# The Long-Run Demographic Impact of Post-War Land-Use Zoning: How Early Restrictive Land-Use Controls Shaped the Suburbs

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# Overview

**Quick Note:** This research has been folded into a much larger project with Allison Shertzer (U. of Pittsburgh) and Tate Twinam (William & Mary).

Two big questions:

1. What motivated the development of post-WWII land-use zoning laws, particularly their level of stringency?
    - Was perceived "racial threat" a motivating factor?

2. Did early post-WWII land-use zoning laws have a lasting impact on the spatial distribution of economic activity?
    - Long-term impact of the spatial distribution of minorities?
    - Preliminary results suggests that the answer is "yes"

# Motivation

- New evidence points to land-use zoning's historic role in shaping the modern urban landscape within *central cities*
  - Considerable persistence in zoning's impact on land use (Shertzer, Twinam, & Walsh, 2016; Twinam, 2018)
  - Mechanism through which other historic public investments exhibit long-term effects (Brooks & Lutz, 2019)
  - Implemented with discriminatory intent (Shertzer, Twinam, & Walsh, 2016)
- But what about the suburbs?
  - A great deal of modern social/urban change can be described through the lens of suburbanization and urban sprawl (Jackson, 1985)

# Motivation

- Surprisingly, very little research on the *long-run* effects of early suburban zoning
  - Some evidence suburbs used zoning to limit entry of low-income HHs (Rolleston, 1987; Bates & Santerre, 1994)
  - Suburban restrictions on apartments appears to have slowed the growth of minority populations (Schuetz, 2009; Quigley, Raphael, & Rosenthal, 2004)
- But what about the early post-WWII era when suburbs grew rapidly and adopted/revised zoning laws?
  - Considerable evidence of discriminatory intent (Babcock & Bosselman, 1963; Jackson, 1985; Massey & Denton, 1993)

# Motivation

- **Goal:** Investigate early suburban zoning's long-run impact on the spatial distribution of demographic outcomes
  - Focus on spatially fine block-level variation
- *Currently:* Emphasize spatial variation in suburban racial composition that can be explained by area's assignment to earlier 1950 suburban zoning districts
- Future iterations will incorporate 1940, 1960, & 1970 zoning laws

# Data

- Study area: Suburban Cook County, IL (i.e., suburban Chicago)
- Majors sources of data:
  - Demographic outcomes: 1980 - 2010 census blocks
    - 1970 coming soon
  - Zoning data (maps & bylaws):
    - Municipal records
    - Academic/public libraries
    - Out-of-print land-value appraisal guides (*Olcott's* Blue Books (inner- and outer-ring suburbs)
  - Land-use data:
    - Digitized Cook County assessor files
    - Digitized subdivision plat maps (not yet)
    - Aerial photography (not yet)

# Data

Figure 1: Olcott's Blue Book, '39

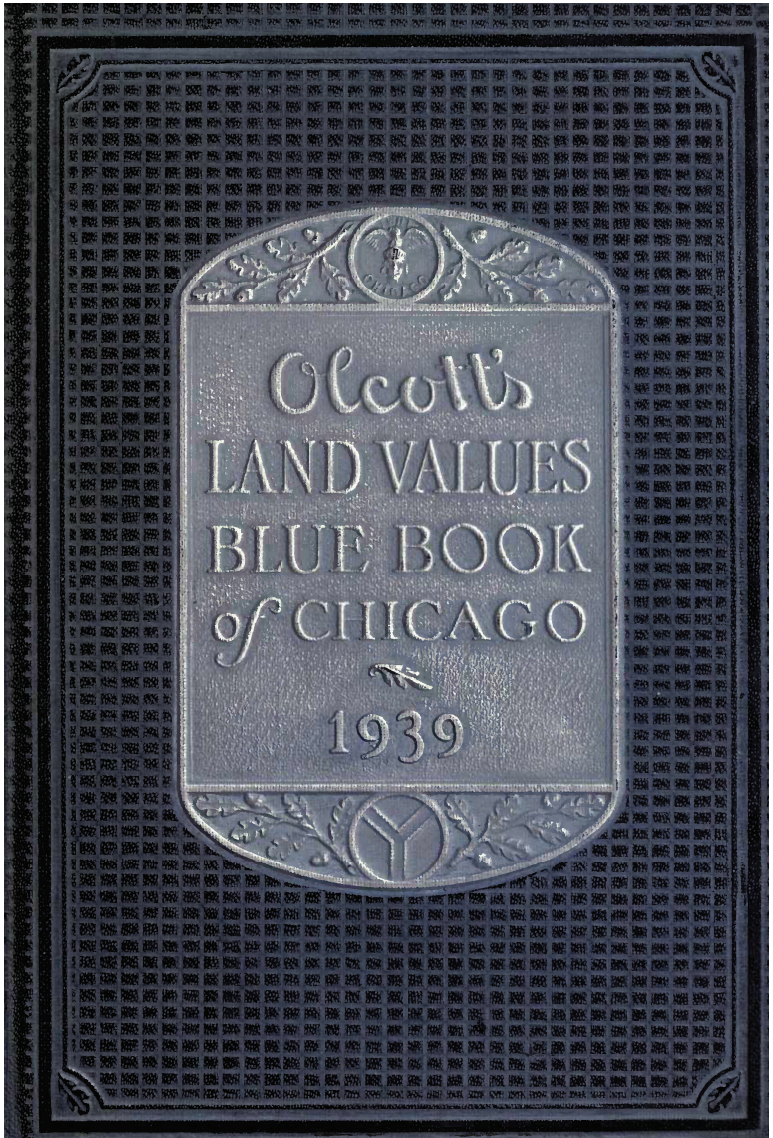
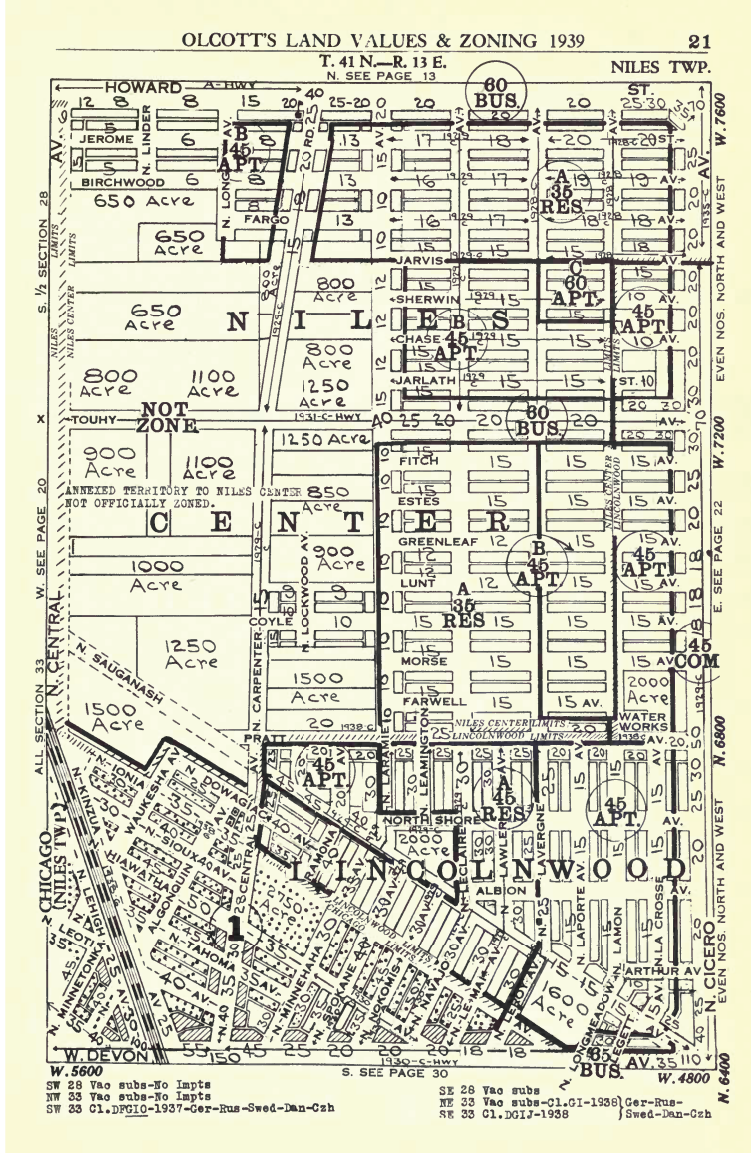
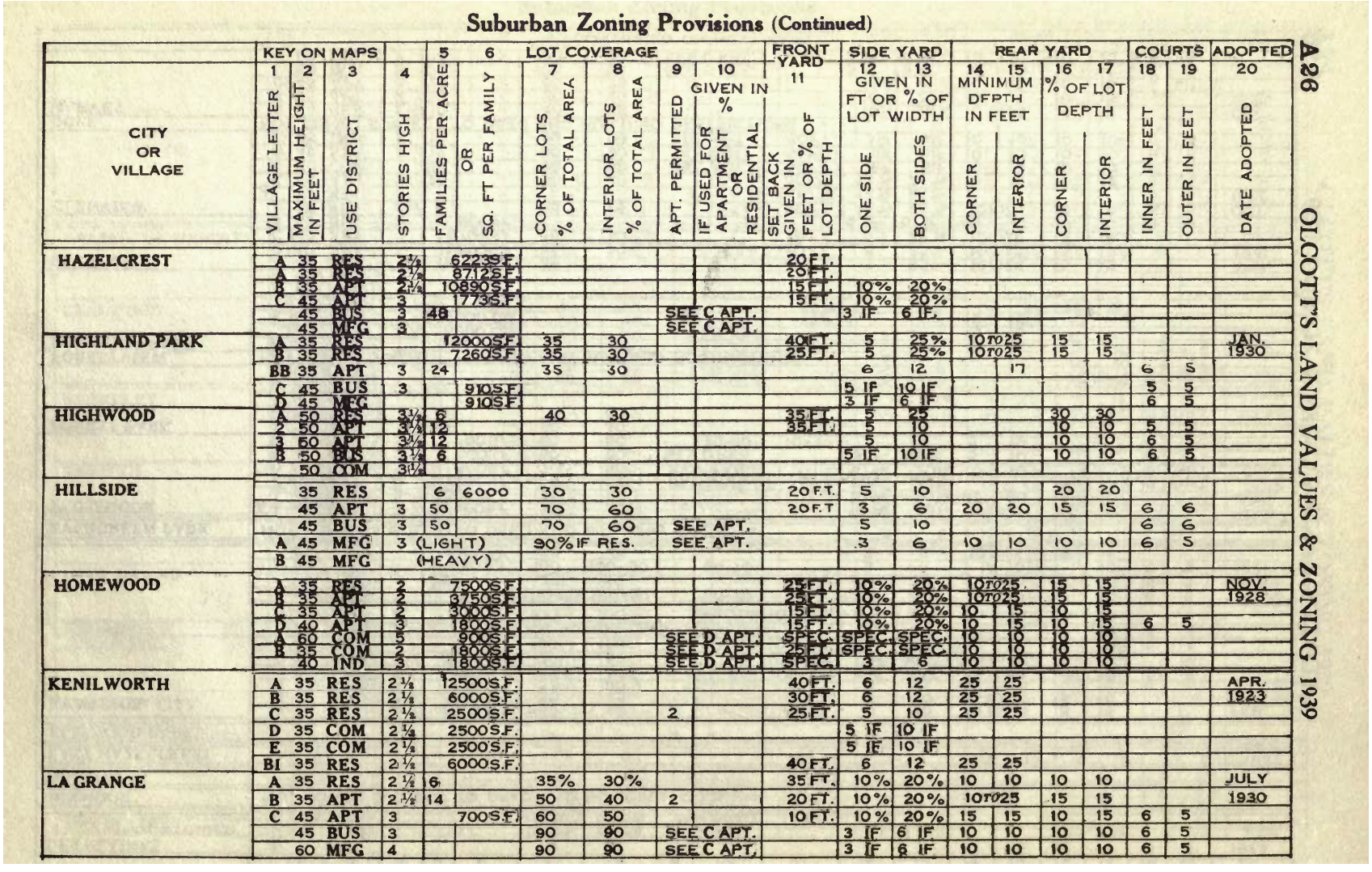



Figure 2: Olcott's Blue Book, '39



# Data

Figure 3: Olcott's Blue Book, '39: Bylaws



**Suburban Zoning Provisions (Continued)**

| CITY OR VILLAGE | KEY ON MAPS: 1 VILLAGE LETTER | 2 MAXIMUM HEIGHT IN FEET | 3 USE DISTRICT | 4 STORIES HIGH | 5 FAMILIES PER ACRE | 6 OR SQ. FT PER FAMILY | LOT COVERAGE: 7 CORNER LOTS % OF TOTAL AREA | 8 INTERIOR LOTS % OF TOTAL AREA | 9 APT. PERMITTED | 10 IF USED FOR APARTMENT OR RESIDENTIAL GIVEN IN % | FRONT YARD 11 SET BACK GIVEN IN FEET OR % OF LOT DEPTH | SIDE YARD: 12 ONE SIDE | 13 BOTH SIDES | REAR YARD: 14 MINIMUM DEPTH IN FEET CORNER | 15 INTERIOR | 16 % OF LOT DEPTH CORNER | 17 INTERIOR | COURTS: 18 INNER IN FEET | 19 OUTER IN FEET | ADOPTED: 20 DATE ADOPTED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HAZELCREST | A | 35 | RES | 2½ | | 6223 S.F. | | | | | 20 FT. | | | | | | | | | |
| | A | 35 | RES | 2½ | | 8712 S.F. | | | | | 20 FT. | | | | | | | | | |
| | B | 35 | APT | 2½ | | 10890 S.F. | | | | | 15 FT. | 10% | 20% | | | | | | | |
| | C | 45 | APT | 3 | | 1773 S.F. | | | | | 15 FT. | 10% | 20% | | | | | | | |
| | | 45 | BUS | 3 | 48 | | | | SEE C APT. | | | 3 IF | 6 IF. | | | | | | | |
| | | 45 | MFG | 3 | | | | | SEE C APT. | | | | | | | | | | | |
| HIGHLAND PARK | A | 35 | RES | | | 12000 S.F. | 35 | 30 | | | 40 FT. | 5 | 25% | 10 TO 25 | | 15 | 15 | | | JAN. 1930 |
| | B | 35 | RES | | | 7260 S.F. | 35 | 30 | | | 25 FT. | 5 | 25% | 10 TO 25 | | 15 | 15 | | | |
| | BB | 35 | APT | 3 | 24 | | 35 | 30 | | | | 6 | 12 | | 17 | | | 6 | 5 | |
| | C | 45 | BUS | 3 | | 910 S.F. | | | | | | 5 IF | 10 IF | | | | | 5 | 5 | |
| | D | 45 | MFG | | | 910 S.F. | | | | | | 3 IF | 6 IF | | | | | 6 | 5 | |
| HIGHWOOD | A | 50 | RES | 3½ | 6 | | 40 | 30 | | | 35 FT. | 5 | 25 | | | 30 | 30 | | | |
| | 2 | 50 | APT | 3½ | 12 | | | | | | 35 FT. | 5 | 10 | | | 10 | 10 | 5 | 5 | |
| | 3 | 60 | APT | 3½ | 12 | | | | | | | 5 | 10 | | | 10 | 10 | 6 | 5 | |
| | B | 50 | BUS | 3½ | 6 | | | | | | | 5 IF | 10 IF | | | 10 | 10 | 6 | 5 | |
| | | 50 | COM | 3½ | | | | | | | | | | | | | | | | |
| HILLSIDE | | 35 | RES | | 6 | 6000 | 30 | 30 | | | 20 FT. | 5 | 10 | | | 20 | 20 | | | |
| | | 45 | APT | 3 | 50 | | 70 | 60 | | | 20 FT | 3 | 6 | 20 | 20 | 15 | 15 | 6 | 6 | |
| | | 45 | BUS | 3 | 50 | | 70 | 60 | SEE APT. | | | 5 | 10 | | | | | 6 | 6 | |
| | A | 45 | MFG | 3 (LIGHT) | | | 90% IF RES. | | SEE APT. | | | 3 | 6 | 10 | 10 | 10 | 10 | 6 | 5 | |
| | B | 45 | MFG | (HEAVY) | | | | | | | | | | | | | | | | |
| HOMEWOOD | A | 35 | RES | 2 | | 7500 S.F. | | | | | 25 FT. | 10% | 20% | 10 TO 25 | | 15 | 15 | | | NOV. 1928 |
| | B | 35 | APT | 2 | | 6750 S.F. | | | | | 25 FT. | 10% | 20% | 10 TO 25 | | 15 | 15 | | | |
| | C | 35 | APT | 2 | | 3000 S.F. | | | | | 15 FT. | 10% | 20% | 10 | 15 | 10 | 15 | | | |
| | D | 40 | APT | 3 | | 1800 S.F. | | | | | 15 FT. | 10% | 20% | 10 | 15 | 10 | 15 | 6 | 5 | |
| | A | 60 | COM | 5 | | 900 S.F. | | | SEE D APT. | | SPEC. | SPEC. | SPEC. | 10 | 10 | 10 | 10 | | | |
| | B | 35 | COM | 2 | | 1800 S.F. | | | SEE D APT. | | 25 FT. | SPEC. | SPEC. | 10 | 10 | 10 | 10 | | | |
| | | 40 | IND | 3 | | 1800 S.F. | | | SEE D APT. | | SPEC. | 3 | 6 | 10 | 10 | 10 | 10 | | | |
| KENILWORTH | A | 35 | RES | 2½ | | 12500 S.F. | | | | | 40 FT. | 6 | 12 | 25 | 25 | | | | | APR. 1923 |
| | B | 35 | RES | 2½ | | 6000 S.F. | | | | | 30 FT. | 6 | 12 | 25 | 25 | | | | | |
| | C | 35 | RES | 2½ | | 2500 S.F. | | | 2 | | 25 FT. | 5 | 10 | 25 | 25 | | | | | |
| | D | 35 | COM | 2½ | | 2500 S.F. | | | | | | 5 IF | 10 IF | | | | | | | |
| | E | 35 | COM | 2½ | | 2500 S.F. | | | | | | 5 IF | 10 IF | | | | | | | |
| | BI | 35 | RES | 2½ | | 6000 S.F. | | | | | 40 FT. | 6 | 12 | 25 | 25 | | | | | |
| LA GRANGE | A | 35 | RES | 2½ | 6 | | 35% | 30% | | | 35 FT. | 10% | 20% | 10 | 10 | 10 | 10 | | | JULY 1930 |
| | B | 35 | APT | 2½ | 14 | | 50 | 40 | 2 | | 20 FT. | 10% | 20% | 10 TO 25 | | 15 | 15 | | | |
| | C | 45 | APT | 3 | | 700 S.F. | 60 | 50 | | | 10 FT. | 10% | 20% | 15 | 15 | 10 | 15 | 6 | 5 | |
| | | 45 | BUS | 3 | | | 90 | 90 | SEE C APT. | | | 3 IF | 6 IF | 10 | 10 | 10 | 10 | 6 | 5 | |
| | | 60 | MFG | 4 | | | 90 | 90 | SEE C APT. | | | 3 IF | 6 IF | 10 | 10 | 10 | 10 | 6 | 5 | |

A26 OLCOTT'S LAND VALUES & ZONING 1939

# Data

Figure 4: Suburban Cook County: 1940

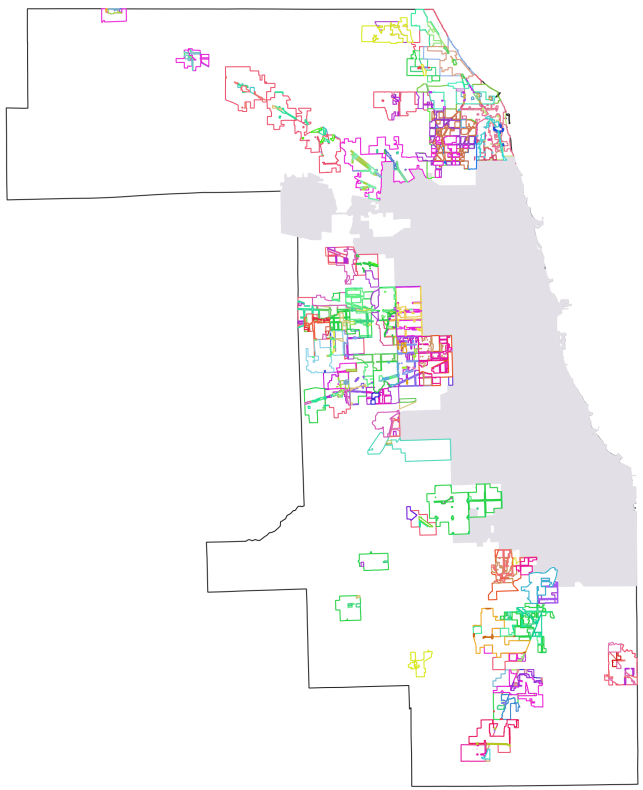
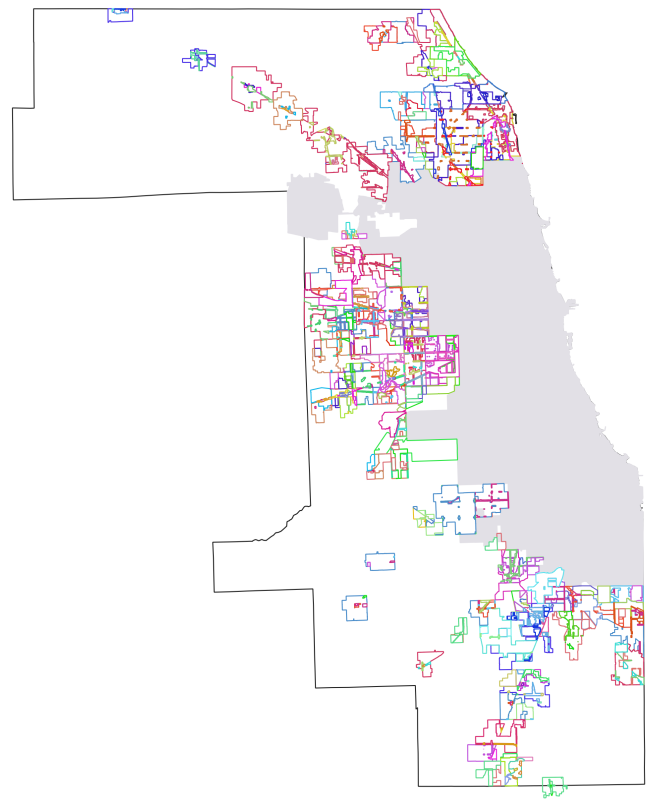


Figure 5: Suburban Cook County: 1950



# Data

Figure 6: Suburban Cook County: 1940

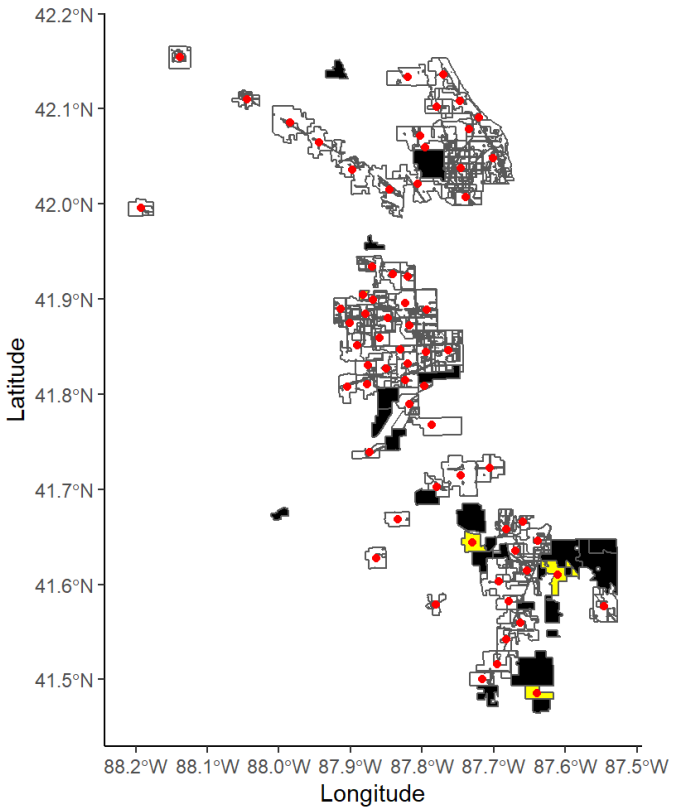
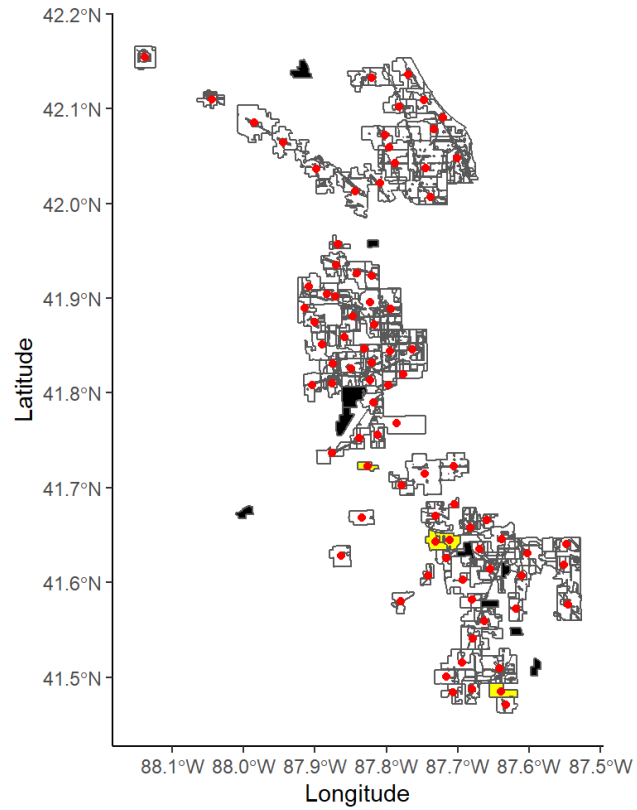



Figure 7: Suburban Cook County: 1950



# Data

Figure 8: Suburban Cook County: 1960

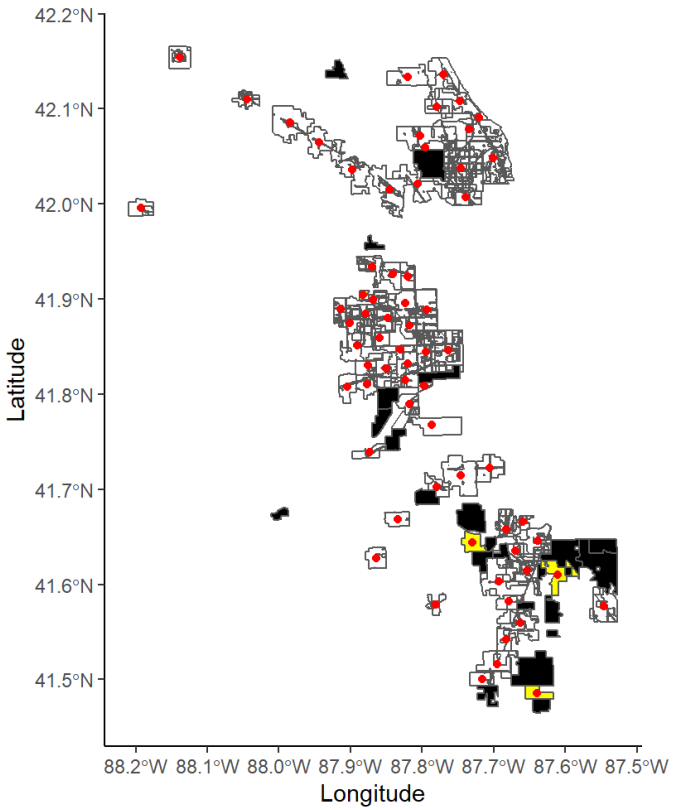
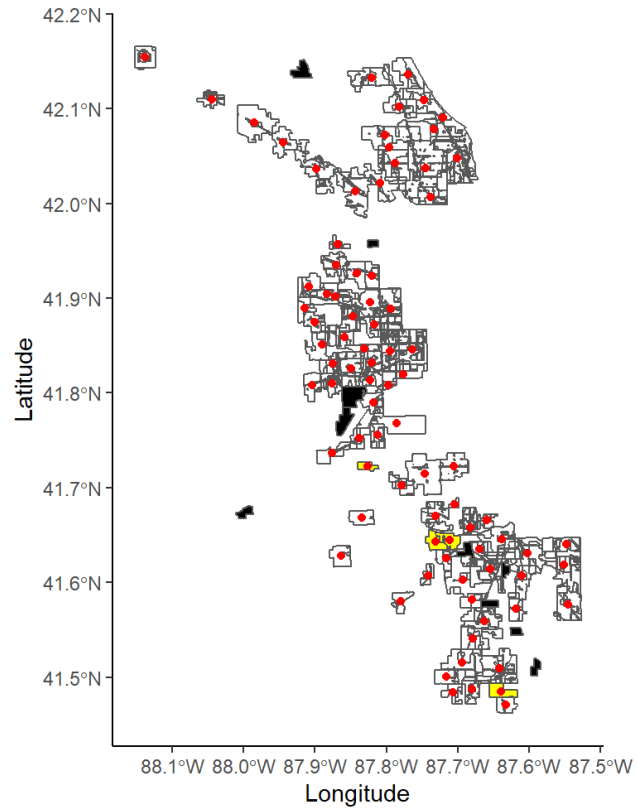
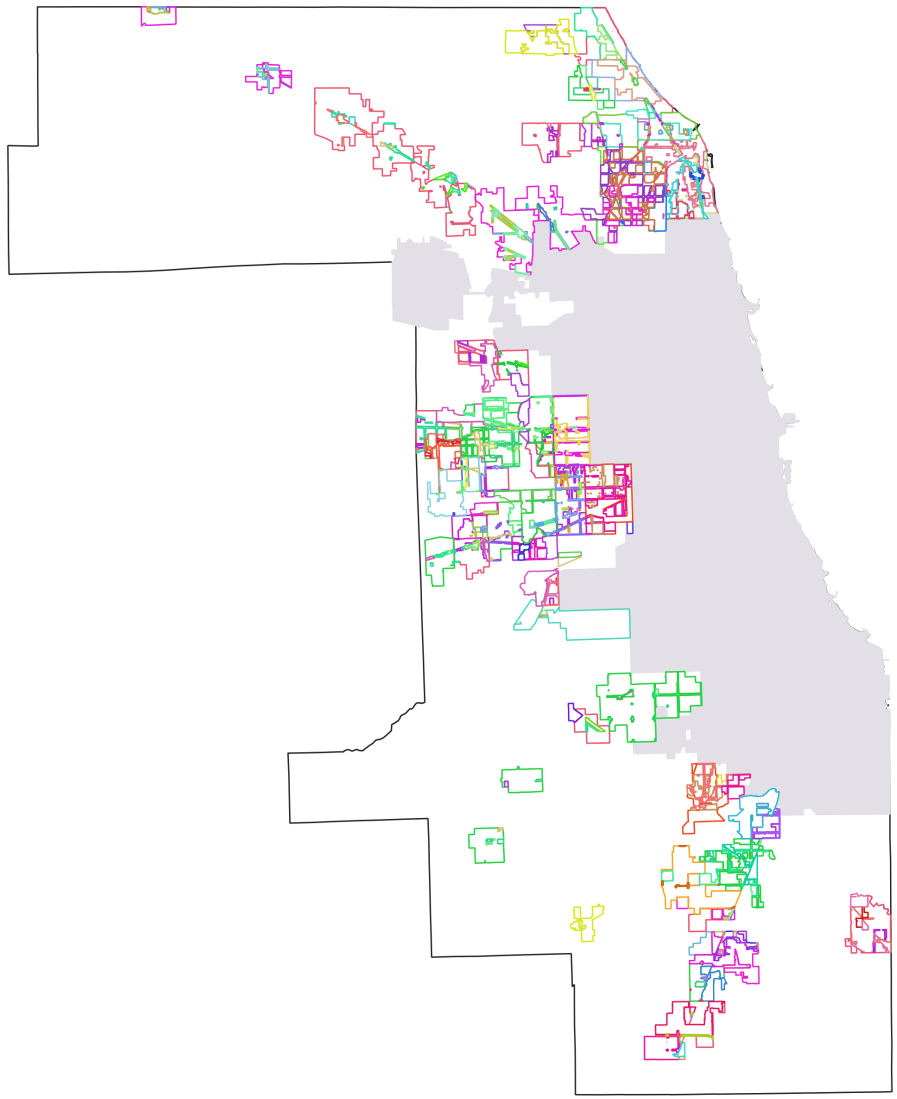



Figure 9: Suburban Cook County: 2010



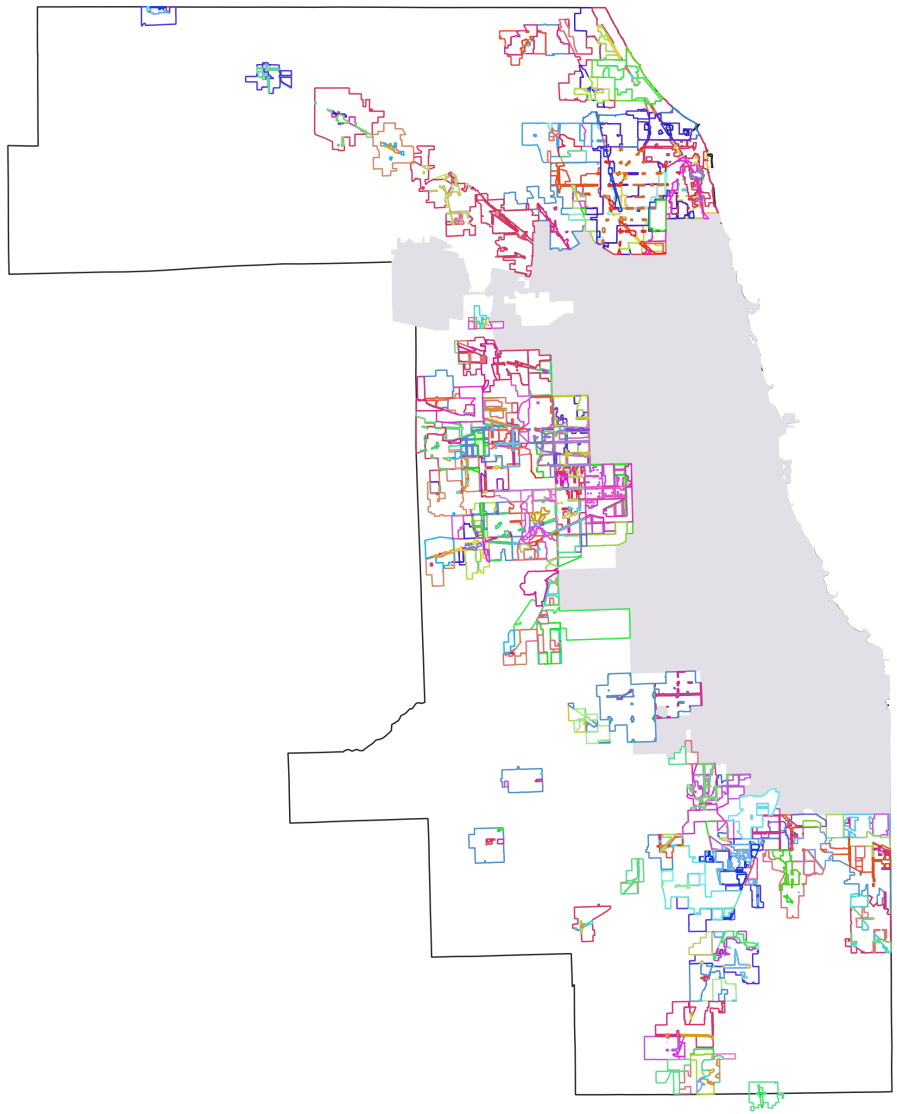
# Data

Figure 10: Suburban Cook County Zoning: 1940



# Data

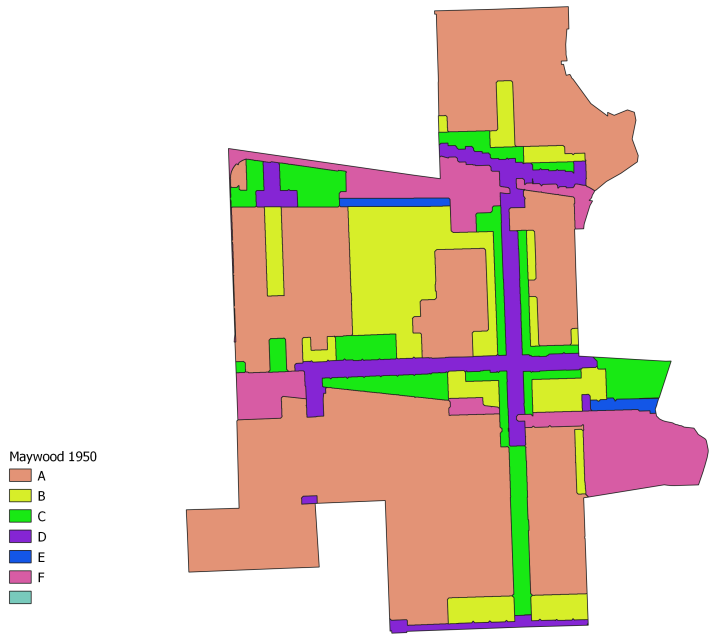
Figure 11: Suburban Cook County Zoning: 1950



# Data

Figure 12: Maywood, IL: 1940


Figure 13: Maywood, IL: 1950



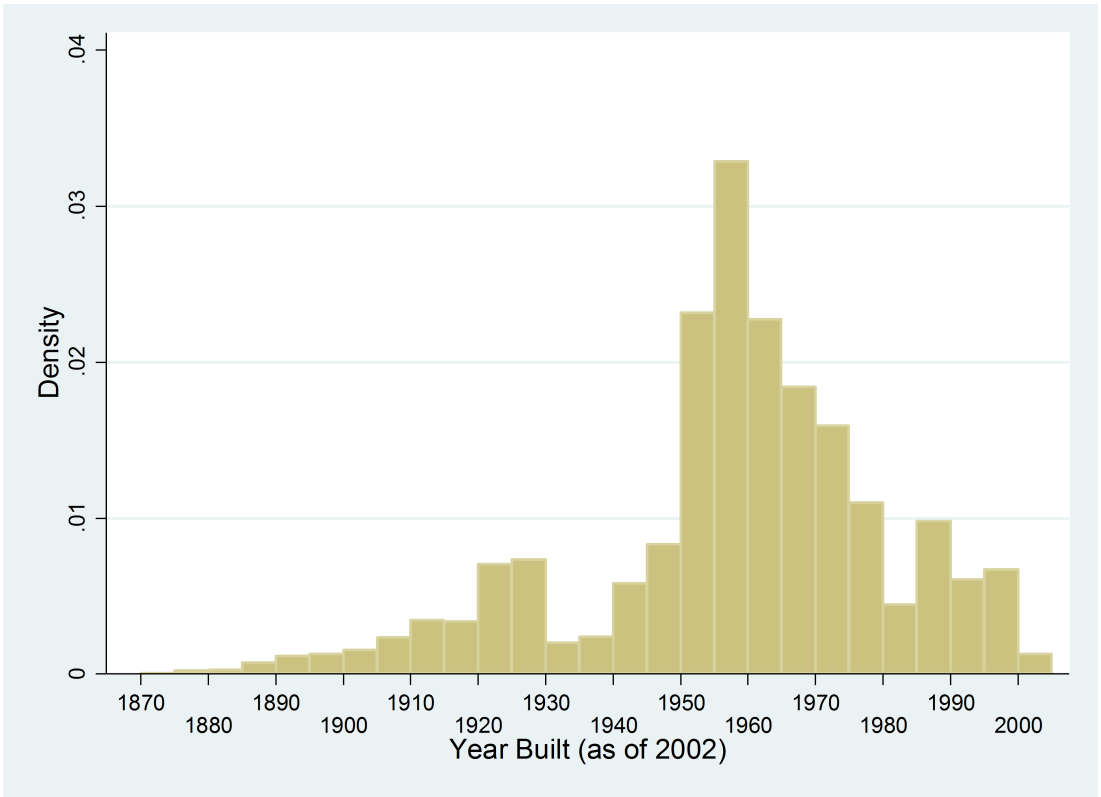
# Data

| | 1940 File | 1950 File |
|---|---|---|
| # of Zoned Municipalities | 57 | 77 |
| Total Land Area Zoned ($km^2$) | 449.4 | 565.6 |
| Total Land Area Zoned Residential ($km^2$) | 345.1 | 415.2 |
| | | |
| Ave. # of Residential Districts | 2.4 | 2.7 |
| Ave. Area of Residential Districts ($km^2$) | 6.2 | 5.7 |
| Ave. MLS (,000 $ft^2$, weighted by land area) | 6.5 | 7 |

# Data

- Current distribution of suburban housing stock suggests that the early post-WWII era likely had lasting effects
  - 50% of current suburban parcels built in 1950-69

Figure 14: Distribution of 'Year Built' (as of 2002)



# Data

- Baseline sample of blocks (N = 935):
  - Blocks from 1980, 1990, 2000, & 2010
  - $\geq$ 90% of land area falls within a single 1950 zoning district
  - $\geq$ 80% of parcels built in 1950+ (as of 2002)
  - BG served by only two 1950 zoning dist. (i.e., one boundary)
  - $\leq$ 250 meters from BG's zoning district boundary

**Summary Statistics**

| Variable | [a] - Mean | [b] - Low Side | [c] - High Side | [c] - [d] | [e] - $\Delta$ Conditional on BG |
|---|---|---|---|---|---|
| MLS (sq. ft., 000) | 5.702 | 3.566 | 6.834 | 3.268 | 3.200*** |
| \|Dist. To Border (m)\| | 54.205 | 51.882 | 55.437 | 3.555 | 13.024 |
| Pop. Density (,000 per km2) | 4.22 | 5.44 | 3.57 | -1.87 | -1.37*** |
| HH Share Renter | 0.149 | 0.237 | 0.102 | -0.135 | -0.105*** |
| Share Vacant | 0.029 | 0.035 | 0.027 | -0.008 | -0.010** |
| Pop. Share 0-17 | 0.255 | 0.255 | 0.255 | 0 | -0.01 |
| Pop. Share 65+ | 0.138 | 0.127 | 0.144 | 0.016 | 0.006 |
| Pop. Share Hispanic | 0.381 | 0.356 | 0.394 | 0.037 | 0.001 |
| Pop. Share Black | 0.159 | 0.136 | 0.171 | 0.035 | -0.021* |

- Conditional on BG, lower black share on more restrictive side of 1950 boundary

# Empirical Design - Baseline Model

- For census block i in year t, the relationship between 1950 zoning stringency, $z_i^{50}$, and a demographic outcome, $y_{it}$, is modeled as:

$$y_{it} = \beta_1 z_i^{50} + \mathbf{x_{it}}\mathbf{B} + \alpha_{b(it)} + \epsilon_{it}$$

  where $\alpha_{b(it)}$ is a block group-by-year fixed effect

- For now $y_{it}$ = pop. share black , t = {'80, '90, '00, '10}

# Empirical Design - Baseline Model w/ Time Effects

| Panel A: w/o BG FEs | | | |
|---|---|---|---|
| | [a] - 250m | [b] - 100m | [c] - 75m |
| MLS | -0.034*** | -0.031*** | -0.032*** |
| | [.007] | [,007] | [.008] |
| $r^2$ | .16 | .14 | .15 |

| Panel B: w/ BG FEs | | | |
|---|---|---|---|
| | [a] - 250m | [b] - 100m | [c] - 75m |
| MLS | -0.010** | -0.010** | -0.013* |
| | [.005] | [.005] | [.007] |
| $r^2$ | .92 | .92 | .95 |
| N | 935 | 716 | 639 |

# Empirical Design - Baseline Model w/ Time Effects

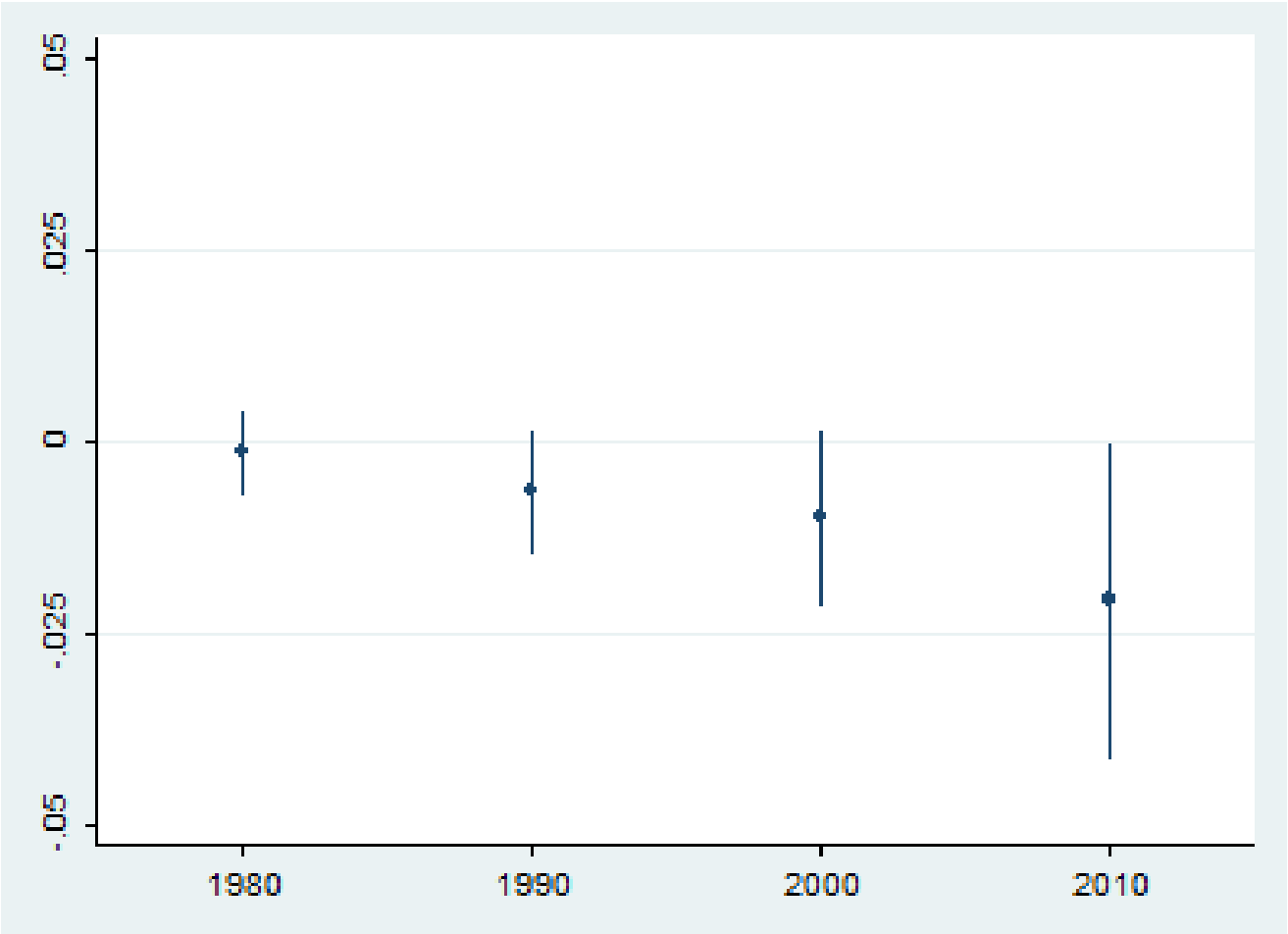
- Do the effects vary by the year a block is observed?
- Black suburbanization rose considerably over this 30 yr. period
  - 1980: 5.4% of a suburban block's pop. was black
  - 2010: 24%
- Introduce interactions by the year a block is observed

$$y_{it} = \sum_m \beta_m z_i^{50} \mathbf{1}\{m = t\} + \mathbf{x_{it}}\mathbf{B} + \alpha_{b(it)} + \epsilon_{it}$$

where m $= \{$'80, '90, '00, '10$\}$.

# Empirical Design - Baseline Model

Figure 15: Impacts by Year



# Empirical Design - Spatial RD

- Define $d_{it}^{50}$ as the $i^{th}$ block's distance to the 1950 boundary
  - $d_{it}^{50} < 0$ on the less restrictive side of the boundary

$$y_{it} = \beta_1 \mathbf{1}\{d_{it}^{50} > 0\} + f^{<0}(d_{it}^{50}) + f^{>0}(d_{it}^{50}) + \mathbf{x_{it}B} + \alpha_{b(it)} + \epsilon_{it}$$

where $f^{<0}$ and $f^{>0}$ are $4^{th}$-order polynomials in $d_{it}^{50}$

# Empirical Design - Spatial RD

| Panel A: w/o BG Fixed Effects | | | |
|---|---|---|---|
| | [a] - 250m (baseline) | [b] - 100m | [c] - 75m |
| High Side | 0.142*** | 0.135** | 0.149*** |
| | [0.055] | [0.055] | [0.056] |
| $r^2$ | 0.11 | 0.11 | 0.11 |
| **Panel B: w/ BG Fixed Effects** | | | |
| | [d] - 250m (baseline) | [e] - 100m | [f] - 75m |
| High Side | -0.04** | -0.051** | -0.051** |
| | [0.023] | [0.023] | [0.023] |
| $r^2$ | 0.94 | 0.94 | 0.95 |
| N | 935 | 716 | 639 |

# Empirical Design - Spatial RD

Figure 16: MLS: 1950 Boundaries

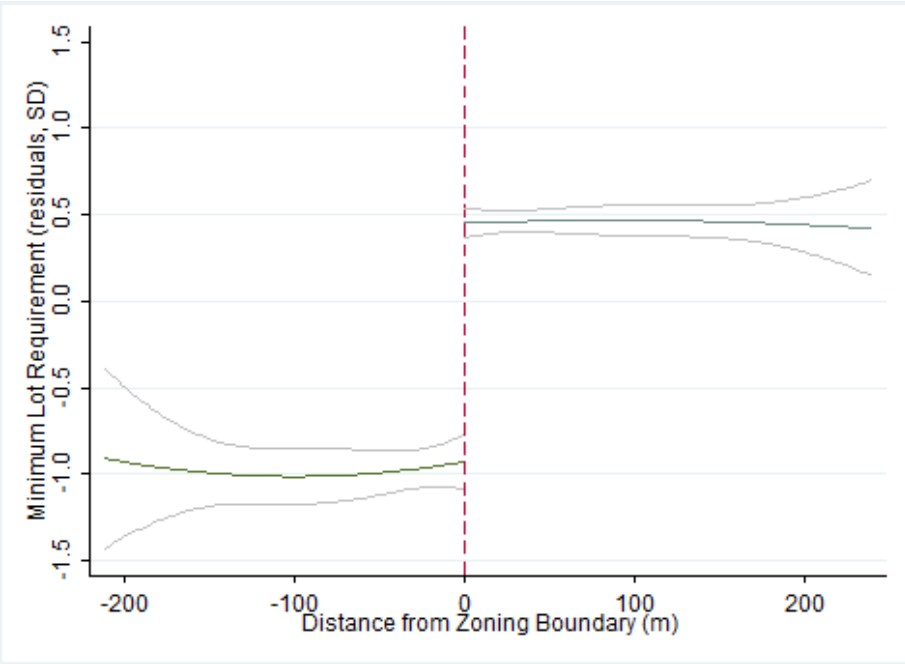
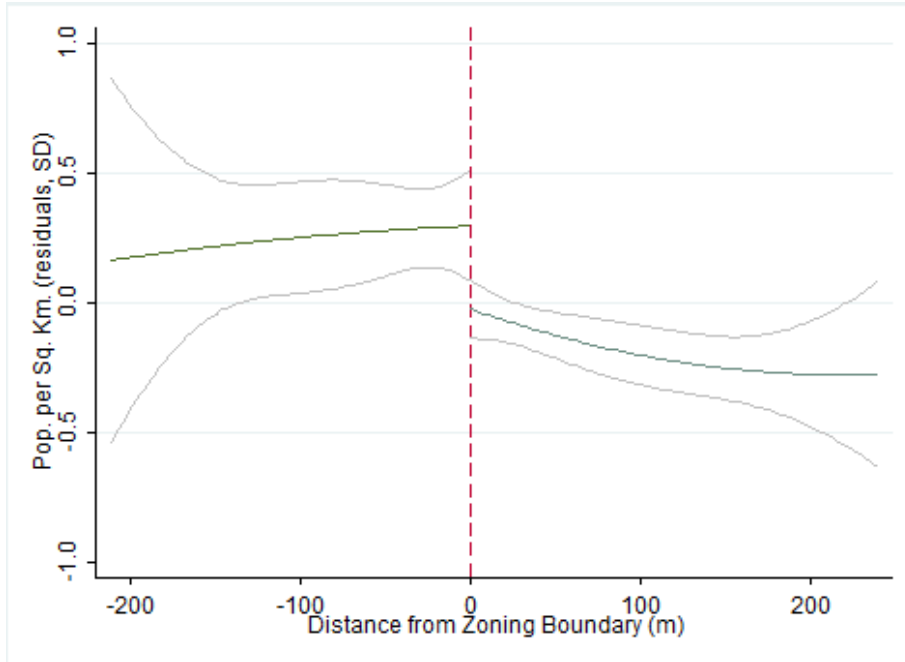



Figure 17: Population Density: 1950 Boundaries



# Empirical Design - Spatial RD

Figure 18: Share Renters: 1950 Boundaries

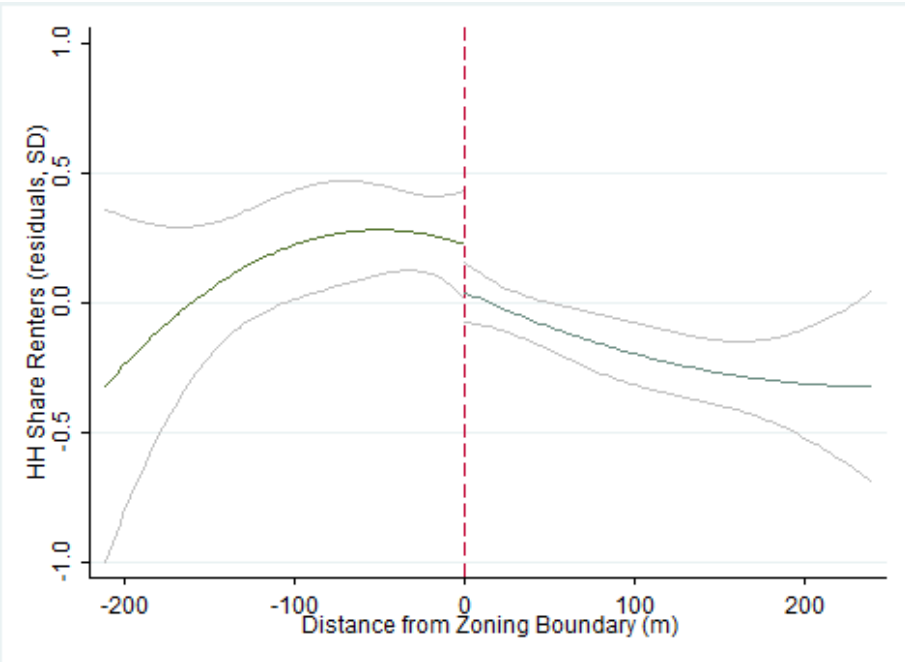
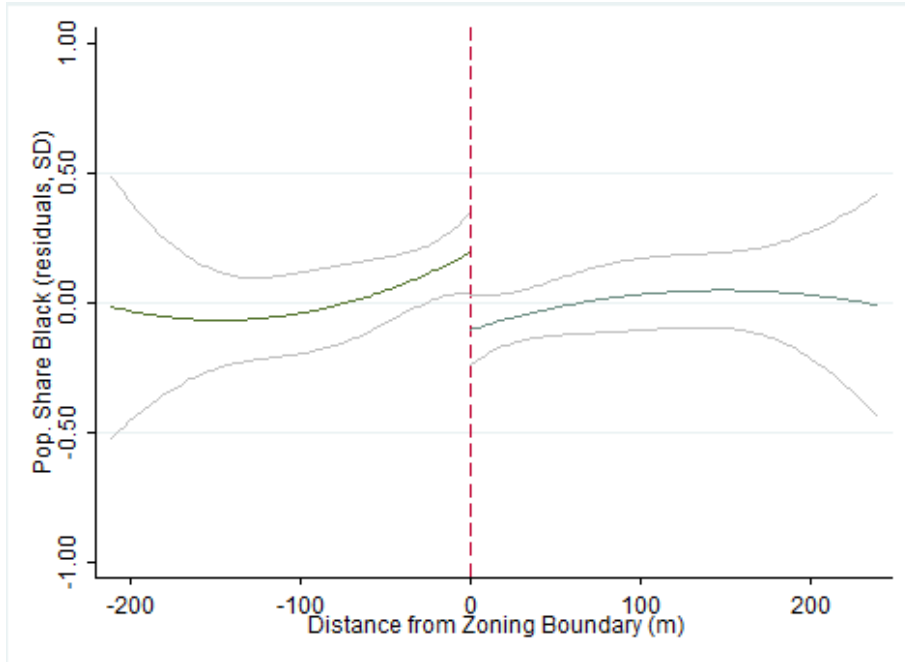



Figure 19: Share Black: 1950 Boundaries



# Empirical Design - Spatial RD

Figure 20: Share Black - 1980: 1950 Boundaries

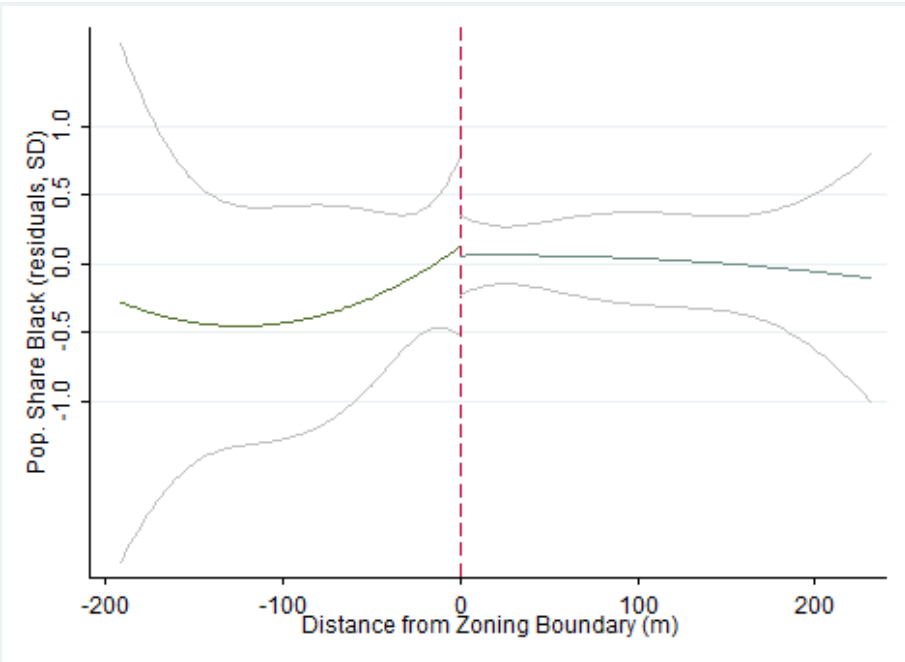
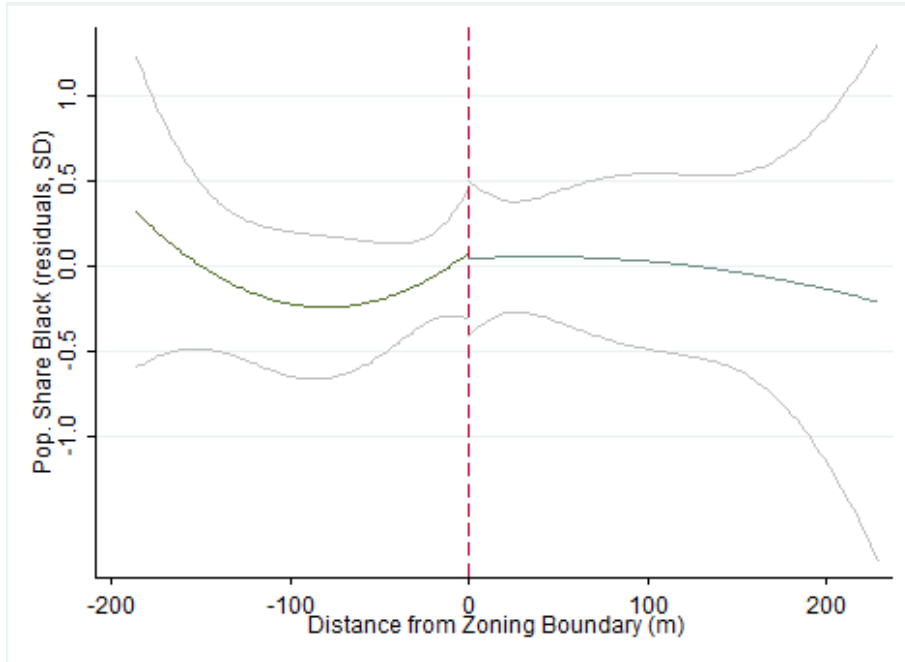



Figure 21: Share Black - 1990: 1950 Boundaries



# Empirical Design - Spatial RD

Figure 22: Share Black - 2000: 1950 Boundaries

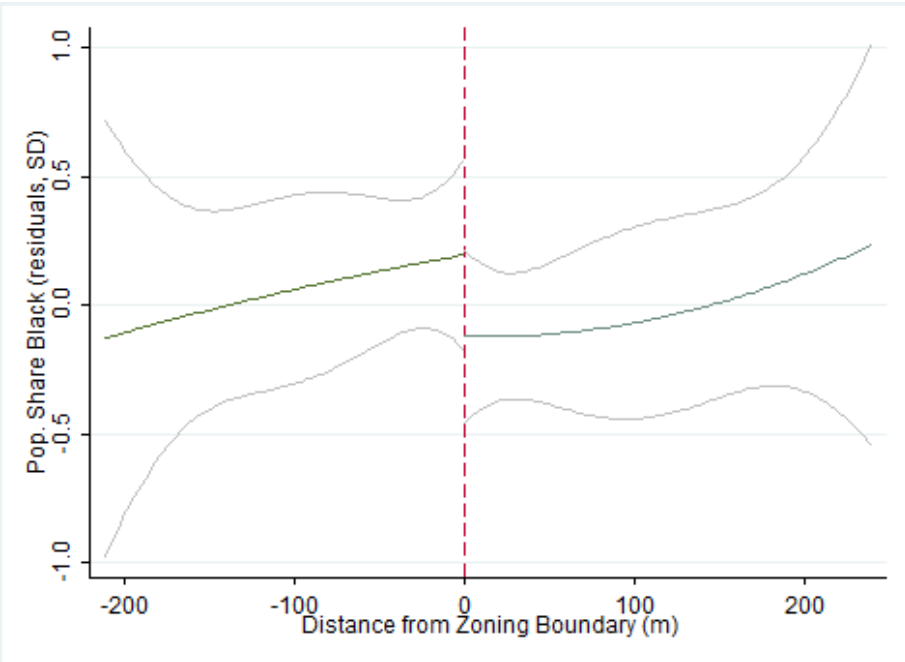
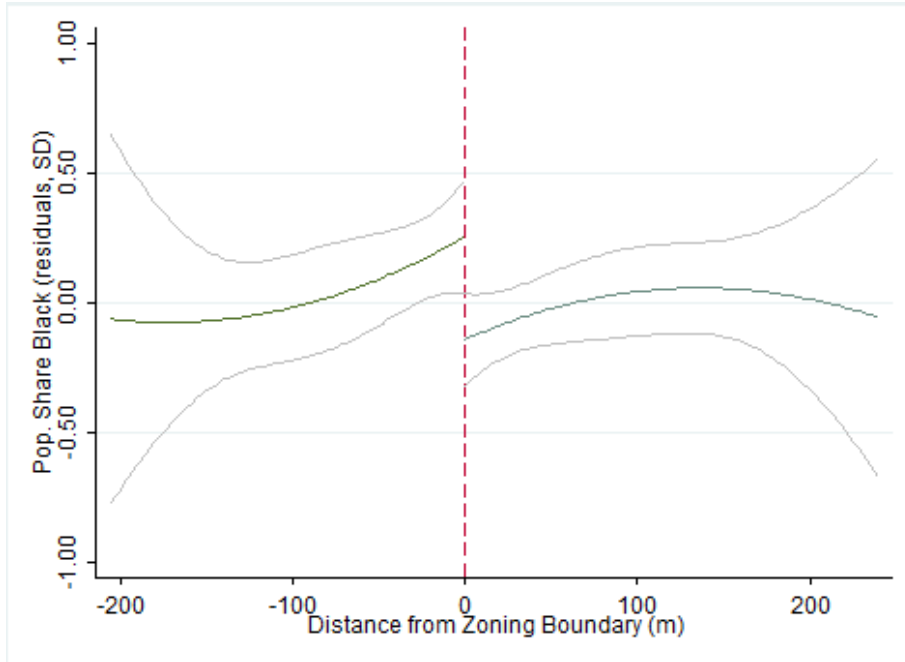



Figure 23: Share Black - 2010: 1950 Boundaries



# Summary

- This study is in its very early stages
- Preliminary evidence suggests that early land-use controls in the suburbs have had lasting effects on the spatial distribution of minority populations
- Next steps:
  - Better controls for pre-existing land uses
  - Bring in 1940 and 1960 zoning maps
  - Add additional demographic variables