

Inequality and Segregation

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Sethi, Rajiv and Rohini Somanathan (2004) "Inequality and Segregation."
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Patterns of Association

Patterns of association in cities, campuses, clubs, etc.

- arise from **decentralized**, **uncoordinated** choices
- interacting with policy initiatives

What determines such patterns of association?

What if attributes are multidimensional?

What is the role of heterogeneity within & between groups?

When incomes differ both within and between groups

- and sorting is based on both income and race
- what determines the extent of segregation?

Is segregation consistent with pro-integrationist preferences?

Does declining group inequality imply greater integration?

Does segregation imply persistent group inequality?

Multidimensional Attributes

Incomes vary within and between groups

Location decisions are based on housing costs

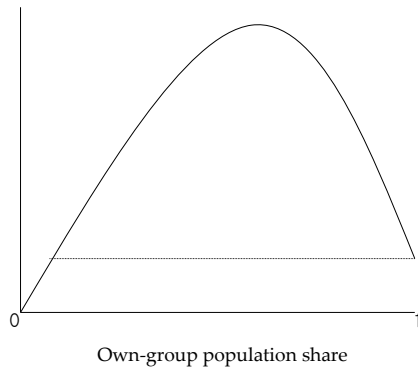
- and neighborhood affluence
- and neighborhood racial composition

Preferences are pro-integrationist in the sense that

- a range of integrated allocations
- are preferred to either extreme

No restrictions on location; prices adjust to clear market

Preferences over racial composition are non-monotonic



Types of Allocations

- An allocation is an assignment of each household to some neighborhood
- Allocations induce neighborhood income distributions and racial compositions
- An allocation is **intragracially stratified** if there exist threshold incomes for blacks and whites such that those above the threshold live together
- At any IRS allocation, the neighborhood with households above the thresholds is **upper-tail**

Marginal Bid Rents

At any given IRS allocation...

- Neighborhood incomes and racial compositions are fully determined
- The **marginal bid rent** for whites is the maximum rent that the marginal white household is willing to pay to live in the upper-tail neighborhood
- Marginal bid rent for blacks and analogously defined

A Simple Example

Two groups: “black” & “white”

Two neighborhoods, equal size, rents uniform within each

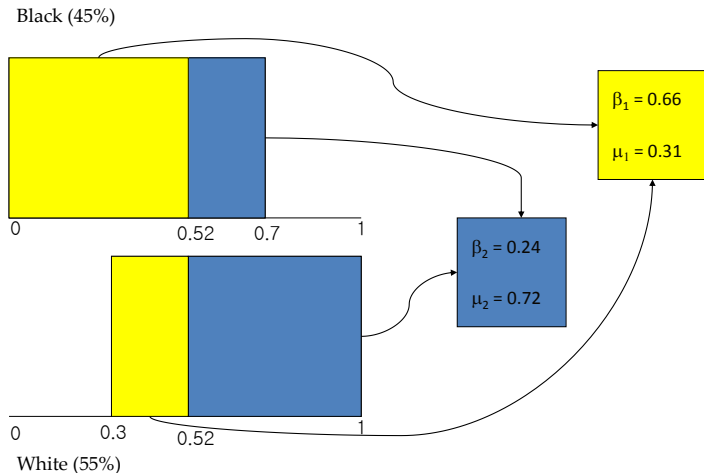
Income distributions uniform, whites more affluent

- support $[0,0.7]$ for black households
- and $[0.3,1]$ for white households

Black share of population 45%

What does pure sorting by income look like?

Pure Sorting by Income



Equilibrium Allocations

An equilibrium is an allocation

- of households across neighborhoods
- and a profile of neighborhood rents
- such that no household wants to move

Stable equilibria: small perturbations self-correcting

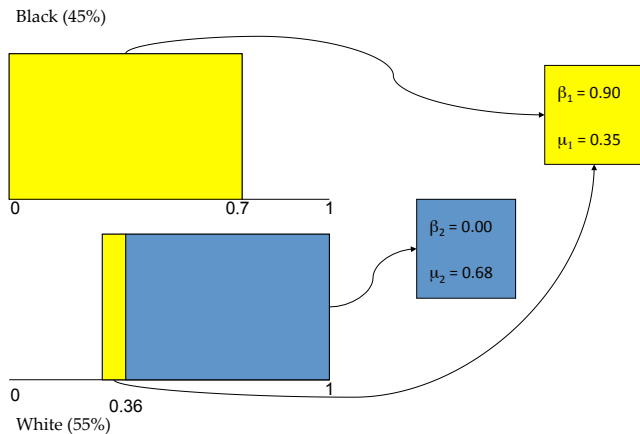
Pure sorting by income cannot arise in equilibrium

- β_i share of black households in neighborhood i
- μ_i average income in neighborhood i
- ρ rent differential between the neighborhoods
- y^b income of marginal black household
- y^w income of marginal white household

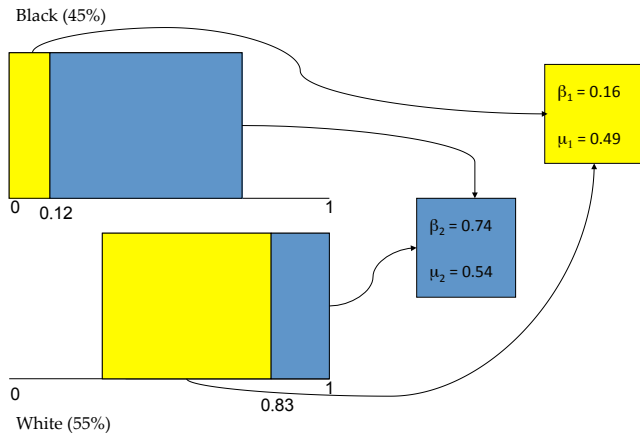
Equilibria

y_w	y_b	β_1	β_2	μ_1	μ_2	ρ
0.36	0.70	0.90	0.00	0.35	0.68	0.11
0.83	0.12	0.16	0.74	0.49	0.54	0.02

Equilibrium A



Equilibrium B



Marginal Bid Rents



Properties of Segregated Equilibrium

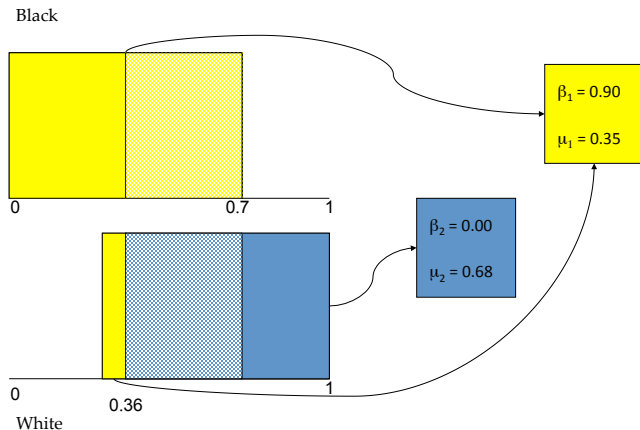
Only Equilibrium A is **stable**

At the unique stable equilibrium

- households belonging to a lower income group
- experience lower levels of neighborhood affluence
- relative to **otherwise identical** households
- belonging to a higher income group

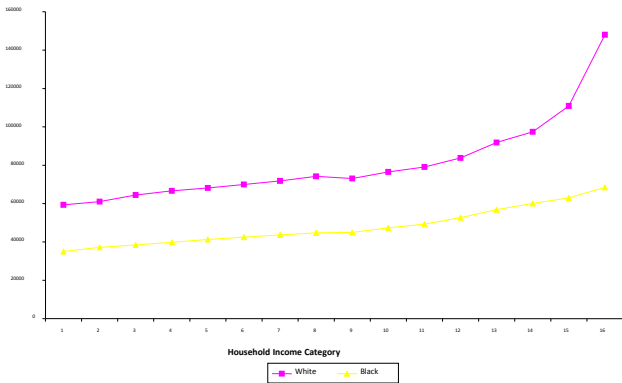
Black households with incomes between 0.36 and 0.7 experience lower neighborhood quality than white households **with the same income**

Disparities in Neighborhood Quality



White (Non-Hispanic)		Black	
Own Income	Neighborhood Income	Own Income	Neighborhood Income
Less than \$10,000	59,334	Less than \$ 10,000	34,941
\$10,000 - \$ 14,999	60,972	\$10,000 - \$14,999	37,160
\$15,000 - \$19,999	64,422	\$15,000 - \$19,999	38,417
\$20,000 - \$24,999	66,611	\$20,000 - \$24,999	39,785
\$25,000 - \$29,999	68,130	\$25,000 - \$29,999	41,256
\$30,000 - \$34,999	69,934	\$30,000 - \$34,999	42,476
\$35,000 - \$39,999	71,768	\$35,000 - \$39,999	43,606
\$40,000 - \$44,999	74,186	\$40,000 - \$44,999	44,725
\$45,000 - \$49,999	73,016	\$45,000 - \$49,999	44,951
\$50,000 - \$59,999	76,459	\$50,000 - \$59,999	47,312
\$60,000 - \$74,999	79,039	\$60,000 - \$74,999	49,282
\$75,00 - \$99,999	83,746	\$75,000 - \$99,999	52,611
\$100,000 - \$124,999	91,829	\$100,000 - \$124,999	56,837
\$125,000 - \$149,999	97,381	\$125,000 - \$149,999	60,024
\$150,000 - \$199,999	110,881	\$150,000 - \$199,999	62,930
\$200,000 or more	147,989	\$200,000 or more	68,450

Mean Neighborhood Household Income (NY PMSA 2000)



Effects of Income Convergence

Earlier Example

Income distributions uniform

- support $[0, 0.7]$ for black households
- and $[0.3, 1]$ for white households

New Example

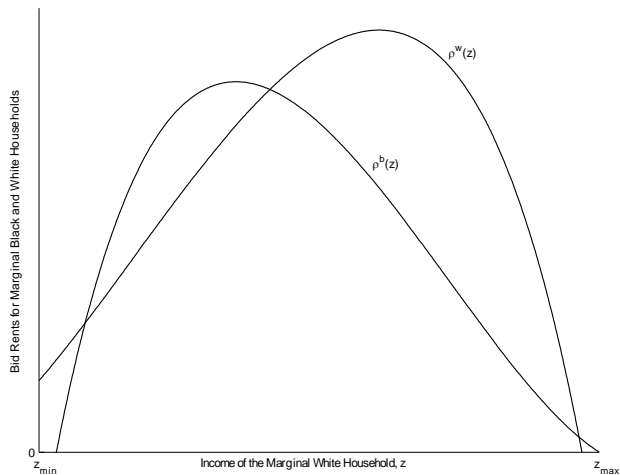
Income distributions uniform

- support $[0, 0.9]$ for black households
- and $[0.1, 1]$ for white households

Multiple Stable Equilibria

y_w	y_b	β_1	β_2	μ_1	μ_2	ρ
0.18	0.90	0.90	0.00	0.42	0.59	0.04
0.24	0.83	0.83	0.07	0.37	0.64	0.06
0.49	0.53	0.53	0.37	0.28	0.73	0.18
0.89	0.03	0.03	0.87	0.48	0.53	0.01

Multiple Stable Equilibria



Stability of Segregation

Suppose distribution functions depend on a parameter $\alpha \geq [0,1]$ such that $F^b(y, \alpha)$ is decreasing and $F^w(y, \alpha)$ is increasing in α , with perfect equality when $\alpha = 1$ and hierarchical distributions when $\alpha = 0$

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Suppose distribution functions depend on a parameter $\alpha \geq [0,1]$ such that $F^b(y, \alpha)$ is decreasing and $F^w(y, \alpha)$ is increasing in α , with perfect equality when $\alpha = 1$ and hierarchical distributions when $\alpha = 0$

Proposition

There exists $\beta^ < \frac{1}{2}$ with the following property: for any $\beta > \beta^*$ there exist $\alpha_l > 0$ and $\alpha_h < 1$ such that a stable segregated equilibrium exists for all $\alpha \geq (0, \alpha_l) \cup (\alpha_h, 1)$.*

Stability of Integration

Suppose own-group share is r and preferences over neighborhood composition given by $v(r) = r(1 - r + \eta)$

Stability of Integration

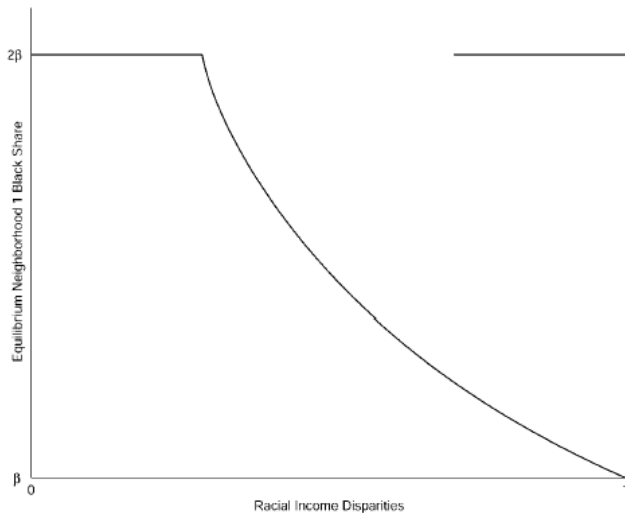
Suppose own-group share is r and preferences over neighborhood composition given by $v(r) = r(1 - r + \eta)$

Proposition

There exists $\alpha^ < 1$ with the following property: for any $\alpha > \alpha^*$, there exists $\eta^* > 0$ such that a stable integrated equilibrium exists for all $\eta < \eta^*$*

- If overall share of black households is sufficiently high: segregation is stable when racial income disparities are either very **high** or very **low**
- Segregation may be unstable for intermediate levels of inequality
- But integrated allocations can also be stable when inequality is low: multiple stable equilibria

Racial Income Disparities and Equilibrium Segregation



Implications

- Stable integration becomes viable as income disparities lessen
- But historical patterns of segregation may trap a city in basin of attraction of segregated equilibrium
- Temporary incentives for segregation may give rise to permanent effects
- From cross-sectional perspective, lower racial inequality may not correspond to lower segregation
- From historical perspective, progress toward greater integration may stall as inequality declines