Love thy neighbor?

An empirical test of neighborhood ethnicity change and Schelling behavior

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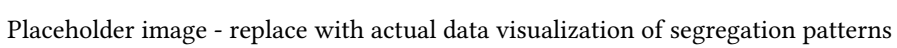
Overview

- **Motivation**: Residential segregation in Denmark and Schelling's model
- **Research Question**: Does the ethnicity of your nearest neighbor affect propensity to move?
- **Methods**: Nearest-neighbor research design with comprehensive administrative data
- **Results**: Asymmetry in residential responses based on ethnicity
- **Heterogeneity Analysis**: SES differences in Schelling behavior
- **Conclusion**: Evidence of individually motivated segregation

Introduction

Residential Segregation in Denmark

- Denmark has transformed from a relatively homogeneous society to increasing ethnic diversity
- Non-Western households grew from 2% in 1985 to 10% by 2020
- Limited empirical evidence on how ethnic background directly influences residential sorting



Theoretical Background: Schelling's Model

- **(Schelling, 1971)** proposed that neighborhoods may "tip" when minority share reaches a threshold
- Even with relatively tolerant preferences toward diversity
- Three types of segregation:
  1. Organized segregation (e.g., historical Jim Crow laws)
  2. Economically induced segregation (clustering by income/education)
  3. Individually motivated segregation ← **Focus of this paper**
- Schelling's key insight: Small individual preferences can lead to macro-level segregation

Methods

Empirical Framework

Modeling a household's decision to stay or move in a neighborhood that evolves over time:

$$U_{i,j,t} = f(Z_{i,t}, X_{j,t}, \xi_{j,t}) + \sum_k g(Z_i, Z_{k,t}, D_{i,k}) + \varepsilon_{i,j,t}$$

Where:

- $f(\cdot)$: Utility from neighborhood amenities
- $g(\cdot)$: Utility from characteristics of each neighbor k at distance $D_{i,k}$
- Z_i: Observable household attributes
- X_j: Observable neighborhood attributes
- ξ_j: Unobservable neighborhood attributes
- $\varepsilon_{i,j,t}$: Idiosyncratic preferences

Identification Challenge

$$V_{i,j,t} = f(Z_{i,t}, X_{j,t}, \xi_{j,t}, \alpha) + \sum_k g(Z_{i,t}, Z_{k,t}, D_{i,k}, \beta) + \delta E\left[V_{i,j,t+1}\right] + \varepsilon_{i,j,t}$$

Key identification challenges:

- Unobserved neighborhood amenities
- Dynamic preferences (expectations of future changes)
- Selection effects (who moves where is not random)

Nearest-Neighbor Research Design

Innovative approach from (Bayer *et al.*, 2022):

Compare households within the same neighborhood who receive different-type neighbors:

- **Treatment group**: Households with new different-type neighbors among their 3 nearest neighbors
- **Control group**: Households with new different-type neighbors "just down the road" (ranks 4-6)

$$Y_{i,j,t} = \beta_1 I[e', k = n_{nearest}] + \beta_2 I[e', k = n_{near}] + \beta_3 I[e', k = n_{close}] + \gamma Z_{i,j,t} + \omega_{j,t} + \varepsilon_{i,j,t}$$

Parameter of interest:

$$\beta_1 - \beta_2$$

This design addresses key identification challenges by comparing households experiencing same neighborhood conditions but different micro-geography of new neighbors.

Comprehensive Danish administrative data, 1985-2020:

- Population register (BEF): Demographics, family structure, country of origin
- Income register (IND): Gross income, net wealth
- Labor market register (RAS): Employment status
- Education register (UDDF): Educational attainment

Unique geospatial data (BOPAEL_KOORD):

- Precise coordinates with start/end dates at each address
- 4-dimensional: (x_E, y_N, z_F, z_D) (East, North, Floor, Door)
- Enables construction of exact nearest neighbors for each household

Results

Spatial Patterns of New Different-Type Neighbors

Key spatial patterns:

- Clear east-west and urban-rural divide
- Concentration in Copenhagen and surroundings
- Highest incidence in Ishøj (9 new different-type neighbors)
- Copenhagen (6), Aarhus and Odense (4)

Within-city variation:

- Some Copenhagen neighborhoods: 30+ new non-Western neighbors
- Other Copenhagen neighborhoods: < 2 new non-Western neighbors

Placeholder - replace with actual visualization from Figure 3

Placeholder - replace with actual visualization from Figure 4

Summary Statistics

Key observations from summary statistics:

- "Treated" households show higher mobility: 23-24% vs. 19-20% for "control" households
- Treated native households have lower wealth (48,500 DKK vs. 81,000 DKK) and income
- Treated non-Western households have slightly lower wealth than controls
- Non-Western households are better educated on average (by 2 years)
- Native households tend to live in less dense, more affluent, less integrated neighborhoods
- Treated native households live in neighborhoods with 15% non-Western share vs. 8% for all native households

These patterns highlight selection effects and the importance of the nearest-neighbor research design.

Main Results: Asymmetric Schelling Behavior

Native households

- Increase moving propensity by 0.3 percentage points when receiving a new non-Western neighbor
- 1.6% increase relative to baseline exit rate
- Effect stable across specifications
- Robust to controls for income, wealth, age, tenure

Non-Western households

- Show substantially smaller response: 0.06-0.1 percentage points
- 0.5% relative to baseline exit rate
- Not statistically significant
- Suggests they are unaffected by identity of new native neighbors

Key finding: Asymmetric Schelling behavior in the Danish context

Heterogeneity by Socioeconomic Status

SES definitions:

- **Low SES**: Income < 200,000 DKK, outside labor market or $\leq$ 11 years of education
- **High SES**: Income $\geq$600,000 DKK, employed full-time or $\geq$ 18 years of education

Key findings:

- Schelling behavior primarily driven by low-SES native households responding to low-SES non-Western households
- Effect size: 0.56 percentage points or 2.8% increase from baseline exit rate
- Nearly twice the magnitude observed in full sample
- Very rare for low-SES native households to receive high-SES non-Western neighbors and vice versa
- Confirms powerful residential sorting at neighborhood level

Comparison with U.S. Context

Danish findings vs. (Bayer *et al.*, 2022) U.S. results:

Context	Response	Magnitude
Denmark (Native)	Asymmetric	1.6% above baseline
Denmark (Non-Western)	Insignificant	0.5% above baseline
U.S. (White)	Symmetric	4% above baseline
U.S. (Black)	Symmetric	6% above baseline

Possible explanations for differences:

- Institutional variation in housing market and integration policies
- Different neighborhood contexts (urban/dense vs. suburban)
- Historical path dependence in residential patterns

Conclusion

Key Findings

1. Native Danish households increase moving propensity by 1.6% when receiving non-Western neighbors
2. Non-Western households show no significant response to new native neighbors
3. Heterogeneity by SES: Low-SES native households responding to low-SES non-Western neighbors show strongest effects (2.8%)
4. Spatial decay of effects: Moving response decreases monotonically with distance to new different-type neighbors
5. Magnitude in Denmark (1.6%) more modest than in U.S. context (4-6%)

Implications and Contributions

Contributions to segregation research:

- Causal evidence of individually motivated segregation as theorized by Schelling (1971)
- Demonstration of asymmetric responses in the European welfare state context
- Socioeconomic gradient in responses highlighting intersection of ethnicity and economic resources
- Evidence that Schelling mechanisms operate across different settings, but with context-specific magnitude and symmetry

Policy implications:

- Integration efforts may need to account for micro-geography of neighborhood mixing

Implications and Contributions

- Targeted interventions may be more effective for low-SES populations
- Understanding asymmetric responses could inform more effective housing policies

Thank you for your attention!

Questions?

References

Bayer, P. *et al.* (2022) "Distinguishing Causes of Neighborhood Racial Change: A Nearest Neighbor Design," *Social Science Research Network* [Preprint]. Available at: https://doi.org/10.3386/w30487.

Schelling, T.C. (1971) "Dynamic models of segregation," *Journal of mathematical sociology*, 1(2), pp. 143–186.

Appendix

Municipal-level patterns of new different-type neighbors (1985-2020)

Placeholder - replace with Figure 3 from thesis

- Dark blue/purple represents “low” intensity of new different-type neighbors
- Orange/yellow represents “high” intensity
- East-west divide clearly visible

Same-Type Neighbor Trends over Time

Evolution of residential sorting (1990-2020)

Placeholder - replace with Figure 5 from thesis

- Native households: Increasing proportion with exclusively native nearest neighbors
- By 2020, 60% of native households had 80-100% same-type neighbors (vs. 40% in 1990)
- Non-Western households: Opposite trend suggesting integration, not segregation
- Counterfactual simulation shows increased segregation beyond what would be expected from demographic changes alone

Robustness Checks

Alternative specifications:

- Combining all control distances into a single category
- Varying distance thresholds for nearest neighbors
- Different neighborhood definitions

Results remain consistent across specifications:

- Spatial decay of effects provides additional support for Schelling mechanism
- Moving response decreases monotonically with distance to new different-type neighbors
- Effects primarily concentrated within 25 meters

The Schelling Model Simulation

Simple agent-based model:

- Agents of two types randomly allocated on grid
- Agents move if share of different-type neighbors exceeds tolerance threshold
- Even with modest tolerance thresholds, segregation emerges

Placeholder - replace with Figure C.1 from thesis appendix

This visualization demonstrates how small individual preferences can lead to significant macro-level segregation patterns