Race and Neighborhood Composition

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What We Do

1. Estimate parameters of a dynamic neighborhood choice model.

2. We assume households care about the racial composition of their neighbors. We use an IV approach to estimate these preferences.

3. We simulate model to study long-run equilibrium changes to racial integration in response to various policies

Annual Model

- Value to HH i from waking up in tract j and living in tract ℓ:

$$\underbrace{V\left(\ell \mid j, \tau, \epsilon_{\ell i}\right)}_{\text{Current Value}} = \underbrace{u\left(\ell \mid j, \tau, \epsilon_{\ell i}\right)}_{\text{Flow Payoff}} + \underbrace{\beta \sum_{\tau'=1}^{T} \gamma_{\tau'\tau} EV\left(\ell, \tau'\right)}_{\text{Continuation Value}}$$

  - τ is current "type" – to be discussed
  - $\epsilon_{\ell i}$ is the random taste specific to HH i for living in ℓ, known $\forall \ell$.
  - $\gamma_{\tau'\tau}$ is the probability next period type is τ' given current type τ
  - $\beta = 0.95$ is annual discount factor

- HH chooses ℓ yielding the maximum payoff:
  (impose no across-MSA moves)

$$V\left(j, \tau \mid \epsilon_{1i}, \epsilon_{2i}, \ldots, \epsilon_{Ji}\right) = \max_{\ell \in 1,\ldots,J} V\left(\ell \mid j, \tau, \epsilon_{\ell i}\right)$$

Types

- A household's type has 4 elements:
  - Race: Black, Hispanic, White/Other
    Does not change
  - Age of HH head: Young (25-44), Middle (45-64), Old (65+)
    With 5% probability, age-up to next category
  - Credit Bin: Low ($<$ 600), Middle (600-720), High (720+)
  - Renter or Homeowner
- This yields a 54 x 54 transition matrix with some 0s

Flow Payoffs

- 3 groups of types, $g(\tau)$: Low, Medium and High Credit Score

- Flow utility to hh i, choose to live in ℓ given current location j and type τ

$$
\begin{aligned}
u(\ell \mid j, \tau, \epsilon_{\ell i}) = \quad & -\kappa_\tau \mathbf{1}_{\ell \neq j} && \text{Moving Cost} \\
& + A_{\ell g(\tau)} && \text{Fixed Tract Amenities (by Group)} \\
& - \alpha^r_{g(\tau)} \log r_\ell && \text{Avg. Group Valuation of Rent} \\
& + \alpha^x_{g(\tau)} X_\ell && \text{Avg. Group Valuation of Racial Mix} \\
& + \alpha^x_\tau X_\ell && \text{Type-Specific Valuation of Racial Mix} \\
& + \epsilon_{\ell i} && \text{Type I Extreme Value IID shock}
\end{aligned}
$$

- Jumping ahead a little:
  - Can estimate α^x_τ without instruments
  - Need instruments for $\alpha^r_{g(\tau)}$ and $\alpha^x_{g(\tau)}$

Data

- NYFRB Consumer Credit Panel / Equifax
  - 5% of U.S. population
  - Panel 1999-present
    - Census block of residence
    - Equifax Risk Score^{TM}
  - Exclude Across-MSA moves
- Full Sample: >150 million person-year observations

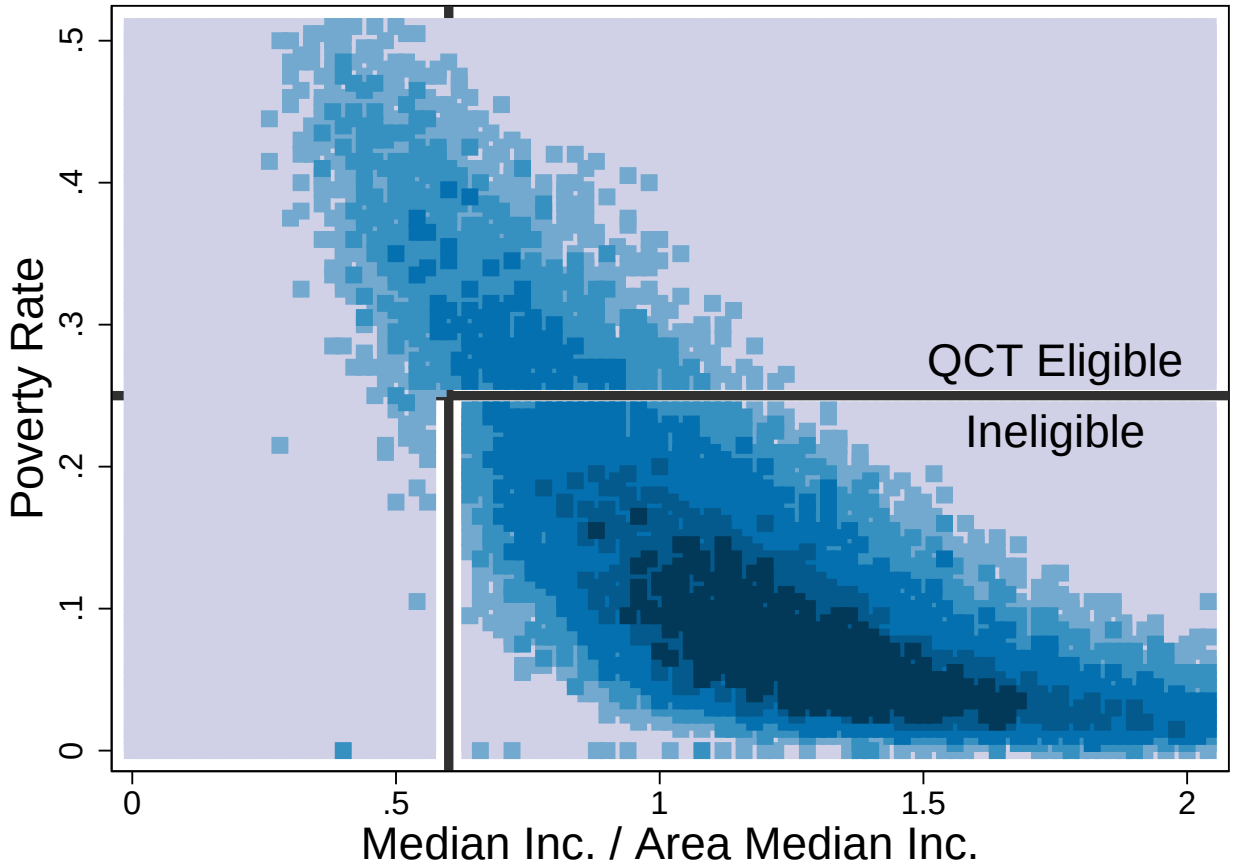
Implementation

- Observe Census block; map to Census tract for location choice model
- Observe age of household head
- Observe credit score directly each year
- Observe whether or not household has a mortgage each year.
  - If household has a mortgage, we assign as homeowner.
  - If household does not have a mortgage, we assign as renter.
- We do not observe race. In likelihood calculations we integrate out uncertainty using probability distribution over race based on the Census block where household first observed.

Estimation Strategy

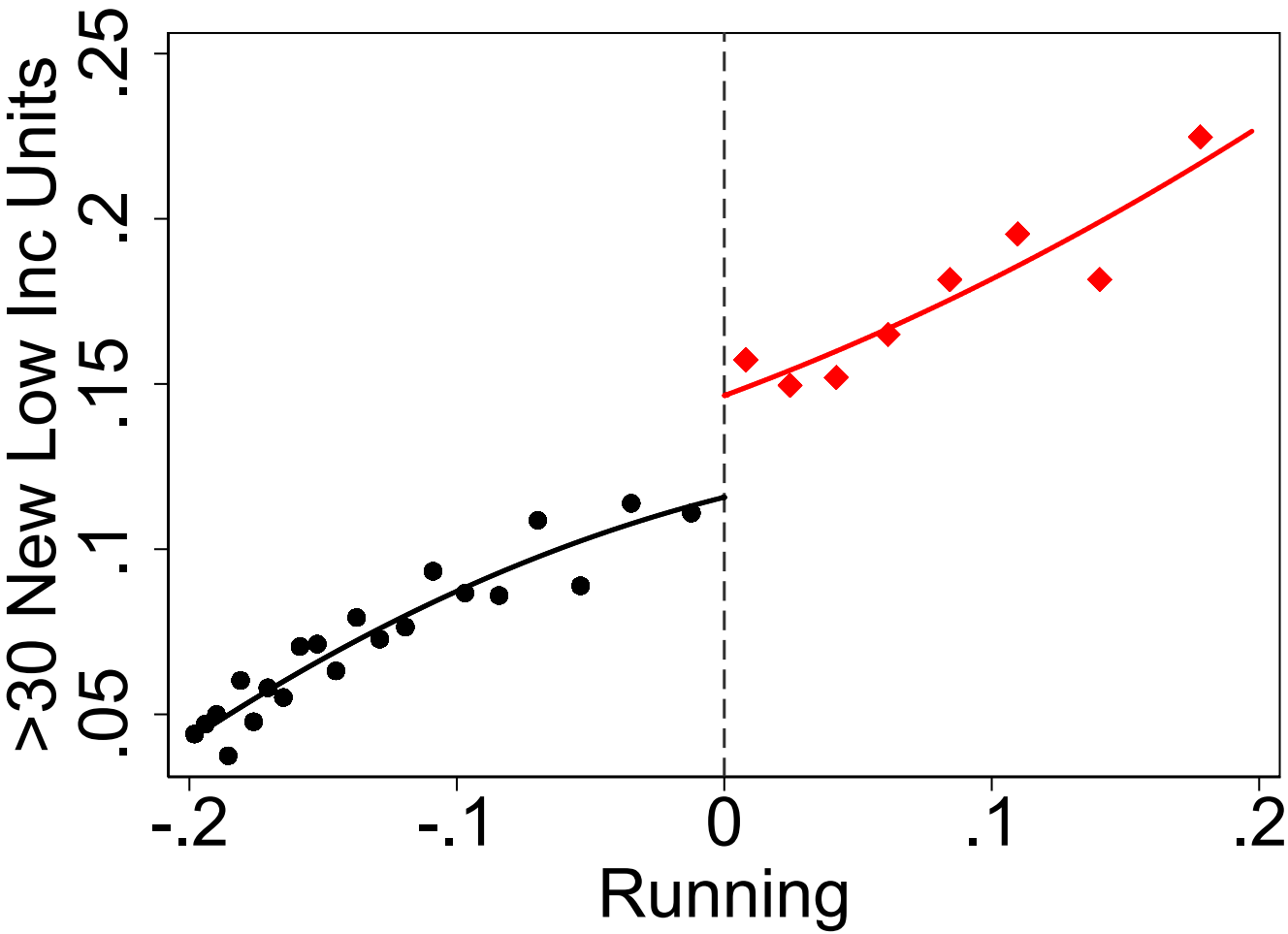
- Basic idea
  - Estimate what we can using maximium likelihood without instruments:
    - Type-specific moving cost κ_τ
    - Type-specific deviation from group avg. valuation of racial mix α^x_τ
  - Impose group valuation of log rent $\alpha^r_{g(\tau)}$ based on data on budget shares and estimates from our other paper
  - Use IV to estimate group valuation of racial mix $\alpha^x_{g(\tau)}$

The QCT/LIHTC Instrument



QCT area: LIHTC developers eligible for extra tax credits

QCT Impacts Low Income Development



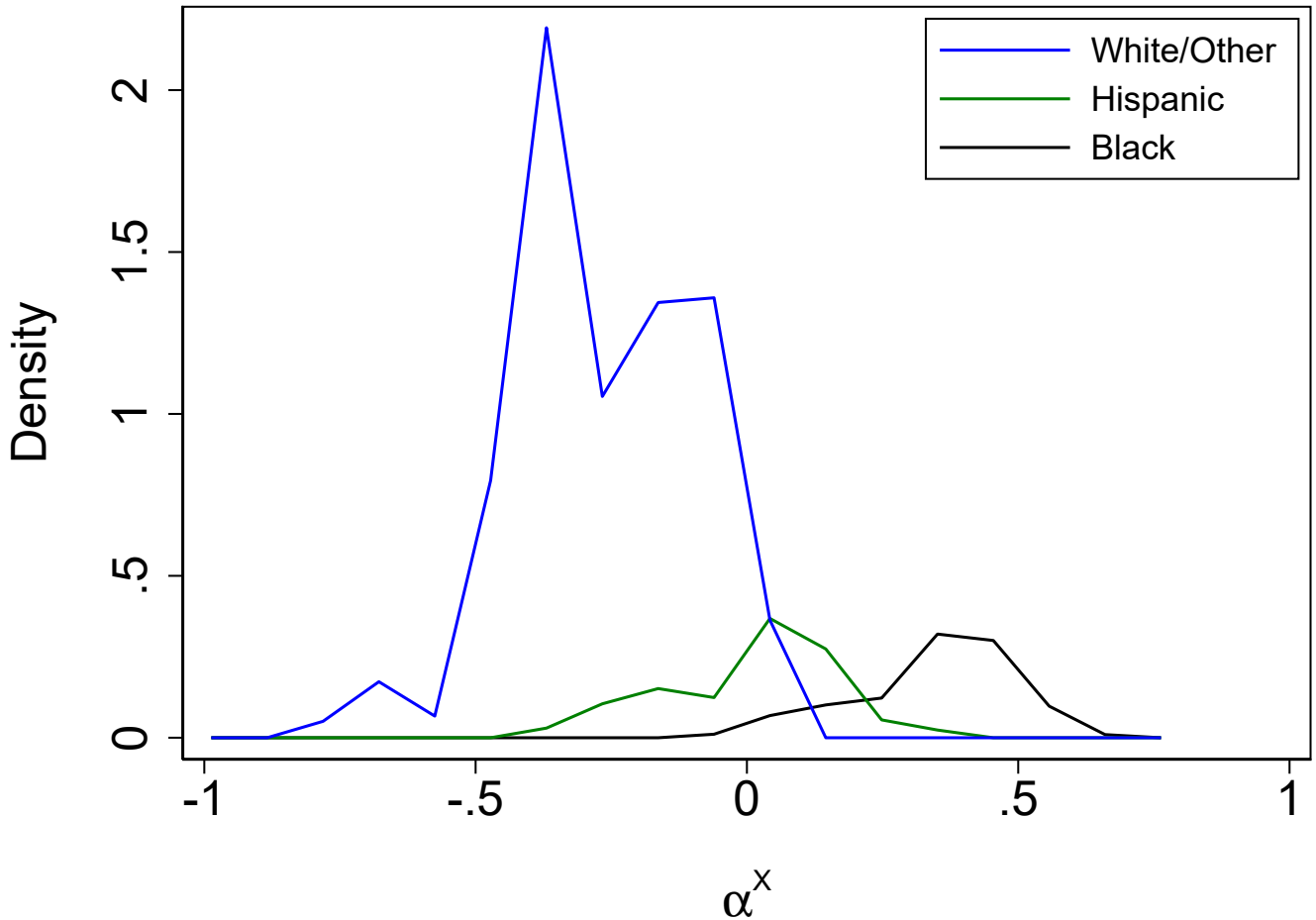
$$Running_j = \max\left(pov_j - 0.25, 0.6 - MedIncIndex_j\right)$$

Sketch of our IV Method

- Basic idea
  - Intrinsic tract amenities $A_{\ell g(\tau)}$ smoothly vary across $Running_j$
  - QCT new units ultimately change X_ℓ, amenities change by $\alpha^x_{g(\tau)} \Delta X_\ell$
- IV procedure occurs in 3 steps
  1. Estimate simple dynamic model of location choice. Type-specific flow utility of ℓ depends on QCT status of ℓ and a residual to match population shares.
  2. Given QCT status of each tract, set residual to zero and simulate simple model to predict steady-state black and hispanic share of each tract.
  3. Use predicted black and hispanic shares as instruments to estimate $\alpha^x_{g(\tau)}$ (given estimates of flow utility of each tract from full model)
- Why does this work?

  We use a location-choice model to map a simple 0/1 instrument (QCT) into predicted continuous variation in black and hispanic shares.

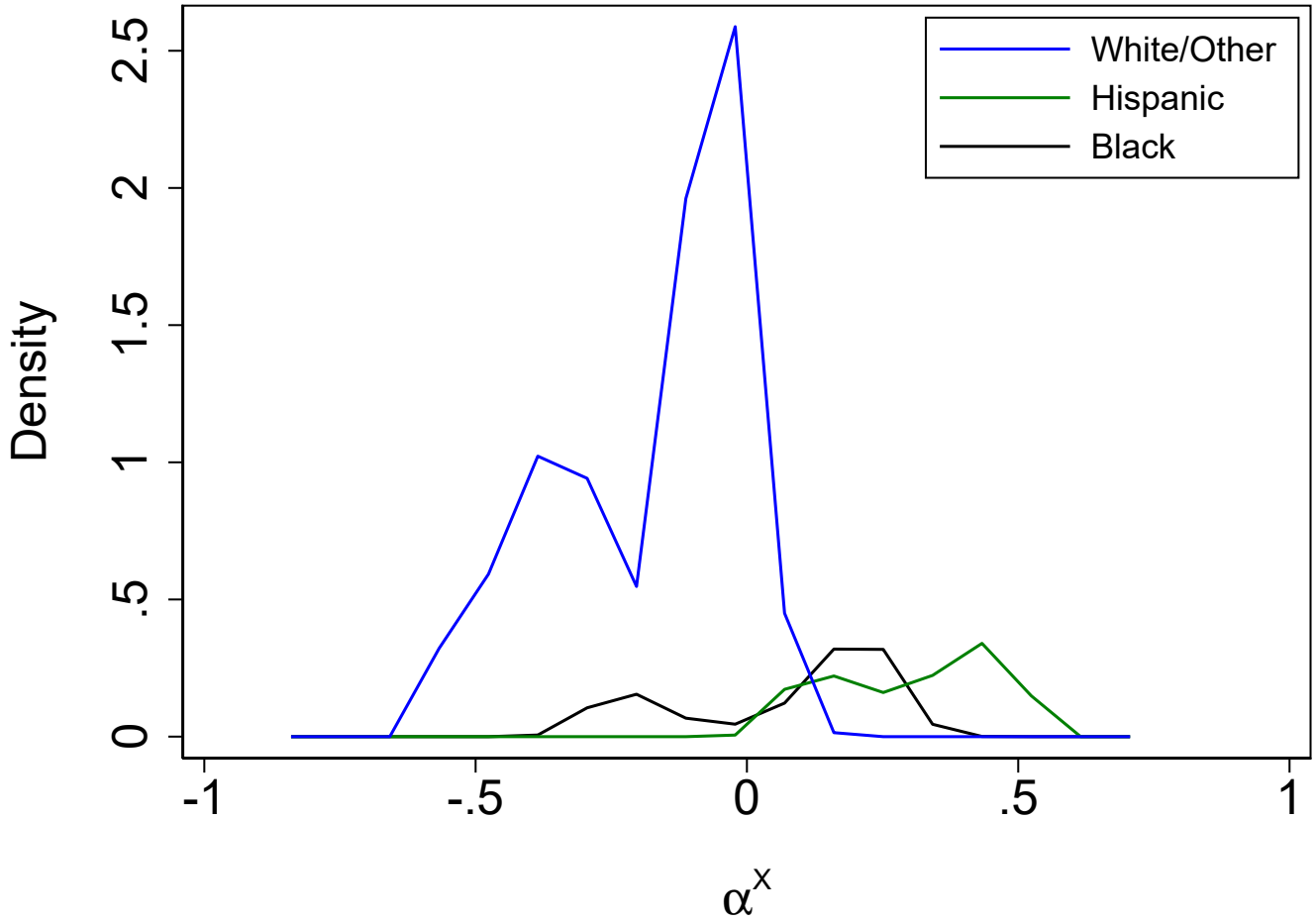
Results: Preferences for Black Share



Note: Each race has 18 types;

White types population share = 76%, Black=12%, Hispanic=12%

Results Preferences for Hispanic Share



Counterfactual Simulations

- Study changes to steady states in response to policy
- Steady state baseline:
  - Simulate model a few periods ("burn in") to eliminate any 0s
  - Find births/deaths by type and tract $\rightarrow$ constant type distn by tract
- Counterfactual:
  - Implement policy
  - Hold births/deaths fixed
  - Compute new equilibrium where in each tract
    - Beliefs over type distribution are correct
    - Rents adjust until housing demand = housing supply
  - Use Baum-Snow and Han (2021) tract-specific housing supply elasticities:

$$\log\left[\mathcal{H}_{\ell}^{counter} \;/\; \mathcal{H}_{\ell}^{base}\right] \quad = \quad e_{\ell} \log\left[r_{\ell}^{counter} \;/\; r_{\ell}^{base}\right]$$

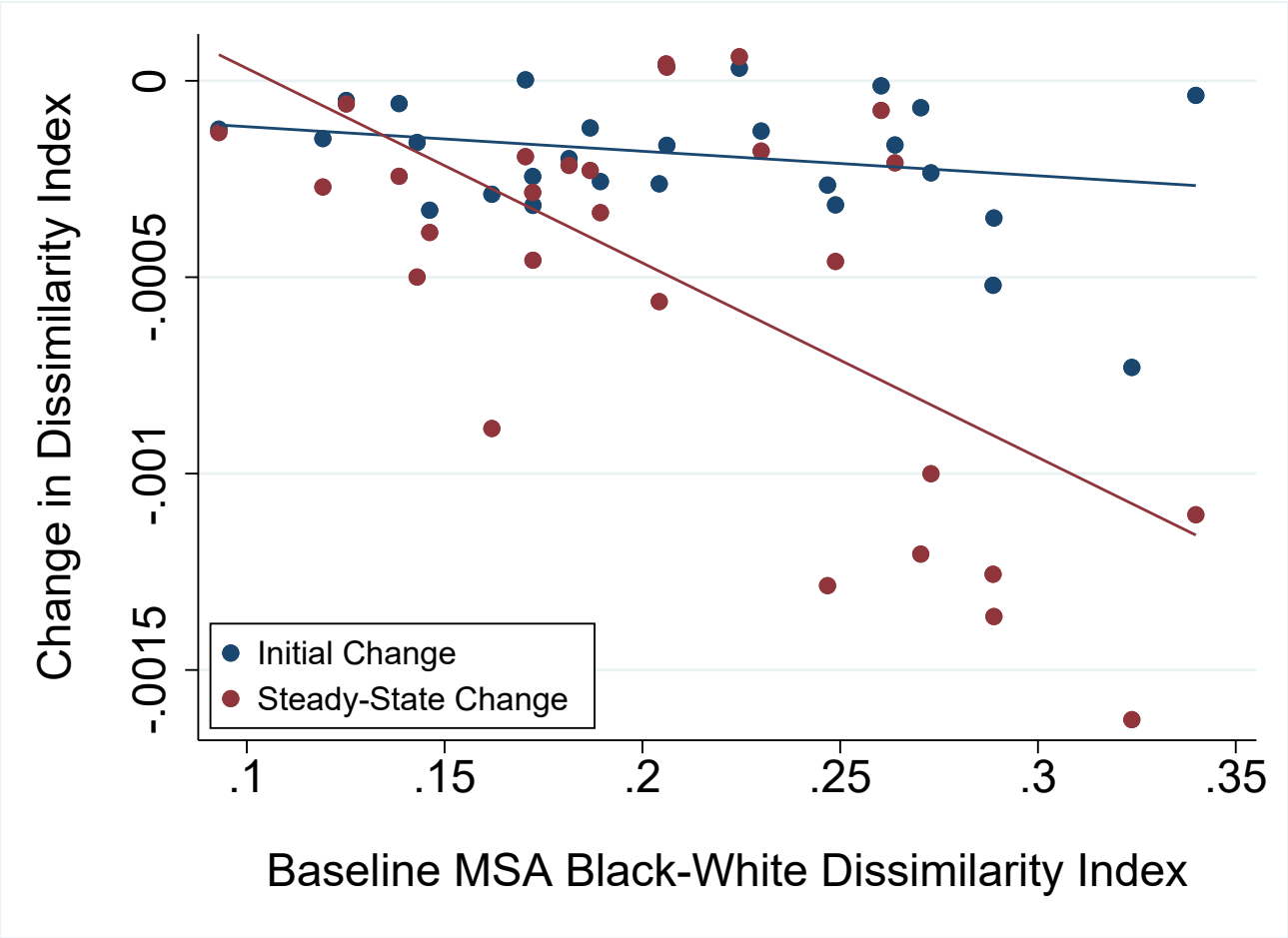
Experiment

- Experiment: Add 10% to existing LIHTC
  a. Remove 0.1*total LIHTC unit low-credit households from group occupying private housing from the MSA
  b. Simulate 5 burn-in-periods holding tract amenities and rents fixed. (We use this to compute new births/deaths).
  c. Add new LIHTC units. In new units, put in group from part a. **All new LIHTC units in the MSA receive the same type mix**.
- This type mix matters. It is likely not the same as the existing type mix in the tract and (we show) can cause large demographic changes.

Results

- For most tracts, changes in demographic mix is small.
- In some CBSAs, no tract changes very much. These CBSAs become more racially integrated.
- In most CBSAs, the black share or hispanic share of a few tracts changes by at least 5 percentage points. This large change in a few tracts causes the CBSA to be less racially integrated.
- Our policy intervention is small. Tipping – an unstable demographic mix – appears to be a feature of a few but not most tracts.

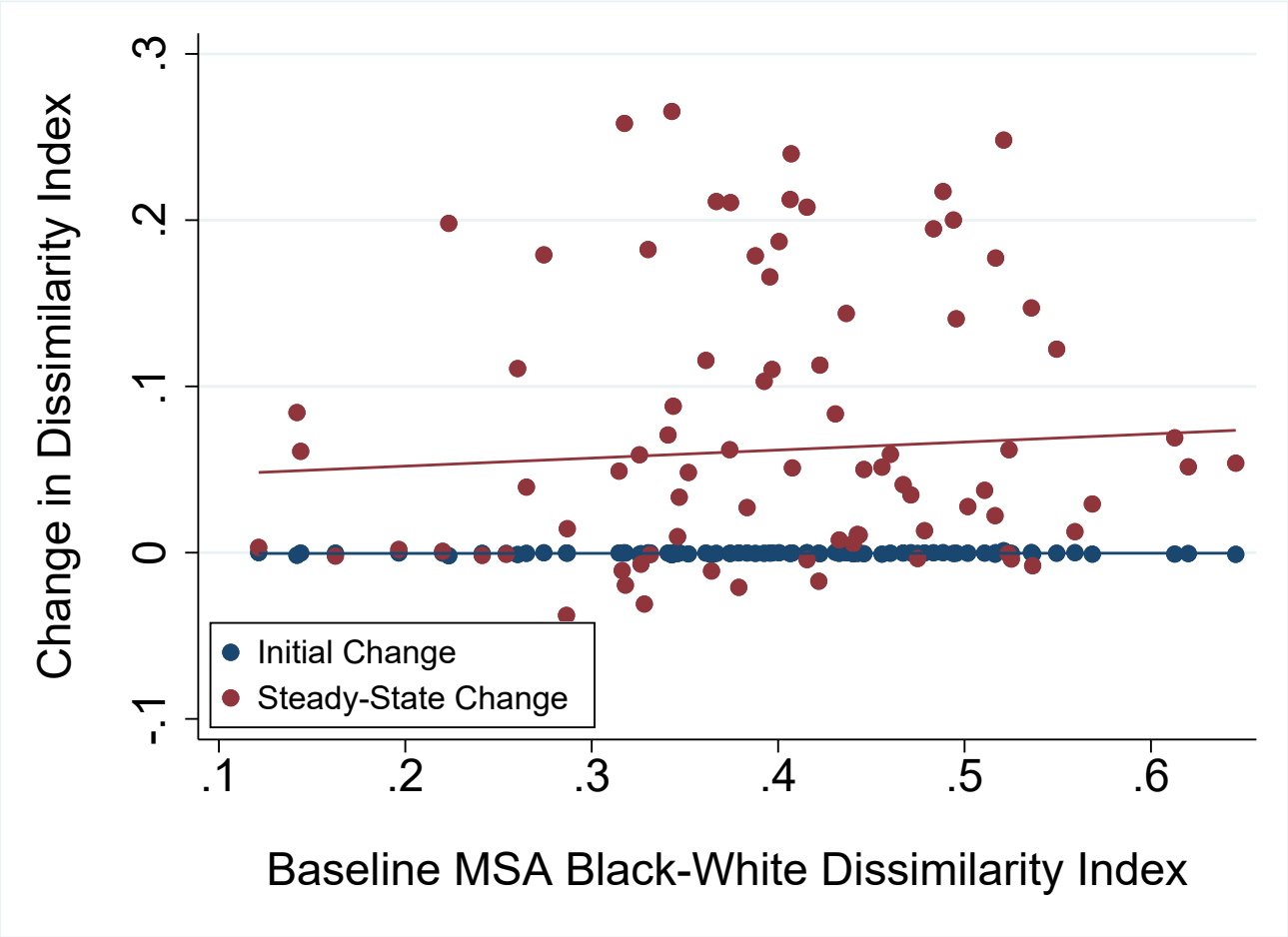
Results for MSAs where No Tract Tips



When no tract tips, MSAs become more integrated.

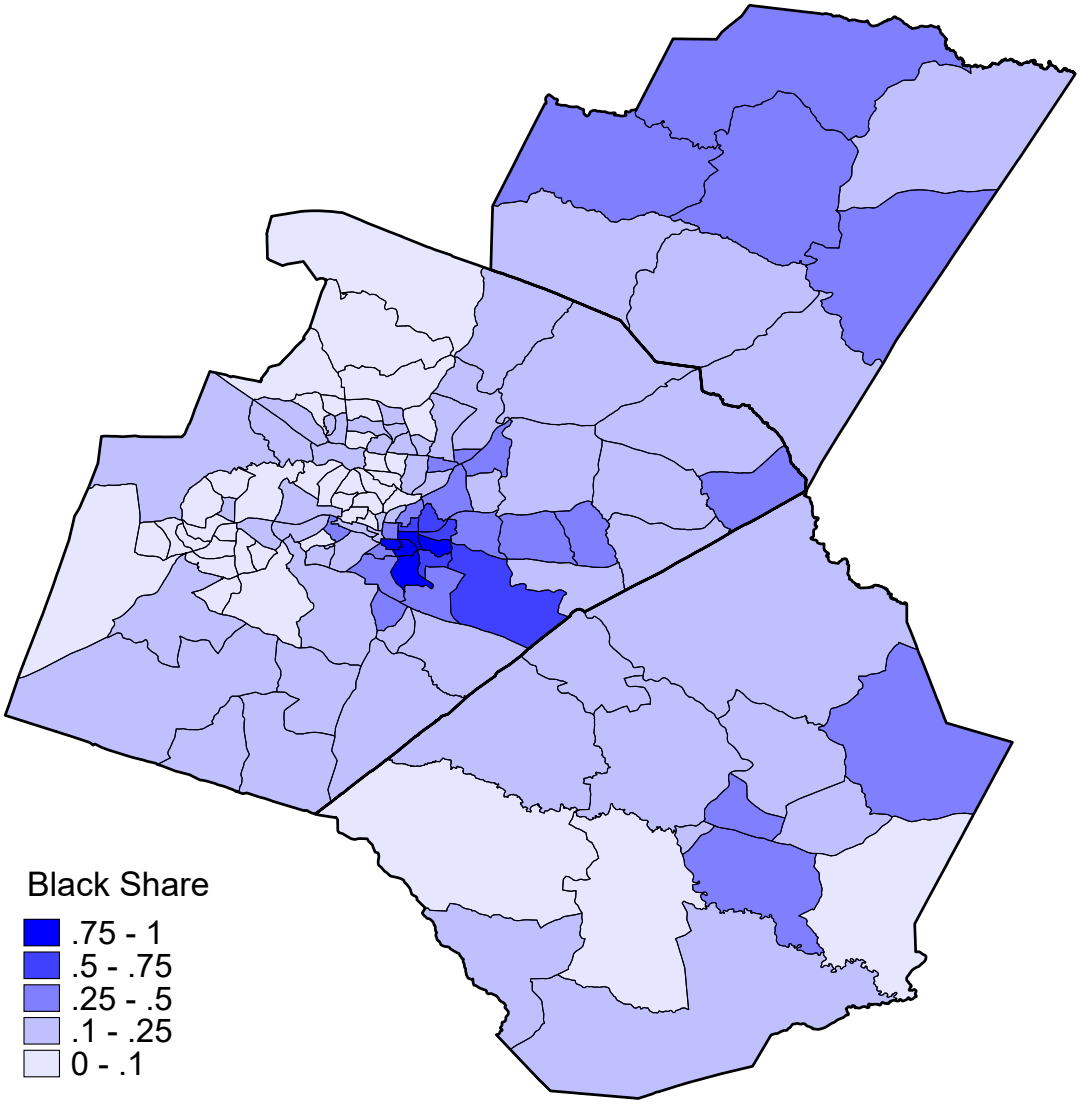
Steady-state change (red) a bit larger than initial, mechanical change (blue)

Results for MSAs where One or More Tracts Tip

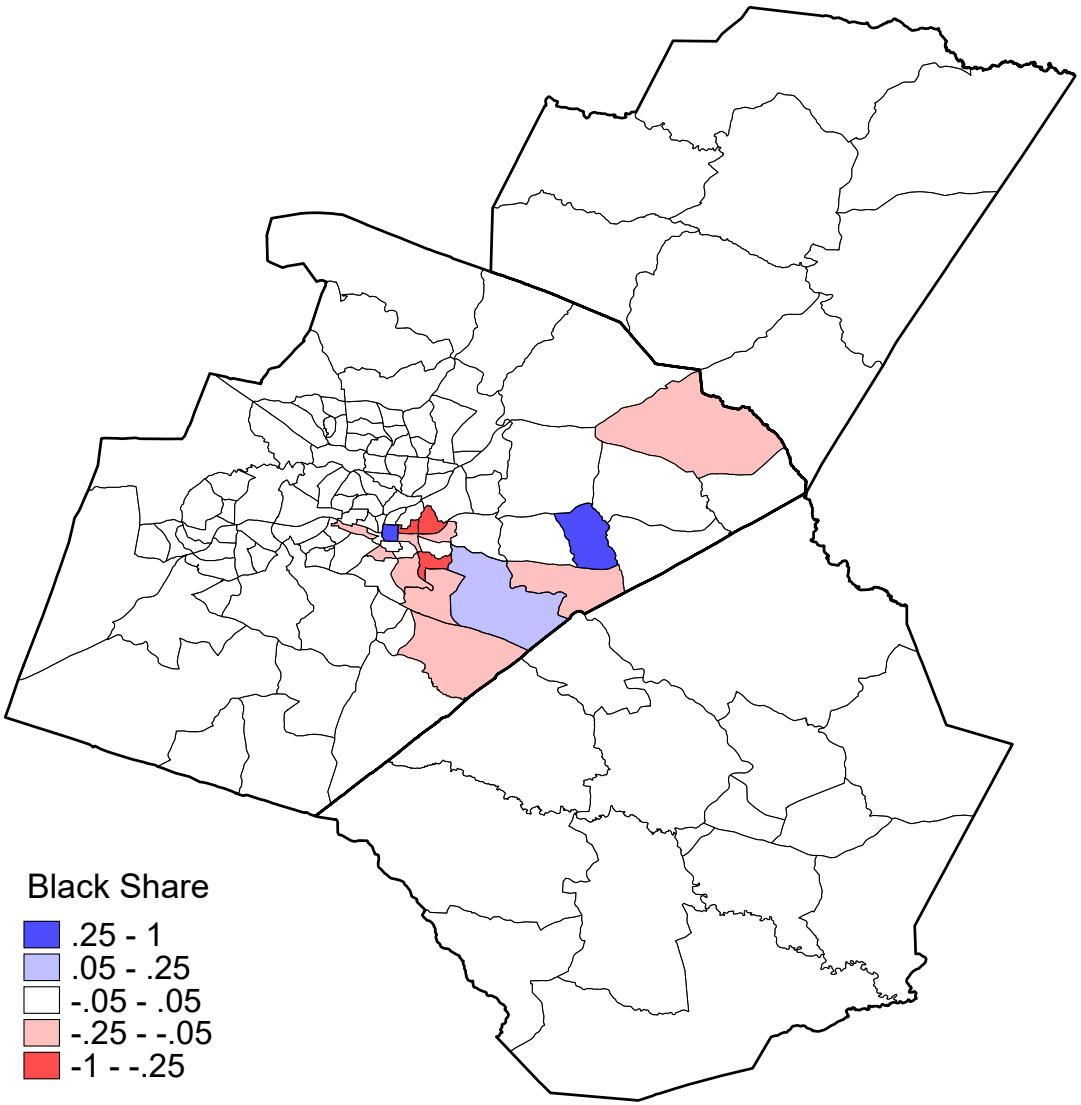


When at least one tract tips, most MSAs become demonstrably less integrated

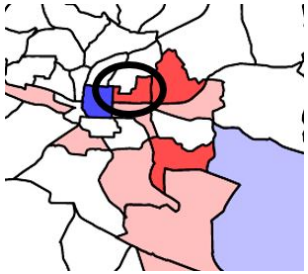
Raleigh MSA - Baseline Steady State



Raleigh MSA - Change in Steady State



Tract 050600 in Wake County, NC

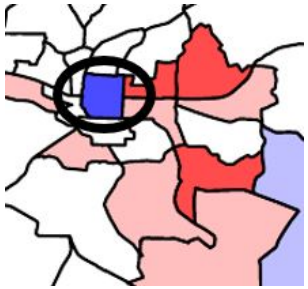


- Baseline: **1,253 households**, 277 LIHTC units
  Black **67%**, Hispanic 5%, White 27%

- Policy adds 28 units: 9 black hh, 8 hispanic hh, 11 white hh.
  (proportional is 19 black hh, 2 hispanic hh, 7 white hh)

- New steady state: **1,782 households**, 305 LIHTC units
  Black **6%**, Hispanic 3%, White 91%

Tract 050100 in Wake County, NC



- Baseline: **1,628 households**, 126 LIHTC units
  Black **28%**, Hispanic 7%, White 66%
- Policy adds 13 units: 4 black hh, 4 hispanic hh, 5 white hh.
  (proportional is 4 black hh, 1 hispanic hh, 8 white hh)
- New steady state: **8,408 households**, 139 LIHTC units
  Black **96%**, Hispanic 2%, White 2%
- This is not a "ghetto." Rental prices / ft^2 increase by 4.5x.
  Units are smaller and more expensive.

More notes and conclusions

- If we rescale racial preferences by 0.25 almost all tipping goes away. Implies tipping is related to size of preferences
- Conclusions (so far)
  - People prefer to have neighbors that are own race → tipping
  - We simulate a small policy intervention. The key part of the intervention is that it introduces a different racial mix to the tract.
  - In a few tracts, this causes big changes.