

Race and Economic Well-Being in the United States

Jean-Felix Brouillette, Chad Jones, and Pete Klenow

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Race and economic well-being

Large and persistent racial differences in economic outcomes in the U.S.

- Earnings: Chetty, Hendren, Jones and Porter (2020), Karger (2020)
- Wealth: Barsky, Bound, Charles and Lupton (2002), Aliprantis et al. (2019)
- Mortality: Case and Deaton (2015) and Chetty et al. (2016)

Studied separately, but likely correlated

- How large is the racial gap in overall living standards?
- Has it changed over time?
- What are the sources of the racial welfare gap?

Methodology

Build on the expected utility framework of Jones and Klenow (2016)

Construct a consumption-equivalent welfare statistic

- Life expectancy
- Consumption
- Consumption inequality
- Leisure
- Leisure inequality

Preview

- Black welfare started at 45% of White welfare in 1984, rose to 64% by 2019
 - Progress from rising relative consumption and life expectancy
- Black welfare was only 28% of White welfare in 1940 (limited data)
 - Black welfare increased by a factor of 30 between 1940 and 2019
- COVID has temporarily reversed some of the relative life expectancy gains

Framework

Expected utility for individual of race i :

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

where S_{ia} = survival rate, c_{ia} = consumption and ℓ_{ia} = leisure

Expected utility if consumption is multiplied by factor λ at each age:

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

Consumption-equivalent welfare

How to adjust consumption of White Americans for them to be indifferent between living their lives in the conditions faced by Black Americans and their own?

$$U_W(\lambda_{EV}) = U_B(1)$$

Analogously, how to adjust consumption of Black Americans for them to reach the same indifference point as White Americans?

$$U_W(1) = U_B(1/\lambda_{CV})$$

Our consumption-equivalent welfare statistic geo-averages λ_{EV} and λ_{CV}

Main datasets

Welfare calculation requires data on mortality, consumption and leisure

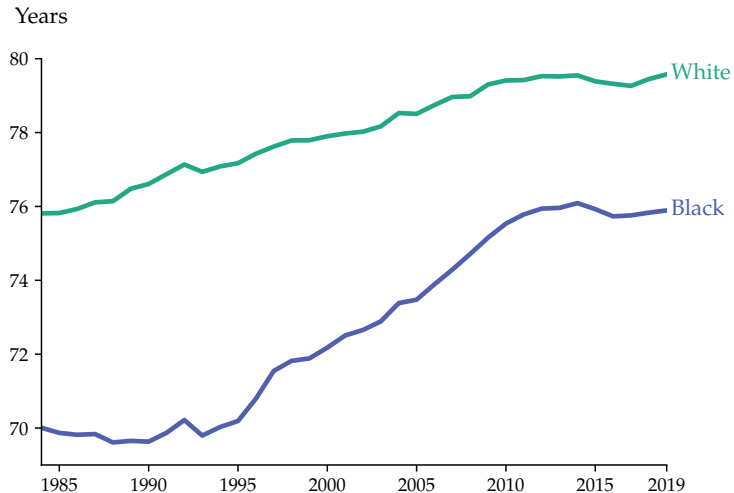
- Mortality: Centers for Disease Control and Prevention (CDC)
- Consumption: Consumer Expenditure Surveys (CEX)
- Leisure: Current Population Surveys (CPS)
- Primary period: 1984 to 2019
- Groups: Black and White Americans

Centers for Disease Control and Prevention (CDC)

- Life Tables for each age in each year
- Death records (D) and population-at-risk estimates (P)
- Probability of surviving up to age a :

$$S_a = \prod_{age=0}^a (1 - M_{age}) \quad \text{where} \quad M_{age} = D_{age}/P_{age}$$

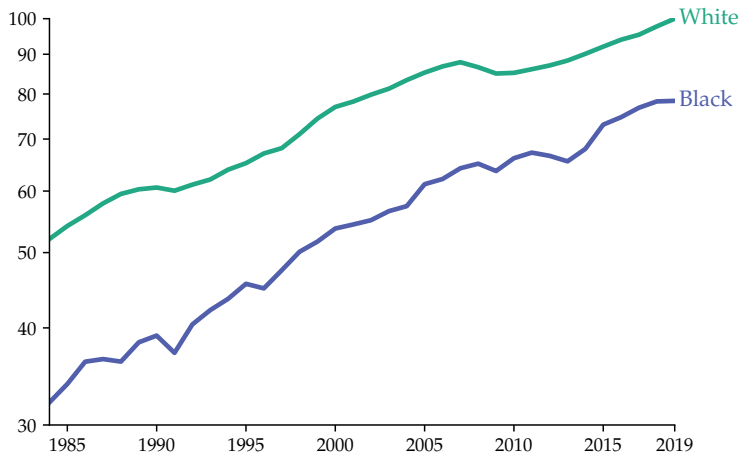
Life expectancy by race



Consumer Expenditure Surveys (CEX)

- Rotating panel of about 20,000 households
- Divide consumption equally among all household members
- Scale up to NIPA real consumption per capita in each year

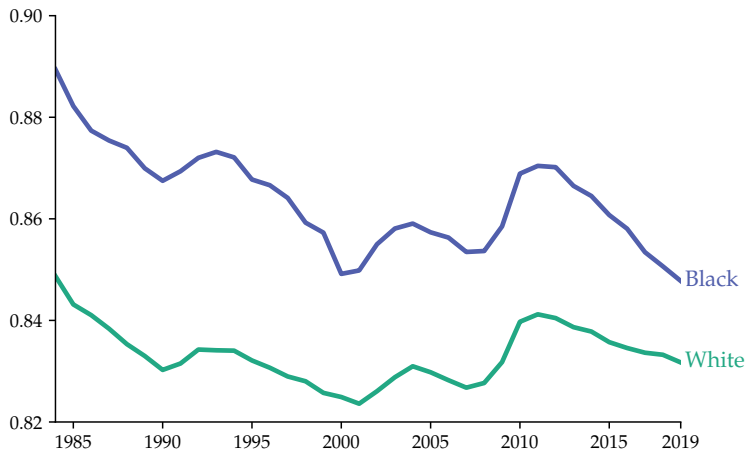
Per capita consumption by race



Current Population Surveys (CPS)

- Rotating panel of about 60,000 households
- Leisure $\equiv (5,840 - \text{hours worked in the year}) / 5,840$
 - $5,840 = 16 \text{ hours per day} \cdot 365 \text{ days}$
- e.g., 40 hours a week for 48 weeks \rightarrow 67% of waking time is leisure
- Divide leisure equally among all 25 to 64 year olds in the household

Leisure by race



Flow utility

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

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

- Death is normalized to zero
- ϵ is the constant Frisch elasticity of labor supply

Calibration

Parameter	Symbol	Value	Source
Frisch elasticity	ϵ	1.0	Hall (2009) and Chetty et al. (2012)
Leisure utility weight	θ	14.2	Jones and Klenow (2016)
Flow utility intercept	\bar{u}	6.23	VSL of \$7.4M in 2006 (EPA)

- Leisure: one percentage point is worth about 1.9% of consumption in 2019
- Intercept: one year of life is worth 6.23 years of consumption in 2019

Calibrating \bar{u} from the VSL

With no discounting, growth, leisure or inequality:

$$U = \sum_{a=0}^{\infty} S_a \cdot u(c) = e \cdot u(c) = e \cdot (\bar{u} + \log c)$$

Slope of the indifference curve $dU = 0$ implies:

$$\frac{dc}{c} = \frac{u(c)}{u'(c) \cdot c} \cdot \frac{de}{e} = \bar{u} \cdot \frac{de}{e}$$

1% higher LE is equivalent to \bar{u} % higher consumption:

$$\bar{u} = \frac{u(c)}{u'(c) \cdot c} = \frac{\text{VSLY}}{c} = \frac{\text{VSL}/e_{40}}{c} \approx \frac{\$7,400,000/40}{\$30,000} = \frac{\$185,000}{\$30,000} \approx 6.2$$

Definitions

Survival rates normalized by White life expectancy:

$$s_{Ba} \equiv \frac{S_{Ba}}{\sum_a S_{Wa}} \quad \text{and} \quad \Delta s_{Ba} \equiv \frac{S_{Ba} - S_{Wa}}{\sum_a S_{Wa}}$$

Average lifetime utility from consumption and leisure:

$$\mathbb{E} \log(c_i) \equiv \sum_a s_{Wa} \cdot \mathbb{E}[\log(c_{ia})] \quad \text{and} \quad \mathbb{E} v(\ell_i) \equiv \sum_a s_{Wa} \cdot \mathbb{E}[v(\ell_{ia})]$$

Average lifetime consumption and leisure:

$$\bar{c}_i \equiv \sum_a s_{Wa} \cdot \mathbb{E}[c_{ia}] \quad \text{and} \quad \bar{\ell}_i \equiv \sum_a s_{Wa} \cdot \mathbb{E}[\ell_{ia}]$$

Decomposition

$$\log(\lambda_{EV}) = \sum_a \Delta s_{Ba} \cdot \mathbb{E}[u(c_{Ba}, \ell_{Ba})]$$

Life expectancy

$$+ \log(\bar{c}_B) - \log(\bar{c}_W)$$

Consumption

$$+ v(\bar{\ell}_B) - v(\bar{\ell}_W)$$

Leisure

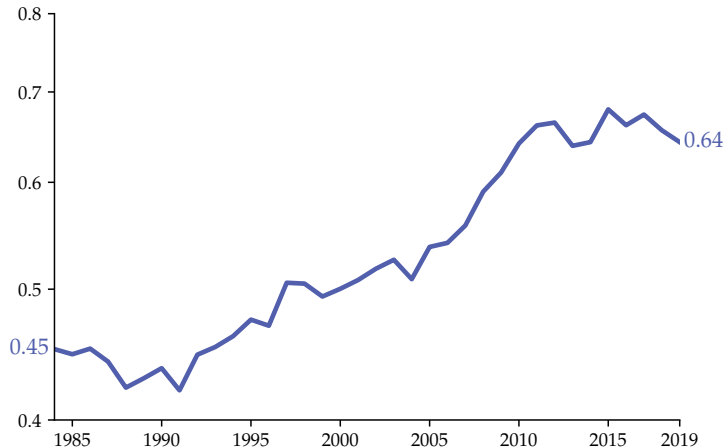
$$+ \mathbb{E} \log(c_B) - \log(\bar{c}_B) - [\mathbb{E} \log(c_W) - \log(\bar{c}_W)]$$

Consumption inequality

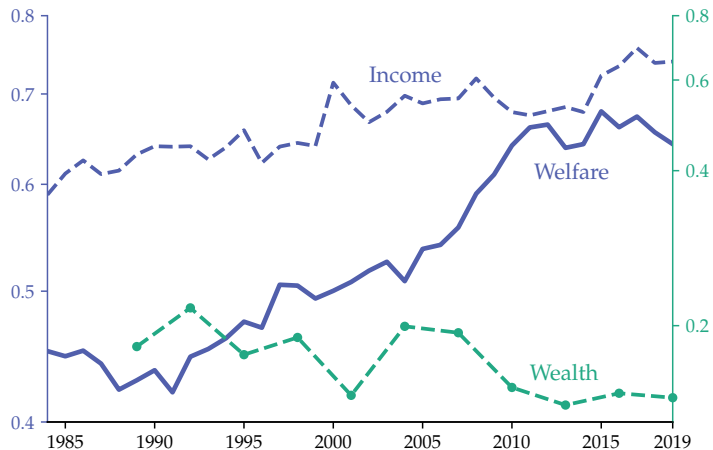
$$+ \mathbb{E} v(\ell_B) - v(\bar{\ell}_B) - [\mathbb{E} v(\ell_W) - v(\bar{\ell}_W)]$$

Leisure inequality

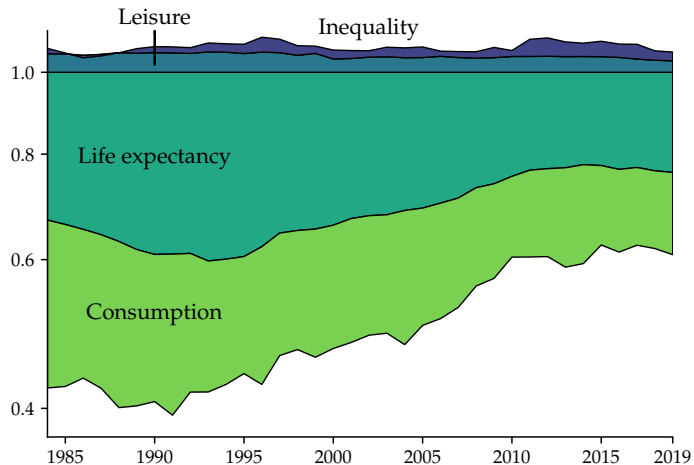
Black relative to White welfare



Black relative to White welfare, income and wealth



Relative welfare decomposition



Relative welfare decomposition in 1984, 2000 and 2019

	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

Welfare growth between 1984 and 2019 (in % per year)

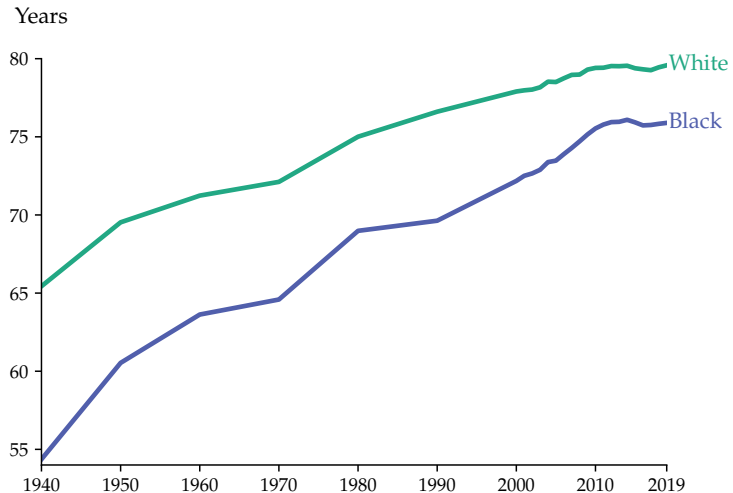
	Welfare	Income	LE	c	$\sigma(c)$	ℓ	$\sigma(\ell)$
Black	3.39	2.29	1.22	2.49	-0.03	-0.17	-0.12
White	2.32	1.63	0.78	1.84	-0.10	-0.12	-0.08
Gap	1.08	0.66	0.44	0.66	0.07	-0.05	-0.04

A longer view with more limited data

U.S. Census goes back further in time:

- Decadal: 1940 to 2000
- Annual American Community Survey (ACS): 2005 to 2019
- Impute consumption from income in the Census data
- Coefficients from consumption on income in the CEX 1984–2019
- Omit the inequality terms

Life expectancy



Imputing consumption from income and demographics

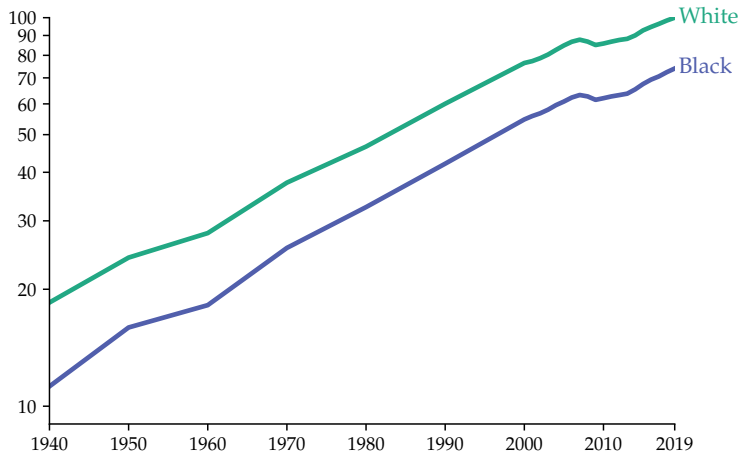
Run this simple regression on CEX data from 1984–2019:

$$\frac{c_{it} - \bar{c}_t}{\bar{c}_t} = \beta \cdot \frac{y_{it} - \bar{y}_t}{\bar{y}_t} + \sum_x \alpha_x \cdot \frac{x_{it} - \bar{x}_t}{\bar{x}_t} + \epsilon_{it} \quad \text{for } x_{it} = \{\text{race, gender, age}\}$$

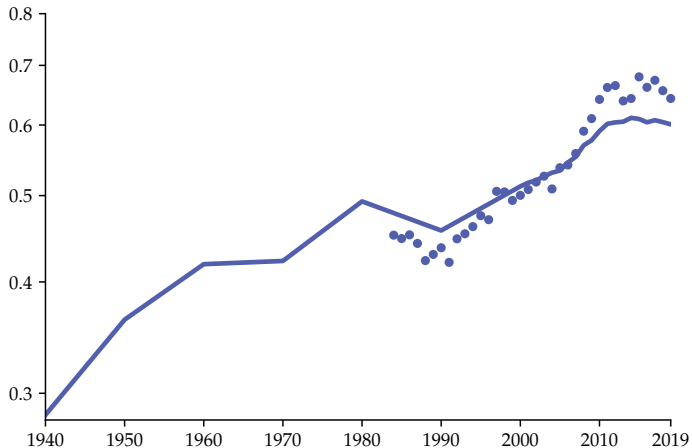
- $\hat{\beta} = 0.301$ (0.001)
- $R^2 = 0.249$

Impute consumption from fitted values using Census data for 1940 onward

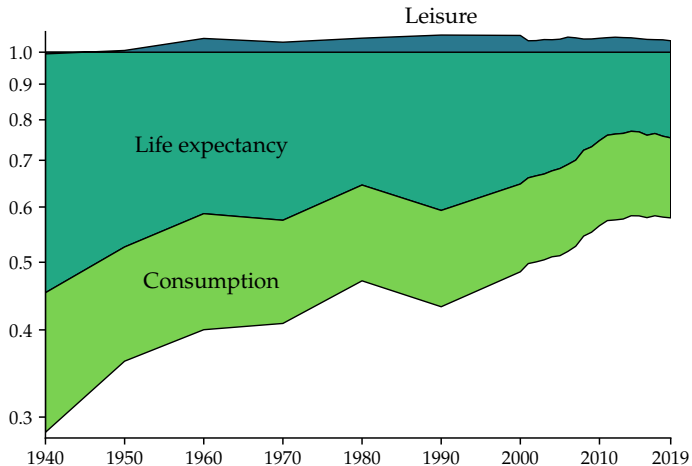
Imputed consumption per capita



Black relative to White welfare



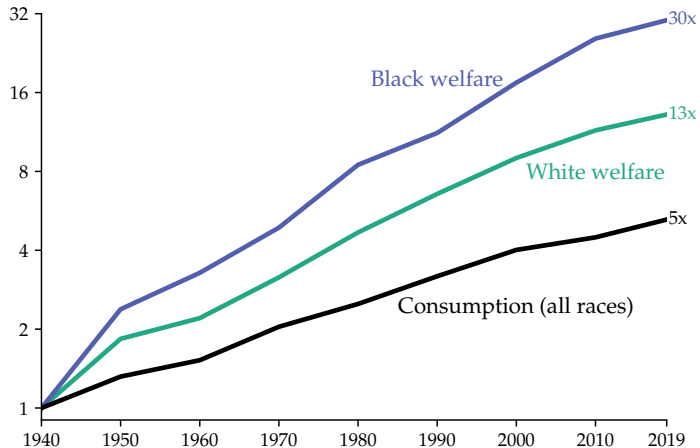
Relative welfare decomposition



Welfare growth between 1940 and 2019

	1940–1980				1940–2019			
	λ	LE	c	ℓ	λ	LE	c	ℓ
Black	5.43	2.77	2.64	0.03	4.48	2.18	2.34	-0.04
White	3.88	1.69	2.29	-0.10	3.33	1.33	2.10	-0.10
Gap	1.55	1.07	0.35	0.13	1.15	0.85	0.24	0.06

Cumulative welfare growth

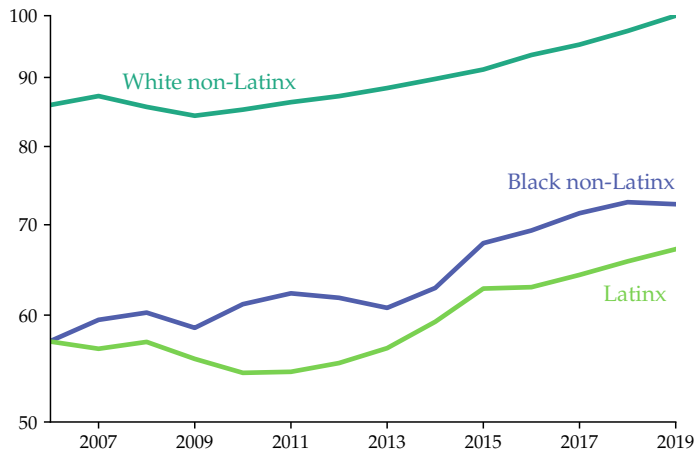


COVID-19 and welfare

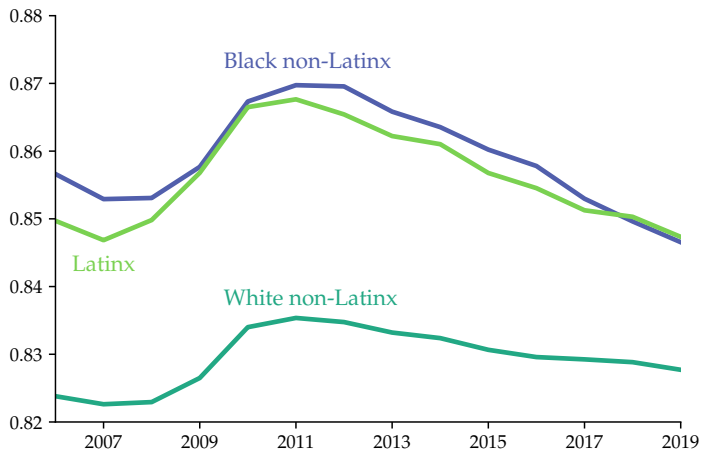
	Deaths per thousand	Age of victims	Years of life lost per victim	Lower lifespan	Group welfare loss (%)
Black non-Latinx	1.93	71.4	15.6	2.5	17.3
White non-Latinx	1.68	79.3	11.2	1.3	9.7
Latinx	1.66	68.9	20.0	4.3	26.3
All groups	1.65	75.8	14.2	2.0	13.8

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

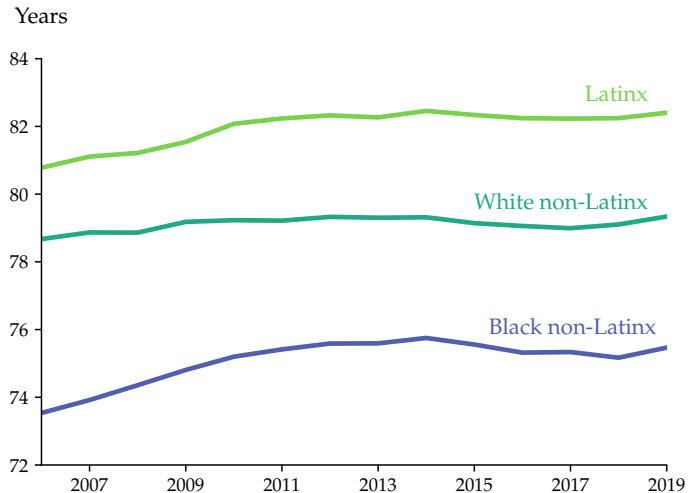
Per capita consumption with Latinx as a separate group



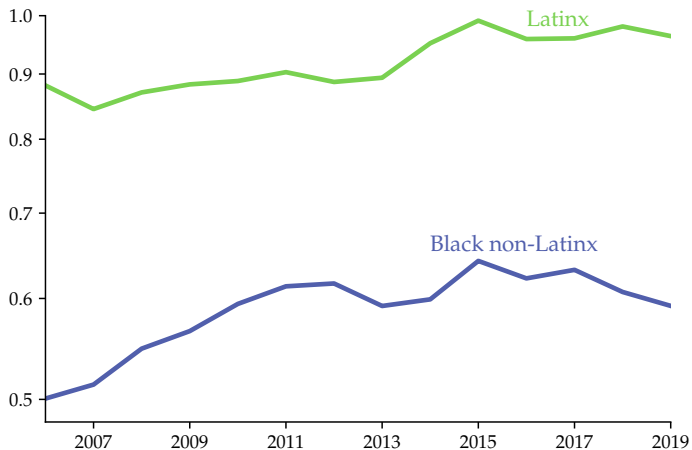
Leisure with Latinx as a separate group



Life expectancy with Latinx as a separate group



Black and Latinx welfare relative to White welfare



Extensions (more speculative)

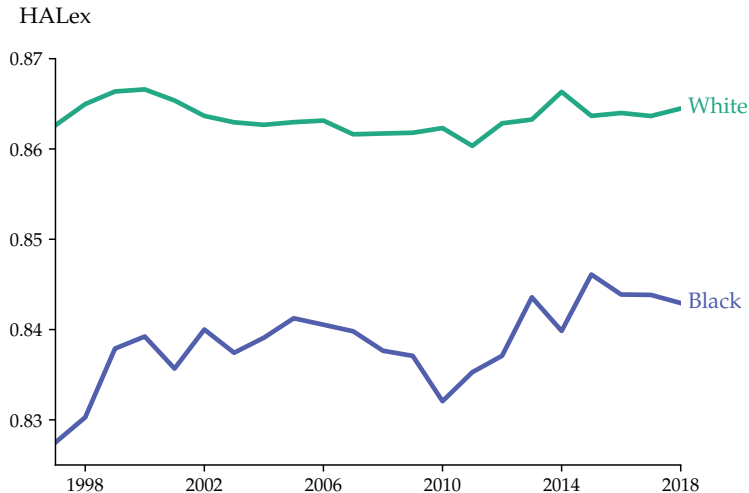
- Morbidity
- Incarceration
- Unemployment
- Education

Health and Activity Limitations Index (HALex)

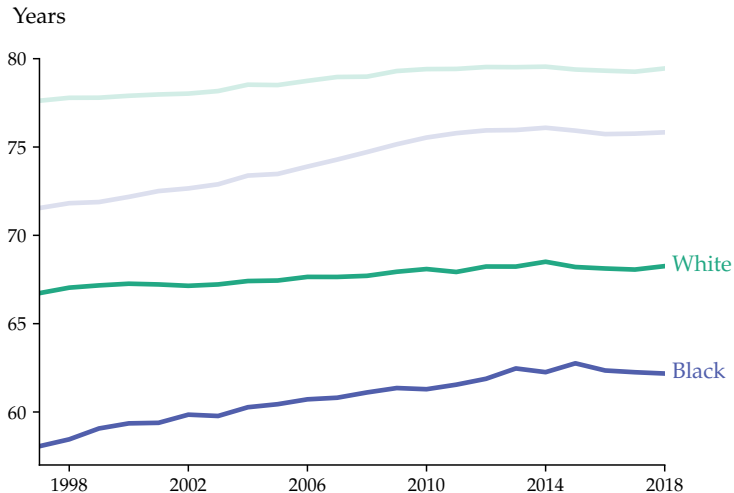
$$\text{HALex} = \underbrace{\alpha}_{\text{HALex} = 0.1} + (1 - \alpha) \times [0.41 \times (P + A) + 0.18 \times P \times A]$$

1. Personal health assessment (P) goes from 0 to 1:
 - 5 answers from “poor” ($P = 0$) to “excellent” ($P = 1$)
2. Activity limitations (A) also goes from 0 to 1:
 - Limited in non-work activities
 - Limited in work
 - Unable to work
 - Limited in household chores, shopping, etc.
 - Limited in eating, bathing, dressing, etc.

Health and Activity Limitations Index (HALex)



HAlex-adjusted life expectancy



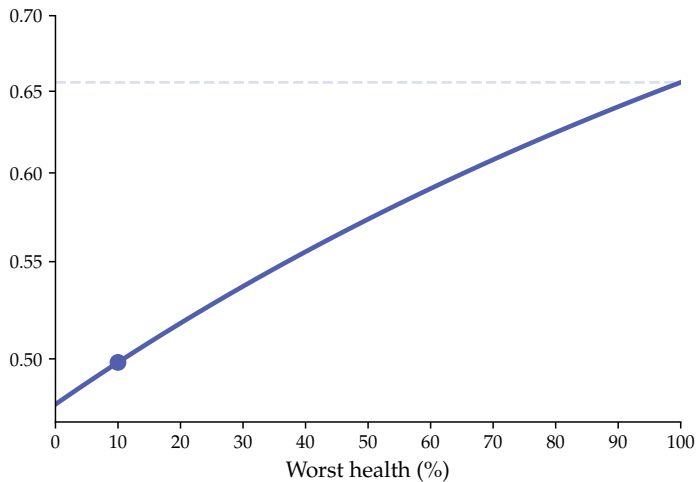
Health and welfare

Expected utility with health:

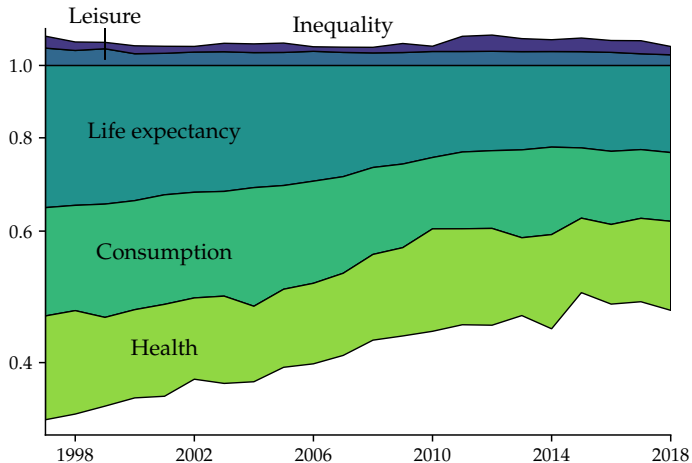
$$U_i = \mathbb{E} \sum_{a=0}^{100} S_{ia} \cdot Q_{ia} \cdot u(c_{ia}, \ell_{ia})$$

Q_{ia} = compressed or stretched $HAlex_{ia}$

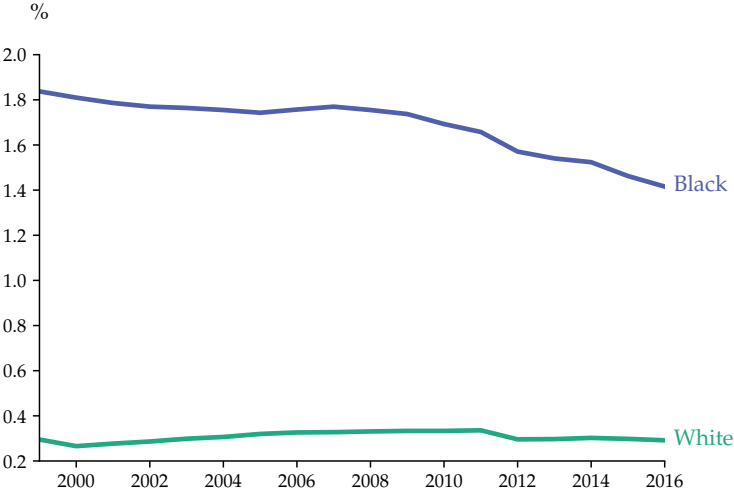
Black relative welfare in 2019 with QALYs



Health and the Black-White welfare gap



Incarceration rates



Incarceration and welfare

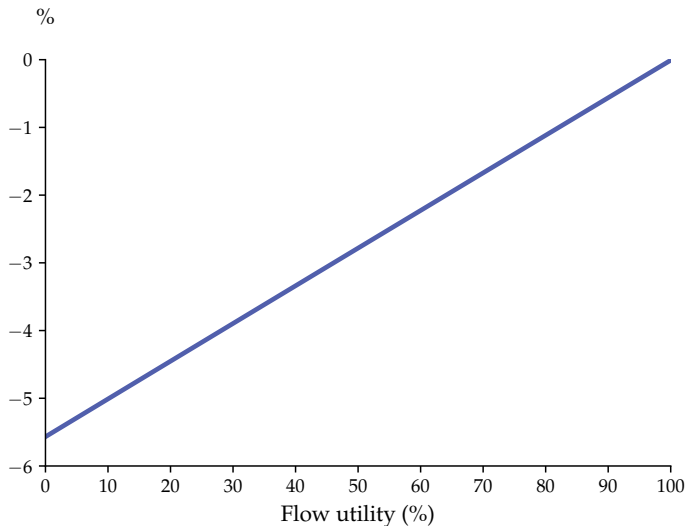
Expected utility with incarceration:

$$U_i = \mathbb{E} \sum_{a=0}^{100} S_{ia} [(1 - I_{ia}) u(c_{ia}, \ell_{ia}) + I_{ia} u_a^I]$$

where I_{ia} = incarceration rate and u_a^I = incarcerated flow utility

Incarcerated flow utility is some fraction of average flow utility for individuals of all groups with high school education or less

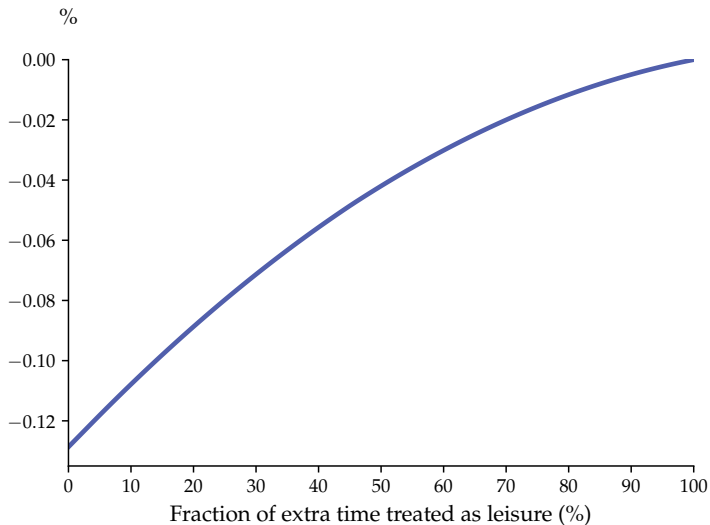
The effect of incarceration on Black relative welfare in 2016



Broad unemployment rates



The effect of unemployment on Black relative welfare in 2019



Welfare by race and education in 2019

	High school or less	Some college	Bachelor's or more
Black welfare	0.23	0.36	0.64
% of 30+ population	52%	26%	22%
White welfare	0.30	0.46	1.00
% of 30+ population	45%	22%	33%

Recap of results

- Black welfare started at 45% of White welfare in 1984, rose to 64% by 2019
 - Progress from rising relative consumption and life expectancy
- Black welfare was only 28% of White welfare in 1940 (limited data)
 - Black welfare increased by a factor of 30 between 1940 and 2019
- COVID mortality has temporarily lowered Black welfare by 17%
 - 10% for White welfare

Potential policy implications

- Quantifying welfare loss due to past and present discrimination
 - ▶ Potential welfare gains from eliminating this misallocation
- Quantifying sources of the welfare gap
 - ▶ Helpful for gauging benefits of competing policies