The Great Migration and Educational Opportunity

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Motivation

- The Great Migration had profound impacts on the US economy and society
  - Over 6 million African Americans moved out of the South from 1915–70

- Mixed consequences for adult migrants: higher earnings, mortality, and incarceration
  [Collins and Wanamaker 2014; Black et al. 2015; Boustan 2017; Eriksson 2019]

- Less evidence on consequences for children
  - Derenoncourt (2019): 1940–70 migration lowered mobility of Black kids born in 1980s
  - Tabellini (2019): 1915–30 migration reduced public expenditures
  - Boustan (2010) and Shertzer and Walsh (2019): migration led to white flight
  - Did migration ever yield benefits for children?
This paper

- Examine effects of migration from 1915–1940 on Black children’s education
  - Estimate county-level place effects for all destinations chosen by Southern-born migrants
  - Using complete count records from 1940 Census

- Empirical strategy addresses selection on observed and unobserved variables
  - Control for observed characteristics of children and families
  - Adjust for selection on unobservables using model + selection on observed variables
    [Altonji, Elder, and Taber 2005; Oster 2019; Finkelstein, Gentzkow, and Williams 2019]
Results: Place effects in 1940

- On average, moving North increased schooling of Black children by 0.8 years (12%)
  - 84 of best 100 counties are in North, and 96 of 100 worst counties are in South
  - Adjusting for selection on unobservables lowers impact on moving North by 39%

- Large intraregional variation in place effects
  - Gap between 90th and 10th percentiles is 1.2 years in North and 1.6 years in South
  - Some areas in South (such as Birmingham, AL and Harris, TX) are among the best places

- Place effects are larger in counties with better schools, better labor market opportunities for Black adults, fewer homicides, and stronger social capital
Results: Changes in place effects over time

- Many of the best places in 1940 offer limited opportunities today
  - Chicago, Detroit, Cleveland, and St. Louis among best places for Black children in 1940
  - Correlation with contemporary place effects is 0.2 [Chetty et al. 2020]

- Same factors that explain cross-sectional variation explain time-series variation
  - Changes in place effects are larger in counties with better schools, better labor market opportunities for Black adults, fewer homicides, and lower incarceration rates
Historical Background
Historical background

- Wide variation in opportunities for African Americans in the early 20th century
  - Median household income in 1940: $370 in South vs. $690 in North ($6,900 vs. $12,800 in 2019$)
  - Poverty rate twice as large in South, and homicide rate three times as large in South

- Differences in opportunities motivated Great Migration
  - 1.5M moved from 1915–1940 and 4.5M moved from 1940–1970
  - Key pull factor: Manufacturing employment during World War I
Possible impacts of moving on children

- Higher parental income in North
  - Black migrants saw income gains of 80–130% [Collins and Wanamaker 2014; Boustan 2017]

- Higher school quality in North
  - All Southern schools and some Northern schools were segregated by law
  - Black schools had lower funding, teacher-pupil ratios, teacher salaries, and term length [Margo 1990, Card and Krueger 1992]

- Possibly offsetting factors:
  - Residential segregation and crowding in the North
  - White flight, hostility, and violence in the North
Empirical Strategy and Data
Econometric model

- Goal: Estimate causal impact of each county on Black children’s educational attainment

- Model for years of education of individual $i$ if they lived in location $j$:
  
  \[ Y_i = \gamma_j + \theta_i \]

  - $\gamma_j$: place effect
  - $\theta_i$: schooling capital

[Finkelstein, Gentzkow, and Williams 2019]
**Econometric model**

- **Goal:** Estimate causal impact of each county on Black children’s educational attainment.

- **Model for years of education of individual $i$ if they lived in location $j$:**
  [Finkelstein, Gentzkow, and Williams 2019]

\[ Y_i = \gamma_j + \theta_i \]

  - $\gamma_j$: Place effect
  - $\theta_i$: Schooling capital

- **Decompose schooling capital:**

\[ \theta_i = X_i \psi + H_i \lambda + \eta_{i,\text{orig}} + \eta_{i,\text{dest}} + \eta_{i,\text{nm}} + \tilde{\eta}_i \]

  - $X_i \psi$: Child demographics
  - $H_i \lambda$: Household characteristics
  - $\eta_{i,\text{orig}}$: FEs for migrant origin and destination
  - $\eta_{i,\text{dest}}$: FEs for non-migrant location
  - $\eta_{i,\text{nm}}$: Non-migrant FEs
  - $\tilde{\eta}_i$: Orthogonal residual
Combining prior equations yields potential estimating equation:

\[ Y_i = X_i \psi + H_i \lambda + \tau_{i}^{\text{orig}} + \underbrace{\tau_{j}^{\text{dest}} + \tau_{j}^{\text{nm}} + \tilde{\eta}_i}_{\gamma_j + \eta_j^{\text{dest}}} \]

Key challenge: Identifying place effect \( \gamma_j \) (due to the confound \( \eta_j^{\text{dest}} \))
- Want to allow correlation between place of residence and unobserved characteristics

Solution: Use selection on observables to adjust for selection on unobservables
Overview of identifying assumptions

- Assumption 1: *Equal selection*
  - Parents’ location choices are equally correlated with observable and unobservable components of children’s schooling capital
  - Identifies *direction* of bias due to selection on unobservables
Overview of identifying assumptions

- **Assumption 1: Equal selection**
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- **Assumption 2: Equal relative importance**
  - Relative variance of observable and unobservable components of schooling capital is equal across destinations and origins
  - Identifies *magnitude* of bias due to selection on unobservables
Overview of identifying assumptions

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  - Relative variance of observable and unobservable components of schooling capital is equal across destinations and origins
  - Identifies magnitude of bias due to selection on unobservables

- Similar to Oster (2019) and Altonji, Elder, and Taber (2005)
  - This approach uses variance of unobservable component of schooling capital to weaken $R^2$ assumption in Oster (2019)
Understanding identifying assumptions

- Assumptions 1 and 2 hold if parents’ location decision is related to children’s overall schooling capital
  - Allows for selection on unobservables and utility-maximizing location choices

- These assumptions are violated if parents respond *differently* to observable and unobservable components of schooling capital
  - Example: Greater selection on observed schooling capital, because this is correlated with parents’ education
  - Robustness tests consider violations of these assumptions (more on this later)
Summary of selection adjustment

- **Outcome:**

\[ Y_i = X_i \psi + H_i \lambda + \tau_{\text{orig}}^i + \tau_{\text{dest}}^i + \tau_{\text{nm}}^i + \tilde{\eta}_i \]

- **Observed schooling capital** \((h_i = H_i \lambda)\) for children of migrants:

\[ h_i = X_i \psi^h + h_{\text{orig}}^i + h_{\text{dest}}^i + \tilde{\eta}_i \]
Summary of selection adjustment

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- **Selection-adjusted place effect** (invoking assumptions 1 and 2):

\[ \hat{\gamma}_j = \hat{\tau}_j^{\text{dest}} - \hat{\eta}_j^{\text{dest}} = \hat{\tau}_j^{\text{dest}} - \frac{\text{SD}(\hat{\tau}_0^{\text{orig}})}{\text{SD}(\hat{h}_0^{\text{orig}})} \hat{h}_j^{\text{dest}} \]
Summary of selection adjustment

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- **Relative variance of unobserved schooling capital across origins pins down the magnitude of bias**
  - This weakens the \(R^2\) assumption in Oster (2019)
Additional estimation details

- Child demographics $X_i$: age and sex
- Household characteristics in observed schooling capital $H_i$: parents’ education
  - We use many more variables in robustness checks
- Conduct inference using Bayesian bootstrap
- When reporting individual place effects, use empirical Bayes shrinkage
Data

■ Complete count 1940 Census

■ Sample: African Americans age 14–18 who live with at least one parent
  • Allows us to observe parent characteristics
  • Limited sample selection, as most children completed schooling while living with parents [Card, Domnisoru, and Taylor 2018]

■ Sample contains children of migrants and non-migrants
  • Migrant: Born in former Confederacy, living outside of birth state in 1940
  • Non-migrant: Living in birth state in 1940

■ 650,040 children, 33% of whom are children of migrants
  • Children of migrants lived in 728 destination counties in 1940
Estimates of Place Effects
Place effects on years of schooling in 1940, Black children age 14–18
Distribution of place effects on years of schooling in South and North

South
Mean = -0.51
SD = 0.73

North
Mean = 0.30
SD = 0.37
Distribution of place effects by region and rural/urban status

- Rural South: Mean = -0.98
- Urban South: Mean = -0.04
- Rural North: Mean = 0.02
- Urban North: Mean = 0.37
Place effects for white versus Black children

Slope: 0.14 (0.02), R²: 0.07
Mechanisms
Understanding mechanisms

- What explains the variation in place effects?

- We constructed a county-level dataset to explore the role of
  - School quality
  - Parents’ labor market opportunities
  - Crime
  - Incarceration
  - Social capital (NAACP chapter)
### Correlates of place effects, 1940

<table>
<thead>
<tr>
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Cross-sectional correlates of 1940 place effects on years of schooling

- School segregation required
- Term length
- High grade 9 enrollment
- Teachers per pupil
- Avg. teacher salary
- Avg. yrs. education, non-migrants 14-18
- Median household income
- Avg. earnings, non-migrant men 25-64
- Place effect, adult earnings
- Manufacturing employment share
- Gini index
- Poverty rate
- Homicide rate
- Lynching rate
- Incarceration rate
- Residential segregation
- NAACP chapter
- Percent Black
- Percent on farm
- Percent urban
- Log population density
- Migration share
- Place effect for whites

Correlation:

- Positive
- Negative
Changes in place effects over time

- How did the land of opportunity for Black children change over the 20th century?
  - Derenoncourt (2019): effect of changes in Black population on upward mobility

- Compare our place effects with upward mobility estimates from Chetty et al. (2020)
  - Upward mobility: mean household income rank for Black children whose parents were at the 25th percentile of the national income distribution, for 1978–1983 cohorts
  - We standardize both sets of estimates for comparability
Relationship between 1940 place effects and 1990s upward mobility

Upward Mobility, Black Children, 1990s Estimates

Slope: 0.20 (0.03), R2: 0.04

Place Effects, Black Children, 1940 Census
Correlation between changes in Black children’s opportunity and changes in explanatory variables
Robustness
Overview of robustness tests

Results are robust to:

- Adding more household characteristics to the selection correction vector $H_i$ (e.g., obtain nearly identical results in a matched sample that includes 1920 and 1940 covariates)
- Using different samples and education measures (e.g., 8th grade attainment) to limit sample selection and censoring
- Bounding place effects to account for differential mortality
- Relaxing Assumption 1 (equal selection) and 2 (equal relative importance)
Robustness: Potential violations of identifying assumptions

- Assumptions 1 and 2 are violated if parents respond *differently* to observable and unobservable components of schooling capital

- Example of violation:
  - Parents’ location decision depends more on parent human capital than children’s schooling capital
  - Intuition: better information about earnings opportunities for parents than schooling opportunities for children

- How would this violation change our results?
Details on identifying assumptions

- **Assumption 1 (Equal selection):**

\[
\text{Corr} \left( T_{ij}, h_{j(i)}^{\text{dest}} \right) = \text{Corr} \left( T_{ij}, \eta_{j(i)}^{\text{dest}} \right) \quad \text{in the sample of migrants for all } j
\]

- **Assumption 2 (Equal relative importance):**

\[
\frac{\text{SD} \left( \eta_j^{\text{dest}} \right)}{\text{SD} \left( h_j^{\text{dest}} \right)} = \frac{\text{SD} \left( \eta_0^{\text{orig}} \right)}{\text{SD} \left( h_0^{\text{orig}} \right)} \quad \text{in the sample of migrants}
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Robustness: Consequences of greater selection on parent human capital

- Greater relative selection of parent human capital has two potential implications:
  - Location choices depend more on parents’ education than unobserved school capital
    → violation of Assumption 1

\[
\text{Corr}(T_{ij}, h_{j(i)}^{\text{dest}}) > \text{Corr}(T_{ij}, \eta_{j(i)}^{\text{dest}})
\]

- Obs. schooling capital \sim parent education
- Unobs. schooling capital

\[
\text{SD}(\eta^{\text{DEST}_j}) \succ \text{SD}(\eta^{\text{ORIG}_o}) \succ \text{SD}(h^{\text{DEST}_j})
\]
Robustness: Consequences of greater selection on parent human capital

- Greater relative selection of parent human capital has two potential implications:
  - Location choices depend more on parents’ education than unobserved school capital → violation of Assumption 1
    \[ \text{Corr}(T_{ij}, h_{j(i)}^{\text{dest}}) > \text{Corr}(T_{ij}, \eta_{j(i)}^{\text{dest}}) \]
    Obs. schooling capital ~ parent education
    Unobs. schooling capital
  - Less cross-county variation in unobserved component of schooling capital → violation of Assumption 2
    \[ \text{SD}(\eta_{j}^{\text{dest}}) < \frac{\text{SD}(h_{j}^{\text{dest}})}{\text{SD}(h_{0}^{\text{orig}})} \]
    Cross-county SD unobs. schooling capital
    Assumption 2
Relaxed assumptions

- Assumption 3 (Relaxed equal selection):
  \[ C_1 \text{Corr} \left( T_{ij}, h_{ij(i)}^{\text{dest}} \right) = \text{Corr} \left( T_{ij}, \eta_{ij(i)}^{\text{dest}} \right) \]

- Assumption 4 (Relaxed equal relative importance):
  \[ \frac{\text{SD} \left( \eta_{ij}^{\text{dest}} \right)}{\text{SD} \left( h_{ij}^{\text{dest}} \right)} = C_2 \frac{\text{SD} \left( \eta_{\text{orig}} \right)}{\text{SD} \left( h_{\text{orig}} \right)} \]
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- Modified estimate of the confounding variable \( \hat{\eta}_j^{\text{dest}} \):
  \[ \hat{\eta}_j^{\text{dest}} = C_1 C_2 \frac{SD \left( \hat{\tau}_0^{\text{orig}} \right)}{SD \left( \hat{h}_o^{\text{orig}} \right)} \hat{h}_j^{\text{dest}} \]
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- Greater selection on parent human capital implies \( C_1 < 1 \) and \( C_2 < 1 \)
Robustness to different proportionality constants

<table>
<thead>
<tr>
<th>$C \equiv C_1C_2$</th>
<th>Corr. with baseline place effects (1)</th>
<th>SD of place effects (2)</th>
<th>North-South difference (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.8</td>
<td>0.997</td>
<td>0.882</td>
<td>0.918</td>
</tr>
<tr>
<td>0.9</td>
<td>0.999</td>
<td>0.864</td>
<td>0.868</td>
</tr>
<tr>
<td>1.0 (Baseline)</td>
<td>1.000</td>
<td>0.847</td>
<td>0.818</td>
</tr>
<tr>
<td>1.1</td>
<td>0.999</td>
<td>0.831</td>
<td>0.768</td>
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<tr>
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<td>0.718</td>
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- Results are robust to range of violations of key identifying assumptions
Conclusion
Conclusion

- Great Migration yielded substantial benefits for children’s education
  - On average, 0.8 year (12%) increase in schooling from moving North
  - Equals 25% of the decrease in Black-white schooling gap across 1900–1970 cohorts

- Mechanisms: Place effects are higher in areas with
  - Better schools and labor market opportunities for Black adults
  - Lower homicide rates and incarceration rates
  - Stronger social capital

- Black economic progress in early 20th century depended on local factors that can be shaped by policy
  - Highlights potential role for place-specific factors in future progress
Thank you!

Comments and questions:
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   eric.t.chyn@dartmouth.edu
   bryan.stuart@phil.frb.org
Additional Slides
Initial patterns of education and migration

| Location in 1940: | Migrant | | Non-Migrant | | |
|------------------|---------|---|---|---|
| Mean years of schooling | South | North | South | North |
|                   | 6.5     | 8.4 | 6.1 | 8.1 |
## Initial patterns of education and migration

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</tr>
<tr>
<td>Mean father’s years of schooling</td>
<td>4.3</td>
<td>6.0</td>
<td>4.1</td>
<td>6.6</td>
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</table>
Selection correction inputs

<table>
<thead>
<tr>
<th>Origin components</th>
<th>Standard Deviation</th>
</tr>
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<tbody>
<tr>
<td>Observed schooling capital ( h_{0}^{\text{orig}} )</td>
<td>0.043</td>
</tr>
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<td>Unobserved schooling capital ( \eta_{0}^{\text{orig}} )</td>
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- Implies that place effect estimate is \( \hat{\gamma}_j \approx \hat{\tau}_j^{\text{dest}} - 1 \times \hat{h}_j^{\text{dest}} \)
### Selection correction inputs

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<td><strong>Destination components</strong></td>
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<tr>
<td>Observed schooling capital ($h_{j}^{\text{dest}}$)</td>
<td>0.392</td>
</tr>
<tr>
<td>Unobserved schooling capital ($\eta_{j}^{\text{dest}}$)</td>
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- Implies that place effect estimate is $\hat{\gamma}_{j} \approx \hat{\tau}_{j}^{\text{dest}} - 1 \times \hat{h}_{j}^{\text{dest}}$

- Variation in destination components highlights potential role for selection