Using Big Data to Solve Economic and Social Problems

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Median Household Income by Race and Ethnicity in 2016

White Non-Hispanic: $63,200
Black Non-Hispanic: $38,600
Asian Non-Hispanic: $80,700
Hispanic: $46,900
American Indian: $39,700

Source: American Community Survey 2016
# Theories of Racial Disparities

## Family-Level Factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental Income</td>
<td>Magnuson &amp; Duncan 2006; Rothstein &amp; Wozny 2012</td>
</tr>
<tr>
<td>Parental Human Capital &amp; Wealth</td>
<td>Oliver &amp; Shapiro 1995; Orr 2003; Conley 2010</td>
</tr>
<tr>
<td>Family Structure and Stability</td>
<td>McAdoo 2002; Burchinal et al. 2011</td>
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<tr>
<td>Ability at Birth</td>
<td>Rushton &amp; Jensen 2005 vs. Fryer &amp; Levitt 2006</td>
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## Structural Features of Environment

<table>
<thead>
<tr>
<th>Feature</th>
<th>References</th>
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<tbody>
<tr>
<td>Discrimination in Criminal Justice</td>
<td>Steffensmeier, Ulmer, Kramer 1998; Eberhardt et al. 2004; Alexander 2010</td>
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<tr>
<td>Social Alienation, Stereotype Threat</td>
<td>Steele &amp; Aaronson 1995; Tatum 2004; Glover, Pallais, Pariente 2017</td>
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## Cultural Factors and Social Norms

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<tr>
<th>Factor</th>
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<tbody>
<tr>
<td>Identity and Oppositional Norms</td>
<td>Fordham &amp; Ogbu 1986; Noguera 2003; Carter 2005; Austen-Smith &amp; Fryer 2005</td>
</tr>
<tr>
<td>Aspirations or Role Models</td>
<td>Mickelson 1990; Small, Harding, &amp; Lamont 2010</td>
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</table>
An Intergenerational Perspective on Racial Disparities

- Most prior work has studied racial disparities within a single generation.

- We will take an intergenerational perspective, focusing on dynamics of income across generations.

- Intergenerational approach sheds light on which disparities will persist in the long run and allows us to isolate the factors that drive persistent gaps.

  - Methods: dynamics of income and **steady states**
Intergenerational Mobility in the United States

Mean Child Household Income Rank vs. Parent Household Income Rank

Slope: 0.351 (0.003)
Convergence in Black-White Gap if Intergenerational Mobility is Race-Invariant

Mean Black Parent Rank: 32.7
Mean White Parent Rank: 57.9
Convergence in Black-White Gap if Intergenerational Mobility is Race-Invariant

Mean Black Parent Rank: 32.7
Mean White Parent Rank: 57.9
Gap = 25.2
Convergence in Black-White Gap if Intergenerational Mobility is Race-Invariant

Gap = 25.2

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<tr>
<th>Mean Black Parent Rank</th>
<th>Mean White Parent Rank</th>
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<tr>
<td>32.7</td>
<td>57.9</td>
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Mean Rank of Black Children: 44.8

Mean Black Parent Rank: 32.7

Gap: 25.2

Mean White Parent Rank: 57.9
Convergence in Black-White Gap if Intergenerational Mobility is Race-Invariant

Gap = 25.2

Mean Black Parent Rank = 32.7
Mean White Parent Rank = 57.9

Mean Rank of White Children = 53.6
Mean Rank of Black Children = 44.8
Convergence in Black-White Gap if Intergenerational Mobility is Race-Invariant

- Current Gen. Gap = 25.2
- Mean Black Parent Rank = 32.7
- Mean White Parent Rank = 57.9
- Predicted Gap in Next Gen. = 8.8
Convergence in Black-White Gap if Intergenerational Mobility is Race-Invariant

Next Gen. Gap = 8.8
If intergen mobility did not vary by race, racial disparities would shrink rapidly across generations [Becker and Tomes 1979]

Convergence in Black-White Gap if Intergenerational Mobility is Race-Invariant

Mean Child Household Income Rank

Parent Household Income Rank

Gen. 2 Gap = 3.1

Next Gen. Gap = 8.8
Intergenerational Mobility for Whites vs. Blacks

White

Black

Diff. at p=25: 12.6

Diff. at p=75: 15.7

Diff. at p=100: 12.4
Income Mobility for Black vs. White Children Raised in High-Income Families

Follow the lives of these 26,867 Americans and see where they end up as adults:

- **Rich adult**
  - Black: 1,159 (18%)
  - White: 2,777 (42%)

- **Upper-middle-class adult**
  - Black: 1,349 (20%)
  - White: 1,549 (23%)

- **Middle-class adult**
  - Black: 1,579 (24%)
  - White: 1,071 (16%)

- **Lower-middle-class adult**
  - Black: 1,446 (22%)
  - White: 622 (9%)

- **Poor adult**
  - Black: 1,098 (17%)
  - White: 575 (9%)

Source: Chetty, Hendren, Jones, Porter 2018; New York Times 2018
Intergenerational Mobility for Whites vs. Blacks

Parent Household Income Rank vs. Mean Child Household Income Rank

Steady State

Whites'
Intergenerational Mobility for Whites vs. Blacks

Mean Child Household Income Rank vs. Parent Household Income Rank

Whites' Steady State

Blacks' Steady State

Mean Child Household Income Rank

Parent Household Income Rank

Mean Child Household Income Rank:

- Whites' Steady State at 54.4
- Blacks' Steady State at 35.2
Intergenerational Mobility for Whites vs. Blacks

Mean Child Household Income Rank vs. Parent Household Income Rank

- Diff. at p=25: 12.6
- Diff. at p=75: 15.7
- Diff. at p=100: 12.4
- Steady-State Gap = 19.2
Intergenerational Mobility for Whites vs. Blacks

Intergenerational gaps $\rightarrow$ racial disparities persist in steady state

Current gap (21 pctiles) close to steady state $\rightarrow$ intergenerational gaps (not transitory factors) drive most of the black-white gap today

Steady-State Gap = 19.2
Mean Child Income Rank vs. Parent Income Rank by Race and Ethnicity

- White
- Black
- American Indian
Mean Child Income Rank vs. Parent Income Rank by Race and Ethnicity

- White
- Black
- American Indian
- Hispanic
Mean Child Income Rank vs. Parent Income Rank by Race and Ethnicity

- White
- Black
- American Indian
- Hispanic
- Asian

Parent Household Income Rank vs. Mean Child Household Income Rank for different racial and ethnic groups.
Mean Child Income Rank vs. Parent Income Rank by Race and Ethnicity
Children with Mothers born in the U.S.
Current Mean Ranks vs. Predicted Ranks in Steady State, by Race

Empirically Observed Mean Household Income Rank vs. Steady State Mean Rank for various racial groups:
- Black
- Hispanic
- American Indian
- White
- Asian (US Natives)

Parents and Children (born 1978-83) are compared against a 45-degree line.
Intergenerational Persistence of Racial Disparities

- Black Americans are close to their long-run steady-state
  - Suggests that intergenerational gaps (not transitory factors) drive most of the black-white gap today

- Addressing the black-white gap therefore requires understanding sources of intergenerational gaps
  - Why do black children earn less than white children who grow up in families with comparable incomes?
Gender Differences in Racial Gaps

- First step in understanding this: examine differences by gender

- Focus on individual (own) income for this analysis, excluding spousal income
Black-White Gap in Child Individual Income Rank vs. Parent Income Rank

Male Children

Diff. at p=25: 9.7

Diff. at p=75: 12.0

Mean Child Individual Income Rank vs. Parent Income Rank

White

Black

Black-White Gap in Child Individual Income Rank vs. Parent Income Rank
Black-White Gap in Child Individual Income Rank vs. Parent Income Rank
Female Children

Diff. at p=25: -1.4
Diff. at p=75: -1.0

White
Black

Black-White Gap in Child Individual Income Rank vs. Parent Income Rank
Female Children

Mean Child Individual Income Rank

Parent Household Income Rank

Diff. at p=25: -1.4
Diff. at p=75: -1.0

White
Black
Employment Rates vs. Parent Income Rank

Male Children

Percent of Children Working (Age >= 30)

Parent Household Income Rank

- White Males
- Black Males

Diff. at p=25: 18.9
Diff. at p=75: 11.4
Incarceration Rates vs. Parent Income Rank
Male Children

Diff. at p=25: -8.2

Diff. at p=75: -3.2
Incarceration Rates vs. Parent Income Rank
Female Children

- White
- Black
Explaining the Black-White Intergenerational Income Gap
Family-Level Factors

- Do family-level factors (e.g., parental wealth, education, etc.) explain the black-white intergenerational gap?
  - No: Black men who grow up in two-parent families with comparable income, education, and wealth to white men still fare worse
Do family-level factors (e.g., parental wealth, education, etc.) explain the black-white intergenerational gap?

- No: Black men who grow up in two-parent families with comparable income, education, and wealth to white men still fare worse

Suggests that environmental factors beyond the family matter

Study the role of environmental factors by analyzing differences in black-white gaps across neighborhoods
The Geography of Upward Mobility in the United States
Average Individual Income Rank for Males with Parents Earning $25,000 (25th percentile)

Note: Green = More Upward Mobility, Red = Less Upward Mobility

- Atlanta: $20.1k
- Charlotte: $20.7k
- Cleveland: $22.9k
- Cleveland: $22.9k
- Salt Lake City: $29.4k
- San Francisco: $27.6k
- Seattle: $26.5k
- Washington DC: $26.3k
- Los Angeles: $26.6k
- Newark: $27.8k
- Salt Lake City: $29.4k
- Dubuque: $32.0k

Note: Green = More Upward Mobility, Red = Less Upward Mobility
Two Americas: The Geography of Upward Mobility by Race
Average Individual Income Rank for Boys with Parents Earning $25,000 (25th percentile)

Note: Green = More Upward Mobility, Red = Less Upward Mobility; Grey = Insufficient Data
Neighborhood Environments and the Black-White Gap

- Commuting-zone level variation illuminates broad regional patterns but does not directly test for “neighborhood” effects

- Blacks live in different neighborhoods from whites within CZs

- Zoom in to examine variation across Census tracts
Variation in the Black-White Earnings Gap Across Tracts

Four key results:

1. Black boys have lower earnings than white boys in 99% of Census tracts in America, controlling for parental income
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2. Both black and white boys have better outcomes in “good” (e.g., low-poverty, higher rent) neighborhoods, but the black-white gap is bigger in such areas
Correlations between Tract-Level Characteristics and Incomes of Black vs. White Men
Children with Parents at 25th Percentile

<table>
<thead>
<tr>
<th>Category</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economy</td>
<td>Share Above Poverty Line, Mean Household Income, Employment Rate</td>
</tr>
<tr>
<td>Schools</td>
<td>Mean 3rd Grade Math Score, Mean 8th Grade Math Score, Share HS Students Not Suspended</td>
</tr>
<tr>
<td>Housing</td>
<td>Median Rent (2BR), Share Homeowners</td>
</tr>
<tr>
<td>Family Structure</td>
<td>Share Married, Share Two-Parent</td>
</tr>
<tr>
<td>Healthcare Access</td>
<td>Share Adults Insured</td>
</tr>
</tbody>
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<tbody>
<tr>
<td>White</td>
<td>Black</td>
</tr>
<tr>
<td>Magnitude of Correlation</td>
<td>0 0.2 0.4 0.6</td>
</tr>
</tbody>
</table>
Black – White Gap in Individual Income Ranks vs. Share Above Poverty Line

Males

White Minus Black Mean Children Ind. Income Rank

Share Above Poverty Line in Tract in 2000 (%)

Intercept: 3.57, Slope: 0.05
Variation in the Black-White Earnings Gap Across Tracts

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2. Both black and white boys have better outcomes in “good” (e.g., low-poverty, higher rent) neighborhoods, but the black-white gap is bigger in such areas.

3. Within low-poverty areas, there are two factors associated with better outcomes for black boys and smaller gaps: greater father presence and less racial bias.
Black-White Gap in Employment Rates vs. Father Presence
Male Children with Parents at 25th Percentile - Poverty Share Less than 10%
Male-Female Gap in Employment Rates vs. Father Presence
Black Children with Parents at 25th Percentile - Poverty Share Less than 10%
Variation in the Black-White Earnings Gap Across Tracts

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3. Within low-poverty areas, there are two factors associated with better outcomes for black boys and smaller gaps: greater father presence and less racial bias.

4. Neighborhoods have causal childhood exposure effects on racial gaps: black boys who move to good areas at a younger age do better.
Summary: Impacts of Neighborhood Environments on Black Men

- Black boys do well in nbhds. with good resources (low poverty rates) and good race-specific factors (e.g., high father presence, less racial bias)

- The problem is that there are essentially no such neighborhoods in America…
Father Presence and Poverty Rates by Tract for Blacks vs. Whites

Note: Low-Poverty: Poverty Rate < 10%; High Father Presence: >50% Father Presence Among Children of Own Race
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Note: Low-Poverty: Poverty Rate < 10%; High Father Presence: >50% Father Presence Among Children of Own Race
Conclusions

1. Mobility into and out of poverty is a central determinant of racial disparities
   
   – Black children have much lower rates of upward mobility and greater downward mobility than white children → gaps persist across generations
Conclusions

1. Mobility into and out of poverty is a central determinant of racial disparities

2. Commonly proposed policies likely to be insufficient to close black-white gap by themselves

   – Changes in transfer programs and minimum wages unlikely to have persistent effects, unless they change rates of mobility

   – Reducing residential or school segregation can improve the level of outcomes of both black and white children, but may not narrow gaps
Conclusions

1. Mobility into and out of poverty is a central determinant of racial disparities.

2. Commonly proposed policies likely to be insufficient to close black-white gap by themselves.

3. Reducing racial gaps requires policies that cut within neighborhoods and improves environments for specific subgroups, such as black men.
   - Ex: Mentoring programs, efforts to reduce racial bias, achieving racial integration within schools, criminal justice reform [Heller et al. 2015, Devine et al. 2012]
   - Further development and evaluation of such efforts would be valuable.