

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's response to underlying shocks?

This paper:

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

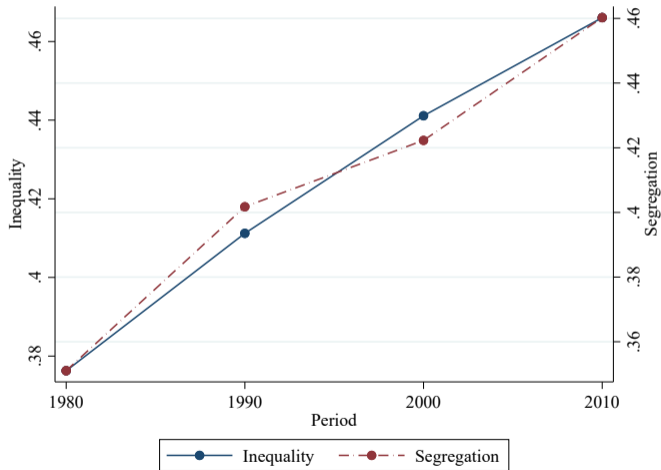
Preview

- data: correlation between inequality and segregation
- benchmark 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 → feedback between inequality and segregation
- general model and calibration to a representative US MSA
- **main exercise**: MIT shock to skill premium in 1980
- finding: segregation has a significant effect on the increase in inequality

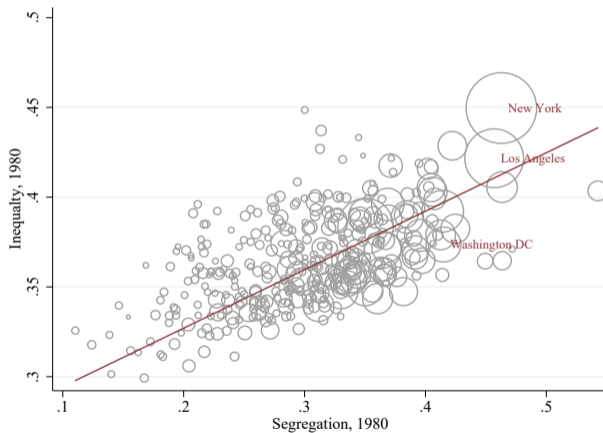
Data and Indices

- data source: census tract data on family income 1980 - 2010
- geographic unit and sub-unit: metro and tracts
- 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

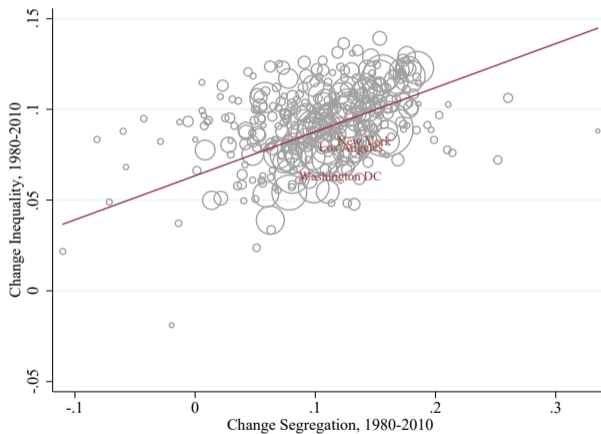
Inequality and Segregation Across Time



Inequality and Segregation Across Space



Inequality and Segregation Across Space and Time



Benchmark Model

- overlapping generations of agents who live for 2 periods: children and parents
- a parent at time t :
 - earns a wage $w_t \in [\underline{w}, \bar{w}]$
 - has a child with ability $a_t \in [\underline{a}, \bar{a}]$
- 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: $n \in \{A, B\}$
- 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
- two levels of 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

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

Parents' Optimization Problem

parent (w_t, a_t) at time t solves

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

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

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

- **wage dynamics:** for any t

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

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

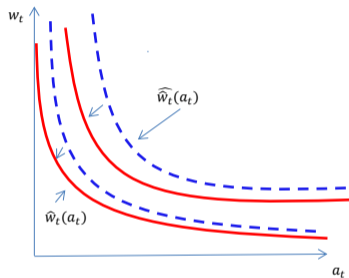
Skill Premium Shock

- what fundamental shock is behind the rise in inequality?
- assume it is skill-biased technical change
- in our model: think about a one-time, unexpected, permanent increase in η

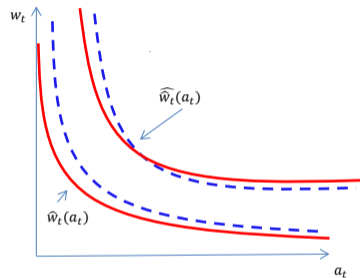
$$\Omega(w, a, e, S^n, \varepsilon) = (b + ea\eta(\beta_0 + \beta_1 S^n))w^\alpha \varepsilon$$

- what is the economy's response?

Response to Skill Premium Shock



(a) Partial Equilibrium



(b) General Equilibrium

- direct effect: gap college/no college and return to local spillover increase
- partial equilibrium/general equilibrium effect on inequality
- dynamic effect through spillover

General Model

1. **three neighborhoods:**

- richer segregation dynamics

2. **upward sloped housing supply:**

- endogenous evolution of neighborhood size

3. **continuous educational choice:**

- higher dispersion in investment in human capital

4. **residential preference shock:**

- amenities shock: ranking of neighborhoods ($A > B > C$)
- idiosyncratic preference shock: more mixing in initial steady state

Main Exercise

- calibrate the model steady state to 1980
- one-time, unexpected, permanent shock to η in 1980
- match skill premium increase between 1980 and 1990
- look at responses of inequality, segregation, mobility
- counterfactual exercises to identify the amplifying role of segregation

Mapping the Model to the Data

neighborhood definition

- according to percentage of residents that is rich (in top 20%)
- finer analysis at the top of distribution: about 50% pop in C

	C	B	A
Year	0-17	17-30	Above 30
1980	0.509	0.309	0.183
1990	0.530	0.268	0.202
2000	0.531	0.257	0.212
2010	0.519	0.253	0.228

Cutoffs (17-30)

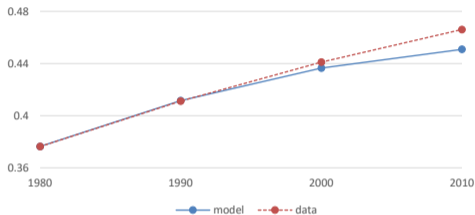
Calibration

We use 21 moments at the metro and neighborhood level to calibrate 20 parameters.

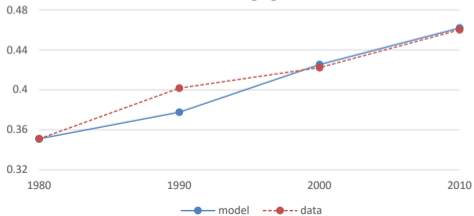
- gini 1980
- dissimilarity 1980
- rank rank correlation
- relative income neighborhoods 1980
- relative housing prices neighborhoods 1980
- relative sizes of neighborhoods over time
- return to college 1980 and 1990
- return to spillover 25th p
- return to spillover 75th p

Response to Skill Premium Shock

Panel a: inequality



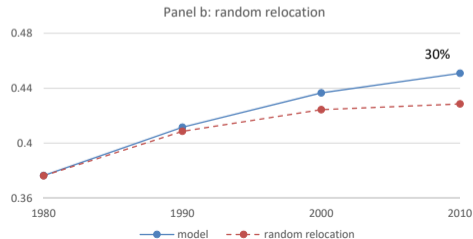
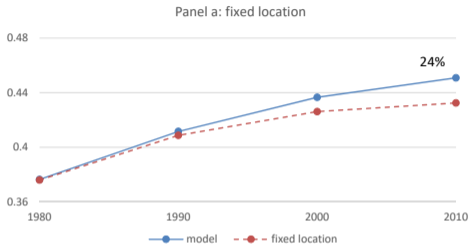
Panel b: segregation



Feedback effect of segregation on inequality

- skill premium shock increases inequality and segregation
- segregation further amplifies the increase in inequality
 1. for given spillovers, more rich children will be exposed to better neighborhoods → even richer
 2. for given spillovers, more poor children will be exposed to worse neighborhoods → even poorer
 3. higher segregation will increase the gap between the spillovers in the two neighborhoods → more inequality

Counterfactuals



To conclude

- shocks that increase inequality also trigger increase in segregation (through residential choice)
- local externalities generate persistent increase in inequality/segregation through time
- segregation amplifies increase in inequality and reduces intergenerational mobility (end of american dream?)