

Neighborhood Choice and Neighborhood Change

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The Problem: Persistent Race Segregation

**Segregation of blacks and whites in
Los Angeles (as measured by the index
of dissimilarity)...**

- 81.2 in 1980**
- 73.2 in 1990**
- 67.5 in 2000**

Possible Explanations

- **Racial preference to live among one's own group**
- **Discriminatory real-estate practices (e.g., redlining)**
- **Economic differences among race groups (poor race group cannot afford housing in wealthy neighborhoods)**

Previous Work

- 1. Studies that use census data to describe patterns of residential segregation in large, American cities. Try to infer race preferences from aggregate outcome.**
- 2. Surveys that investigate the willingness of whites, blacks, Asians, and Hispanics to live in neighborhoods of different race/ethnic compositions. Try to infer aggregate segregation patterns from race preferences.**

Our Approach

- **Assume people's racial preferences, or estimate them from real data**
- **Simulate what neighborhoods would emerge if people acted according to those preferences**

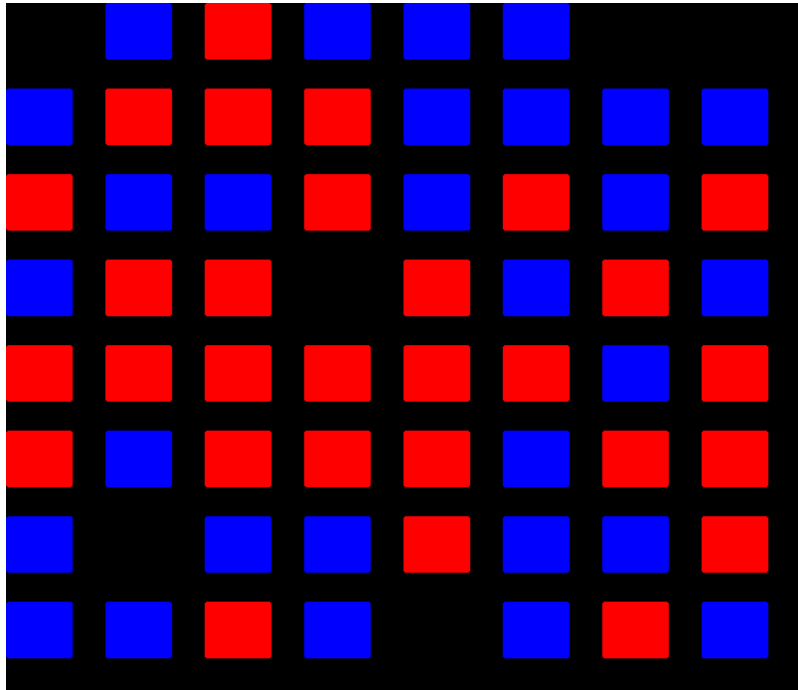
What Kind of Inferences?

- **Perform thought experiments to see what segregation outcomes occur under alternative assumptions about how people make decisions**
- **Develop realistic decisions rules, and try to predict observed levels of segregation**

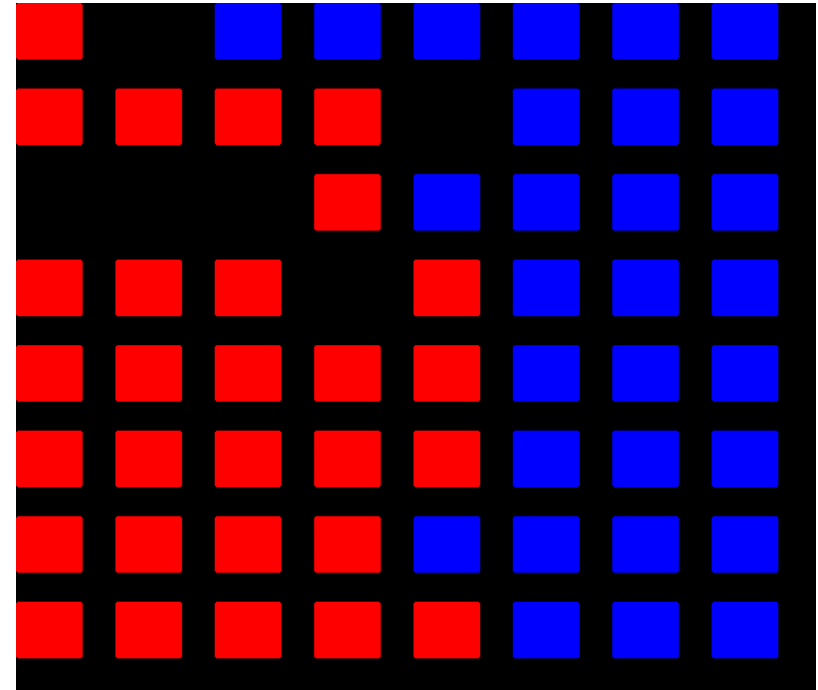
Schelling (1971; 1972)

- **Wanted to understand relationship between individual behavior and aggregate outcomes**
- **The model:**
 - **Assumed a world in which there were only 2 groups (e.g., blacks and whites)**
 - **Each group willing to remain in neighborhood as long as local majority**

Schelling's Model



Begin



End

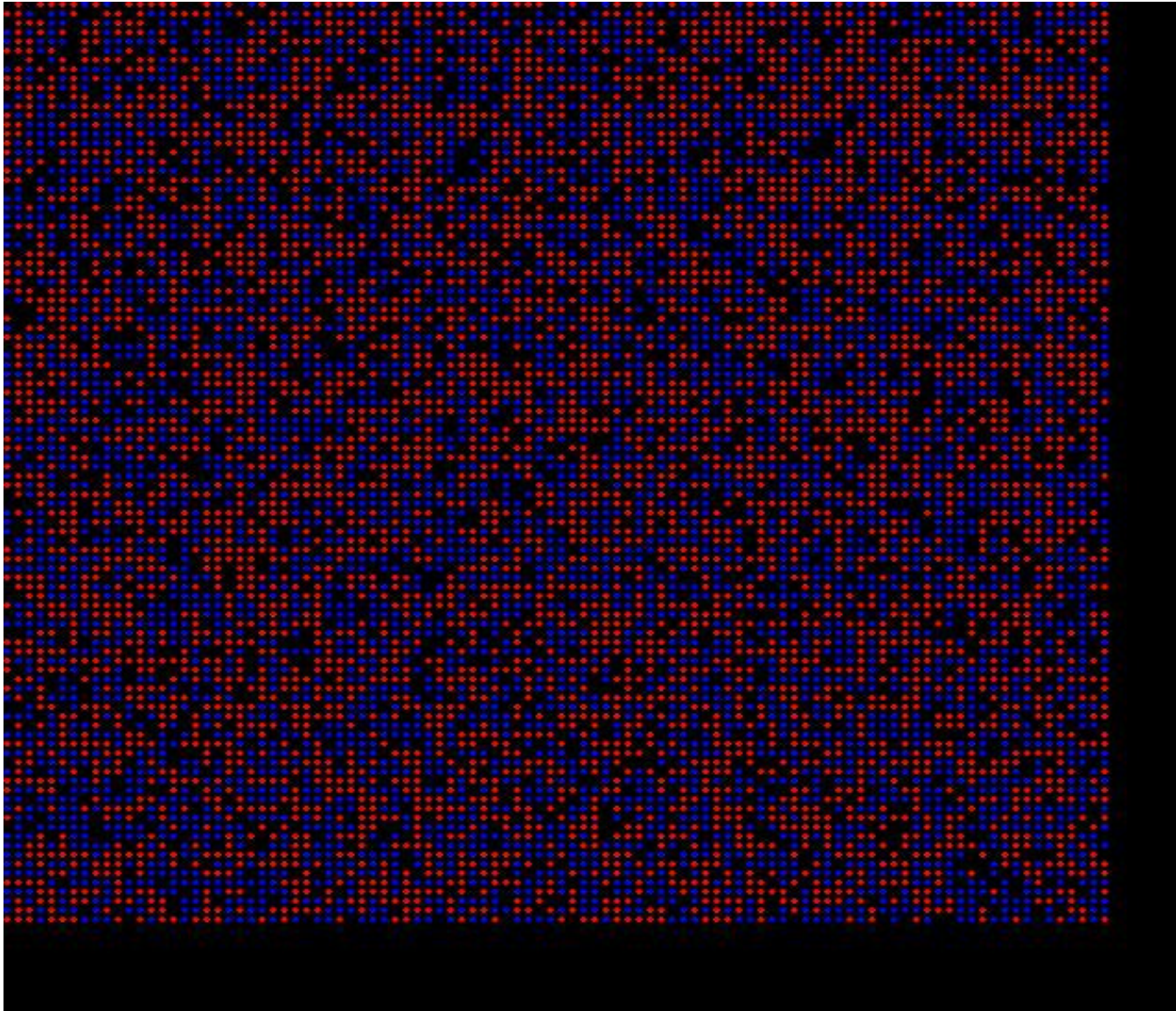
Questions

- 1. What assumptions about individuals' tolerance for integrated neighborhoods lead to high segregation (tipping)?**
- 2. Do empirical data on preferences support these assumptions?**

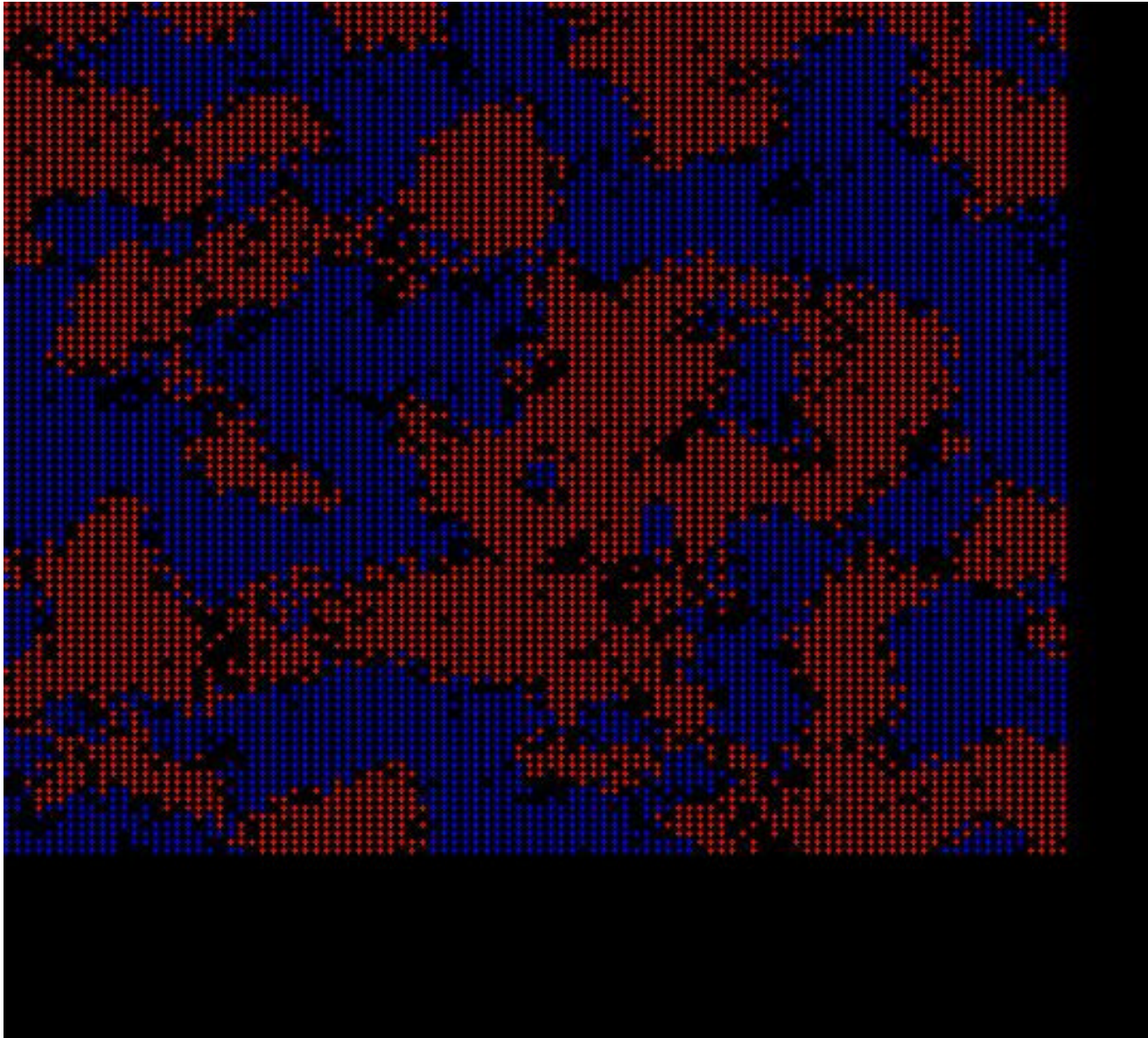
Our Model

- **500 by 500 lattice; 250,000 cells**
- **15% of cells left vacant**
- **50% black, 50% white**
- **City is integrated at time zero**
- **Households behave according to a number of alternative rules for behavior**

City at Initialization



City after 200,000 ticks

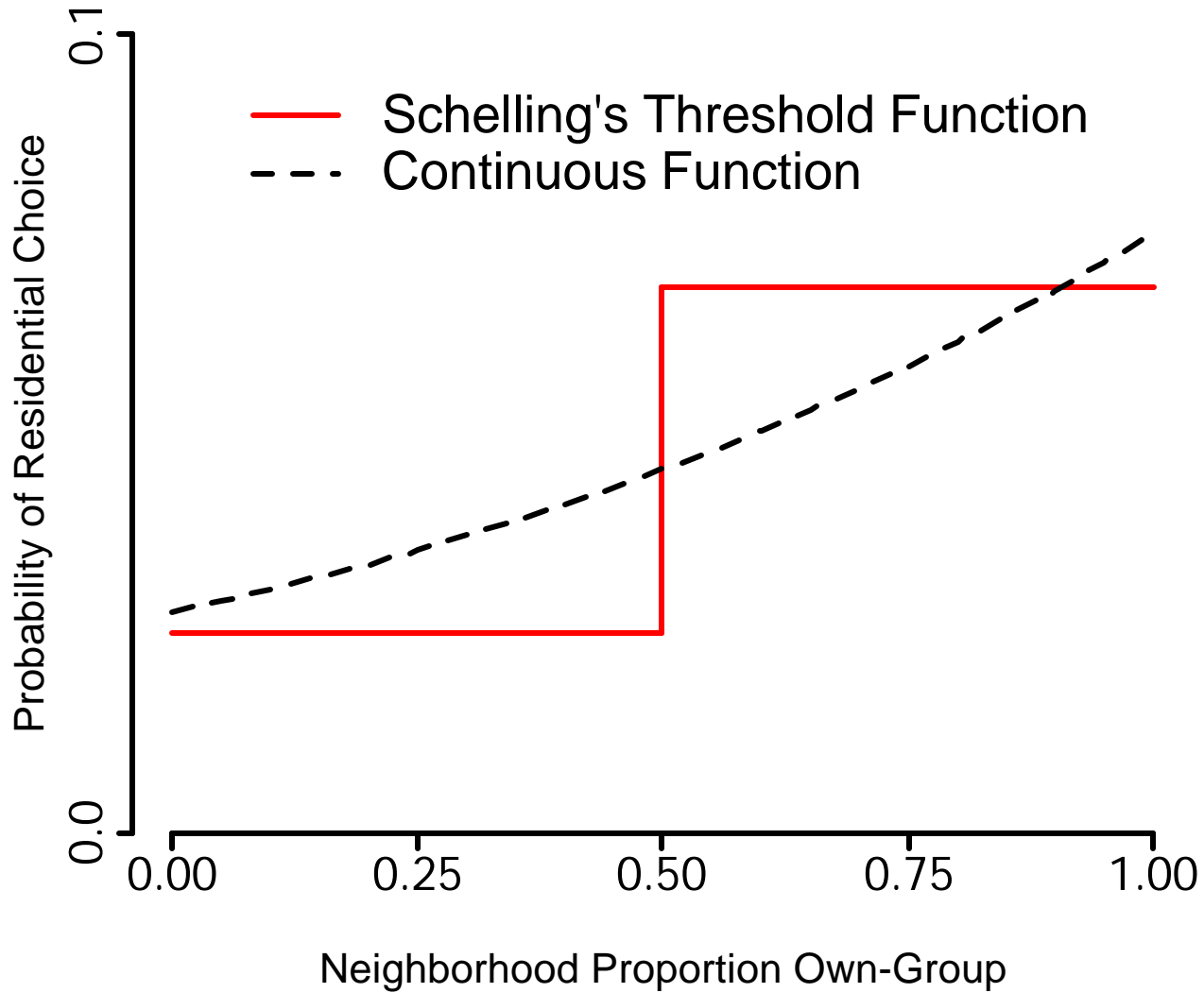


How It Works

In each tick of the clock ...

- **Pick 1 household at random**
- **Sampled household evaluates current residence and all vacant housing units using a decision rule**
- **Picks a destination with probability proportional to relative desirability**
- **Any household who moves leaves its previous cell vacant for another agent to move into**

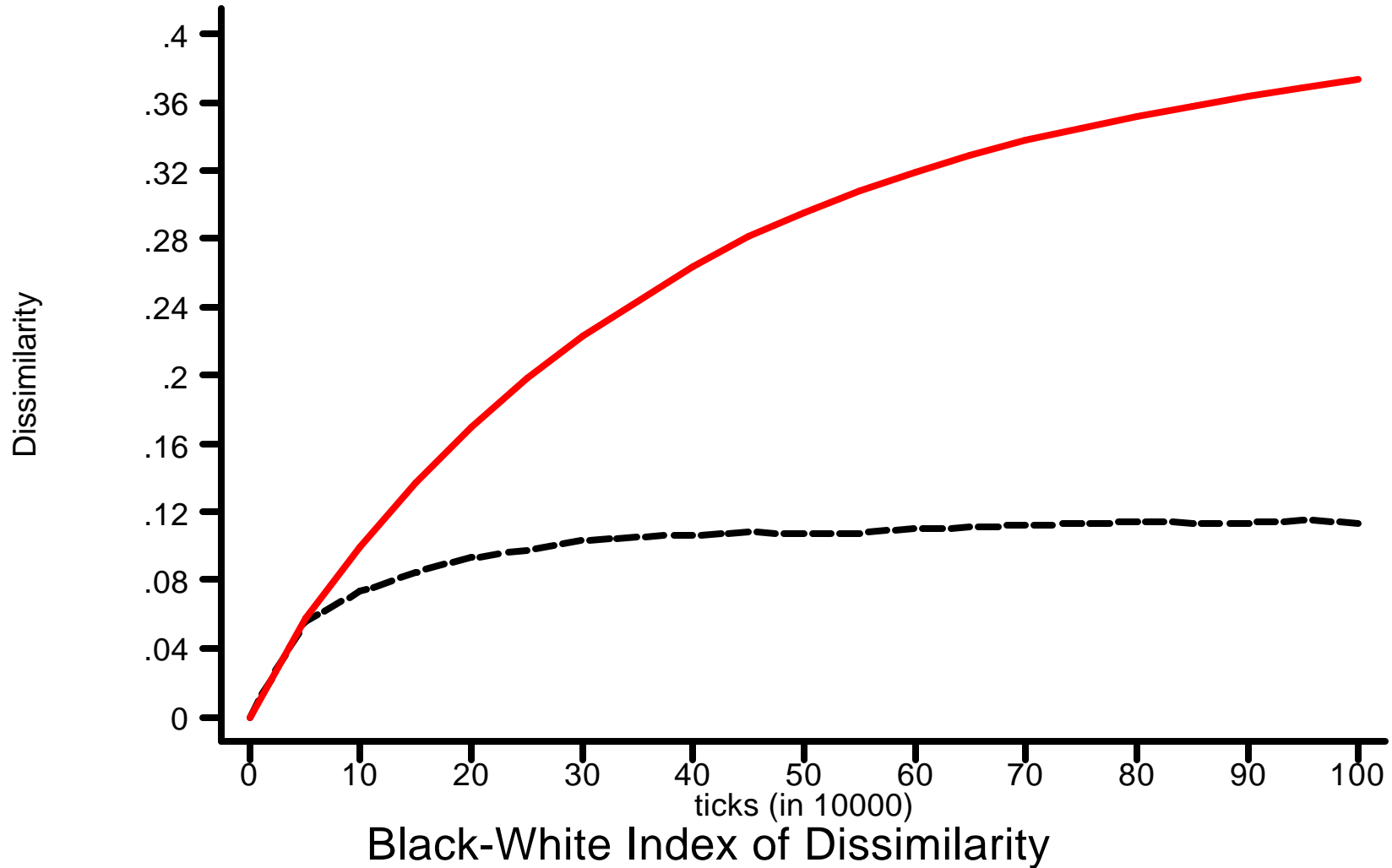
Two Hypothetical Decision Rules



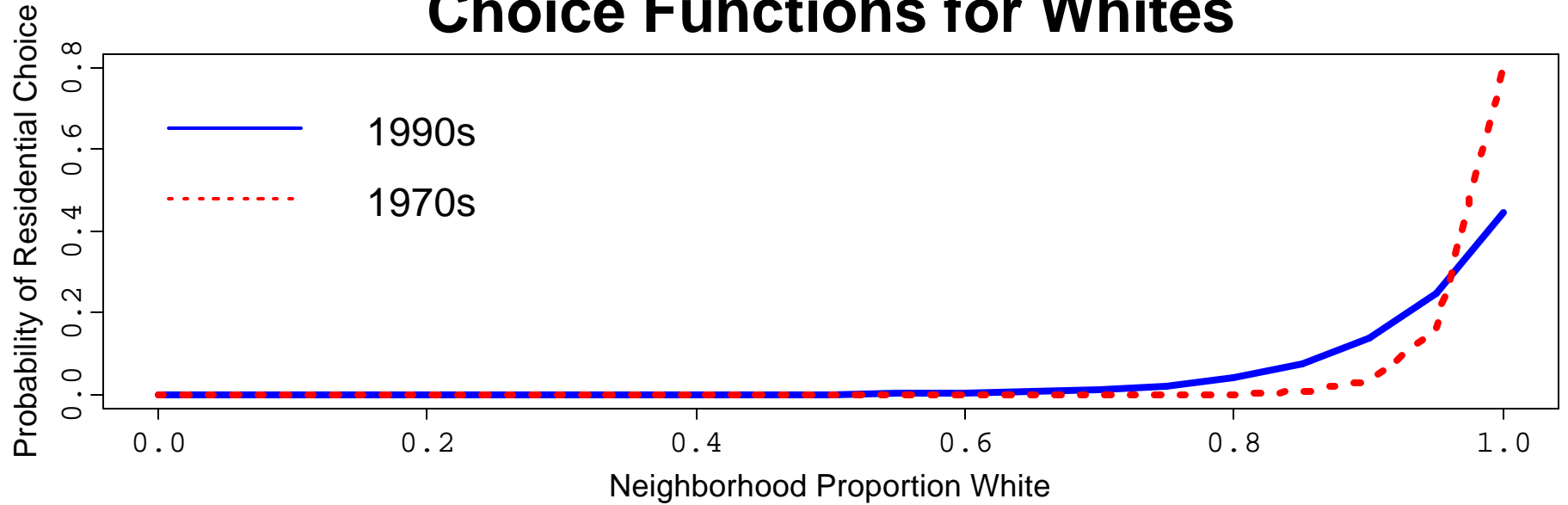
Segregation Measures, Hypothetical Choice Functions

----- Continuous Function

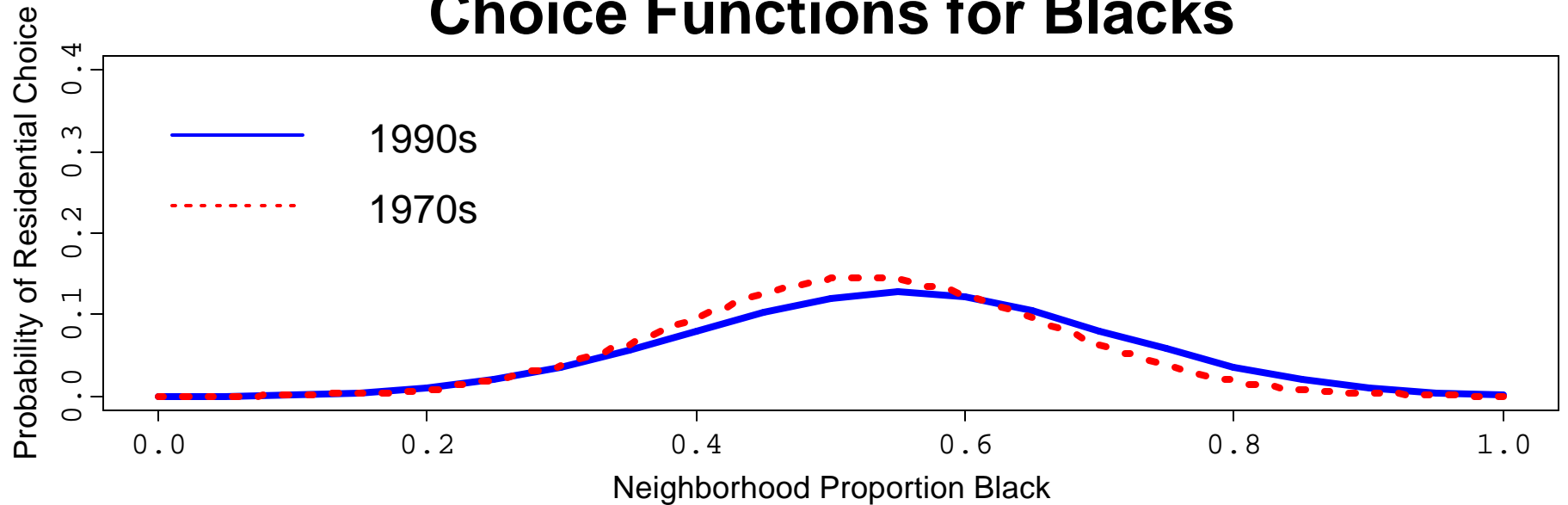
----- Schelling Function



Choice Functions for Whites



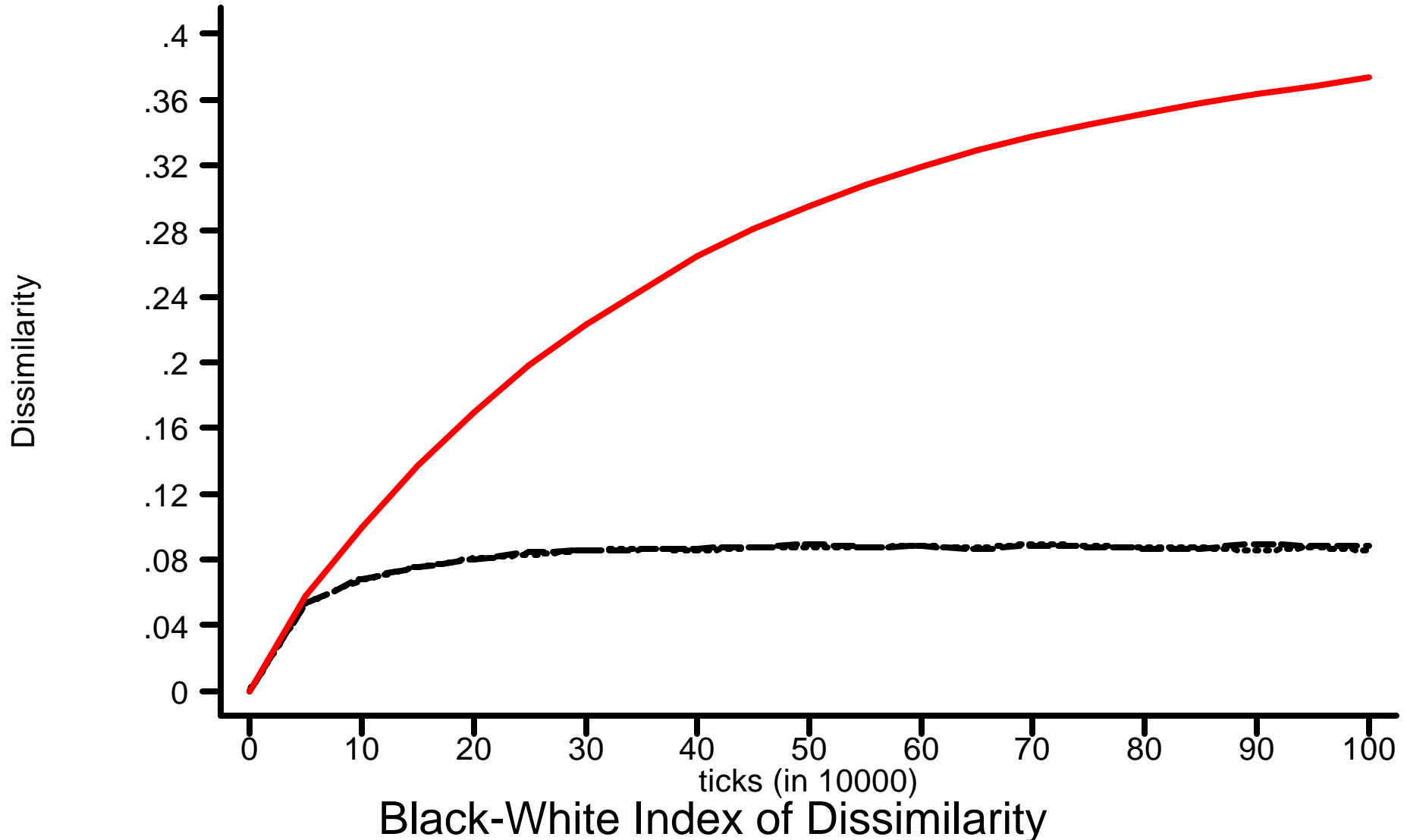
Choice Functions for Blacks



Segregation Measures, Observed Response

----- 1970s Functions
——— Schelling Function

..... 1990s Functions



Conclusions

- 1. Threshold in individual-level utility function translates into another “threshold” at the system level**
- 2. But data suggest that Schelling’s tipping function may be very misleading**
- 3. However, choice functions estimated from data generate unrealistic level of segregation**
- 4. *Either data don’t give us enough information to identify threshold form, or there is another process that can produce very high levels of segregation***

One Possible Explanation

Race correlated with another variable that follows a threshold function, e.g. residential choice based on income.

Income/wealth creates a ceiling that makes it impossible for poor people to enter certain neighborhoods due to housing prices and the availability of mortgages.

Next Steps

- **Design an agent-based model that is grounded in real world data on residential mobility and neighborhood change, and use it so simulate patterns of race and income mobility**
- **Develop statistical techniques to assess how well this model captures trends in patterns of segregation and neighborhood turnover**

Model of Income, Race, And Residence in Los Angeles (MIRAR L.A.)

- Realistic space (agents live on Census blocks)**
- Model time (ticks) mapped to real time (years)**
- Population is 5% sample of 1990 Census data**
- Explicit matching of agents to appropriate housing units**
- Sorting along two dimensions (race and income) or more**
- Model output can be compared to LA County data**

Software

- **Java (object oriented programming language)**
<http://java.sun.com/>
- **Repast (toolkit for building agent based models in Java)**
<http://repast.sourceforge.net/>
- **Eclipse (integrated development environment)**
<http://www.eclipse.org/>
- **Java Unified Mapping Platform (JUMP)**
<http://www.vividsolutions.com/jump/>