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

Alessandra Fogli, Veronica Guerrieri, and Mark Ponder

Workshop on Household Finance and Housing
June 2021

Question

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

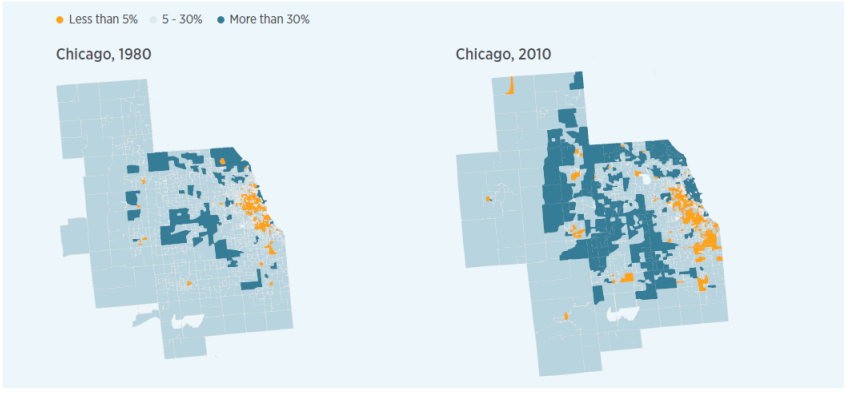
Question:

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

Segregation Patterns: Chicago



- spatial distribution of rich households more concentrated over time
- rich defined as top 20th percentile

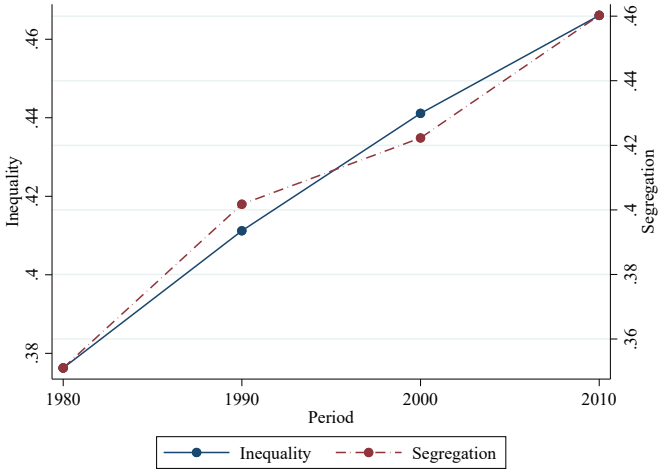
Preview

- 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 $\rightarrow$ 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

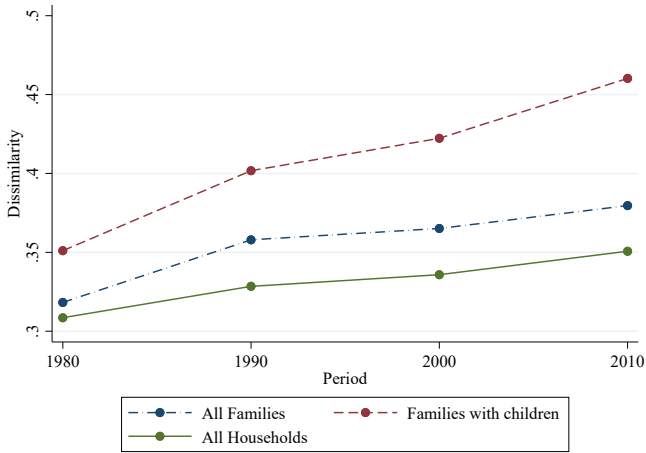
Data and Indices

- 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

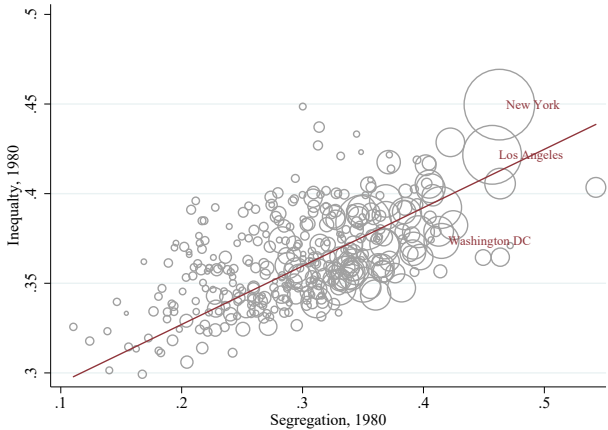
Inequality and Segregation Across Time



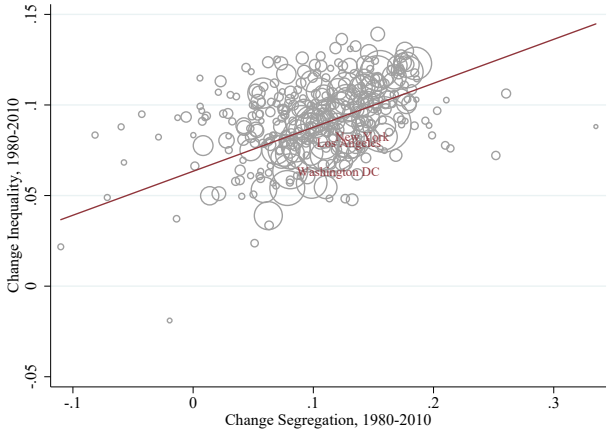
Segregation Across Demographic Groups



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 $w_t \in [\underline{w}, \overline{w}]$
  - 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: $n \in \{A, B\}$
- 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

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

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

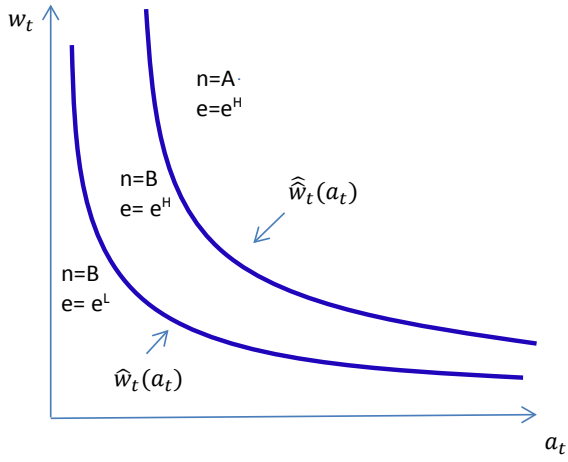
Assumption A1
The function $\Omega(a, e, S, \varepsilon)$ is

- 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

Equilibrium for given spillovers and rental rates, with



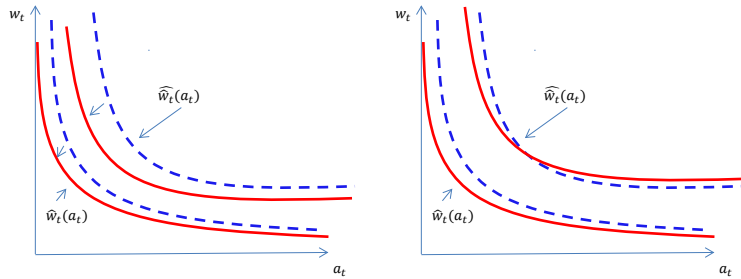
Skill Premium Shock

- 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

Year	C 0-17	B 17-30	A 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

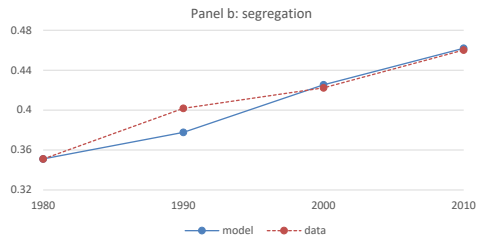
We use 21 moments at the metro and neighborhood level to calibrate 20 parameters.

- 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

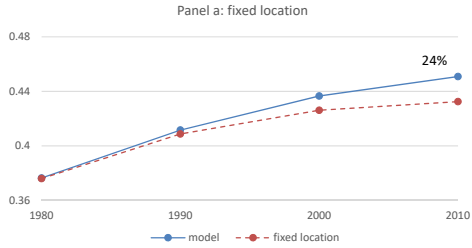
Response to Skill Premium Shock



Feedback effect of segregation on inequality

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