Race and Economic Well-Being in the United States

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Abstract

We construct a measure of consumption-equivalent welfare for Black and White Americans. Our statistic incorporates life expectancy, consumption, leisure, and inequality, with mortality rates playing a key role quantitatively. According to our estimates, welfare for Black Americans was 45% of that for White Americans in 1984 and rose to 64% by 2019. Going back further in time (albeit with more limited data), the gap was even larger, with Black welfare equal to just 28% of White welfare in 1940. On the one hand, there has been remarkable progress for Black Americans: the level of their consumption-equivalent welfare increased by a factor of 30 between 1940 and 2019, when aggregate consumption per person rose a more modest 5-fold. On the other hand, despite this remarkable progress, the welfare gap in 2019 remains disconcertingly large. Mortality from COVID-19 has temporarily reversed a decade of progress, lowering Black welfare by 17% while reducing White welfare by 10%.

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1. Introduction

An enormous literature has documented large and persistent differences in economic outcomes by race in the United States. Chetty, Hendren, Jones and Porter (2020) find persistent disparities in income and earnings between Black and White Americans in recent decades. Case and Deaton (2015, 2017) emphasize the recent decline in life expectancy for White men, in particular those with less then average education. Chetty, Stepner, Abraham, Lin, Scuderi, Turner, Bergeron and Cutler (2016) find rising differences in life expectancy by income over time.

We follow Jones and Klenow (2016) in combining many factors into a single, utility-based welfare metric. Rather than study a panel of countries, however, we focus on race within the United States. We incorporate micro data on consumption, mortality, leisure, inequality in consumption and inequality in leisure to estimate consumption-equivalent welfare by race in recent decades. In a related paper, Falcettoni and Nygaard (2020) look at welfare across U.S. states and embed education in a novel way, but do not concentrate on patterns by race. Karger (2020) focuses on the lifetime earnings of Black versus White males, and finds substantial convergence early in the century but then little afterward.

Our main sample is currently 1984 through 2019. We rely on U.S. Consumer Expenditure Surveys for data on consumption and the U.S. Current Population Surveys for data on hours worked. We use the U.S. Center for Disease Control's (CDC) Life Tables for data on survival rates.

We find a large welfare difference at the end of our sample: consumption-equivalent welfare for Black Americans was only 64% of the level for White Americans in 2019. The gap was even larger in 1984, so Black Americans did show considerable progress in rising from 45% to 64% of White welfare over our sample. The largest contributor to the remaining gap is life expectancy, but consumption growth contributed even more than life expectancy to the convergence in recent decades. Of much lesser importance were changes in mean leisure and in within-group inequality in consumption and leisure.

With less detailed data we can go back several decades before 1984. In particular, we use Census data on income to impute consumption in decennial Census years from 1940 through 2010. Reassuringly, this cruder measure of welfare tracks our more detailed measure in 1990, 2000, and 2010. We estimate that Black welfare was only 28% of White welfare in 1940, but grew substantially in the 1950s and 1960s due to gains in life expectancy.

The rest of the paper is organized as follows. In section 2 we lay out our consumption-equivalent welfare framework. Section 3 describes the datasets and the basic data patterns for life expectancy, consumption, leisure, and inequality. Section 4 discusses how we calibrate key parameters in the utility function while Section 5 presents our welfare results from 1984–2019. In section 6 we report findings with Census data going back to 1940. Section 7 discusses some possible extensions, such as adjusting for morbidity, incarceration, and unemployment. We note in particular the consumption-equivalent loss due to deaths from COVID-19. Section 8 concludes.

2. Expected Utility Framework

Our formulation of lifetime expected utility for an individual of race i is

$$U_i = \sum_{a=0}^{100} \beta^a S_{ia} \cdot \mathbb{E}\left[u(c_{ia}, \ell_{ia})\right].$$

Here a indexes age, $0 < \beta \leq 1$ is the discount factor, S_{ia} is the probability a person survives from birth to age a, c is consumption, and ℓ is leisure. While it is common and most natural to think of applying this equation over time for an individual, we instead apply it to summarize the consumption, leisure, and mortality rates in a cross-section of people at a point in time. This is analogous to how life expectancy is measured by demographers: it is a summary of the cross-section of mortality rates that prevail in a given year. In this sense, our utility function has the following interpretation: consider an individual alive in some year, and suppose that individual lived his or her entire life traveling through the cross-section of consumption, leisure, and mortality rates that prevail in that year. Expected utility would be U_i. In our benchmark calculations that follow, we assume $\beta = 1$, so the only discounting across ages/people in the cross-section occurs because of mortality.

To implement our consumption-equivalent welfare calculation, let $U_i(\lambda)$ denote expected lifetime utility for an individual of race i if consumption is multiplied by a factor λ at each age:

$$U_i(\lambda) = \sum_{a=0}^{100} S_{ia} \cdot \mathbb{E}\left[u(\lambda c_{ia}, \ell_{ia})\right].$$

By what factor λ must we adjust the consumption of all White Americans to make them indifferent between living in the conditions prevailing for Black Americans and their own? That consumption adjustment satisfies

$$U_W(\lambda) = U_B(1). \tag{1}$$

Denoting the sampling weight of an individual j of race i and age a as w^j_{ia}, and the number of individuals of the same race and age as N_{ia}, we replace the expectation operator with the estimate provided by the sample mean:

$$U_i(\lambda) = \sum_{a=0}^{100} S_{ia} \sum_{j=1}^{N_{ia}} w^j_{ia} u(\lambda c^j_{ia}, \ell^j_{ia}).$$

We assume that flow utility takes the following form:

$$u(c, \ell) = \overline{u} + \log(c) + v(\ell)$$

where flow utility from leisure ℓ features a constant Frisch elasticity:

$$v(\ell) = -\frac{\theta\epsilon}{1+\epsilon}(1-\ell)^{\frac{1+\epsilon}{\epsilon}}.$$

Here $\epsilon > 0$ is the Frisch (compensated) elasticity of labor supply, and $\theta > 0$ is a weighting parameter. Average flow utility for an individual of race i and age a can therefore be expressed as:

$$u_{ia} \equiv \sum_{j=1}^{N_{ia}} w_{ia}^{j} u(c_{ia}^{j}, \ell_{ia}^{j}).$$

Solving for the scaling constant in equation (1), we obtain:

$$\log(\lambda) = \frac{1}{\sum_{a=0}^{100} S_{Wa}} \times \sum_{a=0}^{100} \left[u_{Ba}(S_{Ba} - S_{Wa}) + S_{Wa}(u_{Ba} - u_{Wa}) \right]. \tag{2}$$

This equation tells us that White Americans would need to have lower consumption to have the same utility as Black Americans to the extent that the latter have lower life expectancy as well as lower flow utility.

To ease notation, define survival rates normalized by White life expectancy as:

$$s_{Ba} \equiv \frac{S_{Ba}}{\sum_{a=0}^{100} S_{Wa}} \quad \text{and} \quad \Delta s_{Ba} \equiv \frac{S_{Ba} - S_{Wa}}{\sum_{a=0}^{100} S_{Wa}}.$$

Further denote average lifetime utility from consumption and leisure as:

$$\mathbb{E} \log(c_i) \equiv \sum_{a=0}^{100} s_{ia} \sum_{j=1}^{N_{ia}} w_{ia}^{j} \log(c_{ia}^{j}) \quad \text{and} \quad \mathbb{E}\, v(\ell_i) \equiv \sum_{a=0}^{100} s_{ia} \sum_{j=1}^{N_{ia}} w_{ia}^{j} v(\ell_{ia}^{j}).$$

Finally, denote average lifetime consumption and leisure as:

$$\bar{c}_i \equiv \sum_{a=0}^{100} s_{ia} \sum_{j=1}^{N_{ia}} w_{ia}^{j} c_{ia}^{j} \quad \text{and} \quad \bar{\ell}_i \equiv \sum_{a=0}^{100} s_{ia} \sum_{j=1}^{N_{ia}} w_{ia}^{j} \ell_{ia}^{j}.$$

Substituting these definitions into (2), we obtain the following decomposition of consumption-equivalent welfare:

$$
\begin{aligned}
\log(\lambda) = & \sum_{a=0}^{100} \Delta s_{Ba} \cdot u_{Ba} && \text{Life expectancy} \\
& + \log(\bar{c}_B) - \log(\bar{c}_W) && \text{Consumption} \\
& + v(\bar{\ell}_B) - v(\bar{\ell}_W) && \text{Leisure} \\
& + \mathbb{E}\log(c_B) - \log(\bar{c}_B) - [\mathbb{E}\log(c_W) - \log(\bar{c}_W)] && \text{Consumption inequality} \\
& + \mathbb{E}\, v(\ell_B) - v(\bar{\ell}_B) - [\mathbb{E}\, v(\ell_W) - v(\bar{\ell}_W)] && \text{Leisure inequality}
\end{aligned}
\tag{3}
$$

This expression simplifies into an even more intuitive form under a few conditions. Suppose (i) consumption is constant across ages, (ii) consumption is lognormally distributed with variance σ^2, and (iii) leisure is same for all individuals within each race. Under these assumptions, the decomposition in (3) becomes

$$
\begin{aligned}
\log(\lambda^{simple}) = & \frac{e_B - e_W}{e_W} \times [\bar{u} + \log(\bar{c}_B) + v(\bar{\ell}_B) - \sigma_B^2/2] && \text{Life expectancy} \\
& + \log(\bar{c}_B) - \log(\bar{c}_W) && \text{Consumption} \\
& + v(\bar{\ell}_B) - v(\bar{\ell}_W) && \text{Leisure} \\
& + (\sigma_B^2 - \sigma_W^2)/2 && \text{Consumption inequality}
\end{aligned}
$$

The percentage difference in life expectancy ($e_i \equiv \sum_a S_{ia}$) between the two groups matters for consumption-equivalent welfare, with the difference weighted by the average flow utility of one of the groups. With log utility and lognormal shocks, the variance of consumption in the cross-section reduces welfare by the usual factor of 1/2. Finally, a 1% difference in life expectancy is approximately equal to a $\bar{u}$ percent difference in consumption in a year, provided we normalize $\bar{c} = 1$ and the $v(\ell)$ and σ^2 terms are small.

3. Datasets

Our consumption-equivalent welfare calculation requires micro data on survival rates, consumption, and leisure. We draw on three sources: the U.S. Centers for Disease Control and Prevention (CDC) Life Tables, the U.S. Department of Labor's Consumer Expenditure Survey (CEX) and the U.S. Census Bureau's Current Population Survey (CPS).

Racial definitions

In all of the data sources we use, we follow the 1977 Office of Management and Budget (OMB) standards for race and ethnicity. Those standards define four racial groups (White, Black, Native American, and Asian or Pacific Islander) and treat Latin origin as ethnicity, distinct from race.

In 1997 the OMB revised its standards to allow respondents to report two or more racial groups. From 1997 on, therefore, we treat multiple-race observations as fractional and divide each observation's sampling weight by the number of groups reported for that observation. Because Latin origin is not consistently reported over time in some of our data sources, and because the CDC only started publishing Life Tables by Latin origin in 2006, our definition of Black and White Americans includes Americans of Latin origin. For the period in which non-Latinx Black and non-Latinx White Americans are consistently classified, we will report additional results for those sub-groups.

Survival rates

Our data on survival rates comes from the CDC's Life Tables, which are available for the Black and White population since 1890.[1] The 1950 and 1960 (but not 1940) Life Tables cover only White and "non-White" Americans. The 1970 Life Tables include data for both Black and non-White Americans, so we adjust the survival

[1] https://www.cdc.gov/nchs/products/life_tables.htm

rates for non-White Americans in 1950 and 1960 to make them more comparable with data for Black Americans in 1940 and from 1970 onward.

Starting in 2018, the CDC stopped publishing Life Tables for Black and White Americans irrespective of Latin origin. Therefore, for 2018 and 2019 we calculate survival rates using individual death records from the mortality data files of the CDC's National Vital Statistics System (NVSS).[2] Each record contains information on the deceased's gender, race, and age. We then use the CDC's bridged race population estimates to determine the population at risk by gender, race and age in 2018 and 2019.[3]

Figure 1 plots life expectancy at birth for Black and White Americans from 1984 to 2019. Black Americans had about 6 fewer years of life expectancy in 1984 and around 3.5 fewer years in 2019. Lifespans diverged from 1984 to the the mid-1990s before converging sharply through the early 2010s. Life expectancy has leveled-off or fallen for both White and Black Americans in the last decade. Case and Deaton (2015, 2017) attribute this stagnation to "deaths of despair" (suicide, opiod overdoses, and alcohol-related chronic illnesses).

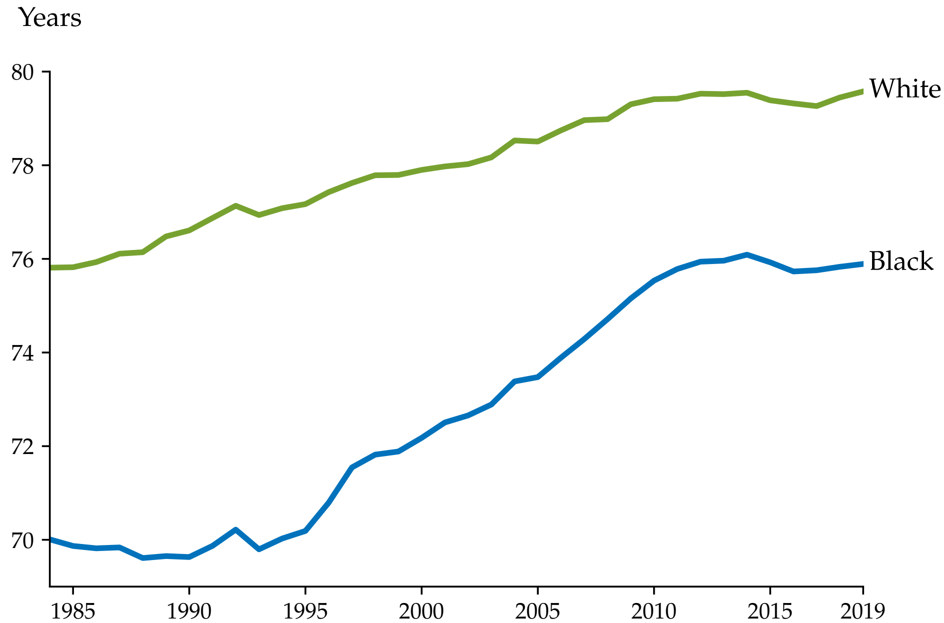
Consumption

Our consumption data comes from the CEX interview samples. For each year from 1984 to 2019, a rotating panel of about 20,000 households are interviewed about their expenditures on hundreds of items for up to four quarters. The survey ask about total household expenditures on each item, but the survey contains the race, age, gender, and educational attainment of each household member.

[2] https://www.cdc.gov/nchs/data_access/vitalstatsonline.htm#Mortality_Multiple

[3] https://wonder.cdc.gov/Bridged-Race-v2019.HTML

Figure 1: Life expectancy at birth by race



Note: Author calculations using data from the CDC.

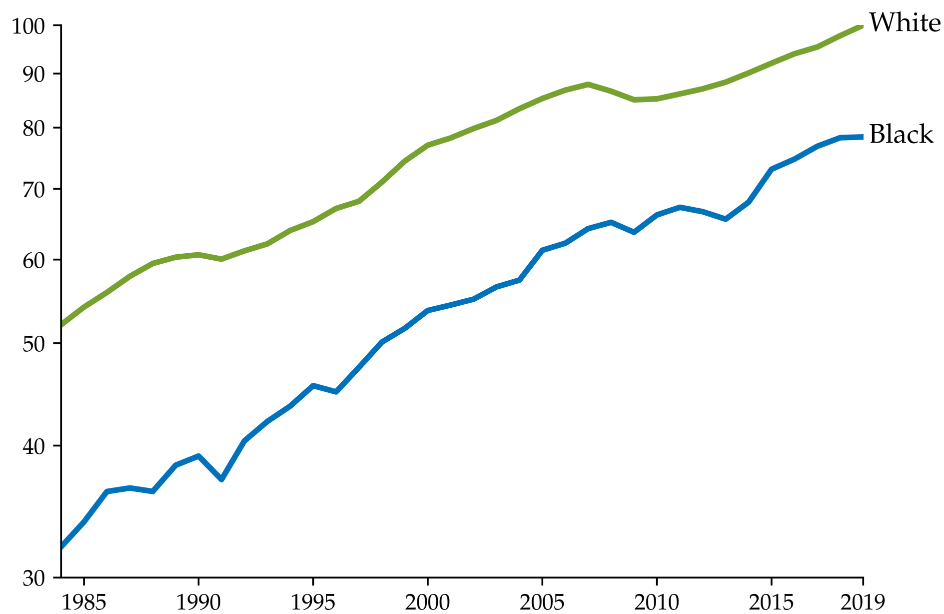
Our measure of household expenditures includes housing (rent paid by renters and self-reported rental equivalence for homeowners). To arrive at a measure of individual consumption, we divide household spending evenly among household members.

As is well-known, consumption expenditures from the CEX do not aggregate to personal consumption expenditures in the National Income and Product Accounts (NIPA); see Aguiar and Bils (2015) for example. We therefore re-scale individual consumption in the CEX such that it aggregates to NIPA personal consumption expenditures per capita in each year from 1984 to 2019.

Figure 2 plots consumption per capita for Black and White Americans when White consumption is normalized to 100 in 2019. Consumption per person was about 38% lower for Black Americans in 1984, but only 22% lower in 2019.

Figure 3 displays the standard deviation of log nondurable consumption across

Figure 2: Consumption per capita by race



Note: Author calculations using data from the U.S. Consumer Expenditure Surveys (CEX). Consumption for White Americans is normalized to 100 in 2019. Log scale.

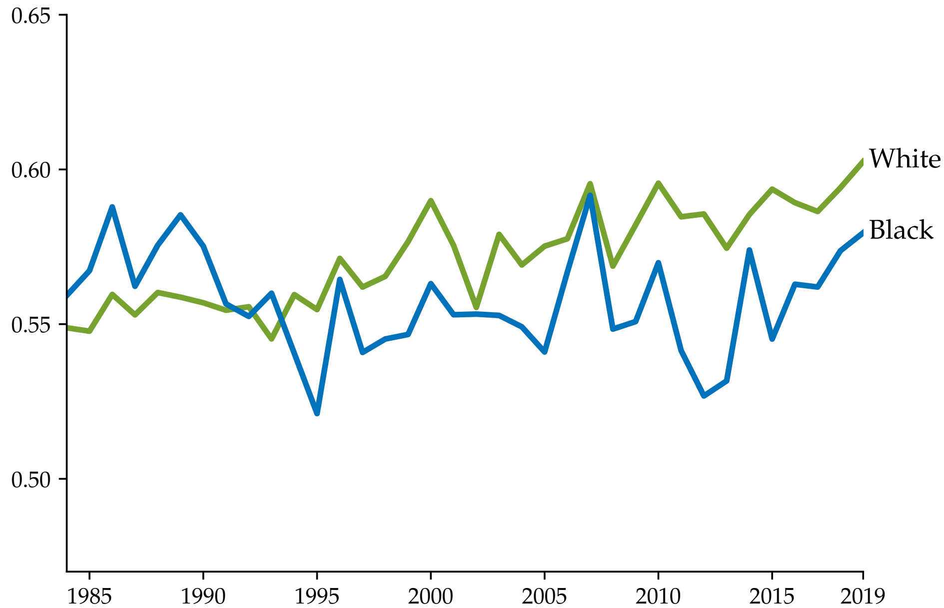
people within a group by year. Consumption dispersion is choppy across years due to modest sample sizes, especially for Black Americans. The standard deviations for both groups hover around 0.6. If consumption is lognormally distributed, then with log utility such inequality lowers consumption-equivalent welfare by 18% for each group.[4]

Leisure

Our leisure estimates are derived from hours worked in the CPS for each year from 1984 to 2019. We define leisure as the fraction of total waking hours that are

[4]In the case of additively separable utility from consumption and lognormally distributed consumption, the loss in consumption-equivalent welfare from behind-the-veil inequality is the coefficient of relative risk aversion times the variance of log consumption divided by two.

Figure 3: Standard deviation of log consumption by race



Note: Author calculations using data from the U.S. Consumer Expenditure Surveys (CEX). For our inequality measures, we use nondurable consumption in order to avoid the overstatement that would otherwise arise from the lumpiness of durable spending.

not spent on market work over the year:

$$\ell \equiv \frac{5,840 - \text{hours worked in the year}}{5,840}.$$

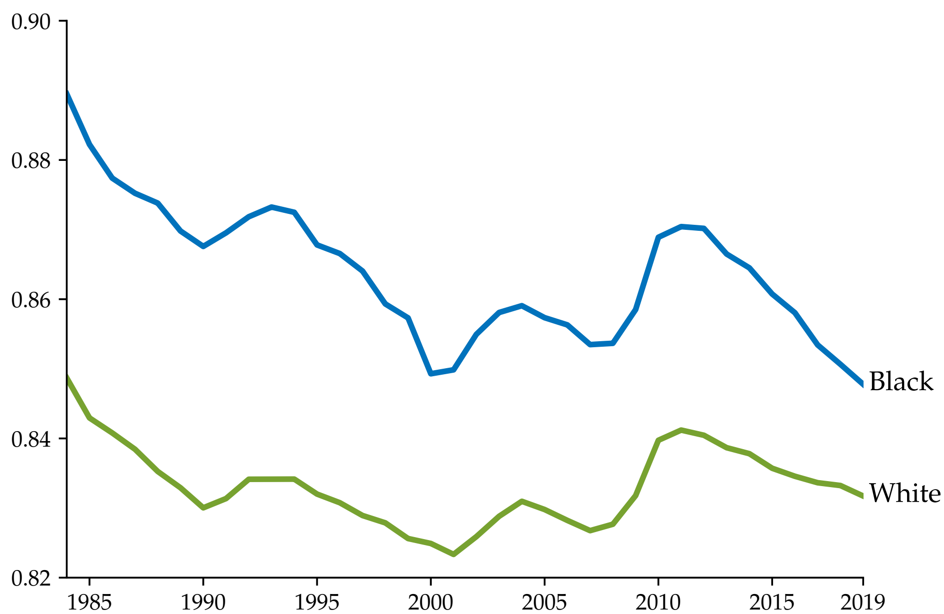
We obtain 5,840 total hours available as the product of 16 hours per day and 365 days.[5] In a rough attempt to account for the division of non-market work, we divide hours worked per year equally among individuals between 25 and 64 years old within each household. For household members outside of this age range, we make no adjustment. The resulting split in leisure time between men and women is similar to that found in Aguiar and Hurst (2007), who carefully delineate leisure from home production work in time-use surveys.

Figure 4 shows that leisure is about four percentage points higher for Black

[5] We use 366 days for leap years and assume 8 hours a day of sleep.

Americans than for White Americans in 1984, but only around two percentage points higher in 2019. There are sizable fluctuations in between, with leisure rising notably for both groups in the 2008–2009 Great Recession and its aftermath. In our extensions in Section 7, we consider the possibility that unemployment yields less utility than other non-work time. This may matter for our comparisons given that unemployment rates are uniformly higher in the CPS for Black Americans than for White Americans over our sample. Incarceration rates are also higher for Black men than for other groups, so we will likewise explore the effect of treating incarceration as providing much lower flow utility.

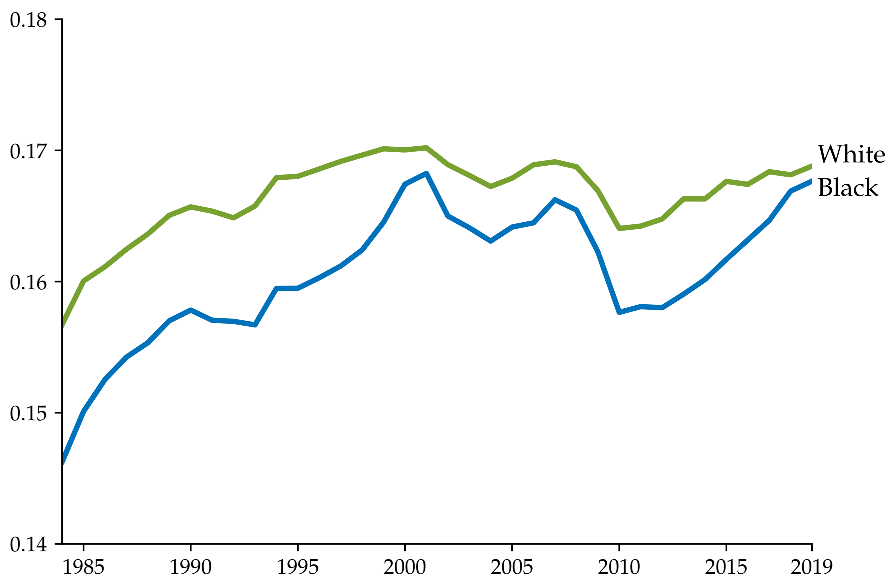
Figure 4: Leisure by race



Note: Author calculations using data from the U.S. Current Population Survey.

Figure 5 compares the standard deviation of leisure across individuals within groups. Just as for consumption, unequal leisure lowers average utility from due to diminishing marginal utility from leisure. Leisure inequality is similar across racial groups, especially at the end of the sample.

Figure 5: Standard deviation of leisure by race



Note: Author calculations using data from the U.S. Current Population Survey.

4. Calibration

We follow Jones and Klenow (2016) in our strategy for setting key parameter values. The five parameters to be calibrated are: the growth rate of consumption g, the discount factor β, the Frisch elasticity ϵ, the utility weight on leisure θ, and the intercept in flow utility $\overline{u}$.

We abstract from growth and pure time discounting by setting $g = 0$ and $\beta = 1$. Note that there is still discounting due to survival probabilities. We will check robustness to a growth rate of 2% per year and a discount factor of $\beta = 0.99$.

We consider a Frisch elasticity of labor supply of 1.0, which implies that the disutility from working rises with the square of the number of hours worked. This is a compromise between Hall (2009), who advocates for a Frisch elasticity of 1.7, and Chetty, Guren, Manoli and Weber (2012), who recommend a value closer to 0.5.

We use the first-order condition for the labor-leisure choice to calibrate the weight on leisure in the utility function. The static first order condition is $u_\ell/u_c = w(1-\tau)$, where w is the real wage and τ is the marginal tax rate on labor income. With log utility from consumption and a constant Frisch elasticity, this implies $\theta = w(1-\tau)(1-\ell)^{-1/\epsilon}/c$. We use the value of $\theta = 14.2$ estimated by Jones and Klenow (2016) to fit this first order condition for the average U.S. worker in 2006.

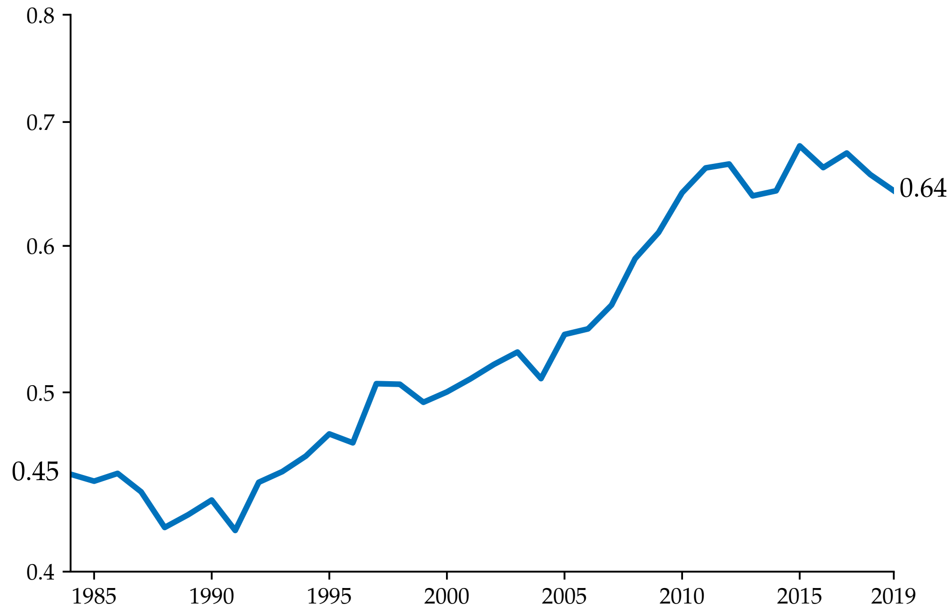
The intercept in flow utility, $\overline{u}$, is critical for valuing differences in mortality. The U.S. Environmental Protection Agency (2020) recommends \$7.4 million for the value of remaining life in 2006 dollars for those age 25 to 55. Hall, Jones and Klenow (2020) use this figure when valuing lives at risk from COVID-19. Matching this number leads to $\overline{u} = 6.23$ when consumption per capita is normalized to 1.0 in 2019. This means that $\overline{u}$ has a natural interpretation for our utility function: one additional year of life is valued at $\overline{u} = 6.23$ years of 2019 consumption.[6]

5. Welfare

We combine our ingredients into a single measure of consumption-equivalent welfare as described in Section 2. Figure 6 plots Black versus White welfare from 1984 through 2019. The initial level in 1984 is surprisingly low at 45%. It rises to around 64% from the mid-1990s to the early 2010s. The gap between Black and White Americans remains disappointingly wide.

[6] An individual with constant consumption by age is indifferent between a 1 percent change in life expectancy and a 6.23 percentage point (log point) change in lifetime consumption. Since we scale both life expectancy and lifetime consumption by total years of life, this yields the interpretation in the main text. Note that this statement incorporates our normalization of per capita consumption in 2019 to the value 1.0 and assumes the other terms in utility are small.

Figure 6: Consumption-Equivalent Welfare, Black vs. White Americans

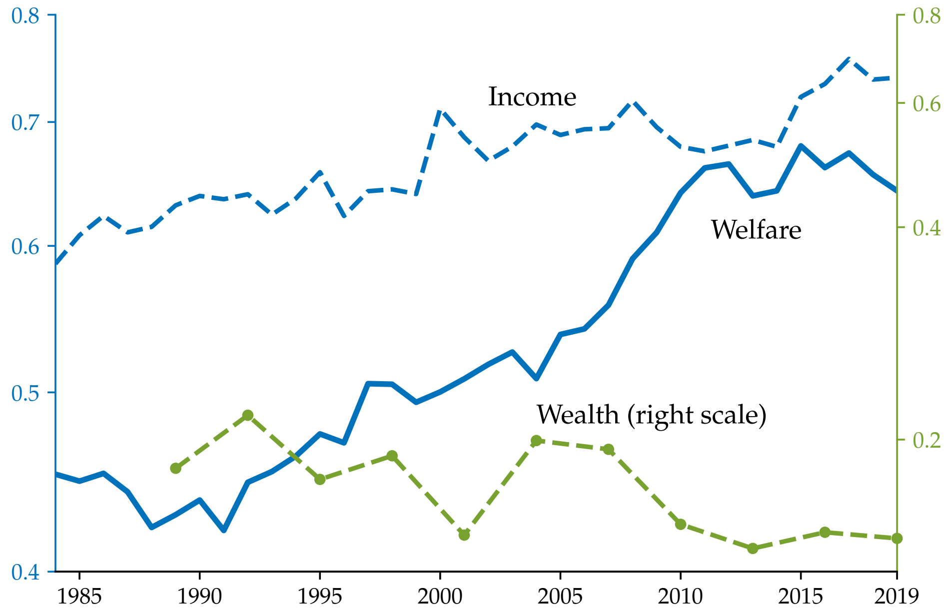


Note: The figure shows the consumption-equivalent welfare for Black relative to White Americans from 1984 to 2019, computed according to equation (3).

Figure 7 also plots income in the CPS and wealth in the Federal Reserve's Survey of Consumer Finances (SCF) for Black relative to White Americans for comparison. Income includes wage, salary, business income, and farm income, but excludes all taxes and transfers. Black relative income was notably higher than Black relative welfare until the 2010s. In contrast, Black relative wealth is significantly lower throughout the period, actually declining in recent years to just 14 percent. This illustrates the contribution of life expectancy and consumption (versus income and wealth) to gaps in welfare.

Table 1 and Figure 8 decompose the drivers of the overall welfare differences using the expression in equation (3). The biggest contributor is life expectancy, followed by consumption. Leisure, inequality in consumption, and inequality in leisure contribute surprisingly little to both levels and trends.

Figure 7: Consumption-Equivalent Welfare, Black vs. White Americans

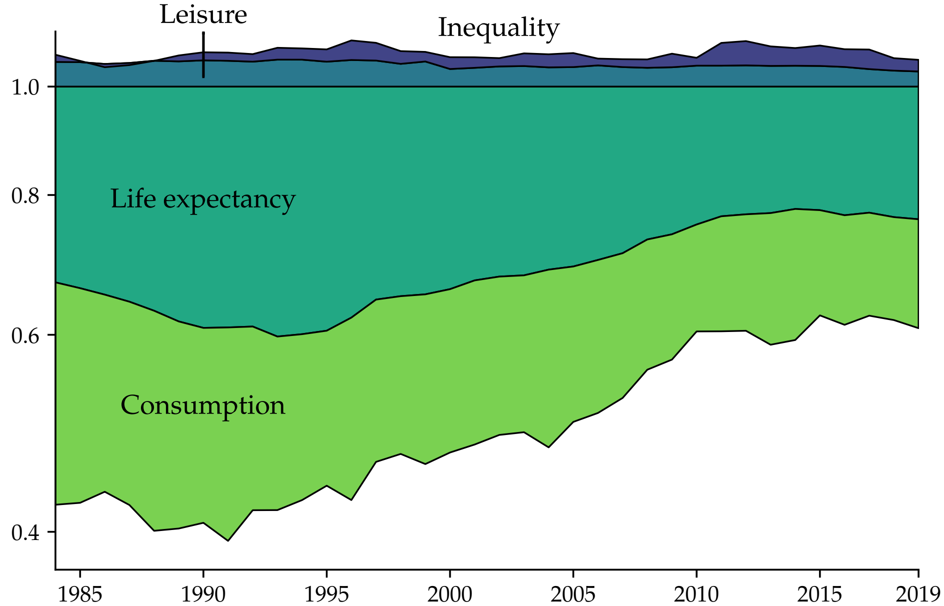


Note: The figure shows the consumption-equivalent welfare for Black relative to White Americans from 1984 to 2019, computed according to equation (3). For comparison, we also show the corresponding relative income and wealth level. The income series is from the CPS and includes wage, salary, business income, and farm income, and excludes all taxes and transfers. The wealth series is from the SCF and corresponds to total net worth.

Table 1: Relative Welfare Decomposition

	λ	$\log(\lambda)$	LE	c	$\sigma(c)$	ℓ	$\sigma(\ell)$
2019	0.64	-0.44	-0.27	-0.22	0.02	0.03	0.00
2000	0.50	-0.69	-0.42	-0.34	0.02	0.04	0.01
1984	0.45	-0.80	-0.40	-0.46	-0.00	0.05	0.02

Figure 8: Relative Welfare Decomposition



Note: The figure shows the decomposition of consumption-equivalent welfare for Black relative to White Americans from 1984 to 2019, computed according to equation (3). Author calculations using data from the CDC's NVSS and the Department of Labor's CPS and CEX Surveys.

We next examine growth rates in consumption-equivalent welfare in Table 2. For this calculation, we apply equation (3) over time rather than across groups. From 1984 to 2019, Black consumption-equivalent welfare grew 3.4% per year, faster than their income growth of 2.3% per year. For White Americans, welfare also rose more quickly than income (2.3% vs. 1.6% per year).

Table 2: Welfare growth between 1984 and 2019

	Welfare	Income	LE	c	$\sigma(c)$	ℓ	$\sigma(\ell)$
Black	3.39	2.29	1.22	2.49	-0.03	-0.17	-0.12
White	2.32	1.63	0.78	1.84	-0.10	-0.12	-0.08
Gap	1.08	0.66	0.44	0.66	0.07	-0.05	-0.04

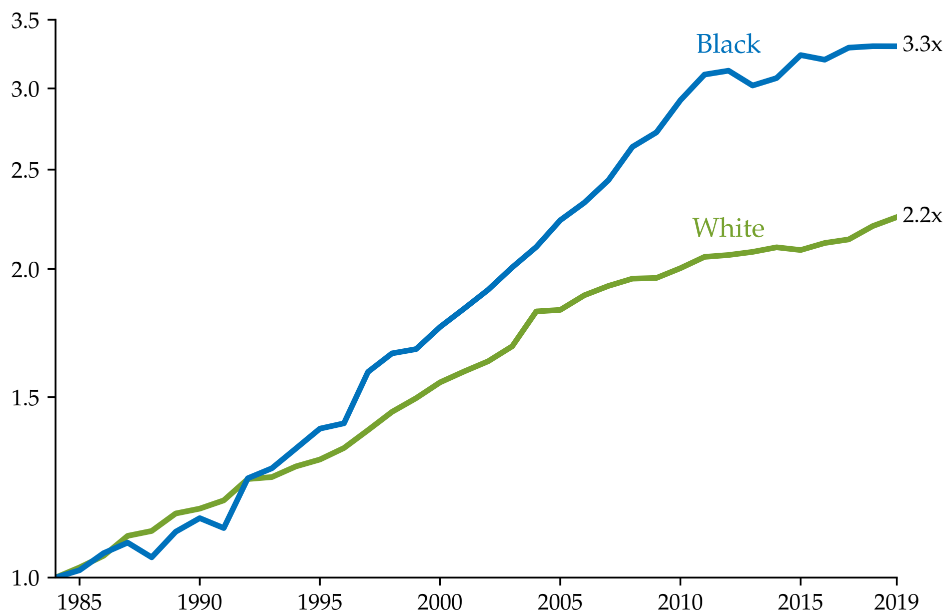
Table 2 also decomposes the contributions to growth rates. From 1984 to 2019 the biggest contributor was consumption growth at 2.49% for Black Americans and 1.84% for White Americans. Life expectancy was the next most important at 1.22% per year for Black Americans and 0.78% for White Americans. Though dwarfed by other factors, rising inequality of consumption and leisure together subtracted between 15 and 18 basis points a year from growth for both groups. Falling leisure lowered growth 17 basis points a year for Black Americans and 12 basis points a year for White Americans.

Figure 9 shows that consumption-equivalent welfare grew by a factor of 3.3 for Black Americans from 1984 to 2019, and by a factor of 2.2 for White Americans.

6. Census Data back to 1940

We can extend our welfare calculations further back in time using the population Censuses for 1940, 1950, ..., 2000 and the American Community Survey annually for 2005 to 2019. An advantage of Census data is the large sample sizes relative to the CEX. For example, even in 1940 using our 1% sample, the Census sample

Figure 9: Cumulative welfare growth by race



Note: Author calculations using a combination of data from the CDC's NVSS and the Department of Labor's CPS and CEX Surveys.

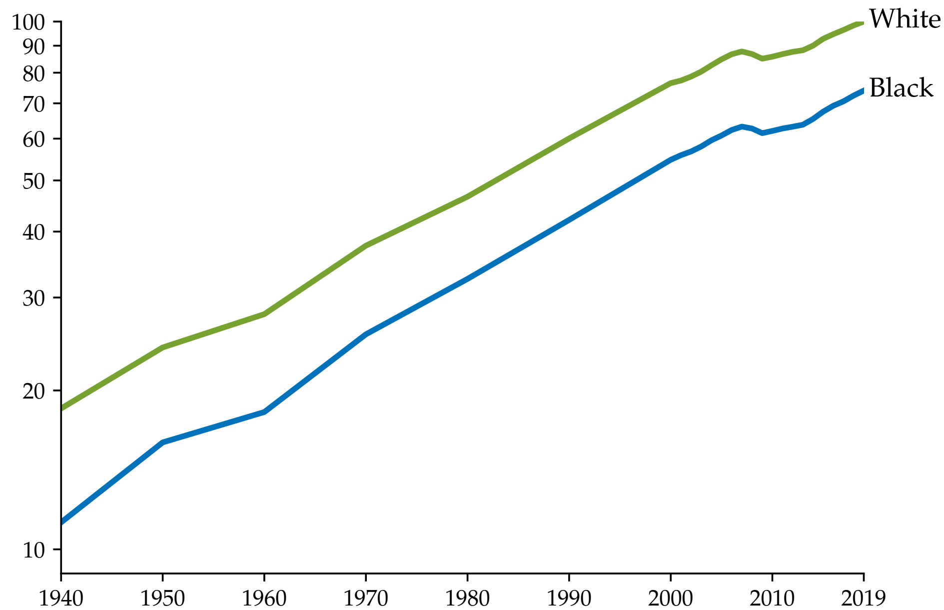
contains 1.3 million individuals versus only 31,000 in 1984 in the CEX. The main limitation of the Census is that it has no data on consumption. We therefore impute consumption from Census income data.

We use the CEX to create a procedure for imputing consumption from income. More precisely, we regress CEX consumption on CEX wage and salary income, controlling for race, age, gender and education. All variables are in percentage deviations from their annual average across individuals. We then infer consumption from income in the Census using the same variables and the CEX regression coefficients. We next scale up the aggregate imputed consumption expenditures to match real personal consumption expenditures per capita from NIPA. This scaling deals with the downward trend in CEX aggregate consumption relative to NIPA aggregate consumption. Importantly, our aggregate re-scaling preserves the CEX consumption-to-income ratios we impute. More details are available in

Appendix A.[7]

Figure 10 shows average consumption for Black and White Americans based on this procedure. While the lines look remarkably parallel, there is some catch-up: the average gap in imputed consumption between Black and White Americans is 39% in 1940, 32% in 1970, and 25% in 2019.

Figure 10: Imputed consumption per capita by race since 1940



Note: Author calculations using data from the CEX, and U.S. censuses and ACS. Consumption for White Americans is normalized to 100 in 2019. While the lines look remarkably parallel, there is some catch-up: the average gap in imputed consumption between Black and White Americans is 39% in 1940, 32% in 1970, and 25% in 2019.

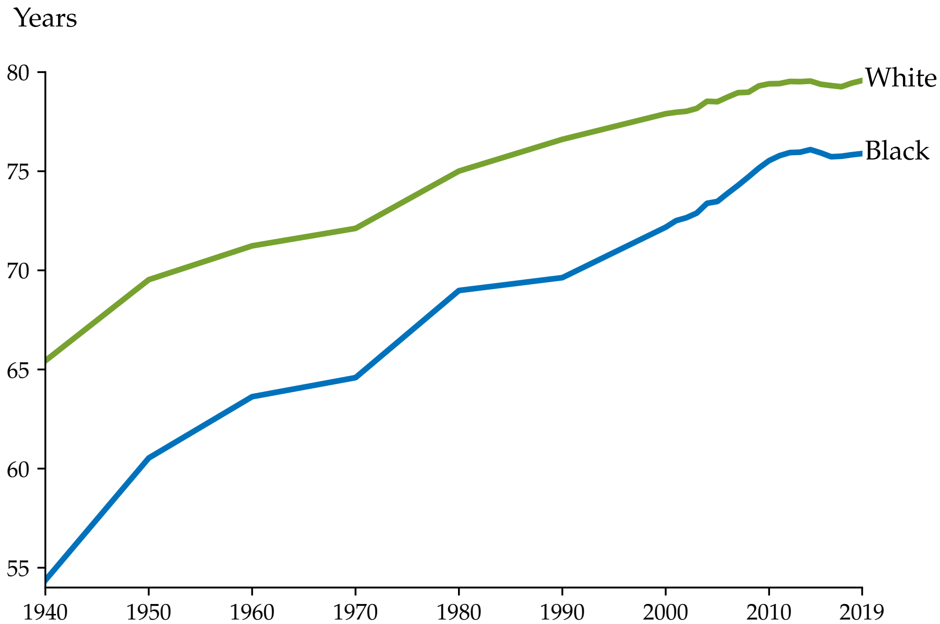
Figure 11 plots the levels of life expectancy at birth that we calculate from the survival rates in the CDC Life Tables in each decade back to 1940.[8] There is

[7]We do not attempt to impute consumption inequality by race because this is more difficult than imputing mean consumption by race, and within-group consumption inequality differences were small in the CEX from 1984–2019.

[8]As mentioned, the 1950 and 1960 Life Tables report data for "non-White" rather than Black Americans. In 1970, however, data for both non-White and Black Americans are observed and we use that overlap to adjust the 1950 and 1960 survival rates to make them more comparable. More precisely, we multiply the non-White survival rates in 1950 and 1960 by the ratio of Black to non-White survival rates in 1970 at each age.

substantial catch-up in life expectancy over the past 80 years: the life expectancy shortfall between Black and White Americans is 11 years (17%) in 1940, 7.5 years (10.5%) in 1970, and just 3.5 years (4.5%) in 2019.

Figure 11: Life expectancy at birth (in years) by race since 1940



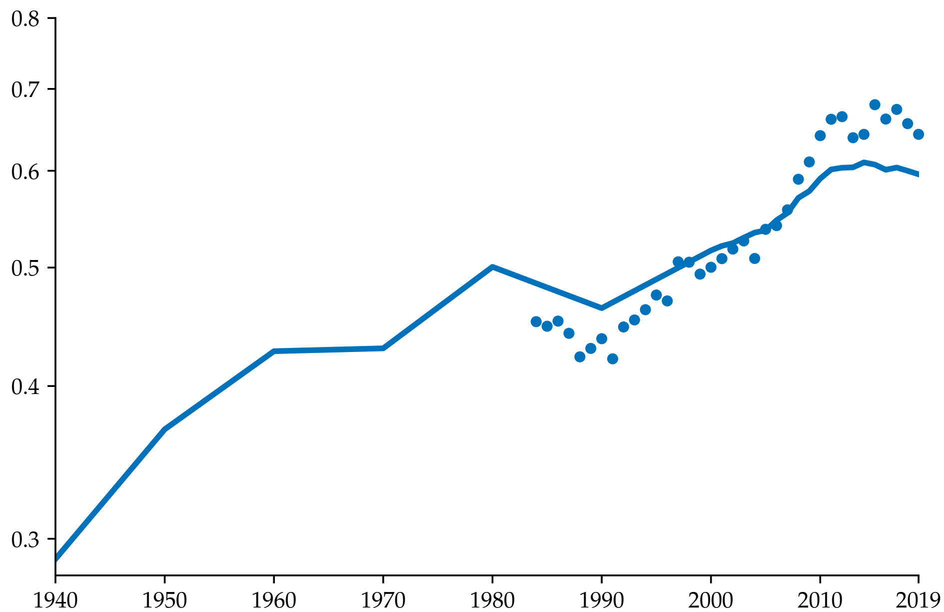
Note: Author calculations using CDC data. The life expectancy shortfall between Black and White Americans is 11 years (17%) in 1940, 7.5 years (10.5%) in 1970, and just 3.5 years (4.5%) in 2019.

We observe hours worked in the Census/ACS, so we can incorporate leisure along with lifespan and consumption. Specifically, the two variables we use to construct our measure of leisure are "usual hours worked per week" and "weeks worked last year." In Censuses before 1980, however, the Census asked about "weeks worked last week" and an intervalled version of "weeks worked last year." Since those definitions are also available in 1980 and 1990, we use those two years to adjust average leisure computed from the pre-1980 years. We could calculate leisure inequality but do not because it differed little by race in the CPS from 1984–2019.

Figure 12 shows our decadal welfare calculations based on Census/ACS data.

For comparison, the circles show our earlier CEX-based welfare measure; the fact that the two results are relatively close in overlapping years provides some reassurance in studying our Census-based welfare measure back to 1940.

Figure 12: Relative Welfare for Black Americans, 1940 – 2019 (White = 1)

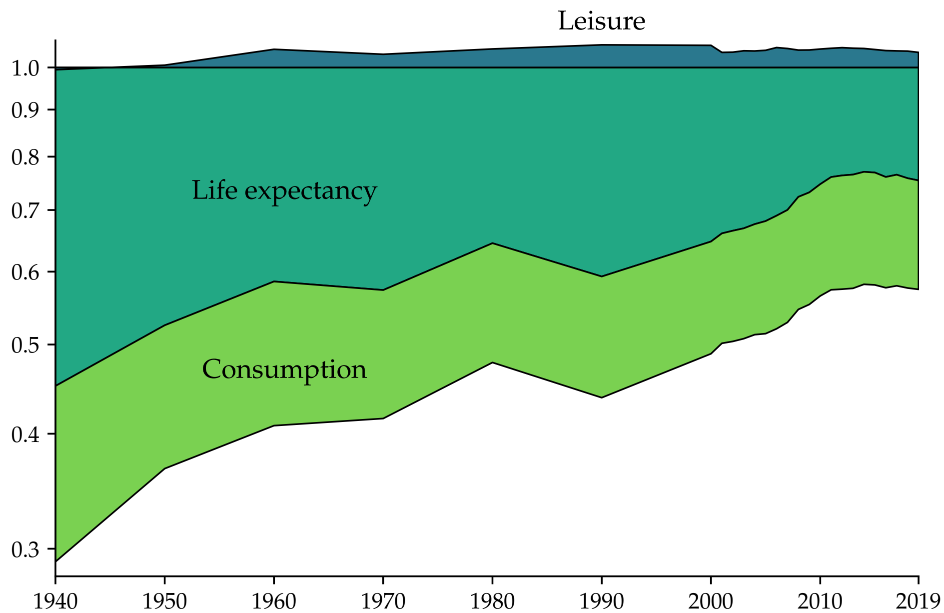


Note: Author calculations using data from the CDC's NVSS, and the U.S. censuses and ACS. Circles display the previous CEX/CPS results from 1984 onward for comparison; they include the inequality terms that are omitted from the Census/ACS calculation.

The key finding revealed by Figure 12 is the stunningly low level of Black welfare historically. In 1940, Black consumption-equivalent welfare was just 28% of that of White Americans. Recall that relative consumption in 1940 was around 61%, so the 11-year shortfall in life expectancy in 1940 played a large role. The welfare measure rose to 45% in 1960 and 49% in 1980 and reaches 60% in 2019.

Figure 13 plots the components of relative welfare over time. Differences in mortality rates far and away play the largest role, both in the levels of welfare and in the partial catch-up that has occurred over the past 80 years. Recall that the life expectancy gap fell from 17% (11 years) in 1940 to 4.5% (3.5 years) in 2019. Given that each percentage point difference in life expectancy translates into approximately a 6 percentage point difference in consumption-equivalent welfare, this this explains the enormous role played by mortality differences. Consumption is the other important contributor, with about 10 percentage points of the closing of the welfare gap due to gains in consumption for Black Americans relative to White Americans. Leisure plays a minor role.

Figure 13: Decomposing Relative Welfare, 1940 – 2019

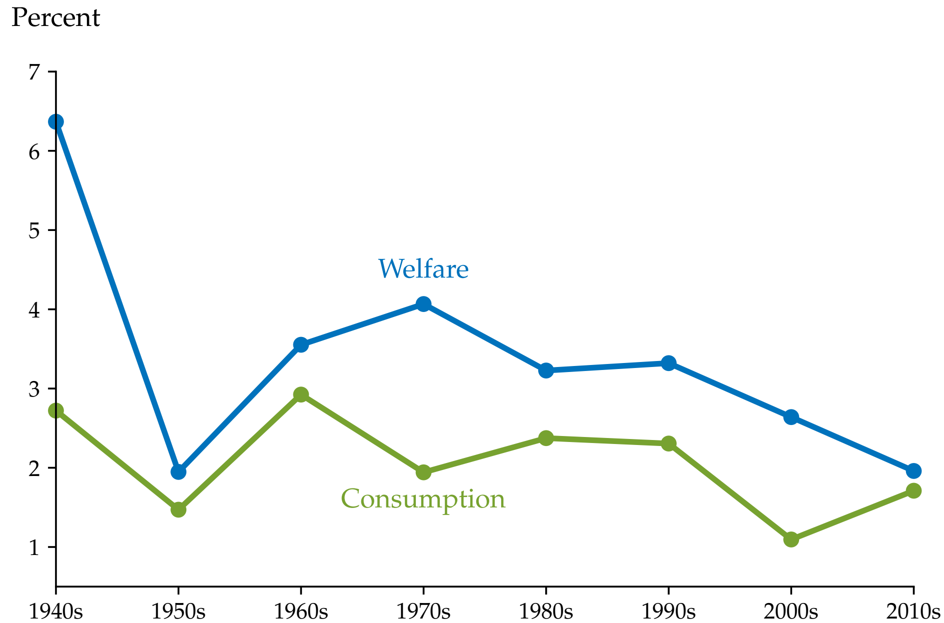


Note: Author calculations using data from the CDC's NVSS, and the U.S. censuses and ACS. The graph shows the components of consumption-equivalent welfare for Black Americans, where that for White Americans is normalized to 1.

Figure 14 provides a different perspective on the past 80 years by computing the average annual growth rate of consumption-equivalent welfare for people of all races over time. To begin, the green line in the figure shows the growth rate of consumption per person, which averages 2.1% per year over the entire sample. In contrast, the rise in life expectancy means that consumption-equivalent welfare was growing much faster. For the entire period, the average growth rate in welfare was 3.5% per year for all races.

Another key fact that emerges from the figure is the appreciable slowdown

Figure 14: Welfare and consumption growth since 1940



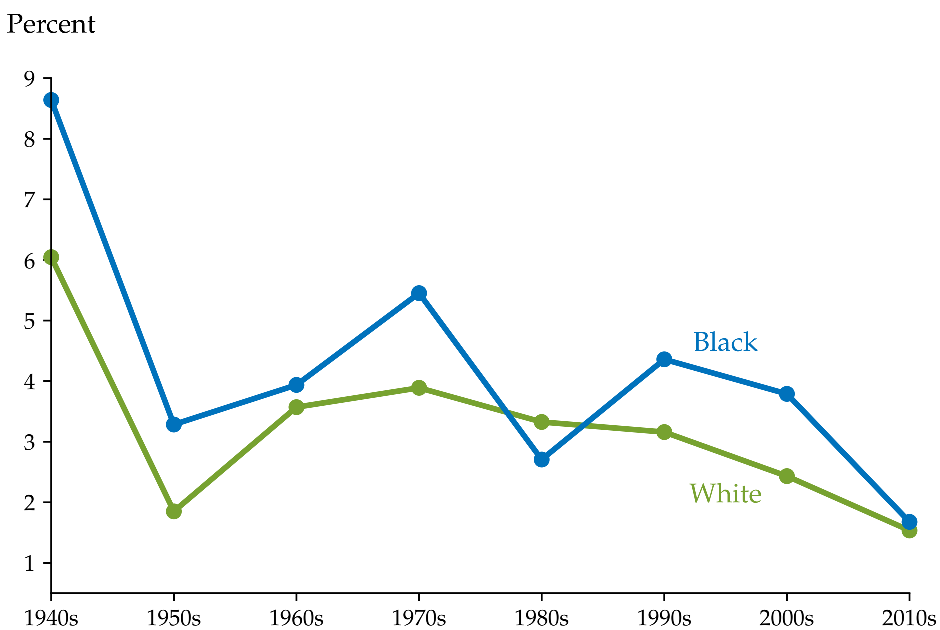
Note: Author calculations using data from the CDC's NVSS, and the U.S. censuses and ACS. Average annual growth rates by decade for consumption-equivalent welfare and consumption per capita for people of all races.

in the growth rate of consumption-equivalent welfare. Between 1940 and 1980, welfare growth averaged 4.1% per year versus just 2.9% per year since 1980. (Consumption growth fell more modestly from 2.3% to 1.9% over the same intervals.) Put differently, the decade of the 1970s, traditionally viewed as a decade of slow growth, looks much better when life expectancy gains are included. Welfare growth is then on a downward trend for the past 50 years. From this perspective, the growth slowdown is something continually worsened throughout the last half century rather than something that developed recently. Table 3 provides more detail, noting that this slowdown is also a feature of welfare growth for Black and White Americans separately. Welfare growth by decade for Black and White Americans is displayed in Figure 15.

Table 3: Annual welfare growth, 1940-2019 (percent)

	1940–1980				1940–2019			
	λ	LE	c	ℓ	λ	LE	c	ℓ
Black	5.41	2.78	2.61	0.03	4.41	2.18	2.27	-0.04
White	3.86	1.70	2.27	-0.10	3.31	1.34	2.07	-0.10
Gap	1.55	1.08	0.34	0.13	1.10	0.85	0.20	0.06

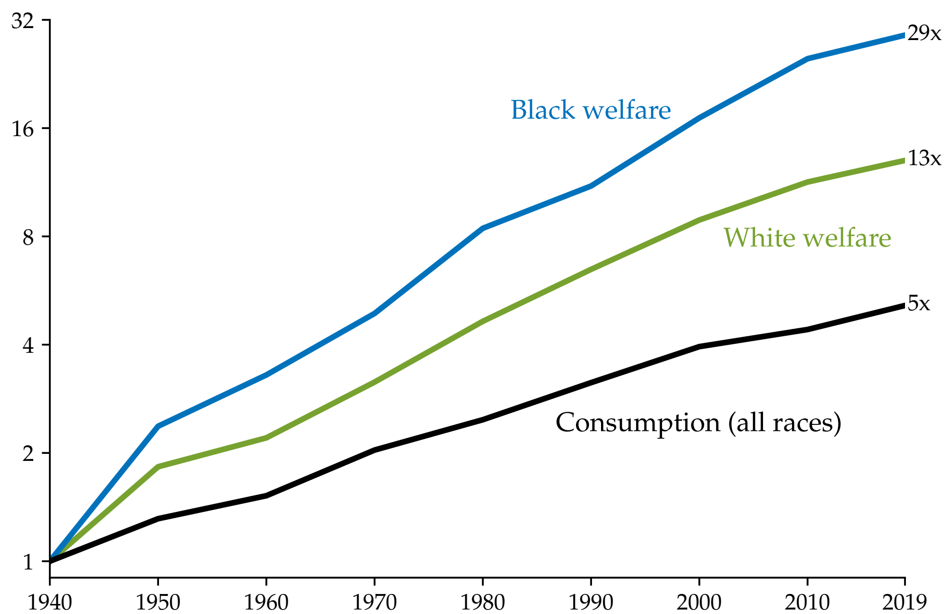
Figure 15: Welfare growth by race since 1940



Note: Author calculations using data from the CDC's NVSS, and the U.S. censuses and ACS. Average annual growth rates by decade for consumption-equivalent welfare.

Figure 16 shows the cumulative increase in consumption-equivalent welfare. Between 1940 and 2019, nondurable consumption per person increased by a factor of 5. In contrast, consumption-equivalent welfare increased by a factor of 13, both for White Americans and for the overall population. Most remarkable of all is the factor of 30 increase in consumption-equivalent welfare for Black Americans between 1940 and 2019. It is a sign of just how low welfare was in 1940 that even this rapid growth — which averaged 4.4% per year — could still leave Black welfare at only 64% of White welfare in 2019.

Figure 16: Cumulative welfare and consumption growth by race since 1940



Note: Author calculations using data from the CDC's NVSS, and the U.S. censuses and ACS. Despite the slowdown in growth, the cumulative increase in living standards is huge! 30x for blacks versus 13x for whites vs 5x for consumption.

7. Extensions

In this section, we quantify the effect of several additional factors on consumption-equivalent welfare. Doing so is inherently more speculative and difficult, so we did not incorporate them into our baseline estimates. But each could be quite important.

First, we analyze COVID-19 mortality, which is notably higher for Black Americans than for White Americans. Second, we use CDC health surveys for morbidity to include an adjustment for quality of life (QALYs), not just quantity. Third, we consider incarceration rates, which are several percentage points higher for Black men than for White men and rose over our sample. Fourth, we treat unemployment as equivalent to working rather than as leisure.

7.1 COVID-19

Some of the convergence in life expectancy we documented from 1984–2019 was reversed, at least temporarily, by COVID-19. Table 4 reports information obtained from the CDC on deaths from COVID-19 by race and age. We follow the CDC's reporting practices and present results for Black non-Latinx, White non-Latinx, and Latinx.[9] About 1.9 in a thousand Black non-Latinx have died from COVID-19, versus about 1.7 in a thousand White non-Latinx. Black victims have been younger at around 71 years old on average, compared to 79 years old for Whites. This outweighs the lower life expectancy of Black Americans so that Black victims lost 15.6 years of remaining life whereas White victims lost 11.2 years on average. A caveat is that these figures for life-years lost per victim do not take into account comorbidities facing COVID-19 victims.

Table 4 indicates that the American Latinx population has lost even more life years from COVID-19 despite having fewer deaths per thousand. The lower age

[9]As mentioned earlier, the CDC's mortality data for Latinx only becomes reliable after 2006, which is why the focus of this study is on Black and White Americans, regardless of Latinx origin. However, in the Appendix, we present our results for Black non-Latinx, White non-Latinx and Latinx separately starting in 2006.

of Latinx victims (closer to 69 years) combines with their higher remaining life expectancy to imply 20 years of lost life years per victim. The implication is that life expectancy has temporarily fallen 4.3 years for Latinx, compared to 2.5 years for Black Americans and 1.3 years for White Americans.

Table 4: Welfare and COVID-19

	Deaths per thousand	Age of victims	Years of life lost per victim	Lower lifespan	Group welfare loss (%)
Black non-Latinx	1.93	71.4	15.6	2.5	17.3
White non-Latinx	1.68	79.3	11.2	1.3	9.7
Latinx	1.66	68.9	20.0	4.3	26.3
All groups	1.65	75.8	14.2	2.0	13.8

Note: As of April 24, 2021, the CDC reports a total of 555,569 COVID-19 deaths.

Because a 1% drop in life expectancy is tantamount to a roughly 6% drop in consumption, COVID-19 mortality translates to 26% lower consumption-equivalent welfare for the U.S. Latinx population. The comparable figure for Black non-Latinx Americans is a 17% drop in consumption-equivalent welfare and for White non-Latinx Americans a 10% drop.

7.2 Health

Our data on health status comes from the CDC's National Health Interview Survey (NHIS) for each year from 1997 through 2018.[10] This survey collects information on medical conditions, physical activity, and other health behaviors through personal interviews for the civilian noninstitutionalized population of the United States. Each year, approximately 35,000 households containing about 87,500 individuals are interviewed. From those interviews, we construct the Health and Activities Limitation Index (HALex) developed by Erickson, Wilson and Shan-

[10] https://nhis.ipums.org/nhis/

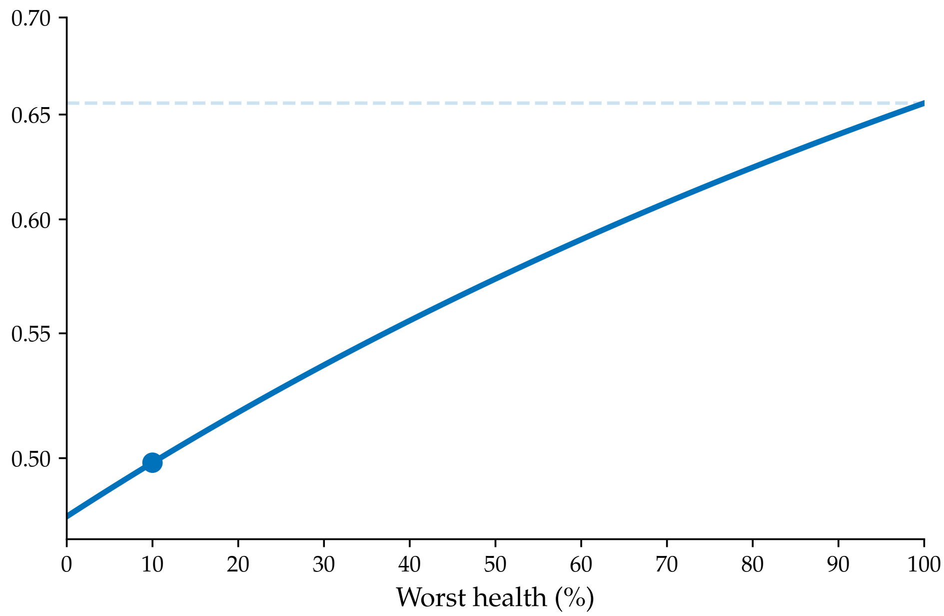
non (1995). The HALex has two ingredients, perceived health and activity limitations, which are derived from questions in the NHIS. Information on both of those are combined to construct a single health score defined on the unit line, which we then multiply by survival rates to obtain quality-adjusted life years (QALYs). Quality-adjusted life expectancy (QALE) is simply the sum of QALYs for all ages.

An important issue is how to convert the qualitative survey-based HALex measure into consumption-equivalent units. As we discuss in Appendix A.5, the HALex score ranges from 0.10 for the worst health state to 1 for the best. The traditional QALY approach simply multiplies this index by life years: so a year in the worst health state is the equivalent of 0.10 years in the best health state.

Figure 17 shows the impact on Black vs. White welfare in 2019 of incorporating the HALex as a measure of morbidity differences. The dot in Figure 17 shows the effect of following the traditional approach and treating the HALex itself as a cardinal measure of QALYs needing no rescaling. Under this assumption the higher morbidity of Black Americans lowers their relative welfare from 65% down to 50% in 2018. The other points on the curve in Figure 17 show the effect of stretching or compressing the HALex to range anywhere from 0 to 1 (on the left) to not varying at all (on the right). In other words, we linearly adjust the scale so that the 0.10 worst health state is the equivalent of x percent years of life at the best state, where x is the value on the horizontal axis.[11] Clearly, morbidity differences between Black and White Americans could be quite important. Our baseline calculation that ignores morbidity may understate the welfare gap substantially.

[11] A separate issue from the range of the HALex is whether the HALex's curvature appropriately captures QALYs.

Figure 17: Black vs. White welfare in 2018 incorporating QALYs

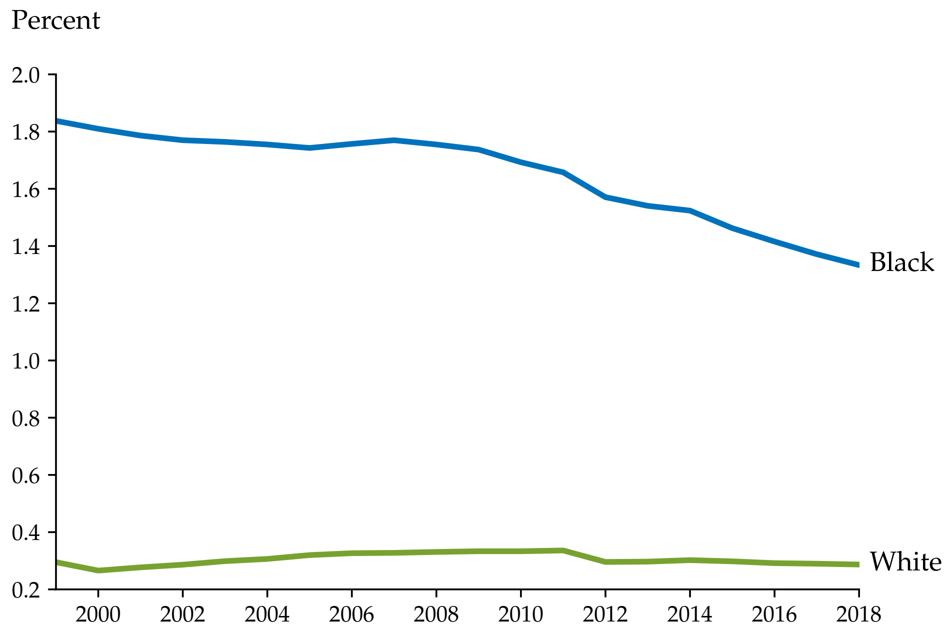


The vertical axis reports the value of Black relative welfare in 2018. The dashed line at 0.66 is the baseline value ignoring morbidity and reported earlier in the paper. The blue dot treats the HALex score itself as a cardinal measure of QALYs with no rescaling. The other points in the graph show the effect of rescaling the worst health state to be the equivalent of x% of the best health state.

7.3 Incarceration

We obtain incarceration rates by race and age from the National Prisoner Statistics (NPS) program and the National Corrections Reporting (NCR) program of the U.S. Bureau of Justice Statistics.[12] Figure 18 shows that Black non-Latinx have markedly higher incarceration rates than White non-Latinx. If flow utility is much lower while incarcerated, incarceration will subtract from both the level and the growth rate of Black non-Latinx welfare relative to White non-Latinx welfare.

Figure 18: Incarceration rates by race



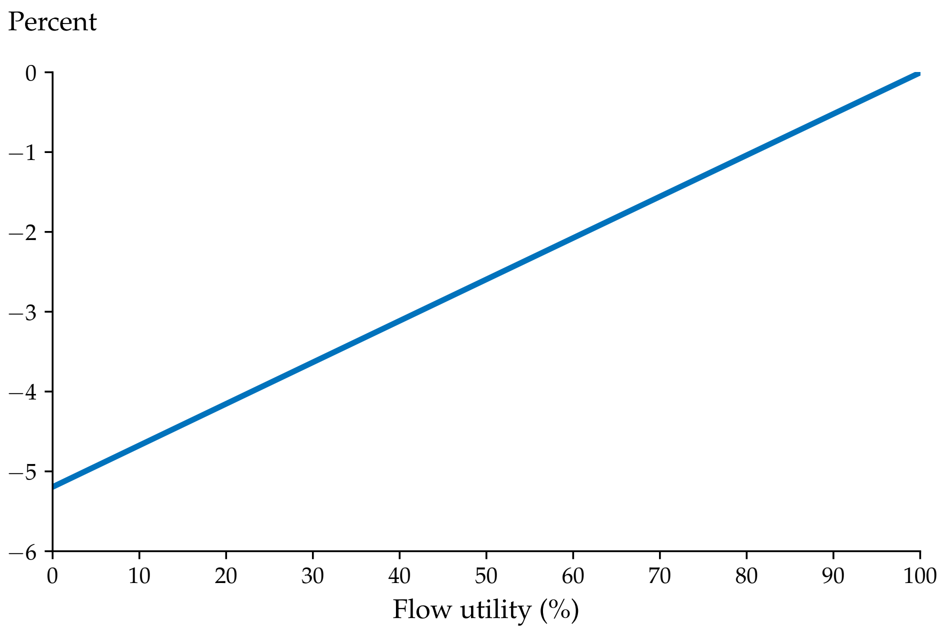
Note: Incarceration rates are calculated from the National Prisoner Statistics (NPS) Program of the U.S. Bureau of Justice Statistics.

To illustrate the potential impact of incarceration on welfare, we assume flow utility for the incarcerated population is equal to some fraction of the average flow utility for a non-incarcerated individual of the same age with a high school education or less. Figure 19 shows the resulting change in the consumption-

[12] See Bureau Justice Statistics (2020) and Bureau Justice Statistics (2021)

equivalent welfare of Black non-Latinx relative to White non-Latinx in 2018. The x-axis indicates different assumed values of the flow utility adjustment when incarcerated, going from 0% (no utility while incarcerated) to 100% (no utility discount from incarceration). The figure shows that the higher incarceration rate for Black non-Latinx Americans lowered their relative welfare in 2018 by up to 5.1% in consumption-equivalent terms.

Figure 19: Impact of incarceration on Black non-Latinx relative welfare in 2018



Note: The effect on relative welfare is calculated by setting flow utility of incarcerated individuals to z% of the average flow utility of individuals with high school education or less, and using incarceration rates by race in each year. The x-axis shows different values of z.

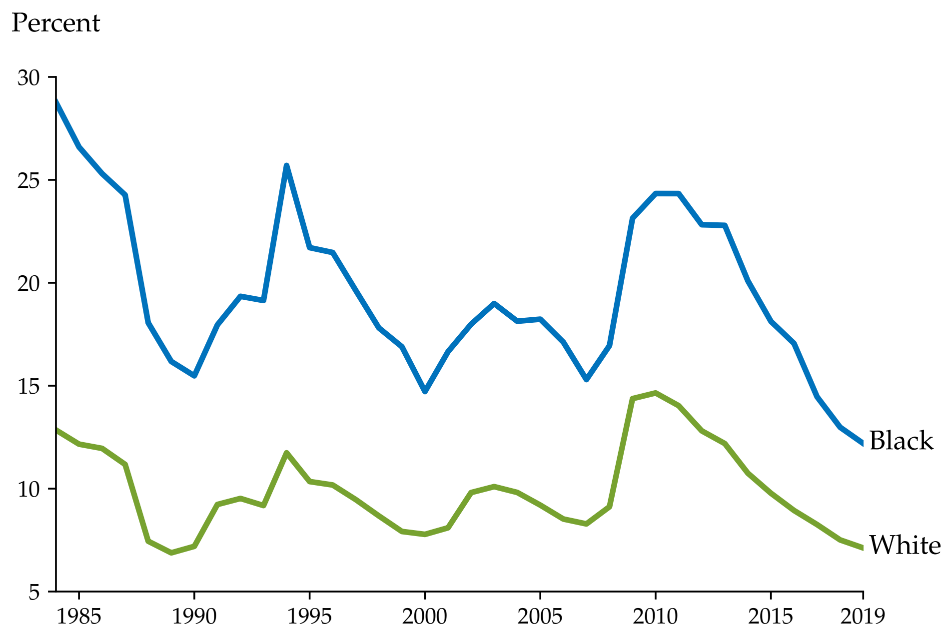
7.4 Unemployment

Our baseline calculation treats unemployment as leisure. Needless to say, this may be a bad assumption and could mean our estimates overstate the relative welfare of Black Americans given their higher unemployment rates.

Surveys by Krueger, Mueller, Davis and Şahin (2011) shed light on how flow utility varies with employment status. They find that the same leisure activities yield less enjoyment when a person is unemployed compared to when they are employed. They also find that those unemployed had similar hours worked in their previous jobs as employed individuals.

Considering these facts, we perform an adjustment where unemployed individuals have their hours worked set to full-time hours. This adjustment ensures leisure hours are no longer greater for unemployed individuals. We also consider a broad definition of unemployment, including the unemployed and marginally attached workers as well as workers who are involuntary working part-time. As illustrated in Figure 20, Black Americans face a persistently higher rate of unemployment than White Americans in our sample.

Figure 20: Broad unemployment rate by race

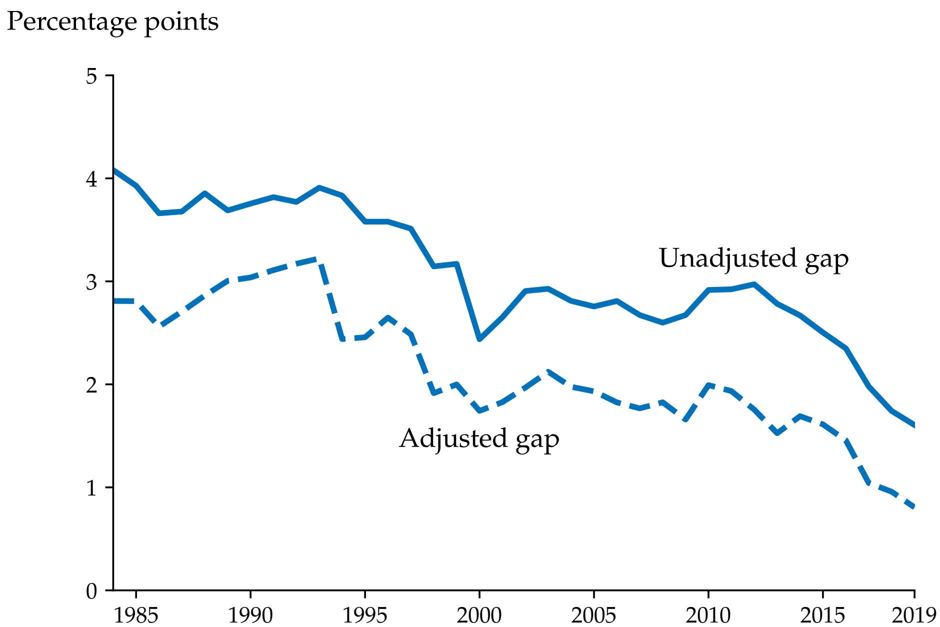


Note: The broad definition of unemployment includes unemployed and marginally attached workers as well as workers who are involuntary working part-time.

How does the unemployment adjustment to leisure impact the racial leisure gap and relative welfare? Figure 21 displays the leisure gap between Black and

White Americans in percentage points before and after the unemployment adjustment. The unemployment adjustment shaves about 1 percentage points off the racial gap in leisure over the entire sample. In 2019, this adjustment reduces the gap in welfare by about 1 percent.

Figure 21: The Black-White Gap in Leisure and the Unemployment Adjustment



Note: The ”unadjusted gap” shows the difference in leisure in our baseline calculation from Section 3. Adjusting for unemployment reduces the gap from 4.1 to 2.8 percentage points in 1984 and from 1.8 to 0.8 percentage points in 2019. As described in the text, our definition of leisure uses total hours worked during the year. However, since we do not observe employment status in the CPS for each individual over the entire year, the definition of leisure used for the unemployment adjustment uses total hours worked during the preceding week, where employment status is observed.

8. Conclusion

We construct consumption-equivalent welfare for Black and White Americans. Our statistic incorporates mortality, consumption, leisure, and inequality in consumption and leisure, with mortality rates playing a key role quantitatively. According to our estimates, welfare for Black Americans was 45% of that for White Americans in 1984 and rose to 64% by 2019. Going back further in time, the gap was even larger, with Black welfare equal to just 28% of White welfare in 1940. On the one hand, there has been remarkable progress for Black Americans: the level of their consumption-equivalent welfare increased by a factor of 30 between 1940 and 2019, when aggregate consumption per person rose a more modest 5-fold. On the other hand, despite this remarkable progress, the welfare gap in 2019 remains disconcertingly large.

A. Appendix

A.1 Survival rates

For years 1984 to 1989 and 1991 to 1996, the CDC's life tables only report survival rates up to age 85. To approximate survival rates for ages above 85, we use the fact that mortality rates increase exponentially with age after age 30, which was first documented by Gompertz (1825). More precisely, we use reported mortality rates from age 65 to 85 to estimate the coefficients α and β of the following function by race and gender:

$$m(a) = \alpha e^{\beta a}$$

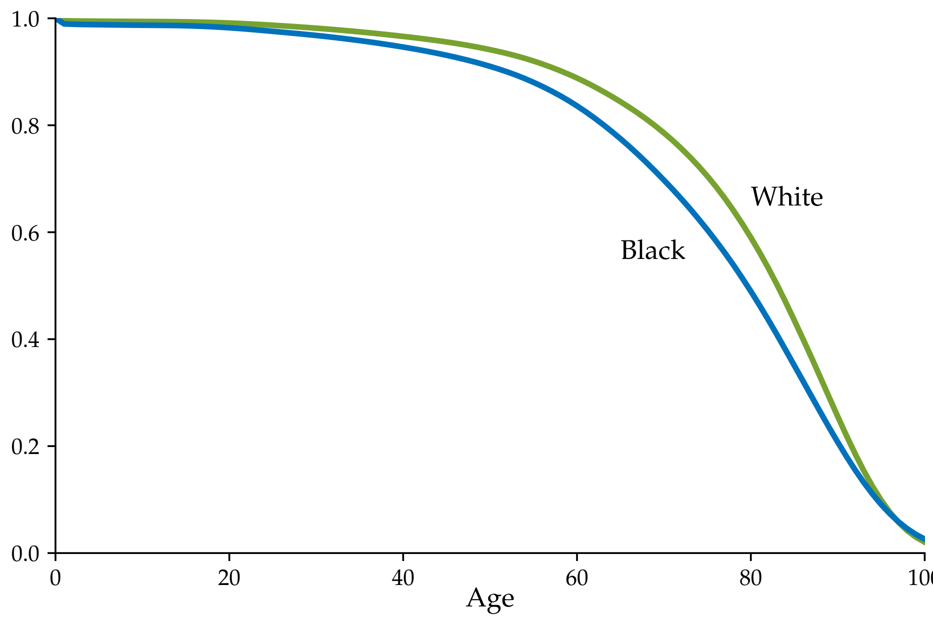
where $m(a)$ is the mortality rate at age a. We can then calculate survival rates up to age 100 using the available survival rate at age 85 and the approximated mortality rates after age 85.

Since the 2018 and 2019 life tables do not report survival rates for Black and White Americans irrespective of Latin origin, we follow the CDC's methodology for producing life tables from death records and population estimates to make sure that our racial groups are consistent throughout our sample.[13] Death records

[13] https://www.cdc.gov/nchs/data/nvsr/nvsr61/nvsr61_03.pdf

are obtained from the CDC's NVSS and in particular, we omit foreign residents. We then count death occurrences by year, age, race, gender and education. In fact, starting in 1989, the NVSS started reporting the deceased's educational attainment. However, the coverage of the educational attainment records was relatively poor until 1994. We then use the CDC's bridged race population estimates in 2018 and 2019 to determine the population at risk by year, age, race and gender. The CDC bridged race population estimates, however, do not provide breakdowns by education. We therefore use the sampling weights of the 2018 and 2019 American Community Surveys (ACS) to approximate the educational attainment distribution within each race, gender and 5-year age group cell.

Figure 22: Survival age profile in 2019



Note: Author calculations using data from the CDC.

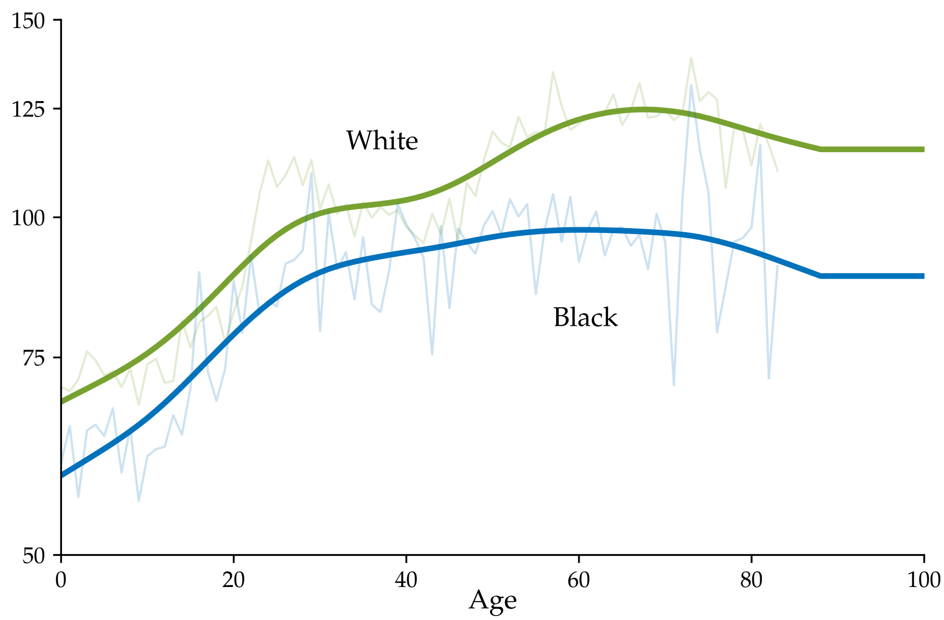
A.2 Consumption

To obtain our consumption measure, we closely follow the work of Aguiar and Bils (2015). In fact, our consumption aggregate corresponds to the sum of the nondurable consumption categories reported in their work, with three exceptions. First, we do not constrain our sample to 4-interview households and complete income reporters. Instead, we use the CEX's full sample and multiply a household's consumption by the inverse of the fraction of interviews in which it participated. However, to ensure that the standard deviation of consumption for below 4-interview households is not artificially high, we slightly adjust their consumption. In fact, we re-scale it such that within each race, gender and education group, its standard deviation is equal to that of 4-interview households. Then, we impose a lower bound on consumption equal to $2,000 in 2012 USD in each year. Third, we also re-scale consumption expenditures such that they aggregate to the nondurable NIPA real personal consumption expenditures per capita. To do so, we first divide consumption equally among each household member. Finally, since the CEX's sample size is relatively small, we smooth the the age profile of consumption within each year using a HP-filter with a penalty term of 1,600.

A.3 Leisure

To calculate leisure, we use information on usual hours worked per week and weeks worked per year from the CPS to obtain an estimate of hours worked per year. Then, assuming that a maximum of 16 hours per day and 365 days per year are available for work, we obtain leisure as the fraction of hours that are not spent in market work. To also account for non-market work discrepancies between genders, we divide hours worked per year equally among individuals between 25 and 64 years old within each household. The resulting split in leisure time between men and women is similar to that found in Aguiar and Hurst (2007). As for consumption, since the CPS' sample size is still somewhat small, we smooth the the age profile of leisure within each year using a HP-filter with a penalty

Figure 23: Consumption age profile by race in 2019



Note: Author calculations using data from the U.S. Consumer Expenditure Surveys (CEX). The age profile of consumption is HP-filtered with a smoothing parameter of 1,600 and kept constant for all ages above the last available age in the CEX data. Consumption for White Americans is normalized to 100 in 2019.

term of 100.

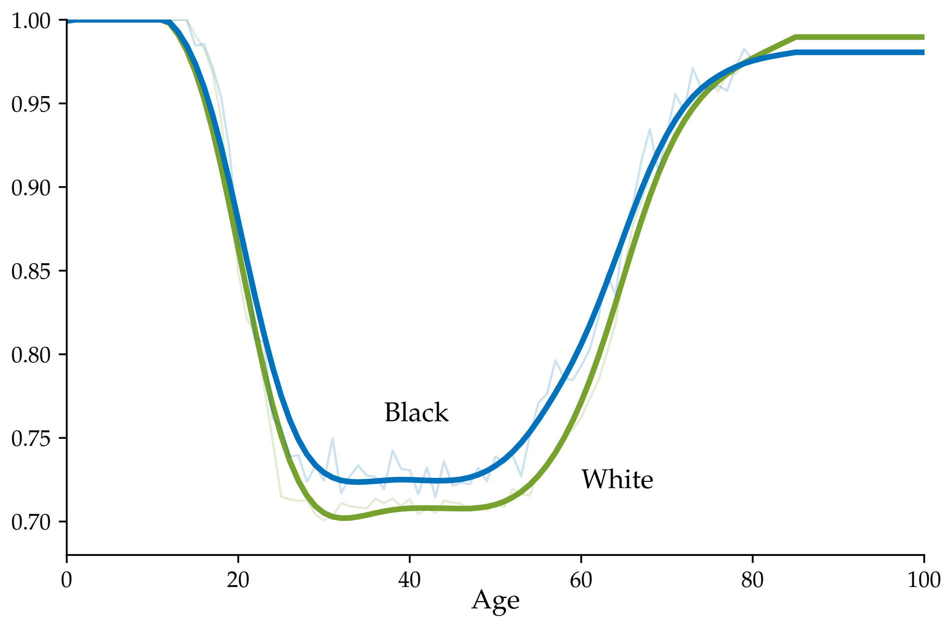
A.4 Calibrating the intercept in the flow utility: $\overline{u}$

This section describes how to calibrate $\overline{u}$ when we are using only part of consumption (such as non-durables). Consider an extreme version of this, where we observe Starbucks coffee purchases c_{sb} and are using this to proxy for consumption. In particular, suppose

$$c = \mu c_{sb}$$

That is, true consumption is a "markup" μ over measured Starbucks consumption.

Figure 24: Leisure age profile by race in 2019



Note: Author calculations using data from the U.S. Current Population Survey. The age profile of leisure is HP-filtered with a smoothing parameter of 100 and kept constant for all ages above the last available age in the CPS data.

Suppose utility is

$$\begin{aligned} V &= \sum_a \beta^a S(a) u(c_a, \ell_a) \\ &= \sum_a S(a)\beta^a (\overline{u}_0 + \log c_a) + v(\ell_a) \\ &= \sum_a S(a)\beta^a (\overline{u}_0 + \log \mu + \log c_{sb,a} + v(\ell_a) \\ &= \sum_a S(a)\beta^a (\overline{u} + \log c_{sb,a} + v(\ell_a) \end{aligned}$$

where $\overline{u} \equiv \overline{u}_0 + \log \mu$.

The VSL=\$7.4m $= V/muc$ in the model where $muc = 1/c$ denotes the marginal utility of all consumption. rearranging

$$\begin{aligned} V &= 7.4m \cdot muc \\ &= \frac{7.4m}{c} \\ &= \frac{7.4m}{\mu c_{sb}} \end{aligned}$$

That is, we have to use “true” consumption to convert the VSL into utils, so that V has the units (when log utility) of “years of consumption”.

Now, we can combine these two sets of equations for V and solve for $\overline{u}$:

$$\overline{u} = \frac{7.4m/c2006 - \sum_a \beta^a S(a) \log c_{sb,a} + v(\ell_a)}{\sum_a \beta^a S(a)}$$

We use a value of c2006 of \$25,288, which is nominal per capita NIPA consumption exenditures (PCE) net of medical care.

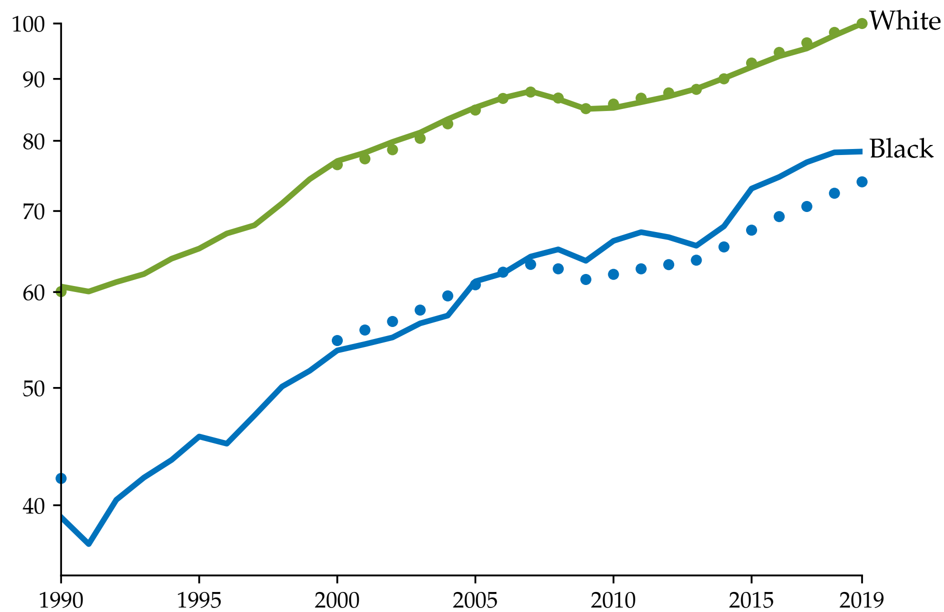
A.5 Consumption imputation

To impute consumption from the CEX to the U.S. censuses and ACS, we regress consumption on wage and salary income, controlling for race, gender, education and age in the CEX, where all variables are in percentage deviation from their annual average. Consumption and wage and salary income are both calculated at the household level and divided evenly among family household members. Finally, we restrict the CEX estimation sample to complete income reporters.

We then use the estimated coefficients of this regression to impute consumption in the Census from household wage and salary income as well as the race, gender, education and age of household members. All Census imputation variables are constructed as they are in the CEX. Finally, we re-scale imputed consumption in the Census such that it aggregates to real personal consumption expenditures per capita from NIPA.

Figure 25 plots per capita consumption by race from 1990 to 2019 in the CEX (solid lines) and its imputed analog in the Census (dotted lines), where consumption is normalized to 100 for White Americans in 2019.

Figure 25: Consumption imputation



Health

For the perceived health component of the HALex, respondents are asked to self-report their overall health as excellent, very good, good, fair or poor, which defines five perceived health states. For the activity limitation component of the HALex, activities are sorted into four categories: activities of daily living (ADLs), instrumental activities of daily living (IADLs), major activities, and non-major activities. ADLs are basic personal care activities such as eating, bathing, dressing and mobility, while IADLs are slightly more involved routine activities such as household chores, doing necessary business or shopping. In contrast, a major activity represents a respondent's primary social role such as working, housekeeping, or studying, while non-major activities include all other activities that cannot be classified in the previous three categories.

Respondents are asked to report whether they are limited in performing activities in any of the above four categories. If they report being limited in multiple activity categories, they are assigned to the category that represents the greater degree of limitation. Therefore, there are six activity limitation states: not limited in any activities, limited in non-major activities, limited in major activities, unable to perform major activities, limited in IADLs and limited in ADLs.

With the five perceived health states and six activity limitation states, the HALex comprises 30 health states. A nonlinear multiattribute model was used to assign cardinal values to each health state by Erickson et al. (1995). Respectively denoting perceived health and activity limitation as PH and AL, Table 5 presents those values, which are derived from the formula in equation (A.1). Through correspondence analysis, the PH variable was assigned values of 1, 0.85, 0.7, 0.3 and 0 for the excellent to poor perceived health states and the AL variable was assigned values of 1, 0.75, 0.65, 0.4, 0.2 and 0 for the least to most dysfunctional states of activity limitation.[14]

$$\text{HALex} = 0.1 + 0.9 \times (0.41 \times \text{PH} + 0.41 \times \text{AL} + 0.18 \times \text{PH} \times \text{AL}) \tag{A.1}$$

This health score has come to be widely used as way to estimate Quality-Adjusted Life Years (QALY's) in the health literature. It is also used by the CDC's health promotion and disease prevention initiatives for constructing QALYs.[15] Moreover, a potentially valuable feature of the HALex score is that it accounts for a respondent's subjective perception of their own health. For instance, respondents who rely on wheelchairs for mobility, but have adapted to this condition, might report themselves as healthy. In that case, the HALex score would yield higher utility than a measure that relied solely on physical limitations. Fisher, Wennberg, Stukel, Gottlieb, Lucas and Pinder (2003) looks at the relationship be-

[14]Refer to the Appendix for a detailed derivation of the scaling constants in equation (A.1) and the values assigned to the PH and AL variables.

[15]See Erickson et al. (1995), Erickson (1998) and Fryback, Dunham, Palta, Hanmer, Buechner, Cherepanov, Herrington, Hays, Kaplan, Ganiats et al. (2007), for example.

Table 5: HALex ingredients

AL\PH	Excellent	Very good	Good	Fair	Poor
Not limited	1.00	0.92	0.84	0.63	0.47
Limited – non-major	0.87	0.79	0.72	0.52	0.38
Limited – major	0.81	0.74	0.67	0.48	0.34
Unable – major	0.68	0.62	0.55	0.38	0.25
Limited – IADLs	0.57	0.51	0.45	0.29	0.17
Limited – ADLs	0.47	0.41	0.36	0.21	0.10

Note: AL and PH respectively stand for activity limitations and perceived health, which are both measured using the CDC's National Health Interview Survey (NHIS). The HALex combines AL and PH using the formula in equation (A.1), developped by Erickson, Wilson and Shannon (1995).

tween the HALex and various diseases, the impact of chronic conditions on the HALex, and the impact of similar conditions on summary scores from other surveys like the Medical Outcomes Study.

A.6 Welfare by Education

In Table 6 we report life expectancy for Black and White Americans by gender and education in 2018. The race gap in longevity is larger among men (4.4 years) than among women (2.7 years). For the education breakdown, we report life expectancy at age 30 since educational attainment is most likely not realized for everyone below that age. Black Americans have 1.7 to 2.1 lower years life expectancy at age 30, even within education groups.

Table 6: Life expectancy by race, gender and education in 2019

	At birth		At 30 years old		
	Males	Females	High school –	Some college	Bachelor's degree +
Black	72.9	79.6	46.3	49.2	53.6
White	77.5	82.4	48.6	50.6	55.5

Table 7: Welfare by race and education in 2019

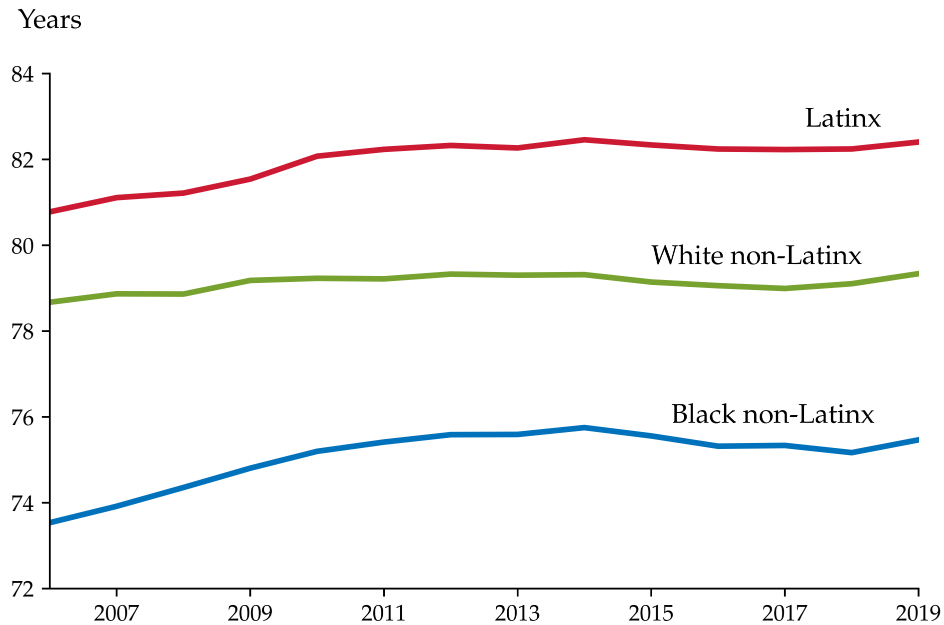
	High school –	Some college	Bachelor's degree +
Black welfare	0.23	0.36	0.67
Black income	0.30	0.52	0.88
% of 30+ population	51.6 %	25.9 %	22.5 %
White welfare	0.30	0.46	1.00
White income	0.35	0.53	1.00
% of 30+ population	44.7 %	22.3 %	33.0 %

A.7 Welfare by Latinx Origin

In this section, we report our life expectancy, consumption and leisure statistics by race and Latin origin since 2006. As mentioned earlier, the CDC only started publishing Life Tables by Latin origin starting in 2006, which is why we focus on the sample period from 2006 to 2019.

Figure 26 plots life expectancy at birth for non-Latinx Black and White, as well as Latinx Americans. What stands out of this figure is how high Latinx life expectancy is relative to the two other groups. In 2019, life expectancy at birth stood at 82.4 years old for Latinx Americans, as opposed to 79.3 and 75.5 years old for non-Latinx White and Black Americans, respectively. This is often referred to as the "Latino paradox" by which Latinx Americans tend to have better health outcomes than non-Latinx Americans, but worst socioeconomic outcomes.

Figure 26: Life expectancy at birth by race and ethnicity



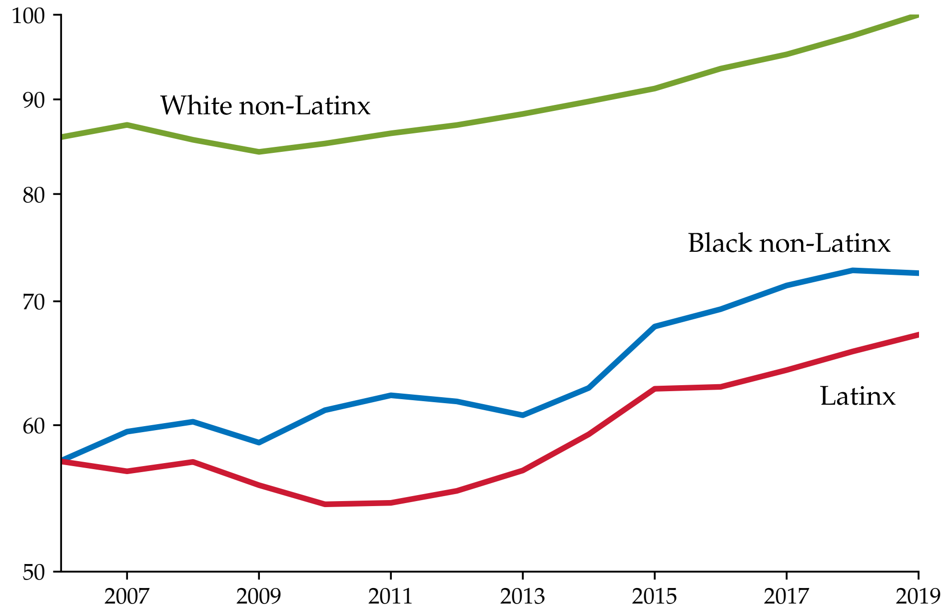
Note: Author calculations using data from the CDC.

In fact, looking at consumption per capita for the same three groups in Figure 27, we see that Latinx and non-Latinx Black consumption was 33% and 28% lower than non-Latinx White consumption in 2019.

In terms of leisure, Latinx and non-Latinx Black Americans have very similar outcomes for the entire sample period. About 85% of their time endowment is spent on leisure, as opposed to 83% for non-Latinx White Americans.

Figure 29 plots the combination of the above ingredients into our consumption-equivalent welfare statistic. In 2019, Latinx welfare was 96% of non-Latinx White welfare such that the higher Latinx life expectancy almost fully compensates for their lower consumption according to our metric. In contrast, the welfare of non-Latinx Black Americans was 59% of non-Latinx White welfare in 2019, which is slightly lower than our 64% estimate obtained when comparing all Black and

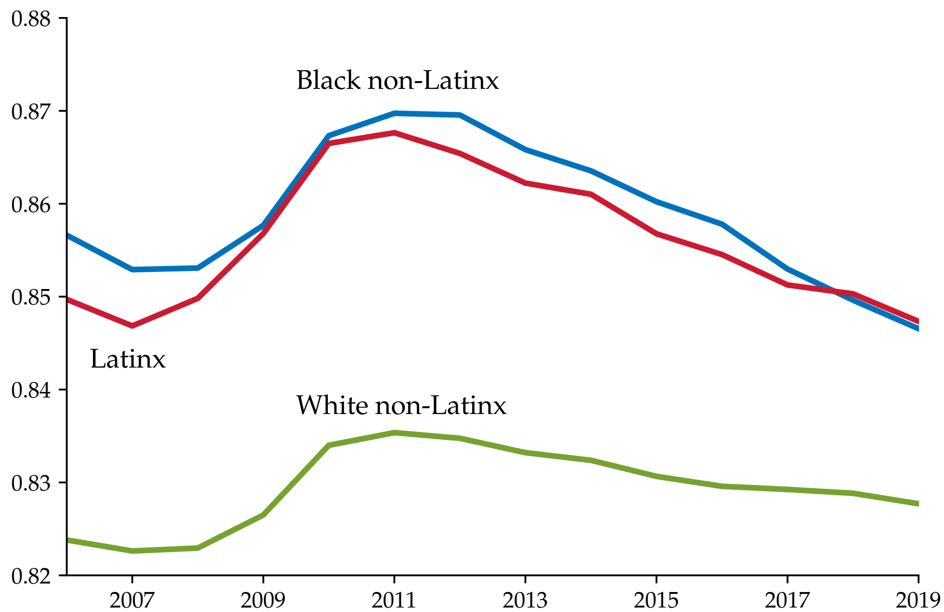
Figure 27: Consumption per capita by race and ethnicity



Note: Author calculations using data from the U.S. Consumer Expenditure Surveys (CEX). Consumption for White Americans is normalized to 100 in 2019. Log scale.

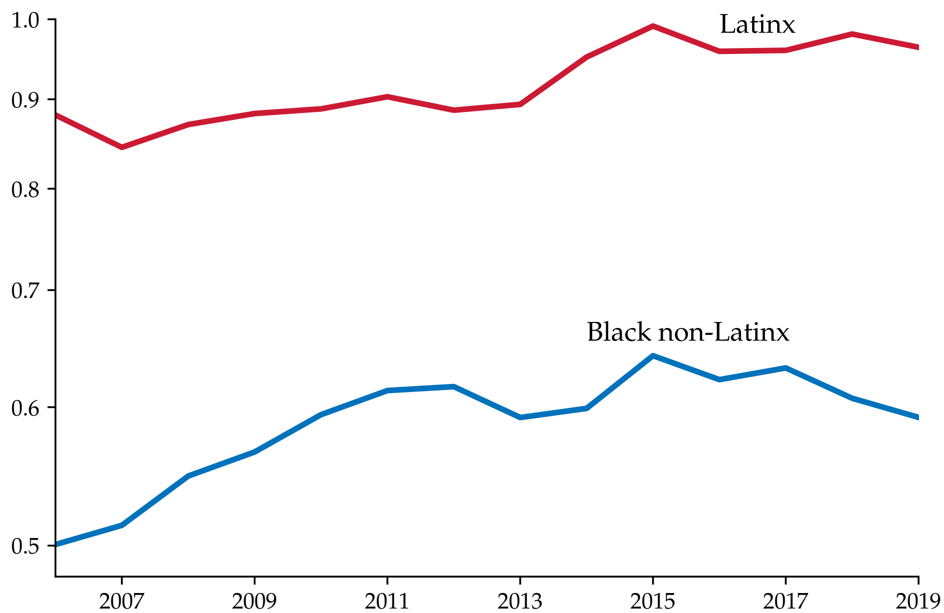
White Americans.

Figure 28: Leisure by race and ethnicity



Note: Author calculations using data from the U.S. Current Population Survey.

Figure 29: Consumption-Equivalent Welfare, Black non-Latinx and Latinx vs. White non-Latinx



Note: The figure shows the consumption-equivalent welfare for Black non-Latinx and Latinx relative to White non-Latinx from 2006 to 2019, computed according to equation (3)

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