The End of the American Dream? Inequality and Segregation in US Cities

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Question

- over last 40 years large increase in US income inequality
- simultaneous rise in residential income segregation

Question:

has residential segregation contributed to amplify inequality response to underlying shocks?

This paper:

model of human capital accumulation and local spillovers disciplined with new micro estimates by Chetty-Hendren

Some Literature

- 90s theoretical work on inequality and local externalities: Benabou (1996a,1996b), Durlauf (1996a,1996b), Fernandez and Rogerson (1996,1998),. . .
- recent use of administrative data: Chetty, Hendren and Katz (2016) and Chetty et Hendren (2018) estimate effects of childhood exposure to better neighborhoods
- we bridge the two literatures and use recent micro estimates to discipline a quantitative GE model
- new active area of research: Durlauf and Seshadri (2017), Zheng (2017), Eckert and Kleineberg (2018)

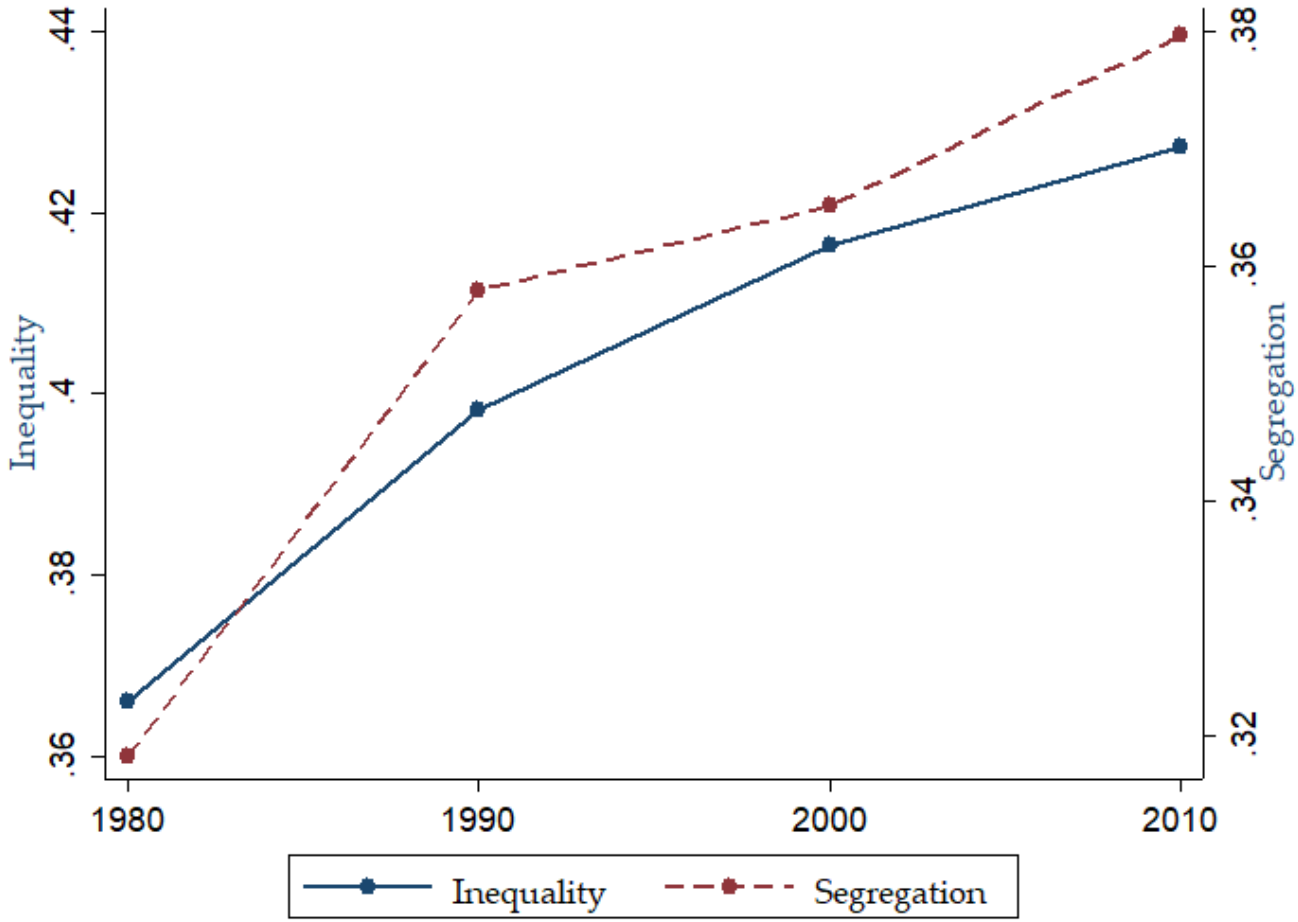
Preview

1. Data: correlation between inequality and segregation
2. Model: GE OGM with human K and residential choice
   - key ingredient: neighborhood spillover
     - peer effects, public schools, social norms, learning . . .
   - endogenous response of house prices $\rightarrow$ feedback between inequality and segregation
3. Counterfactual: calibrate model to representative US MSA
   - **main exercise**: MIT shock to skill premium in 1980
   - segregation contributes to 28% of the increase in inequality

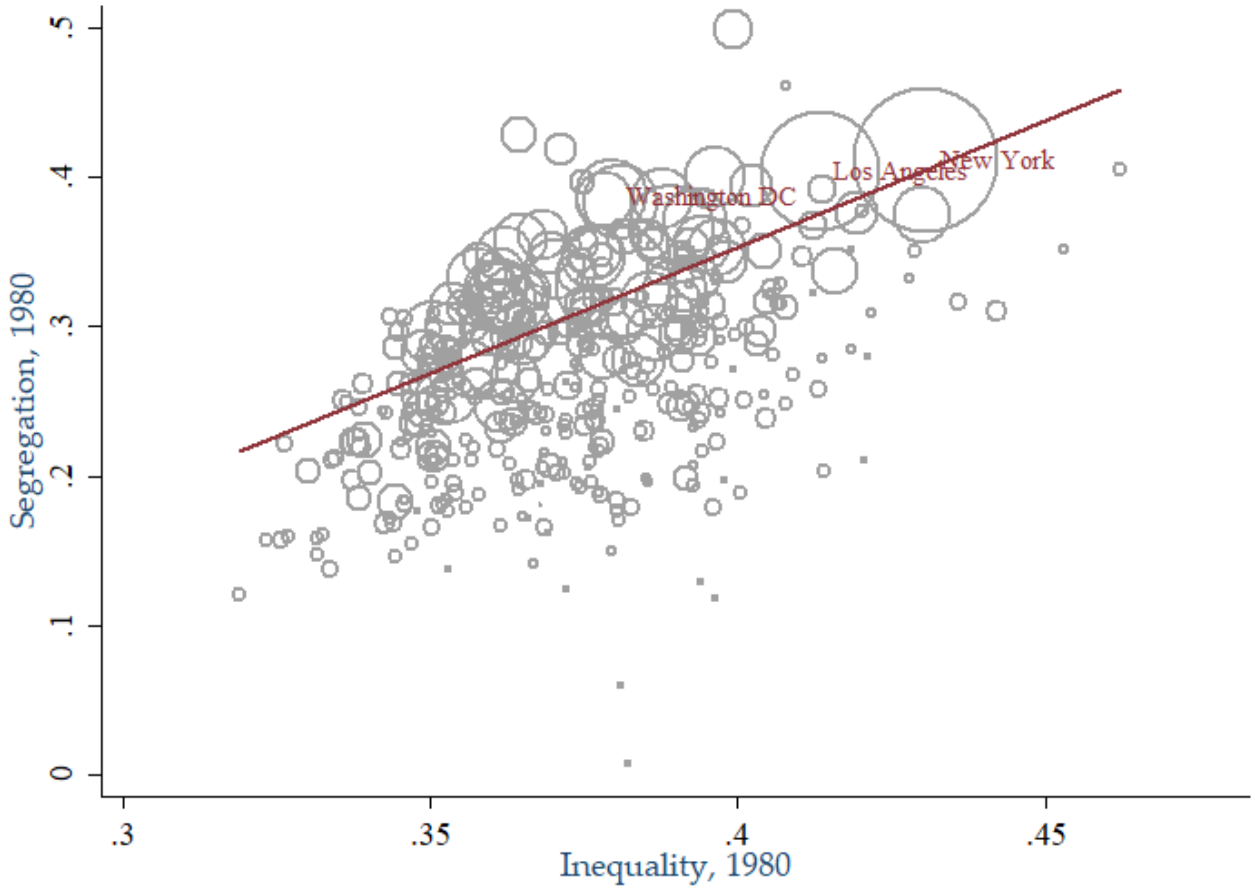
Data and Indexes

- data sources:
  1. Census tract data on family income 1980 - 2010
     - geographic unit and sub-unit: metro and tracts (according to Census 2000)
  2. restricted-access geocoded version of National Longitudinal Survey of Youth (NLSY79)
- inequality measure = Gini coefficient
- segregation measure = dissimilarity index
  - it measures how uneven is the distribution of two mutually exclusive groups across geographic subunits
  - groups: rich and poor as above and below the 80th percentile

Inequality and Segregation Across Time

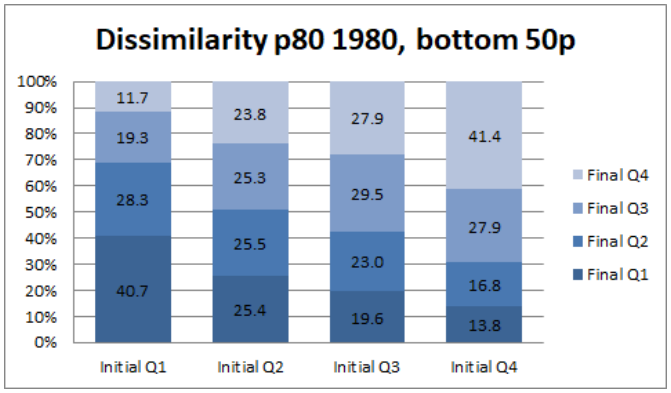


Inequality and Segregation Across Space

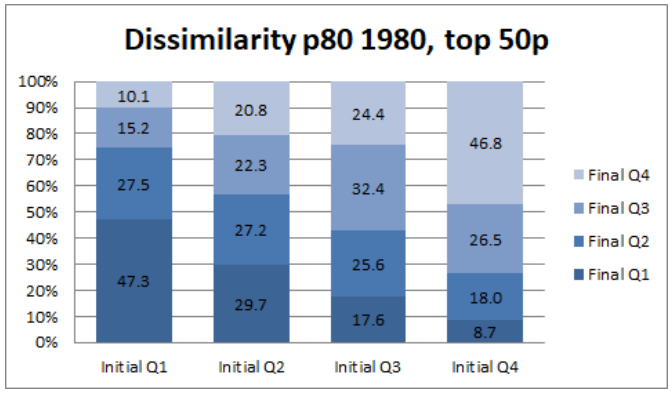


Inequality and Segregation Across Space and Time

Intergenerational Mobility Matrices



(a) Low Segregation Metros



(b) High Segregation Metros

High/low: above/below median Dissimilarity p50 in 1980

Set Up

- overlapping generations of agents who live for 2 periods: children and parents
- a parent at time t:
  - earns a wage $w_t \in [\underline{w}, \overline{w}]$
  - has a child with ability $a_t \in [\underline{a}, \overline{a}]$
- assume $log(a)$ follows an AR1 process with correlation ρ
- $F_t(w, a)$ = joint distribution of w and a at time t

Geography and Housing Market

- two neighborhoods: $n \in \{A, B\}$
- each agent live in a house of same size and quality
- R_t^n = rent in neighborhood n at time t
- extreme assumptions on supply:
  - fixed supply H in neighborhood A;
  - fully elastic supply of houses in neighborhood B;
- marginal cost of construction in B = 0 $\Rightarrow R_t^B = 0$ for all t

Education and Wage Dynamics

- parents can directly invest in education $e \in \{e_L, e_H\}$
- cost of $e_L = 0$, cost of $e_H = \tau$
- wage of child with ability a_t, education e, growing up in n:

$$w_{t+1} = \Omega(w_t, a_t, e, S_t^n, \varepsilon_t)$$

where ε_t is iid noise and S_t^n is neighborhood n spillover

- S_t^n = average human capital in neighborhood n at time t

$$S_t^n = E[w_{t+1}(w, a, \varepsilon) | n_t(w, a) = n]$$

Parents' Optimization Problem

parent (w_t, a_t) at time t solves

$$\begin{aligned} U(w_t, a_t) &= \max_{c_t, e_t, n_t} u(c_t) + E_t[g(w_{t+1})] \\ s.t. \quad & c_t + R_t^{n_t} + \tau e_t \leq w_t \\ & w_{t+1} = \Omega(w_t, a_t, e_t, S_t^{n_t}, \varepsilon_t) \end{aligned}$$

taking as given R_t^k and S_t^k for $k = A, B$

Equilibrium

For given $F_0(w,a)$, an equilibrium is a sequence $\{n_t(w,a), e_t(w,a), R_t^A, S_t^A, S_t^B, F_t(w,a)\}_t$ satisfying

- **agents optimization**: for any t given R_t^A, S_t^A, S_t^B
- **spillover consistency** for any t and $k = A, B$
- **housing market clearing**: for any t

$$H = \int \int_{n_t(w,a)=A} F_t(w,a) dwda$$

- **wage dynamics**: for any t

$$w_{t+1}(w,a,\varepsilon) = \Omega\left(w, a, e_t(w,a), S_t^{n_t(w,a)}, \varepsilon\right)$$

Assumptions

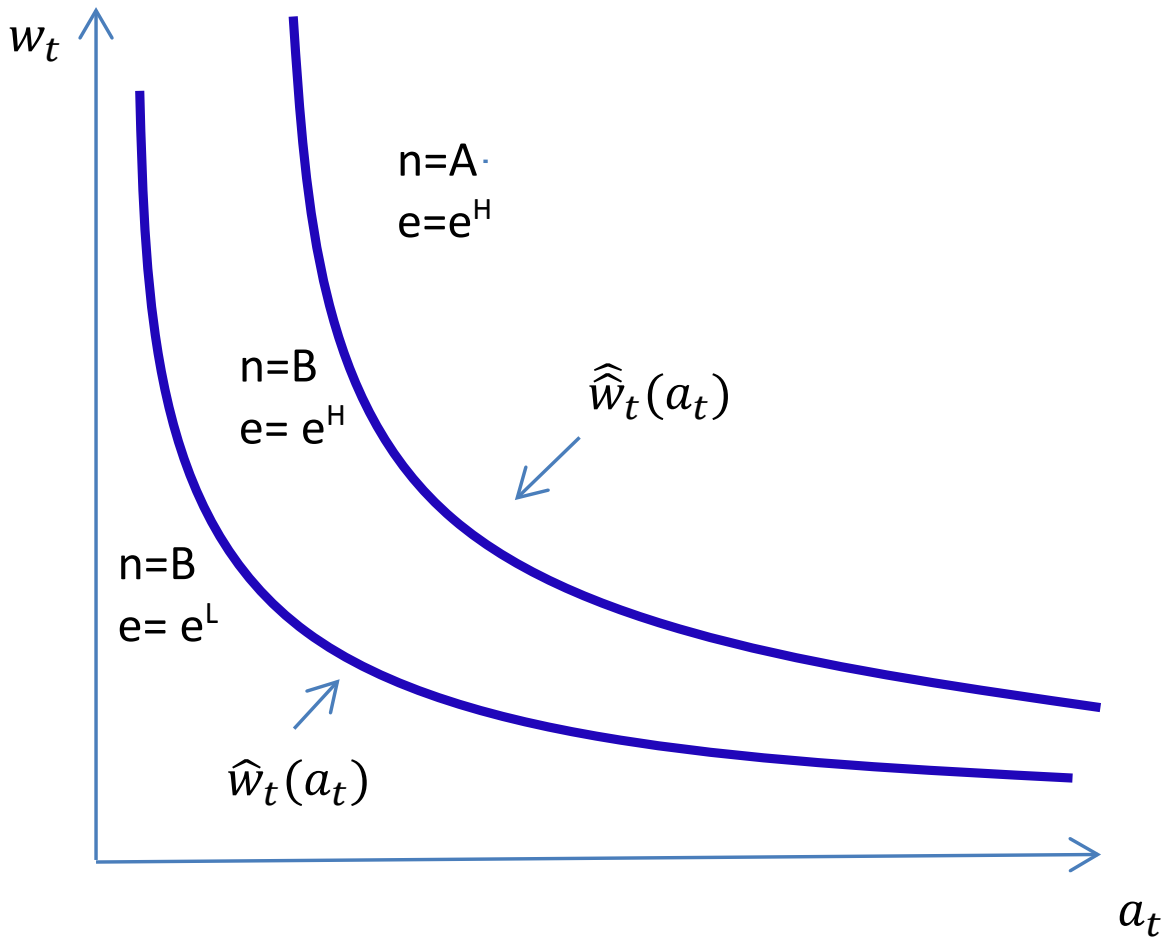
Focus on equilibria with $R_t^A > 0$ for all t $\Rightarrow$ $S_t^A > S_t^B$ for all t

Assumption A1
The function $\Omega(a, e, S, \varepsilon)$ is

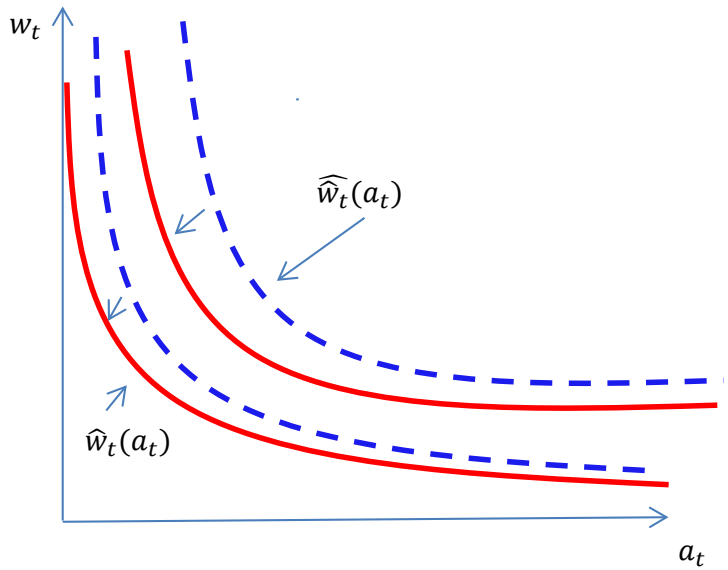
- constant in S and a if $e = e_L$
- increasing in S and a if $e = e_H$

Assumption A2
The composite function $g(\Omega(a, e, S, \varepsilon))$ has increasing differences in a and S, a and e, w and S, and w and e

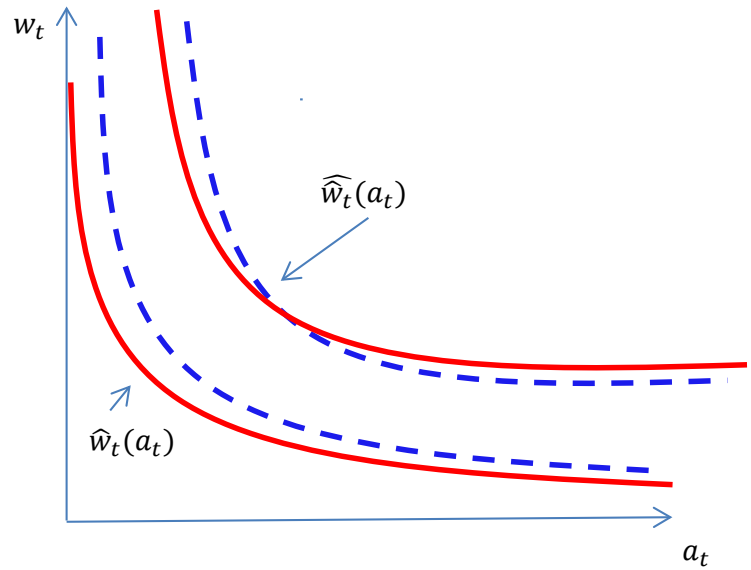
Cut-Off Characterization



Response to Skill Premium Shock



(c) Partial Equilibrium



(d) General Equilibrium

$$\Omega(w, a, e, S^n, \varepsilon) = (b + ea\eta(\beta_0 + \beta_1 S_n^{\xi}))w^{\alpha}\varepsilon$$

Extended Model

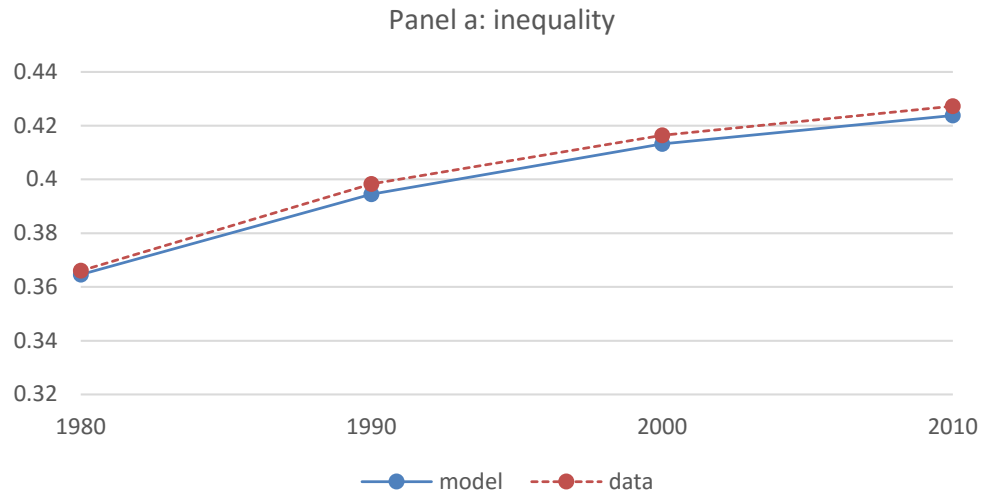
Two new ingredients:

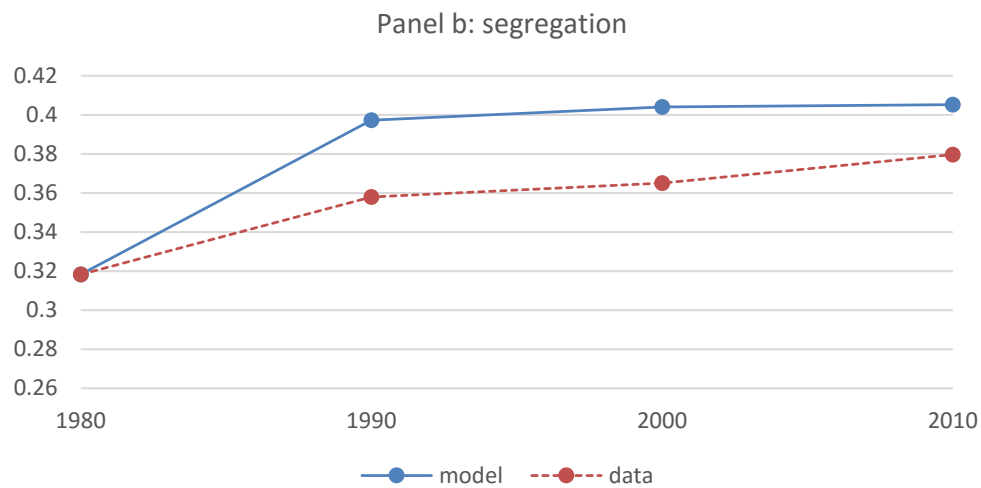
1. **continuous educational choice**:
   - higher dispersion in investment in human capital
2. **residential preference shock**:
   - this generates more mixing in the initial steady state

Calibration

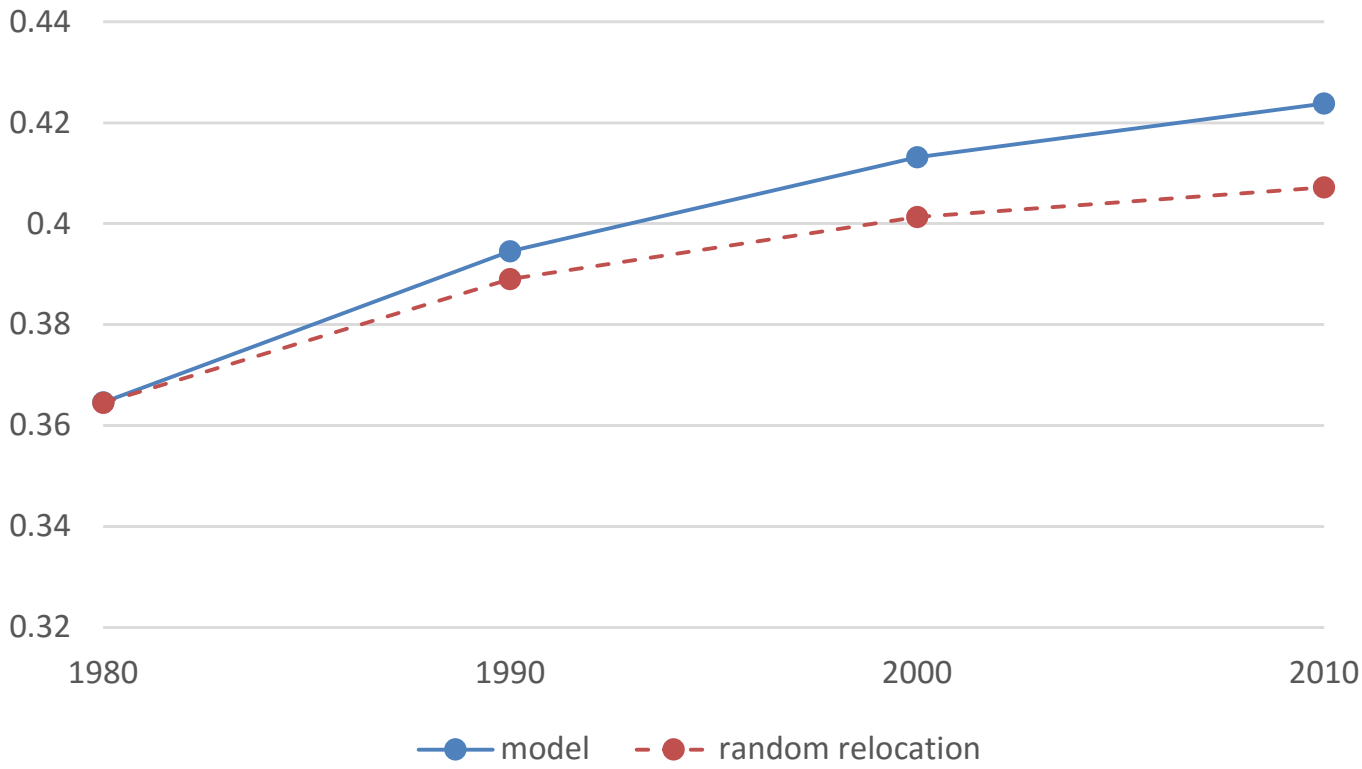
Description	Data	Model	Source
Gini coefficient	0.366	0.365	Census 1980, family income
Dissimilarity index	0.318	0.318	Census 1980, family income
H^R index	0.100	0.094	Census 1980, family income
B/A average income	0.516	0.459	Census 1980
R^A-R^B normalized	0.073	0.074	Census 1980
Rank-rank correlation	0.341	0.330	Chetty et al. (2014)
Return to spillover 25th p	0.104	0.104	Chetty and Hendren (2018b)
Return to spillover 75th p	0.064	0.070	Chetty and Hendren (2018b)
Return to college 1980	0.304	0.306	Valletta (2018)
Return to college 1990	0.449	0.449	Valletta (2018)

Response to Skill Premium Shock

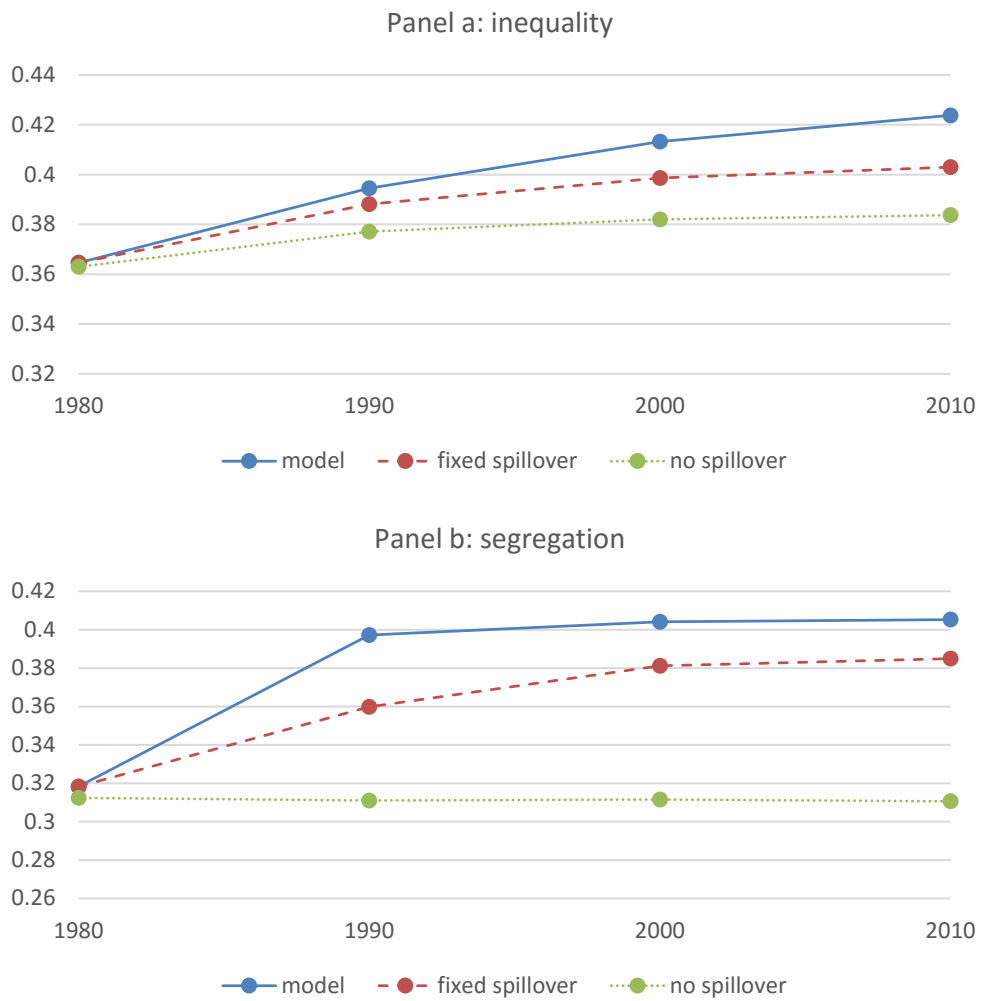




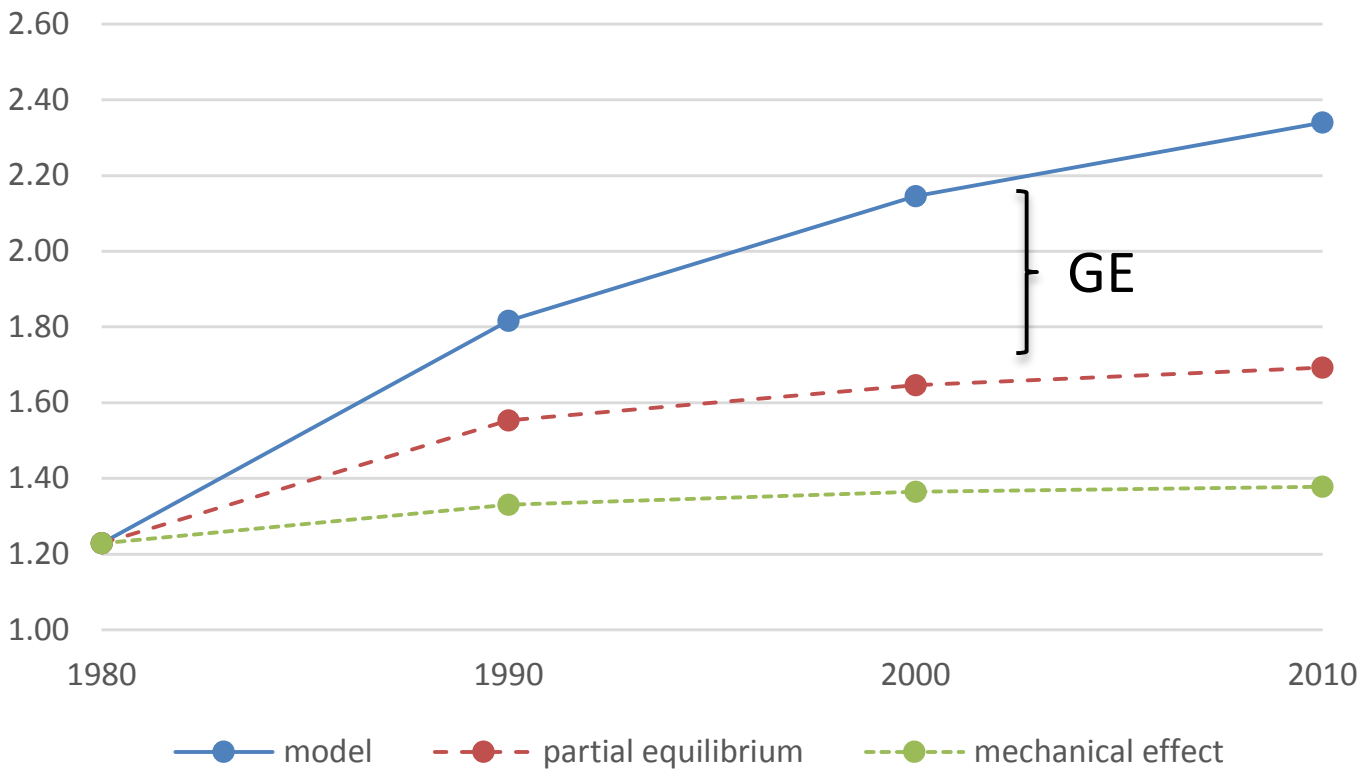
Main Counterfactual: Random Re-Location



No Spillover and No Spillover Feedback



Decomposing the Spillover Feedback



GE effect: as R^A increases, the degree of sorting by income increases

To conclude

- GE model with human capital accumulation, residential choice and local externalities
- local externalities generate segregation by income across neighborhoods
- segregation contributed to roughly 28% of the increase in inequality in response to a skill premium shock
- for the future:
  - use the model to think about differential response of inequality and segregation across metros
  - normative analysis