Neighborhood Change
Drivers and Effects

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Urban Environments and Neighborhood Change

Catchphrases often used in the urban economic literature

- Ghetto, segregation, gentrification, ethnic enclave, revitalization...
- Phenomena commonly observed in cities
- Causes and consequences frequently studied
- Important implications for residents and policymakers
Three essay approach

Studying various urban economics issues using data from Chicago, Illinois

- Effects of public housing on private home values
- Gentrification and school quality
- Ethnic interaction and segregation in real estate transactions
Introduction

Historically → disamenity

- HOPE VI and the Plan for Transformation
- Redevelop and/or rehabilitate dilapidated structures
- Move towards mixed income developments
- Reduce density and eliminate high-rise format

New federal and city policy → different effect???
Closeby public housing generally not thought to be desireable

- Brown (2009)
  - HOPE VI developments in large cities
  - Home prices rose in areas closest to the new developments

  - Positive effects are modest
  - Depend on the type of development constructed
  - Homes closest to new developments typically benefit
Methodological Literature

Hedonic pricing
  ▶ House is a collection of attributes

Spatial considerations
  ▶ Spatial correlation points to the use of spatial econometric methods

Sample selection problem
  ▶ Propensity score matching
Private Homes, Public Housing, and Census Tracts

Chicago home sales in 1997 and 2003
- Before and after policy reform and implementation
- Geocoded by address
- Full set of physical characteristics

Four types of public housing
- Basic characteristics
- Geocoded by address

Census tract level variables
- 882 census tracts
- Attached to houses assigned on location

Distances between public housing developments and private homes
- Distance to nearest, number within radius, binary measures, etc.
Chicago, IL 2003 sales

Home Sales
Price
- Less than $75,000
- $75,000-150,000
- $150,000-300,000
- $300,000-600,000
- More than $600,000

Chicago Census Tracts
Treatment Effects

We are interested in knowing the treatment effect on the treated (Dehejia and Wahba(2002)).

\[ \tau_i = Y_{i1} - Y_{i0} \]

\[ \tau | T = 1 = E(Y_{i1} | T_i = 1) - E(Y_{i0} | T_i = 1) \]

We can't estimate \( E(Y_{i0} | T_i = 1) \)

Estimating

\[ \tau^e = E(Y_{i1} | T_i = 1) - E(Y_{i0} | T_i = 0) \]

is potentially biased if treatment is not administered randomly
Propensity Score Matching

Two steps

- Match treated observations with control observations
- Estimate a treatment effect

Create propensity score

- Estimate propensity to be treated using ordered logit
- Degrees of treatment depend on proximity to and type of public housing
- Use census tract variables on RHS

Match treated with untreated that have similar propensity score

- Nearest neighbor matching (4 and 8 neighbors)
- Use new 'matched' sample to estimate hedonic price model
Hedonic Model

House price is a function of the house’s characteristics (c), neighborhood characteristics (n) and its proximity to public housing (h).

\[ \ln(p_i) = c_i' \beta_1 + n_i' \beta_2 + h_i' \beta_3 + \epsilon_i \]

Spatial error model

\[ \ln(p) = c \beta_1 + n \beta_2 + h \beta_3 + \epsilon \]

\[ \epsilon = \lambda W \epsilon + \mu \]
Primarily interested in effect of public housing

- Is there an effect?
- Does public housing enter as an amenity or disamenity?
- Does the effect differ across the two time periods?
- Does the effect differ depending on the type of public housing development?
School Choice and Gentrification

School choice
- Students default to their geographically assigned school
- Families can choose to enroll in any school in Chicago Public Schools (CPS) system

Gentrification
- Study covers period of rapidly rising home values
- Some parts of city experienced extreme appreciation (gentrification) compared to others
How do neighborhood and a school’s surroundings affect its student body and achievement?

- Certain types of students tend to perform better
- Will gentrification bring these students to poorly performing schools?
- Will presence of school choice programs mute this positive externality?
Literature

School choice programs are disproportionately used by certain groups

- Non-minority, higher income, more educated parents
- Lankford and Wyckoff (2001)
- Cullen et al. (2005)
Data

Chicago public schools and locally-aggregated home sale data

- Panel structure
- Approximately 500 public schools
- Achievement and demographic data over 15 years
- Geocoded home sale data over same time period
CPS and Gentrifying Neighborhoods
**Spatial-Temporal STAR Model**

Relationship between school characteristics and achievement

How does gentrification affect this relationship?

Basic spatial STAR model (Pede et al. (2009)):

\[
y = \alpha_0 + \alpha_1 x_1 + (\delta_0 + \delta_1 x_1) g + \epsilon
\]

\[g = f \text{ (gentrification index)}\]

- \(f\) is generally a logistic or exponential function bounded between 0 and 1
- \(y\) measures a school achievement outcome
- \(x\) includes student and school characteristics
Variables in $g$ are spatial in nature, and potentially temporal

- Measurement of surrounding gentrification
- Includes **recent** home value appreciation proximate to school

$$y = \alpha_0 + \alpha_1 x_1 + (\delta_0 + \delta_1 x_1) g + \epsilon$$

If $\delta$s are equal to zero, gentrification is not altering the relationship between school characteristics and achievement
Introduction

- Chicago is well-known for its ethnic diversity
- Historically large groups of Polish, Greek, Italian, Jewish, Mexican, Ukranian, African American, Chinese, Korean (recently)...
- Neighborhood composition changes over time
- Are there observable differences in property transactions between groups or within neighborhoods?
- Do these differences hint at the 'causes' behind change in neighborhood composition?
Background

Literature

Cutler et al. (1999)

\[ \ln(\text{housing cost}) = \alpha_{city} + \beta_1 \text{structural controls} + \beta_2 \text{black} + \beta_3 \text{black} \cdot \text{structural controls} + \beta_4 \text{black} \cdot \text{dissimilarity} + \epsilon \]

Define three types of segregative behavior

<table>
<thead>
<tr>
<th>Table 6</th>
<th>Predictions of Alternative Theories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relation between Segregation and:</td>
<td>Theory</td>
</tr>
<tr>
<td>House prices</td>
<td>Blacks pay more (esp. migrants)</td>
</tr>
<tr>
<td>Attitudes toward integration</td>
<td>Blacks prefer segregation (esp. migrants)</td>
</tr>
</tbody>
</table>
Introduction

Public Housing

Education

Ethnicity, Segregation, Transactions

Methodology

Data

- Records of all home sales in Chicago, IL between approximately 1990 and 2005
- Includes seller and buyer name
- Common surname lists exist for numerous ethnicities

- Here’s where the fun starts!!
Three Steps

First, ethnicities must be assigned

- Weight names with likelihoods of representing certain ethnicities
- Bayesian? (Elliott et al. (2009))

Second, transactions must be classified:

- Buyer/seller pairs
- Buyer/neighborhood pairs
- Seller/neighborhood pairs

Third, estimate something similar to

\[
\ln(\text{housing cost}) = \alpha_{city} + \beta_1 \text{structural controls} + \beta_2 \text{black} + \\
\beta_3 \text{black(structural controls)} + \beta_4 \text{black} \cdot \text{dissimilarity} + \epsilon
\]

expanding ethnic groups/pairings.
Differences in transaction prices could point to push or pull segregation on the part of buyers or sellers.

Certain ethnicities may be willing to pay a premium to live in certain neighborhoods.

Others may be willing to accept a discounted sale price to leave a certain neighborhood.

Depending on the signs of these differences, we may understand the forces behind observed shifts in ethnic composition (internal migration) within Chicago.