receive the benefit replacement ratio $\lambda_k = [\lambda_{u_s}, \lambda_{u_l}]$, which is a constant fraction of the individual's permanent labor income based upon the last period of employment. Note that unemployment insurance is larger for individuals under short-term unemployment than for those who are long-term unemployed ($\lambda_{u_s} > \lambda_{u_l}$).[12]

In addition to the three employment states for individuals, there is aggregate risk $\Omega(R', R) = [p_{i,j}]$, with $i, j = b, r$, which are recessionary (r) and boom (b) periods:

$$\Omega(R', R) = \begin{pmatrix} \omega_{b,b} & \omega_{b,r} \\ \omega_{r,br} & \omega_{r,r} \end{pmatrix}, \tag{6}$$

where each element $\omega_{ij} = Prob\{t+1 = j | t = i\}$ represents the probability that a particular business cycle state i is followed by state j. We allow idiosyncratic transitions $\Pi(S', S)$ to differ between booms and recessions, in order to capture the cyclicality of unemployment risk. As idiosyncratic income dynamics follow a random walk, we follow Deaton (1989) and express all variables relative to permanent income P_t. From now on, we use $\tilde{x}_t$ to denote $\frac{x_t}{P_t f_t}$.

Investment Individuals have access to capital markets and can either invest in riskless (bonds) or in risky assets (stocks). Each period, after individuals decide their consumption, they decide

[12] Once agents reach retirement age, they receive social security benefits, which are a constant fraction λ_r of the individual's permanent labor income earned in the last period of working life: $Y_t = \lambda_r f_{64} P_{64}$, for $t = 65, \ldots, 100$.

whether or n ot to enter the risky asset market, and in case of entry, they pay a per-period participation cost κ that is a fixed fraction of their permanent income P_t. The riskless bond has a constant gross real return of R_f, whereas equity earns a gross real return of R_t that is assumed to be independently and identically distributed as $R_t \sim LN(ln(R_f + \mu) - \sigma_\zeta/2, \sigma_\zeta^2)$. Excess returns are then composed of the equity premia μ with a disturbance term ζ:

$$R_t - R_f = \mu + \zeta_t. \tag{7}$$

We assume that during recessions, the excess equity premium is lower than in boom periods ($\mu_r > \mu_b$) with higher uncertainty ($\sigma^2_{\zeta,r} > \sigma^2_{\zeta,b}$).

In case of participation, cash-on-hand in period $t+1$ is then defined as

$$\tilde{M}_{t+1} = [\alpha_t R_{t+1} + (1-\alpha_t)R_f] \frac{(\tilde{A}_t - \kappa)f_t}{U_{t+1}f_{t+1}} + \Theta_{t+1}, \tag{8}$$

where $\tilde{A}_t = \tilde{M}_t - \tilde{C}_t$ reflects savings after consumption and $\frac{f_{t+1}}{f_t}$ reflect the growth rate of the deterministic part of labor income. The term α_t stands for the proportion of savings invested in stocks at time t. In case of non-participation, cash-on-hand in period $t+1$ is defined as

$$\tilde{M}_{t+1} = R_f \frac{\tilde{A}_t f_t}{U_{t+1}f_{t+1}} + \Theta_{t+1}. \tag{9}$$

Calibration The main objective of the model is to quantify the partial effect of cyclical unemployment risk on Black and white portfolio choices rather than perfectly matching the entire portfolio profile. Therefore, we calibrate the model for both Black and white households to match the average white household, except along two dimensions. First, we calibrate the transition matrices for employment states during recession and boom periods using the labor market flows from our empirical analysis of the 1980-2020 period; additionally, we target Black and white unemployment rates.[13] For Black workers, the transition matrix Π_b^i is

$$\Pi_b^b(S', S) = \begin{pmatrix} 0.95 & 0.05 & 0 \\ 0.83 & 0 & 0.17 \\ 0.12 & 0 & 0.78 \end{pmatrix} \quad \Pi_b^r(S', S) = \begin{pmatrix} 0.95 & 0.05 & 0 \\ 0.76 & 0 & 0.24 \\ 0.10 & 0 & 0.90 \end{pmatrix} \tag{10}$$

[13]The actual Black and white unemployment rates are 10.6% and 4.9%, respectively, and our model yields an unemployment rate of 10.5% for Black and 4.8% for white.

where i indicates the state of the economy (boom/recession), and the corresponding white transition matrix Π_w^i is

$$\Pi_w^b(S',S) = \begin{pmatrix} 0.97 & 0.03 & 0 \\ 0.93 & 0 & 0.07 \\ 0.14 & 0 & 0.85 \end{pmatrix} \quad \Pi_w^r(S',S) = \begin{pmatrix} 0.96 & 0.04 & 0 \\ 0.89 & 0 & 0.11 \\ 0.13 & 0 & 0.87 \end{pmatrix}. \tag{11}$$

Second, we also allow for racial differences in unemployment benefit replacement rates, λ_{u_s} and λ_{u_l}. According to Skandalis et al. (2022), Black Americans are exposed to higher denial rates when applying for unemployment insurance, resulting in 18% lower replacement rates than white Americans. We apply this gap for our λ_{u_s} and λ_{u_l} for Black and white workers. For short-term unemployment, we set $\lambda_{u_s}^{Black} = 0.29$ and $\lambda_{u_s}^{White} = 0.36$, and for long-term unemployment, we set $\lambda_{u_l}^{Black} = 0.10$ and $\lambda_{u_l}^{White} = 0.12$. Other than this, we calibrate the model using methods standard to the literature, see Table D.1 in Appendix D.

B Results

In Table 2, we present results from simulating the calibrated model. We simulate the life-cycle cycle for 10,000 individuals and draw for each person a 40-year observation period in line with the empirical analysis. Averaging across these individual histories yields the average portfolio difference between Black and white households from the model, which we can compare to the empirical analysis. Our main measure of interest is the white-to-Black difference in the equity shares of their respective financial wealth portfolios ($\alpha^w - \alpha^b$). In addition to this, we also present in the second row of Table 2 the racial differences in stock market participation (the absolute white-to-Black difference in population shares with $\alpha > 0$). We compare our model predictions to the data. According to the SCF for the years 1983-2019, the average white-to-Black difference in stock market participation amounts to around 23 percentage points, while the racial gap in equity shares is around 8 percentage points (see column 1 of Table 2). Columns 2 to 5 present our model simulation results. Our benchmark specification is the one where we introduce racial differences in unemployment risk using two factors: (i) race-dependent cyclical labor market transition rates and (ii) racial differences in unemployment insurance benefits receipt (column 2 of Table 2). In column 3, we also present simulation results under the assumption of equal unemployment benefit replacement rates (λ_{u_s} and λ_{u_l}) across the two groups. Also, we investigate the importance of UE rates on the equity investment gap by assuming only racial differences in EU rates, see column 4. Finally, we also take into account skill losses from job loss that lead to large and persistent earnings losses (Jacobson et al., 1993; Couch and Placzek, 2010). Specifically, we assume that individuals who start a job after long-term unemployment receive a 15% negative permanent earnings shock. Results are presented in column 5.

Our results demonstrate the importance of cyclical unemployment risk in explaining the

Table 2: Data vs. Model: White-to-Black equity gaps

		Model			
	(1) Data (SCF)	(2) Benchmark	(3) No UI gap	(4) Same UE rates	(5) Skill loss
Equity share gap ($\alpha^w - \alpha^b$)	8.2 p.p.	7.1 p.p.	6.4 p.p.	3.1 p.p.	7.9 p.p.
Stock market participation gap	22.6 p.p	3.7 p.p.	2.8 p.p.	0.1 p.p.	4.6 p.p.

Notes: The first column presents the average white-to-Black gap in stock market participation rates and the racial gap in equity shares of financial wealth portfolios from 1983-2019. In columns 2-5, we present the simulated values based on the life-cycle model with portfolio choices. Column 2 presents our benchmark results, where we allow for race-specific cyclical unemployment risk and UI rates. In Column 3, we present the results relying only on racial differences in cyclical unemployment risk. Column 4 presents the results when we only allow for racial differences in EU rates, but not in their UE rates. In Column 5 we allow for skill loss during long-term unemployment, which results in 15% lower wages than those who were not unemployed. *Data source*: SCF+ and own calculations.

racial gap in equity investment. In our baseline model, the higher unemployment risk faced by Black Americans explains around 90% of the differences in equity shares in financial wealth portfolios and around 20% of the actual stock market participation gap. Looking at the different dimensions of racial labor market gaps, we obtain further insights into their relative importance in accounting for these results. First, we find that differences in unemployment insurance benefits seems to play an important role for the decision to participate in the stock market (column 3 of Table 2). Since all racial groups face the same income reduction during unemployment, this buffers against the higher cyclical unemployment risk faced by Black individuals and lowers their cost of participating in the stock market. Additionally, cyclical unemployment risk is important for portfolio choice, especially individuals' UE rates. If Black and white Americans faced the same UE rates and differed only in their EU rates and unemployment insurance benefits receipt, then the Black-to-white stock market participation gap would decrease to 0.1 p.p., while the equity share gap would fall to 3.1 p.p., or 40% of the observed gap. Thus, our results demonstrate that Black agents anticipate that they are more likely to remain unemployed in the future once they enter unemployment and therefore optimally decrease their shares in risky assets in order to mitigate large simultaneous losses in income and wealth. Finally, we get the largest racial investment gap if we also incorporate skill losses from long-term unemployment. In this case, the racial stock market participation gap increases by 24% compared to the benchmark scenario, while the racial gap in equity shares also increases by 11%.

Given our model results, we investigate in a final step the contribution of racial differences in unemployment risk, and the resulting investment differences, for the evolution of the racial wealth gap in the spirit of Derenoncourt et al. (2022). The counterfactual that we are interested

in is the following: what would the racial wealth gap look like if Black Americans faced the same cyclical unemployment risk as white Americans, thus investing $\alpha^w - \alpha^b = 7.1$ p.p. more of their financial wealth in equity? For simplicity, we assume that all investment decisions are made in this year, and households subsequently only accumulate capital gains on their 1983 portfolios. Thus, we are neglecting any additional positive effects of lower unemployment risk on other dimensions wealth convergence, such as savings.

We start in 1983, since this is the first post-1980 wave of the SCF. Our counterfactual Black wealth series $\hat{W}_t^b$ is then constructed as follows:

$$\hat{W}_t^b = W_t^b + \sum_{t=1984}^{2019} q_{t,t-1}^{equity} \cdot \hat{A}_{t-1}^{equity,b}, \text{where} \tag{12}$$

$$\hat{A}_t^{equity,b} = \left[A_{1983}^{equity,b} + (\alpha^w - \alpha^b) \cdot FW_{1983}^b\right] \cdot \prod_{t=1984}^{2019} (1 + q_{t,t-1}^{equity}) \tag{13}$$

where W_t^b is the total wealth of Black households at time t and $q_{t,t-1}^{equity}$ are the capital gains in the equity market between time $t-1$ and t.[14] We denote actual Black equity wealth by $A_t^{equity,b}$. $\hat{A}_t^{equity,b}$ represents the counterfactual equity wealth of Black Americans if they invested more of their 1983 financial wealth FW_{1983}^b in stocks, given the same cyclical unemployment risk as white Americans. Since we are only interested in the additional contribution of capital gains under identical cyclical unemployment risk across racial groups, we multiply the initial equity wealth of 1983 by capital gain rates in the stock market and neglect any changes in $\hat{A}_t^{equity,b}$ that would result from changes in savings behavior.

In Figure 4, we present the counterfactual white-to-Black wealth gap under identical unemployment risk for the two groups ($W_t^w/\hat{W}_t^b$, solid blue line), as well as the observed white-to-Black gap (W_t^w/W_t^b, dashed black line). In the data, we observe an increase in the racial wealth gap of 15% during the last 40 years, with the gap increasing from 5.7 in 1983 to 6.6 in 2019. In the scenario where Black and white Americans have identical cyclical unemployment risk, our simulation shows that the wealth gap would follow dynamics similar but muted dynamics to those of the observed gap, but the gap would only increase by 3%. This is 80.9% less than the actual divergence, thus highlighting the importance of equity investment for racial wealth convergence.

III Conclusion

We study the contribution of greater cyclical unemployment risk faced by Black Americans on racial wealth disparities. Strong correlations between unemployment risk and stock market returns lead to lower equity investment of households. This, in turn, has negative consequences

[14] Equity market capital gains are obtained from the Jordà-Schularick-Taylor Macrohistory Database.

Figure 3: Racial wealth gap without racial differences in unemployment risk: 1983-2019

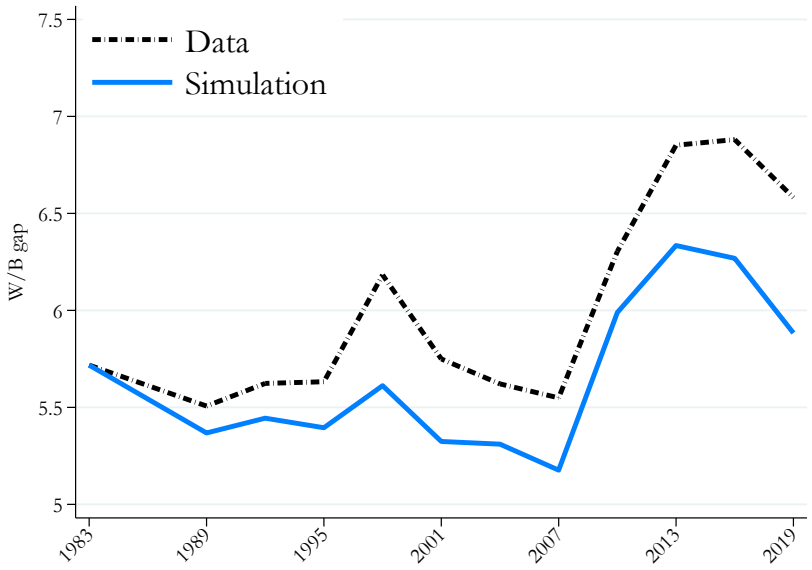


Figure 4: Wealth gap without unemployment risk

Notes: Simulated white-to-Black financial wealth gap series from 1980-2020. In the left panel, we present the counterfactual white-to-Black wealth gap if Black households faced the same degree of cyclical unemployment risk as white households in 1983, resulting in a greater equity share of their financial wealth. We then simulate increases in wealth for the two groups stemming solely from capital gains from the stock market (solid blue line). We also present the actual white-to-Black wealth gap (black dashed line). In the right panel, we present the S&P 500 stock price index. *Data sources:* SCF+, Derenoncourt et al. (2022), and Shiller (2015).

for their wealth accumulation, since the equity market yields high returns compared to other asset markets. Our study confirms that this channel plays an important role in explaining the large gap in Black and white Americans' equity wealth, which in turn has led to racial wealth divergence in the US since the 1980s.

While the current policy debate concentrates on enhancing financial inclusion of minorities, our results provide a new perspective: unless labor market conditions improve for Black Americans, entering the stock market will lead to higher risk exposure and thus have negative effects on their life-cycle consumption and welfare. In times of flourishing equity prices, this optimal lower equity investment will result in larger racial wealth gaps.

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Online appendix for "Unemployment risk, portfolio choice, and the racial wealth gap"

Appendix A Racial differences in stock investment: Survey of Consumer Finances

In this section, we document stylized facts on the racial equity gap in the US by utilizing micro-level household survey data of the Survey of Consumer Finances during 1983-2019. To be consistent with our model, we classify financial assets in the SCF into two categories: *safe* and *risky*. Risky financial assets include directly held stocks, as well as indirectly held stocks in form of mutual funds and DC pensions. Safe assets are then total financial assets net of risky assets, such as checking accounts, saving accounts, money market accounts, certificates of deposit, the cash value of life insurance, US government or state funds, mutual funds invested in fixed-income assets, trusts and annuities invested in bonds and money markets, and DC pension wealth that is invested in fixed-income assets. We start by providing descriptive statistics on these two measures, together with total financial wealth and total net wealth in Table A.1.

Table A.1: Portfolio composition, 1983-2019

	Average value ($)			Participation (%)	
	Black	White	W/B	Black	White
Total financial assets	47087.91	252861.20	5.37		
Risky	13021.11	90466.79	6.95	27.59	50.21
Safe	34066.80	162394.40	4.77	83.20	96.06
Net wealth	110611.40	576743.80	5.21		

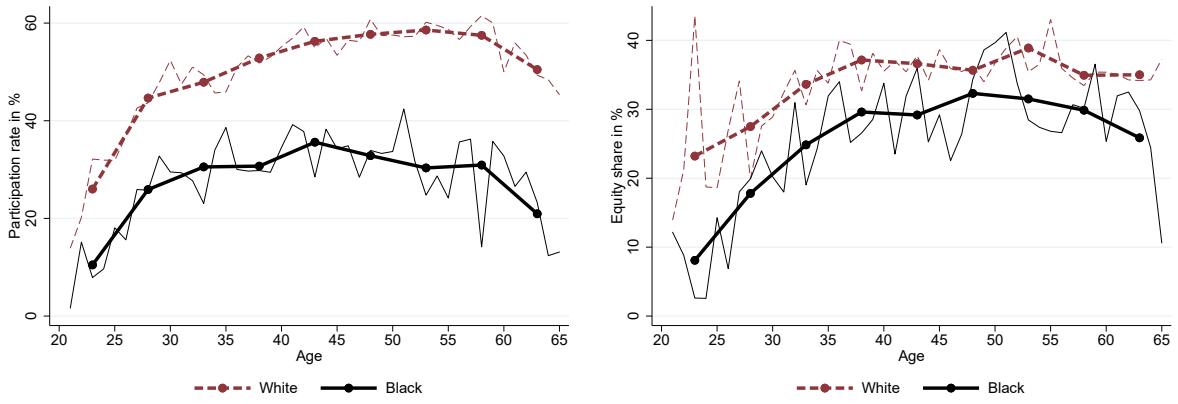
Notes: Average financial wealth composition of Black and white households over 1983-2019. Columns 1 and 2 present the average value of assets (in $2019), with column 3 visualizing the white-to-Black ratio of these values. The next two columns (4-5) present the participation rates of Black and white households in the risky and safe asset market (full participation would be 100); *Data sources*: SCF.

Indeed, we observe large racial disparities in financial wealth. On average, white households have around 5 time higher financial wealth than Black, with larger gaps in risky financial wealth holdings (the gap is 7:1, as opposed to 5:1 for safe financial assets). Also, the participation rates in risky and safe asset markets differ largely across the two racial groups. While almost all white households participate in the safe asset market (96%), only 83% of total Black households hold

safe assets. In terms of risky asset market participation, Black households' participation rates are only half of the rates of their white counterparts. Overall, compared to the white-to-Black gap in net wealth (which is around 5.2 during 1983-2019), the white-to-Black financial wealth gap is slightly higher (5.4).

We now present the gap in risky asset wealth over the life cycle, see Figure A.1. In panel (a) we visualize the average stock market participation rates of Black and white households in the US and in panel (b) the share of equity of their total financial assets. Consistent with the results in Table A.1, white households' participation in the equity market is consistently higher than Black households, irrelevant of age (Figure A.1a. Averaging over all age groups, white stock market participation is around 50%, while it is only 30% for Black households. Both groups exhibit a hump shape: they start with low equity ownership rates when they are young (between 15%-20%), which steadily increase as they get older. However, while participation rates of white peak around the age 55-60, right before their average retirement age, Black households' participation rate already starts to decrease from the age of 45. Also in terms of portfolio composition, white households have 10 percentage points higher shares in their total financial assets invested in equity, irrelevant of their position in the life cycle.

Figure A.1: Racial differences in equity investment over the life cycle



(a) Stock market participation

(b) Equity shares

Notes: Panel (a) represents equity ownership, while panel (b) presents the share of total financial wealth invested in equity. The black thin solid line represents Black households, while the maroon thin dashed line represents white households. Thick solid lines with dots are the average within age bins of 21-25, 26-30, 31-35, 36-40, 41-45, 46-50, 51-55, 56-60, 61-65, and 66-70. *Data source:* SCF.

Appendix B Labor market flows: Current Population Survey

We provide descriptive statistics of the average labor market outcomes of Black and white Americans using data of the Current Population Survey during 1980-2020. For our analysis, we consider individuals that are between the age of 20-64. Our definition of white is non-Hispanic white and Black includes also only non-Hispanic Black.

We observe significant differences in labor market flows across Black and white Americans, see Table B.1. Black Americans are consistently worse off in the labor market: They are more likely to become unemployed from employment (2.1% vs. 1.3%), as well as to exit the labor force (EN rate). Conditional on being unemployed, they are less likely to find a job (19.5% vs 27.7%), and more likely to stay unemployed (56.7% vs. 53.8%) or exit the labor force (23.8% vs. 18.5%). Black American's probability of finding a job from not participating in the labor force is slightly higher than white (NE), however, they are also more likely to switch to unemployment from non-participation (NU).

Table B.1: Labor market flows of Black and white Americans, 1980-2020

	Black	White
Employed-to-Employed (EE)	94.9%	96.6%
Employed-to-Unemployed (EU)	2.1%	1.3%
Employed-to-NLFP (EN)	3.0%	2.1%
Unemployed-to-Employed (UE)	19.5%	27.7%
Unemployed-to-Unemployed (UU)	56.7%	53.8%
Unemployed-to-NLFP (UN)	23.8%	18.5%
NLFP-to-Employed (NE)	6.4%	6.3%
NLFP-to-Unemployed (NU)	6.0%	3.1%
UE conditional on duration		
≤ 1 year unemployed	22.2%	30.0%
> 1 year unemployed	11.4%	13.4%
Labor force participation (LFP)	73.7%	77.9%
Unemployment (U)	10.6%	5.0%

Notes: Labor market indicators, as well as flows during January 1980 - December 2020. *Data source*: CPS.

Appendix C The left tail of the income distribution

We utilize PSID's total annual labor income data of household heads during 1980-2019 to investigate the correlation between the change in the lower income distribution and stock market return dynamics. Labor income includes individual's wage and salary (pre-tax and pre-government transfers) of the *previous* year of the survey year. We do not include salary from self-employment (business and farm income). We investigate the income distribution for two racial groups (Black vs. white), with white including non-Hispanic whites and Black including non-Hispanic Blacks. We further restrict our sample size by considering only household heads between the age of 20 and 64. In terms of data cleaning, we follow Busch et al. (2022) and focus on the representative SRC sample in the PSID. Furthermore, we control for top 1% outliers and consider yearly labor earnings that are above the earnings level that corresponds to 520 hours of employment at half the legal minimum wage.Busch et al. (2022) use the federal minimum wage of 2010.

In Table C.1 we present our final sample size for Black and white household heads during 1978-2019.

Table C.1: Sample selection, 1978-2019

	Black	White
Initial PSID 1978-2019	652,976	652,976
Keep SRC Sample	355,957	355,957
Household head by race	12,263	121,391
Drop if no obs in inc, college, or hours	10,942	112,572
Drop top 1%	10,833	111,563
Drop if Income $< 0.5 * 520 * minwage$	7,485	82,648
Age selection: [20,64]	7,204	78,475

Notes: Final number of observations of Black and white household heads after sample selection. *Data source*: PSID.

C.1 Robustness checks for cyclicality of L5010

In this section, we provide some robustness checks on the cyclicality of the left tail of Black and white income growth distribution. First, instead of stock market returns, we use GDP growth rates as a further indicator of the business cycle. Second, we do not restrict our sample to income that are above the minimum wage threshold. For this exercise, we provide results for both GDP growth and stock market returns on the right hand side.

Our robustness exercises confirm that Black American's L5010 responds much more strongly to business cycle fluctuations than white. When using GDP growth instead of equity returns on

the right hand side, we still observe a stronger response for Black than white (even though the β is only significant at the 10% level for Black household heads). When not imposing a threshold for income (row 3-4 of Table C.2), we observe much stronger responses of the Black L5010 (-0.86 vs. -0.67 when R_t^{equ}, -2.95 vs. -2.17 when GDP growth rate), while the response of white is only marginally higher (-0.33 vs. -0.32 when R_t^{equ}, -1.38 vs. -1.09 when GDP growth rate). This indicates that a significant amount of Black household heads earn less than the minimum wage, which are very cyclical to business cycle fluctuations.

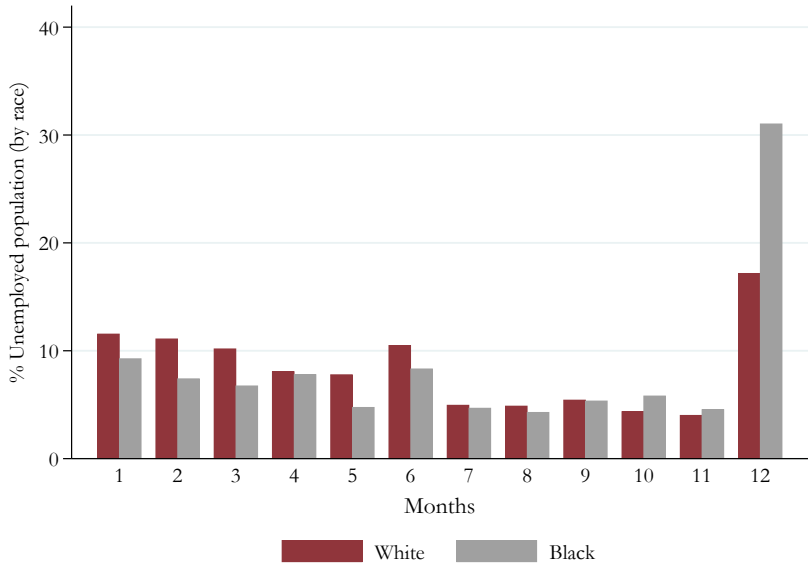
Table C.2: Cyclicality of Black and white unemployment risk

	$L5010^{Black}$	$L5010^{White}$
R_t^{equ} (Benchmark)	-0.67^{***}	-0.32^{***}
	(0.24)	(0.07)
GDP growth instead of R_t^{equ}	-2.17^{*}	-1.08^{***}
	(1.20)	(0.38)
No income restriction		
R_t^{equ}	-0.86^{**}	-0.33^{***}
	(0.33)	(0.07)
GDP growth instead of R_t^{equ}	-2.95^{***}	-1.38^{***}
	(1.00)	(0.38)

Notes: Each cell reports the cyclicality coefficient β in a regression of the moment specified in the column header plus a constant and a time trend. Newey-West t-statistics are in parentheses. $*$, $**$, and $***$ represent statistical significance at the 10%, 5%, and 1% levels, respectively. *Data source*: PSID.

C.2 Distribution of unemployment duration by race

Figure C.1: Distribution of unemployment duration by race



Notes: This figure presents the unemployment duration (months) of household heads. *Data sources*: PSID.

Appendix D Calibration

We calibrate our life-cycle model with portfolio choices for Black and whtie separately. Table D.1 presents the parameter values of our model that are equal across the two racial groups. Besides this, we allow only for racial differences in (i) transition probabilities in employment stages and (ii) the unemployment insurance rates.[15]

First, we chose the transition probabilities such that the unconditional unemployment rate matches for Black and white Americans during boom and recessionary periods. For Black, the transition matrix Π_b^i, where i indicates the state of economy (boom/recession), is then

$$\Pi_b^b(S', S) = \begin{pmatrix} 0.95 & 0.05 & 0 \\ 0.83 & 0 & 0.17 \\ 0.12 & 0 & 0.78 \end{pmatrix} \quad \Pi_b^r(S', S) = \begin{pmatrix} 0.95 & 0.05 & 0 \\ 0.76 & 0 & 0.24 \\ 0.10 & 0 & 0.90 \end{pmatrix} \tag{14}$$

and white transition matrix Π_w^i is as the following:

$$\Pi_w^b(S', S) = \begin{pmatrix} 0.97 & 0.03 & 0 \\ 0.93 & 0 & 0.07 \\ 0.14 & 0 & 0.85 \end{pmatrix} \quad \Pi_w^r(S', S) = \begin{pmatrix} 0.96 & 0.04 & 0 \\ 0.89 & 0 & 0.11 \\ 0.13 & 0 & 0.87 \end{pmatrix}. \tag{15}$$

Second, we also allow for racial differences in λ_{u_s} and λ_{u_l}. According to Skandalis et al. (2022), Black Americans are exposed to higher denial rates when applying for unemployment insurance, resulting in 18 p.p. lower replacement rates than white Americans. We integrate this gap for our λ_{u_s} and λ_{u_l} for Black and white, see Table D.2.[16]

[15] Note that we assume that labor income processes do not differ across race, meaning that once they are employed, they receive the same labor income.

[16] Note that Skandalis et al. (2022) do not provide evidence on the racial gap in unemployment insurance rates conditional on long-term unemployment. Taking Bremus and Kuzin (2014)' values on the average gross rate for unemployment benefits under five year unemployment, we assume that the gap under unemployment is also 18 p.p. as by short-term unemployment.

Table D.1: Equal parameters across Black and white agents

Parameter	Description	Value
T	Life span (20 to 100)	81
K	Average retirement age	65
γ	Relative risk aversion coefficient	6
δ	Discount factor	0.96
R_f	Riskless interest rate	1.03
μ_b	Equity premium (boom)	0.04
μ_r	Equity premium (recessions)	-0.11
$\sigma^2_{\zeta,b}$	Equity premium volatility (boom)	0.13^2
$\sigma^2_{\zeta,r}$	Equity premium volatility (recessions)	0.22^2
σ^2_u	Variance of shock to permanent labor earnings	0.01
σ^2_θ	Variance of transitory shock to labor income	0.07
λ	Benefit replacement rate (retirement)	0.55
p_{bb}	Transition rates from boom-boom	0.97
p_{rr}	Transition rates from recession-recession	0.90
SM	Stock market participation cost	0.05

Table D.2: Unemployment insurance rates: Black vs. white

Parameter	Description	Black	White
λ_{u_s}	Benefit replacement rate (short term unemployment)	0.29	0.36
λ_{u_l}	Benefit replacement rate (long term unemployment)	0.10	0.12