Measuring Historical Residential Segregation

Trevon Logan
Ohio State University

John Parman
William & Mary

NAACP March for Open Housing, Detroit, 1963
Motivation

- There is a long history of racial discrimination in the United States
- Tied in with this is evidence of persistent racial gaps in health, education and employment outcomes
- This project focuses on the role of residential segregation and its historical effects on black Americans
- Existing measures of segregation work for cities but don’t have a natural rural counterpart, limiting usefulness for a large chunk of history
- Our solution is to construct a new segregation measure using household level data to observe races of next-door neighbors
Brief Overview of Paper

- Using the 100% samples of the 1880 and 1940 federal censuses, we identify all household heads in a county living next to neighbors of a different race.
- Comparing this number to the predicted number under complete integration or complete segregation gives us a measure of the degree of residential segregation.
- The measure reveals substantial heterogeneity in segregation across and within states in 1880 and 1940.
- It confirms that the rise in segregation in urban areas was mirrored by a rise in rural areas as well.
- Preliminary results suggest that segregation in 1880 had substantial impacts on health, education and violence as well as lingering effects today.
Residential Segregation Over Time

- There is a large literature linking residential segregation to racial gaps in schooling, labor market outcomes, and health.
- Most of this literature focuses on modern outcomes and modern segregation.
- A lack of data has constrained exploring the historical evolution of residential segregation.
- Cutler, Glaeser and Vigdor (1999) are an exception, documenting the rise and fall of urban segregation levels.
Residential Segregation Over Time

Fig. 3. Dissimilarity by region and city size

1890 and 1940 the urban black population grew by about 4 percent annually in the Northeast and Midwest and about 2 percent annually in the South and West (see table 2). For many northern cities, this was the first experience with large black populations. Segregation rose dramatically with the influx of southern blacks, particularly in the industrial North. Between 1890 and 1940, dissimilarity rose by 20 percentage points (to 68 percent) and isolation increased by 15 percentage points (to 37 percent). For the first time, many cities saw the creation of entirely black areas. Where one city had a ghetto (dissimilarity above .6, isolation above .3) in 1890, 55 cities had a ghetto in 1940. This includes essentially all the major industrial centers of the North. Segregation also increased in the South, although, as we noted above, we have less confidence in this conclusion than we do for the rise of segregation in the North. To
Residential Segregation Over Time

To look at the relation between the great migration north and the rise of segregation, table 3 shows regressions for the change in segregation across cities from 1910 to 1940 as a function of the increase in the black population between those years, the increase in the nonblack population, a dummy variable for cities that had a high level of segregation to begin with, and that dummy variable interacted with the change in black population. We include the last two terms because one would expect segregation in cities that were ini-

10 We use data from 1910 because we have more cities in that year than in 1890. The results are similar when 1890 is used as the starting year. Summary statistics for the data used in all the regressions are in App. table A3.
Residential Segregation Over Time

- Cutler, Glaeser and Vigdor find substantial change in segregation patterns over time.
- Segregation in cities rose over the twentieth century as black residents migrated to urban areas and the physical size of segregated urban centers grew.
- Segregation then began to fall in the 1970s as black residents moved out of city centers.
- The rise in segregation is framed in part as a product of the Great Migration.
- Their work and subsequent work by Collins and Margo has highlighted the problems of these rising isolating black residents from opportunities and services.
Residential Segregation Over Time

- We want to expand the scope of this historical analysis to address two limitations presented by the data.
- First, existing segregation measures require defining geographic subdivisions.
- These subdivisions can change over time and the choice of divisions can affect the estimated segregation level.
- Second, existing segregation measures are difficult to apply to rural areas.
- To understand these issues, consider the two workhorses of the segregation literature: the dissimilarity index and the isolation index.
Dissimilarity Index

The dissimilarity index provides a measure of how evenly black residents are distributed across wards within a city.

\[ D = \frac{1}{2} \sum_{i=1}^{N} \left| \frac{B_i}{B_{\text{total}}} - \frac{W_i}{W_{\text{total}}} \right| \]

- \( B_i \): black households in tract \( i \)
- \( B_{\text{total}} \): total black households in city
- \( W_i \): white households in tract \( i \)
- \( W_{\text{total}} \): total white households in city
**Isolation Index**

The isolation index provides a measure of the exposure of the average black resident to white residents.

\[
I = \sum_{i=1}^{N} \left( \frac{B_i}{B_{\text{total}}} \cdot \frac{B_i}{B_i + W_i} \right)
\]

- \(B_i\): black households in tract \(i\)
- \(B_{\text{total}}\): total black households in city
- \(W_i\): white households in tract \(i\)
Sensitivity to Boundaries

dissimilarity = 0.8
isolation = 0.5

dissimilarity = 0.4
isolation = 0.28
Sensitivity to Boundaries

dissimilarity = 0.8
isolation = 0.5

dissimilarity = 0.93
isolation = 0.83
Sensitivity to Boundaries

- Clearly these measures of segregation are sensitive to the way boundaries are drawn.
- This is particularly problematic when politics affect boundary choices (a big issue when looking at race in the US).
- The measures are also sensitive to the number of subdivisions which can vary across locations and over time.
- Equally problematic for historical segregation is that these boundaries don’t necessarily make sense for rural areas.
Applicability to Rural Areas

![Graph showing percent living in rural area from 1880 to 1990 by race. The graph illustrates a decrease in the percentage of Whites living in rural areas over time, while the percentage of Blacks living in rural areas also decreases but at a slower rate. The graph includes a legend indicating "White" and "Black".

**Legend:**
- Blue line: White
- Red line: Black

**X-axis:** Year (1880-1990)

**Y-axis:** Percent living in rural area (0.0 to 1.0)
Applicability to Rural Areas

- With good reason, few studies attempt to use traditional measures of segregation for rural areas.
- However, in 1900 the majority of Americans live in rural areas.
- By 1940, 50 percent of the black population still lives in rural areas.
- Understanding historical segregation and its impacts on racial gaps requires knowing what is going on in rural areas.
- Furthermore, while urban segregation may tell us what black migrants moved to, it is equally important to know what they were moving from.
Constructing a New Segregation Measure

To capture the experience of rural Americans, a new measure is needed.

Measures based on geographic subunits are problematic (sensitivity to boundaries, applicability to rural areas).

Instead, we consider a measure that does not require subunits and has a clear, intuitive interpretation.

The basic idea is to exploit the availability of the complete census manuscript pages to examine residential patterns at the household level.
The 1880 Federal Census

- Prior to 1960, census enumeration was done door-to-door by enumerators.
- As a consequence, the order in which households appear on the manuscript page is (likely) their order on the street.
- So a household head’s next-door neighbors are the household heads appearing before and after him on the census page.
- Also crucial is that the census gives the race of each individual.
Measuring Historical Residential Segregation

Trevon Logan
John Parman

Introduction
Existing Segregation Measures
Our Measure
Segregation Across Space
Segregation Over Time
Segregation and its Correlates
Conclusions

The 1880 Federal Census

Page No. 2
Supervisor’s Dist. No. 9
Enumeration Dist. No. 345

Note A.—The Census Year begins June 1, 1870, and ends May 31, 1880.
Note B.—All persons will be included in the Enumeration who were living on the 1st day of June, 1880. No others will. Children BORN SINCE June 1, 1880, will be OMITTED. Members of Families who have DIED SINCE June 1, 1880, will be INCLUDED.
Note C.—Questions Nos. 12, 14, 22, and 23 are not to be asked in respect to persons under 10 years of age.

SCHEDULE I.—Inhabitants in

[Table with handwritten entries]
The 1880 Federal Census
Constructing the Measure

- Using the digitized 100% sample of the census, we can sort household heads by county, page number and line number.
- We can then get counts of several variables by county:
  - Number of black household heads
  - Number of white household heads
  - Number of black household heads living next to a white neighbor
  - Number of white household heads living next to a black neighbor
Constructing the Measure

The measure is based on how the number of black households living next to white neighbors compares to the expected number under random assignment and under perfect segregation:

\[ \alpha = \frac{E(\overline{x}_b) - x_b}{E(\overline{x}_b) - E(\overline{x}_b)} \]

- \( x_b \): number of black household heads living next to white neighbors
- \( E(\overline{x}_b) \): expected number under random assignment of households
- \( E(\overline{x}_b) \): expected number under complete segregation
Constructing the Measure

\[ \alpha = \frac{E(\bar{x}_b) - x_b}{E(\bar{x}_b) - E(x_b)} \]

- Note that the measure goes to zero under random assignment (no segregation)
- As counties become more segregated, \( x_b \) decreases leading to a larger value for the statistic
- The measure goes to one under complete segregation
- We can also distinguish between the overall composition of the county and the tendency to segregate by including both the percent black and \( \alpha \) in regressions
Introduction

Existing Segregation Measures

Our Measure

Segregation Across Space

Segregation Over Time

Segregation and its Correlates

Conclusions
Distribution of the Black Population, 1880
Segregation by County, 1880

- Measuring Historical Residential Segregation
  - Trevon Logan
  - John Parman

**Introduction**

- Existing Segregation Measures
- Our Measure

**Segregation Across Space**

**Segregation Over Time**

**Segregation and its Correlates**

**Conclusions**
Comparing Segregation Measures

- To provide a point of comparison, we can construct the index of dissimilarity and index of isolation for these counties.
- To do this, we need to define an appropriate subunit.
- The best (although not necessarily meaningful) option for rural counties is the enumeration district.
- Rural counties have an average of 10 enumeration districts, urban counties have an average of 39.
- There are roughly 350 households per district in rural areas and 450 per district in urban areas (comparable to a modern census block).
### Comparing Segregation Measures

#### Correlations between segregation measures, 1880

<table>
<thead>
<tr>
<th></th>
<th>Rural counties</th>
<th></th>
<th>Urban counties</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Neighbor-based index</td>
<td>Percent black</td>
<td>Dissimilarity index</td>
<td>Isolation index</td>
</tr>
<tr>
<td>Neighbor-based index</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent black</td>
<td>0.43</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dissimilarity index</td>
<td>0.29</td>
<td>-0.21</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Isolation index</td>
<td>0.55</td>
<td>0.08</td>
<td>0.76</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: Counties are weighted by the number of black households.
Comparing Segregation Measures

Ranges of segregation measures ($\bar{x} \pm \sigma_x$) for rural counties by region.
Comparing Segregation Measures

- Alpha segregation index
  - < 0.10
  - 0.10 - 0.20
  - 0.20 - 0.35
  - 0.35 - 0.50
  - > 0.50

- Index of dissimilarity
  - < 0.10
  - 0.10 - 0.30
  - 0.30 - 0.50
  - 0.50 - 0.70
  - > 0.70

Introduction
Existing Segregation Measures
Our Measure
Segregation Across Space
Segregation Over Time
Segregation and its Correlates
Conclusions
Comparing Segregation Measures

- Introduction
- Existing Segregation Measures
- Our Measure
- Segregation Across Space
- Segregation Over Time
- Segregation and its Correlates
- Conclusions

Index of dissimilarity

- < 0.10
- 0.10 - 0.30
- 0.30 - 0.50
- 0.50 - 0.70
- > 0.70
Now that the 72 year waiting period is up, the 1940 census manuscript pages are public.

Cleaning of the 1940 census is still underway but the relevant data for our measure has been digitized at this point.

This means we can get estimates of the segregation measure for 1940 in addition to 1880.

Added bonus: the 1940 census is a vast improvement over previous censuses in terms of data.

We can construct separate statistics by income, education level, or occupation status.
### The 1940 Federal Census

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>HOUSEHOLD DATA</th>
<th>NAME</th>
<th>RELATION</th>
<th>PERSONAL DESCRIPTION</th>
<th>EDUCATION</th>
<th>PLACE OF BIRTH</th>
<th>RESIDENCE, AF</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>13</td>
<td>Davis, Henry E</td>
<td>Head</td>
<td>M W 58 M 66-7 Virginia</td>
<td>Sameplace</td>
<td>Nassau Street</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Maxie W, wife</td>
<td></td>
<td>F W 48 M 66-2 West Virginia</td>
<td>Sameplace</td>
<td>Samehouse</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Hiram W, son</td>
<td>5</td>
<td>M W 23 S 66-2 West Virginia</td>
<td>Sameplace</td>
<td>Sameplace</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>George W, son</td>
<td>5</td>
<td>M W 25 S 66-2 West Virginia</td>
<td>Sameplace</td>
<td>Sameplace</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Robert L, son</td>
<td>5</td>
<td>M W 18 S 66-2 Virginia</td>
<td>Sameplace</td>
<td>Sameplace</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>44</td>
<td>Goodwin, Ethel H</td>
<td>Head</td>
<td>F W 53 W 66-9 Alabama</td>
<td>Sameplace</td>
<td>Sameplace</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>William A, son</td>
<td>5</td>
<td>M W 20 S 66-9 New York</td>
<td>Sameplace</td>
<td>Sameplace</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>John W, son</td>
<td>5</td>
<td>M W 16 S 66-9 Virginia</td>
<td>Sameplace</td>
<td>Sameplace</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>George W, cousin</td>
<td>Head</td>
<td>M W 19 S 66-9 Alabama</td>
<td>Sameplace</td>
<td>Sameplace</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>Nancy O, wife</td>
<td>5</td>
<td>F W 44 M 66-2 Virginia</td>
<td>Sameplace</td>
<td>Samehouse</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>Merritt W, Jr.</td>
<td>5</td>
<td>M W 19 S 66-2 Virginia</td>
<td>Sameplace</td>
<td>Samehouse</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>Halloway, son</td>
<td>5</td>
<td>M W 18 S 66-2 Virginia</td>
<td>Sameplace</td>
<td>Samehouse</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>Dixon L, son</td>
<td>5</td>
<td>M W 17 S 66-9 Virginia</td>
<td>Sameplace</td>
<td>Samehouse</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>Humphrey, Mary P</td>
<td>Head</td>
<td>F W 60 W 66-4 Virginia</td>
<td>Sameplace</td>
<td>Sameplace</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>James G, son</td>
<td>5</td>
<td>M W 22 S 66-9 Virginia</td>
<td>Sameplace</td>
<td>Samehouse</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>Hargis, Ella</td>
<td>5</td>
<td>F W 20 M 66-9 Virginia</td>
<td>Sameplace</td>
<td>Samehouse</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>Russel, Jr. in-law</td>
<td>Head</td>
<td>M W 22 M 66-9 Virginia</td>
<td>Reeltown</td>
<td>Samehouse</td>
<td></td>
</tr>
</tbody>
</table>

---

**Measuring Historical Residential Segregation**

- **Trevon Logan**
- **John Parman**

**Introduction**

**Existing Segregation Measures**

**Our Measure**

**Segregation Across Space**

**Segregation Over Time**

**Segregation and its Correlates**

**Conclusions**
### Measuring Historical Residential Segregation

**Trevon Logan**  
**John Parman**

**Introduction**

**Existing Segregation Measures**

**Our Measure**

**Segregation Across Space**

**Segregation Over Time**

**Segregation and its Correlates**

**Conclusions**

---

**The 1940 Federal Census**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>123 - 3</td>
<td>2 A</td>
</tr>
</tbody>
</table>

**Enumerated by me on April 4, 1940.**

**Person 14 Years Old and Over—Employment Status**

<table>
<thead>
<tr>
<th>Name</th>
<th>Race</th>
<th>Sex</th>
<th>Age</th>
<th>Color</th>
<th>Employed</th>
<th>Occupation, Industry, and Class of Worker</th>
<th>Income in 1940</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mia</td>
<td>N</td>
<td>F</td>
<td>51</td>
<td>White</td>
<td>Yes</td>
<td>Sales Lady, Retail Department, Warehouse</td>
<td>52,822</td>
<td>No</td>
</tr>
<tr>
<td>Mia</td>
<td>N</td>
<td>F</td>
<td>54</td>
<td>White</td>
<td>Yes</td>
<td>Accountant, Hotel</td>
<td>52,822</td>
<td>No</td>
</tr>
<tr>
<td>Mia</td>
<td>N</td>
<td>F</td>
<td>57</td>
<td>White</td>
<td>Yes</td>
<td>Accountant, Hotel</td>
<td>52,822</td>
<td>No</td>
</tr>
<tr>
<td>Mia</td>
<td>N</td>
<td>F</td>
<td>51</td>
<td>White</td>
<td>Yes</td>
<td>Pharmacist, Retail Drug Store</td>
<td>52,822</td>
<td>No</td>
</tr>
<tr>
<td>Mia</td>
<td>N</td>
<td>F</td>
<td>51</td>
<td>White</td>
<td>Yes</td>
<td>Professor, College</td>
<td>52,822</td>
<td>No</td>
</tr>
<tr>
<td>Mia</td>
<td>N</td>
<td>F</td>
<td>51</td>
<td>White</td>
<td>Yes</td>
<td>Cashier, Hotel</td>
<td>52,822</td>
<td>No</td>
</tr>
<tr>
<td>Mia</td>
<td>N</td>
<td>F</td>
<td>51</td>
<td>White</td>
<td>Yes</td>
<td>Waitress, Hotel</td>
<td>52,822</td>
<td>No</td>
</tr>
<tr>
<td>Mia</td>
<td>N</td>
<td>F</td>
<td>51</td>
<td>White</td>
<td>Yes</td>
<td>Telephone, Hotel</td>
<td>52,822</td>
<td>No</td>
</tr>
<tr>
<td>Mia</td>
<td>N</td>
<td>F</td>
<td>51</td>
<td>White</td>
<td>Yes</td>
<td>Engineer, Restoration</td>
<td>52,822</td>
<td>No</td>
</tr>
<tr>
<td>Mia</td>
<td>N</td>
<td>F</td>
<td>51</td>
<td>White</td>
<td>Yes</td>
<td>Waitress, Hotel</td>
<td>52,822</td>
<td>No</td>
</tr>
<tr>
<td>Mia</td>
<td>N</td>
<td>F</td>
<td>51</td>
<td>White</td>
<td>Yes</td>
<td>Chef, Restaurant</td>
<td>52,822</td>
<td>No</td>
</tr>
<tr>
<td>Mia</td>
<td>N</td>
<td>F</td>
<td>51</td>
<td>White</td>
<td>Yes</td>
<td>Brakeman, Railway</td>
<td>52,822</td>
<td>No</td>
</tr>
</tbody>
</table>
The Distribution of the Black Population, 1880
The Distribution of the Black Population, 1940

Percent black by county, 1940:

- <5%
- 5% - 15%
- 15% - 30%
- 30% - 50%
- >50%
The Distribution of the Black Population, 1940
Segregation by County, 1880
Segregation by County, 1940
Change in Segregation by County, 1880 to 1940

Change in segregation by county, 1880 to 1940

- < 0.0
- 0.0 - 0.1
- 0.1 - 0.3
- 0.3 - 0.5
- > 0.5

Introduction
Existing Segregation Measures
Our Measure
Segregation Across Space
Segregation Over Time
Segregation and its Correlates
Conclusions
Change in Segregation by County, 1880 to 1940
Change in Segregation by County, 1880 to 1940
Rising Segregation Over Time

- From the maps, it is obvious segregation is rising across all regions
- It is less obvious how it is changing within regions
- Some dimensions of interest:
  - Is segregation rising as population density increases?
  - Is segregation rising in response to inflows of black residents?
  - Is segregation rising as the percentage of black residents in a county increases?
Rising Segregation and Population Size

- Change in segregation index, 1880 to 1940
- Log of the number of households in 1880
Rising Segregation and Population Growth

Change in segregation index, 1880 to 1940

Change in log of number of households, 1880 to 1940

Introduction

Existing Segregation Measures

Our Measure

Segregation Across Space

Segregation Over Time

Segregation and its Correlates

Conclusions
Rising Segregation and Population Growth

Change in segregation index, 1880 to 1940

Change in log of number of black households, 1880 to 1940
Rising Segregation and the Black Population Share

Change in segregation index, 1880 to 1940

Percent black in 1880
Rising Segregation and the Black Population Share

![Graph showing the relationship between change in segregation index and change in percent black, 1880 to 1940. The x-axis represents change in percent black, ranging from -0.4 to 0.4, and the y-axis represents change in segregation index, ranging from -0.5 to 1.0. The data points are scattered across the graph, with a trend line indicating a positive correlation.]
Segregation Across Space and Over Time

- Our measure, while correlated with existing measures, seems to be capturing a different component of segregation.
- It does not exhibit the sensitivity to borders shown by other measures.
- It suggests that there was substantial heterogeneity in segregation within and across regions.
- Almost everywhere, segregation rose over time and this rise was enormous.
- Rising segregation is not simply an urban story (consistent with Lichter et al. (2007)).
This measure provides new insight into residential segregation patterns following Reconstruction and how they changed by World War II.

Given that the measure is at the county-level, there are a wide range of datasets that can be linked to it and used to explore the correlates and consequences of segregation.

As a brief preview of the possibilities, we’ve explored correlations between segregation and county characteristics and individual outcomes both at the turn of the century and in recent years.
Segregation and its Correlates

- There are many county (and individual) level datasets that could shed light on historical segregation and its effects.
- We’ll briefly consider measures of slavery, violence, health and mobility:
  - Patterns of slaveholding using the 1860 federal census.
  - Racially motivated violence using the Historical American Lynching project (1882-1930).
  - Individual health outcomes using Missouri death certificates (1880-1909).
## Historical predictors of segregation post-Reconstruction, 1880 segregation statistic as dependent variable

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slave percentage of population</td>
<td>-0.390***</td>
<td>-0.438***</td>
</tr>
<tr>
<td></td>
<td>(0.0563)</td>
<td>(0.0557)</td>
</tr>
<tr>
<td>Free percentage of population</td>
<td>0.675***</td>
<td>0.569***</td>
</tr>
<tr>
<td></td>
<td>(0.123)</td>
<td>(0.121)</td>
</tr>
<tr>
<td>Free black as a percentage of slave population</td>
<td>-0.122***</td>
<td>-0.104***</td>
</tr>
<tr>
<td></td>
<td>(0.0175)</td>
<td>(0.0169)</td>
</tr>
<tr>
<td>Black percentage of population, 1880</td>
<td>0.661***</td>
<td>0.708***</td>
</tr>
<tr>
<td></td>
<td>(0.0516)</td>
<td>(0.0509)</td>
</tr>
<tr>
<td>Region fixed effects</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Observations</td>
<td>1,776</td>
<td>1,776</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.470</td>
<td>0.474</td>
</tr>
</tbody>
</table>
## Segregation and Violence

Correlation of segregation and racial violence using county-level lynching data

<table>
<thead>
<tr>
<th>Method:</th>
<th>Negative binomial</th>
<th>Poisson</th>
<th>Probit</th>
<th>OLS</th>
<th>Tobit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variable:</strong></td>
<td>Number of lynchings</td>
<td>Number of lynchings</td>
<td>Lynching in a county (1=yes)</td>
<td>Number of lynchings (lynchings&gt;0)</td>
<td>Number of lynchings</td>
</tr>
<tr>
<td>Segregation index</td>
<td>1.917*** (0.398)</td>
<td>1.464*** (0.208)</td>
<td>0.544*** (0.154)</td>
<td>3.188* (1.698)</td>
<td>5.965*** (1.660)</td>
</tr>
<tr>
<td>Percent black</td>
<td>1.348*** (0.216)</td>
<td>1.252*** (0.105)</td>
<td>0.220** (0.102)</td>
<td>5.264*** (0.906)</td>
<td>5.801*** (0.961)</td>
</tr>
<tr>
<td>Isolation index</td>
<td>-0.0455 (0.820)</td>
<td>0.405 (0.455)</td>
<td>-0.257 (0.243)</td>
<td>0.333 (3.721)</td>
<td>-1.980 (3.123)</td>
</tr>
<tr>
<td>Dissimilarity index</td>
<td>-1.511*** (0.518)</td>
<td>-1.362*** (0.289)</td>
<td>-0.206 (0.176)</td>
<td>-2.396 (2.238)</td>
<td>-3.067 (2.065)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.650*** (0.202)</td>
<td>0.765*** (0.108)</td>
<td>2.328*** (0.861)</td>
<td>0.961 (0.874)</td>
<td></td>
</tr>
<tr>
<td>State fixed effects</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Observations</td>
<td>2,100</td>
<td>2,100</td>
<td>783</td>
<td>597</td>
<td>2,100</td>
</tr>
</tbody>
</table>
Segregation and Health

Correlation of segregation and mortality, OLS estimates using Missouri death records (1880 to 1909)

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Lifespan conditional on survival to age ten</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>(1.025)</td>
</tr>
<tr>
<td>Black</td>
<td>-5.468***</td>
</tr>
<tr>
<td></td>
<td>(0.559)</td>
</tr>
<tr>
<td>Percent black</td>
<td>0.919</td>
</tr>
<tr>
<td></td>
<td>(7.127)</td>
</tr>
<tr>
<td>Segregation</td>
<td>-7.902***</td>
</tr>
<tr>
<td></td>
<td>(1.831)</td>
</tr>
<tr>
<td>Black x Segregation</td>
<td>-12.590***</td>
</tr>
<tr>
<td></td>
<td>(2.974)</td>
</tr>
<tr>
<td>Dissimilarity</td>
<td>9.716**</td>
</tr>
<tr>
<td></td>
<td>(4.829)</td>
</tr>
<tr>
<td>Isolation</td>
<td>-24.37**</td>
</tr>
<tr>
<td></td>
<td>(10.89)</td>
</tr>
<tr>
<td>Constant</td>
<td>43.49***</td>
</tr>
<tr>
<td></td>
<td>(0.755)</td>
</tr>
<tr>
<td>Observations</td>
<td>79,187</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.007</td>
</tr>
</tbody>
</table>

Dependent variable: Female  
(1.025)  (1.011)  (1.012)  (1.016)  
Black -5.468*** -5.233*** -1.361 -1.588  
(0.559) (0.547) (0.955) (0.971)  
Percent black 0.919 5.622 5.039 16.54  
(7.127) (5.580) (5.568) (11.39)  
Segregation -7.902*** -7.021*** -8.322***  
(1.831) (1.987) (1.743)  
Black x Segregation -12.590*** -11.820***  
(2.974) (2.905)  
Dissimilarity 9.716**  
(4.829)  
Isolation -24.37**  
(10.89)  
Constant 43.49*** 45.19*** 45.02*** 42.51***  
(0.755) (0.954) (0.943) (2.369)  
Observations 79,187 78,139 78,139 78,139  
R-squared 0.007 0.009 0.009 0.010
## The Persistence of Segregation

Historical segregation and modern mobility, expected income rank given parents' in the 25th percentile as dependent variable (1980 cohort)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent black in 1880</td>
<td>-4.74***</td>
<td>-4.37***</td>
<td>-7.61***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.35)</td>
<td>(0.38)</td>
<td>(0.83)</td>
<td></td>
</tr>
<tr>
<td>Segregation in 1880</td>
<td></td>
<td>-2.88***</td>
<td>-1.03**</td>
<td>-1.85***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.39)</td>
<td>(0.41)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Percent black in 1880</td>
<td></td>
<td></td>
<td></td>
<td>8.66***</td>
</tr>
<tr>
<td>x Segregation in 1880</td>
<td></td>
<td></td>
<td></td>
<td>(1.98)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.689</td>
<td>0.670</td>
<td>0.690</td>
<td>0.693</td>
</tr>
<tr>
<td>Observations</td>
<td>2083</td>
<td>2083</td>
<td>2083</td>
<td>2083</td>
</tr>
</tbody>
</table>

Standard errors given in parentheses. All regressions include state fixed effects.
Concluding Remarks

- This new measure offers a way to assess segregation in both urban and rural areas in 1880 and 1940, complementing what we’ve learned from existing segregation measures.

- The measure reveals heterogeneity across regions (with the South highly segregated and the Midwest least segregated).

- However, there is also substantial heterogeneity within regions with every region having highly segregated and highly integrated counties.

- The levels of segregation rose dramatically from 1880 to 1940, this change was not confined to urban areas or particular regions.
Concluding Remarks

- 1870, 1900, 1910, 1920 and 1930 are being added in the immediate future.
- After that, the next step is to put the segregation measure to work, figuring out what led to more segregated counties and what the consequences of that segregation were.
- The way in which statistic is constructed will also allow for producing even more nuanced measures.
- The individual data can be used to construct segregation by household income and socioeconomic status.
- These more nuanced measures will help assess the causes of segregation and the conditions under which it is advantageous or disadvantageous.