Race and Economic Well-Being in the United States

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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)
- 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 biggest sources?
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 of our results

- Black welfare started at 43% of White welfare in 1984, rose to 59% by 2019
  - Progress from rising relative consumption and life expectancy

- Black welfare was only 29% of White welfare in 1940 (more limited data)
  - Black welfare increased by a factor of 26 between 1940 and 2019

- COVID-19 has temporarily reversed some of the catch-up in life expectancy
  - Lowered Black welfare by 18%, White welfare by 12%
Framework

Expected utility for individual of race $i$:

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

where $S_{ia} = \text{survival rate}$, $c_{ia} = \text{consumption}$, and $\ell_{ia} = \text{leisure}$

Expected utility if consumption is multiplied by factor $\lambda$ at each age:

$$U_i \left( \lambda \right) = \sum_{a=0}^{100} S_{ia} \cdot \mathbb{E} \left[ u \left( \lambda c_{ia}, \ell_{ia} \right) \right]$$
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 \( \lambda_{EV} \) and \( \lambda_{CV} \)
Main datasets

- 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 (both include Latinx)
Centers for Disease Control and Prevention (CDC)

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

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

Years

White

Black

70
72
74
76
78
80
Years
White
Black
Consumer Expenditure Surveys (CEX)

- Rotating panel of about 20,000 households
- Divide consumption equally among all household members
- Include durables for levels, but exclude them for dispersion within groups
- Scale up to NIPA real consumption per capita in each year
  - Results are robust to scaling up category by category
Per capita consumption by race

[Chart showing consumption trends for White and Black populations from 1985 to 2019, with a notable increase over time.]
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

82
84
86
88
90
%
Black

White

13
Flow utility

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

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

- Death is normalized to zero
- \( \epsilon \) is the constant Frisch elasticity of labor supply
Calibration

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frisch elasticity</td>
<td>$\epsilon$</td>
<td>1.0</td>
<td>Hall (2009) and Chetty et al. (2012)</td>
</tr>
<tr>
<td>Leisure utility weight</td>
<td>$\theta$</td>
<td>8.8</td>
<td>Labor-Leisure F.O.C.</td>
</tr>
<tr>
<td>Flow utility intercept</td>
<td>$\bar{u}$</td>
<td>6.02</td>
<td>VSL of $7.4M$ in EPA (2006)</td>
</tr>
</tbody>
</table>

- Leisure: one percentage point is worth about 1.6% of consumption in 2019
- Intercept: 1 year of life is worth 6.02 years of 2019 consumption
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 $dU = 0$ at $c = 1$ 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; in 2006 we get

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

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

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

\[+ \mathbb{E} v(\bar{\ell}_B) - v(\bar{\ell}_B) - \left[\mathbb{E} v(\bar{\ell}_W) - v(\bar{\ell}_W)\right]\]

Leisure inequality
Black welfare relative to White welfare
Relative welfare, earnings, income and wealth

Welfare
Earnings
Disposable income
Wealth (right scale)
Relative welfare decomposition

Leisure
Inequality
Life expectancy
Consumption

Relative welfare decomposition in 1984, 2000, and 2019

<table>
<thead>
<tr>
<th>Year</th>
<th>$\lambda$</th>
<th>log($\lambda$)</th>
<th>LE</th>
<th>c</th>
<th>$\sigma(c)$</th>
<th>$\ell$</th>
<th>$\sigma(\ell)$</th>
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</thead>
<tbody>
<tr>
<td>2019</td>
<td>0.59</td>
<td>-0.52</td>
<td>-0.27</td>
<td>-0.29</td>
<td>0.02</td>
<td>0.02</td>
<td>0.00</td>
</tr>
<tr>
<td>2000</td>
<td>0.46</td>
<td>-0.77</td>
<td>-0.42</td>
<td>-0.39</td>
<td>0.01</td>
<td>0.02</td>
<td>0.00</td>
</tr>
<tr>
<td>1984</td>
<td>0.43</td>
<td>-0.84</td>
<td>-0.40</td>
<td>-0.46</td>
<td>-0.02</td>
<td>0.03</td>
<td>0.01</td>
</tr>
</tbody>
</table>
### Welfare growth between 1984 and 2019 (in % per year)

<table>
<thead>
<tr>
<th></th>
<th>Welfare</th>
<th>Earnings</th>
<th>LE</th>
<th>c</th>
<th>σ (c)</th>
<th>l</th>
<th>σ (l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>3.26</td>
<td>2.01</td>
<td>1.20</td>
<td>2.25</td>
<td>-0.05</td>
<td>-0.09</td>
<td>-0.06</td>
</tr>
<tr>
<td>White</td>
<td>2.29</td>
<td>1.35</td>
<td>0.77</td>
<td>1.78</td>
<td>-0.18</td>
<td>-0.06</td>
<td>-0.04</td>
</tr>
<tr>
<td>Gap</td>
<td>0.97</td>
<td>0.67</td>
<td>0.43</td>
<td>0.46</td>
<td>0.13</td>
<td>-0.02</td>
<td>-0.02</td>
</tr>
</tbody>
</table>
A longer view with more limited data

U.S. Census micro data goes back further in time:

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

Years

White

Black
Imputing consumption from earnings and demographics

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

\[
\frac{c_{it} - \bar{c}_t}{\bar{c}_t} = \beta \cdot \frac{y_{it} - \bar{y}_t}{\bar{y}_t} + \sum_x \alpha_x \cdot \frac{x_{it} - \bar{x}_t}{\bar{x}_t} + \epsilon_{it}
\]

- \( x_{it} = \{\text{race, gender, education, family size, age}\} \)
- \( \hat{\beta} = 0.292 \ (0.001) \)
- \( R^2 = 0.342 \)

Impute consumption from fitted values using Census data for 1940 onward.
Imputed consumption per capita
Black relative to White welfare

![Graph showing the comparison of Black relative to White welfare over time, with data points for CEX/CPS and Census/ACS, indicating an increasing trend.]
Relative welfare decomposition
Welfare growth between 1940 and 2019

<table>
<thead>
<tr>
<th></th>
<th>1940–1980</th>
<th></th>
<th>1940–2019</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\lambda$</td>
<td>$LE$</td>
<td>$c$</td>
<td>$\ell$</td>
</tr>
<tr>
<td>Black</td>
<td>5.15</td>
<td>2.67</td>
<td>2.47</td>
<td>0.02</td>
</tr>
<tr>
<td>White</td>
<td>3.87</td>
<td>1.65</td>
<td>2.28</td>
<td>-0.06</td>
</tr>
<tr>
<td>Gap</td>
<td>1.27</td>
<td>1.01</td>
<td>0.18</td>
<td>0.08</td>
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</table>

Note: Column $\lambda$ is decomposed in columns $LE$, $c$ and $\ell$. 
Cumulative welfare growth

White welfare
Black welfare
Consumption (all races)
COVID-19 and welfare

<table>
<thead>
<tr>
<th></th>
<th>$\lambda$</th>
<th>$\log(\lambda)$</th>
<th>$LE$</th>
<th>$c$</th>
<th>$\sigma(c)$</th>
<th>$\ell$</th>
<th>$\sigma(\ell)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>0.83</td>
<td>-0.19</td>
<td>-0.23</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>White</td>
<td>0.87</td>
<td>-0.13</td>
<td>-0.12</td>
<td>-0.05</td>
<td>0.02</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Black non-Latinx</td>
<td>0.82</td>
<td>-0.20</td>
<td>-0.24</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>White non-Latinx</td>
<td>0.88</td>
<td>-0.12</td>
<td>-0.10</td>
<td>-0.06</td>
<td>0.02</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Latinx</td>
<td>0.80</td>
<td>-0.22</td>
<td>-0.25</td>
<td>-0.00</td>
<td>0.00</td>
<td>0.02</td>
<td>0.01</td>
</tr>
</tbody>
</table>
Per capita consumption with Latinx as a separate group
Leisure with Latinx as a separate group

![Graph showing leisure rates for White non-Latinx, Black non-Latinx, and Latinx from 2007 to 2019. The graph indicates a decrease in leisure rates for all groups over the years.](image-url)
Life expectancy with Latinx as a separate group
Black and Latinx welfare relative to White welfare

![Graph showing the ratio of Black and Latinx welfare to White welfare from 2007 to 2019. The graph compares Black non-Latinx and Latinx welfare.]
Extensions (more speculative)

- Morbidity
- Incarceration
- Unemployment
Health and Activity Limitations Index (HALex)

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

1. Personal health assessment \((P)\) goes from 0 to 1:
   - 5 answers from “poor” \((P = 0)\) to “excellent” \((P = 1)\)

2. Activity limitations \((A)\) go 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

White

Black

0.82
0.83
0.84
0.85
0.86
0.87
0.88
HALex

White

Black


2018

0.82
0.83
0.84
0.85
0.86
0.87
0.88
HALex

White

Black


2018
HALex-adjusted life expectancy

Years

White unadjusted
Black unadjusted
White adjusted
Black adjusted
Morbidity and welfare

Expected utility with morbidity:

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

$$Q_{ia} = \text{compressed or stretched HALex}_{ia}$$

- compressed $\Rightarrow \alpha > 0.1$, stretched $\Rightarrow \alpha < 0.1$
Black relative welfare in 2018 with QALYs
Morbidity and the Black-White welfare gap (with $\alpha = 0.1$)
Morbidity and the Black-White welfare gap (with $\alpha = 0.1$)
Incarceration rates for the 18 and over population

%  

Black non-Latinx

White non-Latinx

1999 2001 2003 2005 2007 2009 2011 2013 2015 2017 2019
Incarceration and welfare

Expected utility with incarceration:

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

where \( I_{ia} = \) incarceration rate and \( u_{ia}^I = \) incarcerated flow utility

Incarcerated flow utility is some \textit{fraction} of average flow utility for individuals with high school education or less.
The effect of incarceration on Black relative welfare in 2018
Broad unemployment rates

%


Black
White
The effect of unemployment on Black relative welfare in 2019

Fraction of extra time treated as leisure (%)
Recap of results

- Black welfare started at 43% of White welfare in 1984, rose to 59% by 2019
  - Progress from rising relative consumption and life expectancy
- Black welfare was only 29% of White welfare in 1940 (limited data)
  - Black welfare increased by a factor of 26 between 1940 and 2019
- COVID mortality has temporarily lowered Black welfare by 18%
  - 12% for White welfare
- Morbidity and incarceration make the gaps even larger
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