Neighborhood Choice

Set 06

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Fall 2022

"Love thy neighbor as yourself, but choose your neighborhood."

-Louise Beal

Housekeeping

Assignments:

- **PS01** was due last night
  - Go over solutions **today**
- **PS02** will be posted tomorrow
  - due date **Sun Oct 30.**
  - go over solutions + review on **Mon Oct 31**
- **Reading**
  - finish up to chapter 5 before the midterm

Midterm: Wed, Nov 2

Introduction to neighborhood choice

We have a fairly simple model of **residential choice** (rental prices)

Q: What factor(s) in the model determine housing demand?

A: Bid-Rent model assumes commuting costs are the **only factor**

- this **unreasonable** assumption isolates particular economic factors

What factors influence neighborhood decision choices?

Examples:

- Schools
- Demographics
- Tax rates
- Public safety
- Air quality
- Natural beauty

Neighborhood choice: Amenities

Definition: Amenity

An *amenity* is a **location-specific** consumption good

- Beaches
- Weather
- Public transport
- Parks
- Restaurants
- Recreation

Different types of **amenities**

- Some are nonrival[†]: Theaters, public transport
- Some are nonexcludable[††]: Parks
- Some are both nonrival and nonexcludable: National defense, sports teams, fireworks

† Nonrival goods: Accessible by all; usage does limit subsequent use

†† Nonexcludable goods: Impossible to exclude other from consuming

Neighborhood choice: Amenities

Two more refined definitions:

(i) Exogenous Amenities: Location-specific consumption good that exist **are not** influenced by where people decide to live

- **Exogenous:** "Determined outside of the model" (fall from the sky)
- Weather, geographic characteristics

(ii) Endogenous Amenities: Location-specific consumption goods that **are** influenced by location decisions of individuals

- **Endogenous:** "Determined within the model"
- School quality, crime, pollution

Neighborhood choice: Amenities

To determine whether or not an amenity is **exogenous** (**endogenous**):

"Will choosing to live here impact the amenity?"

- **Exogenous** *Beaches exist regardless whether people live near by*
- **Endogenous** *Crime is a function of the individuals in the area*

Questions regarding differences between **EXOGENOUS** and **ENDOGENOUS?**

Neighborhood choice

Previously we explored (broadly) a cities shape

- modeled where different sectors of the economy choose to locate

But we made an assumption that everyone was the **same**

*Why are city neighborhoods so **heterogeneous**?*

*What economics factor influence **neighborhood sorting** within a city?*

Model this **heterogeneity** by considering a public good: **Public parks**

Neighborhood choice + Sorting for public goods

Demand for public goods

Consider a simple sorting model for a single, non-rival public good

Model a three-person city with one public good: **Public park**

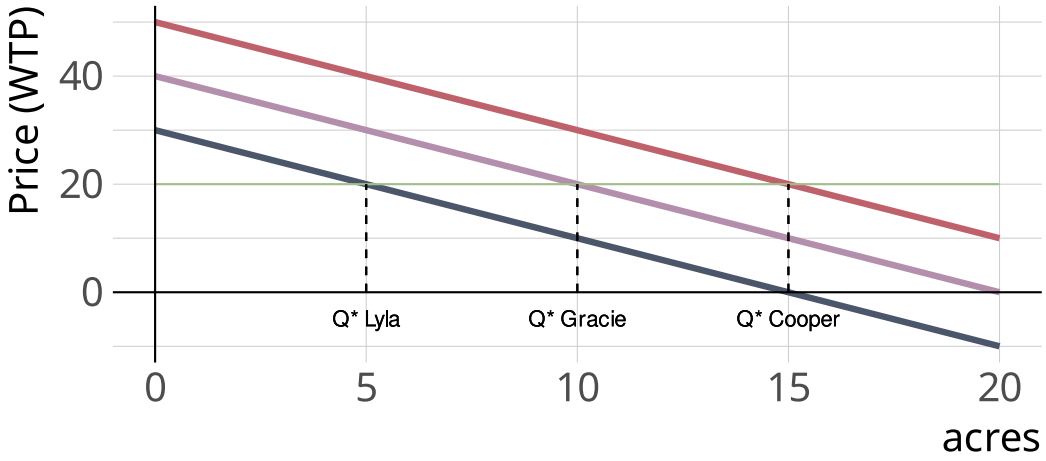
- Cost **$60 per acre** to build
- Cost is shared equally across all three citizens: **$20 per acre** each

Of the three citizen, demand for the park varies:

- Low demand: $\textbf{Lyla}: P = 30 - 2 * \text{acres}$
- Mid demand: $\textbf{Gracie}: P = 40 - 2 * \text{acres}$
- High demand: $\textbf{Cooper}: P = 50 - 2 * \text{acres}$

Together they must **vote** for one park size in a binary election

Demand for public goods



If a first past the post election system is used, who wins their preferred park size? Who loses?

Demand for public goods: Majority rule

Under **majority rule** Gracie's optimal park wins

Why?

Election	10 acre votes	Other votes
5 acres vs 10 acres	Gracie and Cooper	Lyla
15 acres vs 10 acres	Gracie and Lyla	Cooper

Gracie is the **median voter**

- Splits the voting public in half

Alternative to majority rule

Majority rule always leave two citizens unhappy: **Cooper** and **Lyla**

Suppose an *alternative* is to form new municipalities

Consider a new metropolitan area with **3** municipalities with 3 citizen

- Each district votes on their own park
- Each citizen knowns each other's preferences

Key assumption: Citizens pick which municipality to live in

- Lylaville: 5 acre park
- Gracity: 10 acre park
- Cooperstown: 15 acre park

Alternative to majority rule

By **voting with their feet** each citizen sorts themselves into homogenous communities with their preferred public good allocation (park size)

Now our city has three neighborhoods with homogenous types

- Accomodates diversity in demand

Is reality this simple?

Nope

Let's add another layer of complexity: Taxes

Alternative: Property tax

Up to this point, funding for the park is financed with a **head tax**

More realistic to model neighborhood sorting using **property taxes**

- Allow for variation in preferences + property values:
  - The higher your property value, the more taxes you pay for the park
  - $\tau = PV * 10$
  - **3** different property values: 2, 10, 24
  - **9** combos: Low-Low, Low-Mid, Low-High, Mid-Low...High-High

Outcome	Tax rate per dollar in PV	Small PV	Mid PV	Big PV
Mixed municipality	$10	$20	$100	$240
Exclusive small PV	$60	$120	-	-
Exclusive mid PV	$12	-	$120	-
Exclusive big PV	$5	-	-	$120

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Citizen of PV similar type have incentive to sort together to reduce tax

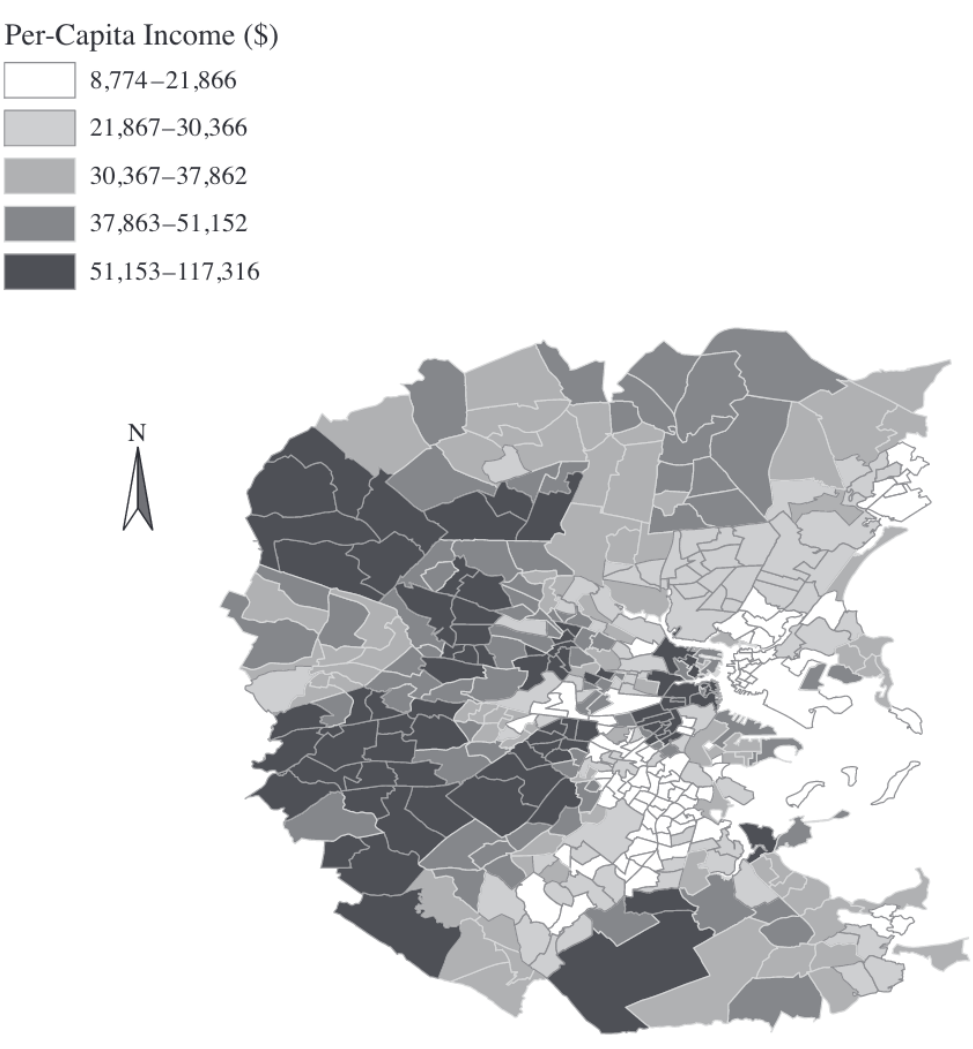
In equilibrium citizen will form **9 different neighborhoods**

Generates a fragmented system of local government in a metro area

- Negative implications arise from this sorting

Neighborhood sorting: Income

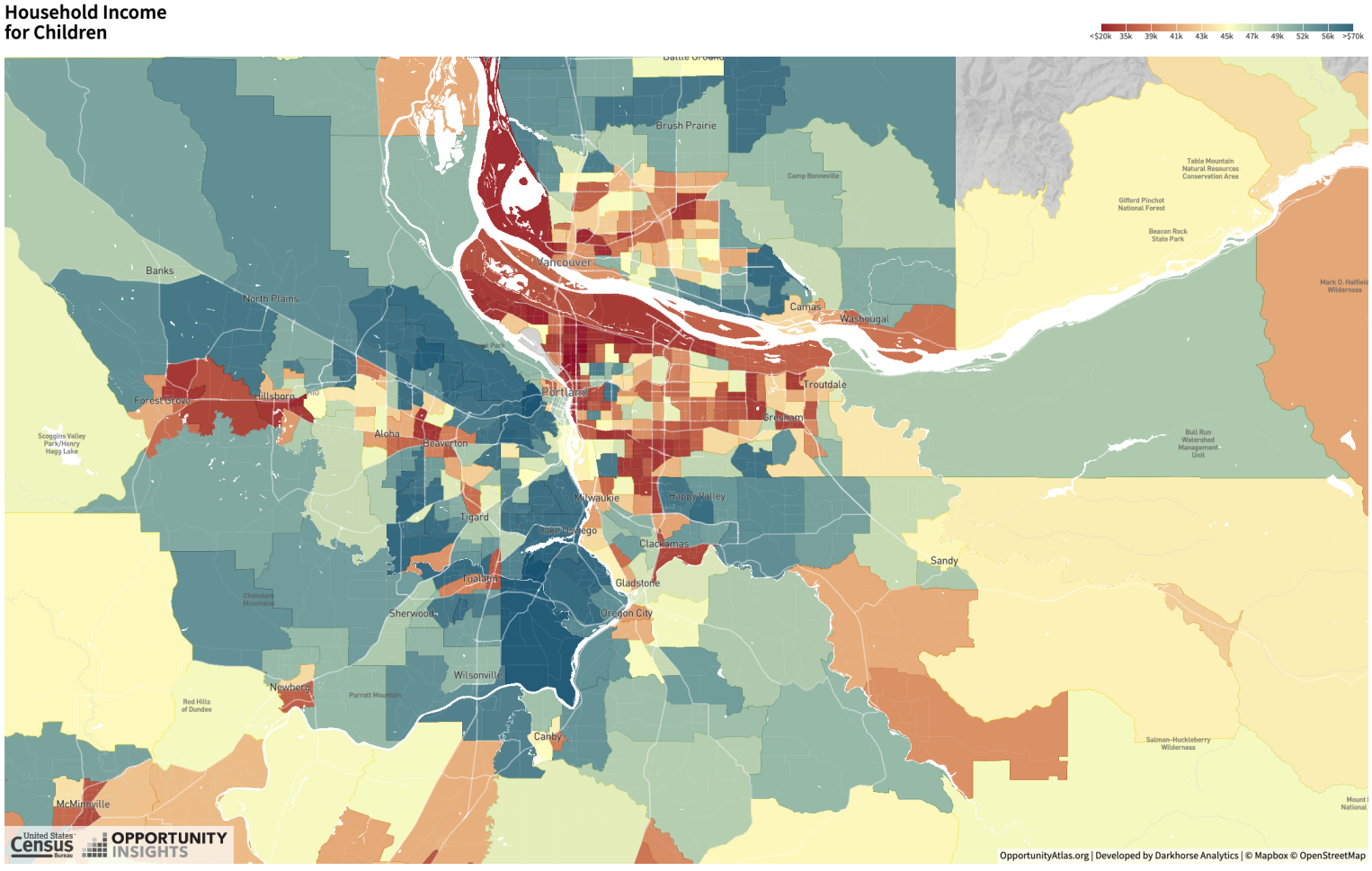
MAP 8–1 Income Segregation: Boston



Neighborhood sorting: Education

MAP 8–2 Segregation with Respect to Educational Attainment: Denver

Neighborhood sorting: Atlas



Source: Oppurtunity Atlas

Neighborhood sorting: Externalities

Neighborhood sorting: Externalities

Do you ***fully* internalize** the costs and benefits of where you decide to live?

- *Is your choice of neighborhood free from externalities?*

Nope.

Examples?

- Social networks
- Jobs
- Good schools
- Culture
- Noise
- Drug use
- Litter
- Pollution

Neighborhood externalities tend to be massively important for **youth**

- Peer effects
- Role models

Neighborhood sorting: Externalities

When your neighbor...

- remodels their kitchen...
- gives the scoop on a new job...
- tells you how to apply for a fraudulent PPP loan...

... ***do you pay them?***

- does a bunch of drugs...
- makes a ton of noise...
- is a bad role model to your children...

... ***do they pay you?***

Positive externalities general increase with income and education level

- more desirable; higher demand

*What does this **imply?***

Becker-Murphy model

Becker-Murphy model

In real life households compete for places in **desirable** neighborhoods

In the Becker-Murphy model we consider this competition

- *land always goes to the highest bidder*

Focus on **positive** externalities for now

- assume these increase with income and education
- ie desirability is a function of number of high income neighbors

Consider a model where:

- Two neighborhoods, A and B (80 lots each)
- Infinite number of households on the market
- Only difference between the neighborhoods is income mix

Becker-Murphy model

Individual choices to move are determined by the *rent premium*

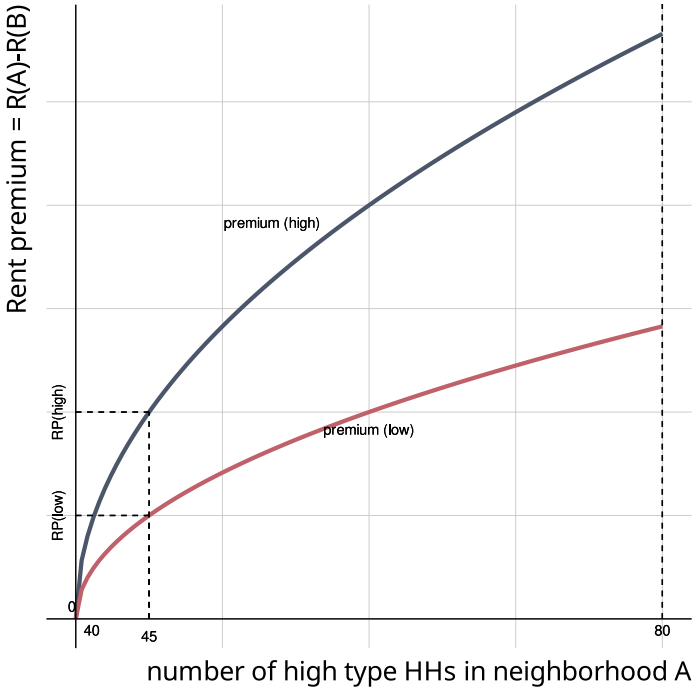
Rent Premium: Difference in rent between A and B

- $RP = R(A) - R(B)$ (for neighborhood A)

In this model:

- Consider two types of workers: **HT**, **LT**
- **RP** for workers (may) differ by type: $RP_h \neq RP_l$
  - ie benefit of living close to high types might vary by type
- land will be allocated to the highest bidder
- rental prices are **homogeneous** within a neighborhood

Integrated vs Segregated Eq



If 5 high types move into A

- $RP(high) > RP(low)$
- favorable mix of neighbors
- HT WTP for A increases
- cascading effect
- Neighborhood A is only high income HH's **segregated eq**
  - Slope **blue line** $>$ slope **red line**

Recall **A02:** Self-reinforcing changes lead to extreme outcomes

Eq Defn

Recall: an **locational eq** is a point at which no one wants to move

- in this model, it occurs when the rent premiums are equal

This always holds when the rent premium curves intersect

May also occur when the do not (full segregation)

- If the RP for the group listed on the axis is ***higher*** then this will also be an equilibrium because **there is no tendency for change**
- If the RP for the group listed on the axis is ***lower*** then population dynamics move away from this point

Stable vs Unstable Eq

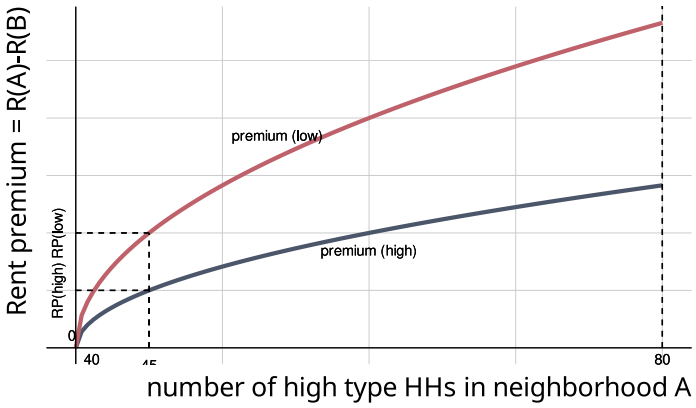
An equilibrium is **stable** if a small movement away will encounter self - **correcting** forces

- An equilibrium is stable if when you move away from it, the pop. dynamics push you back to where you came from
- Physical ex: Funnel

A equilibrium is **unstable** if a small movement away will encounter self - **reinforcing** forces

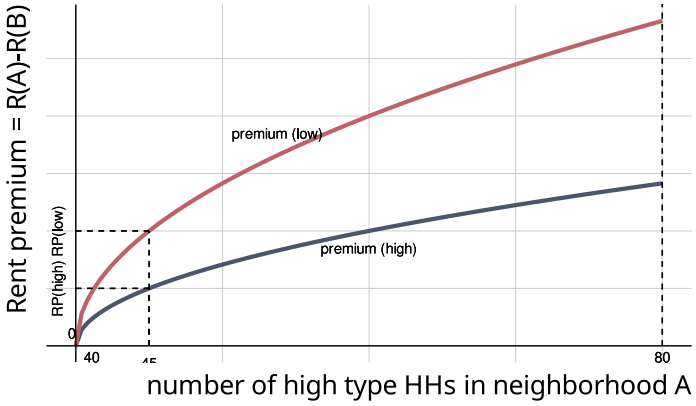
- That is, an equilibrium is unstable if when you move away from it, the population dynamics push you even farther than where you came from
- Physical ex: Stacking golf balls

Integration Eq



- Is the story the same here?
- Now, a small movement of high income HH's into A means $RP(High) < RP(low)$
- So we get pushed back to the initial equilibrium. In this case, integration is the **only equilibrium**
- Furthermore, integration is a **stable equilibrium**

Integration Eq



Note: 80 high income HH's in A is not an EQ because $RP(low) > RP(high)$. So low incomes will outbid highs and move in

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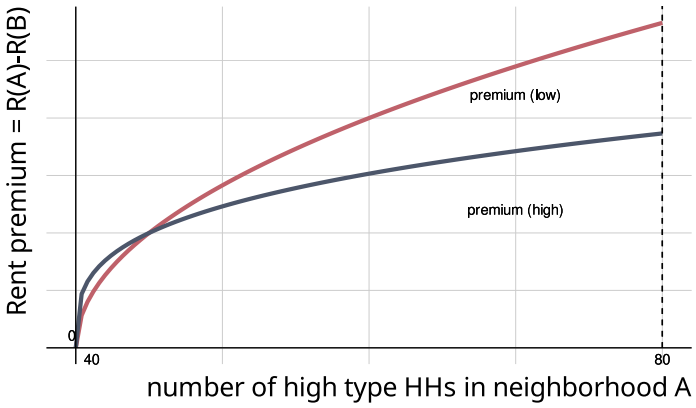
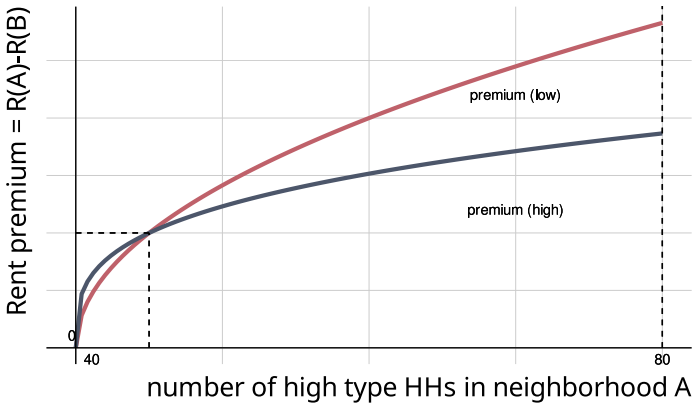
Mixed Eq



- What about a story like this?
- Integration eq (40 of each type in each nbhd) is still an equilibrium. Is it **stable**?
- No. A small deviation away means $RP(high) > RP(low)$. So highs outbid lows until $RP(high) = RP(low)$ at 45 highs in A and 35 lows.
- Is 45 highs in A stable?

Mixed Eq



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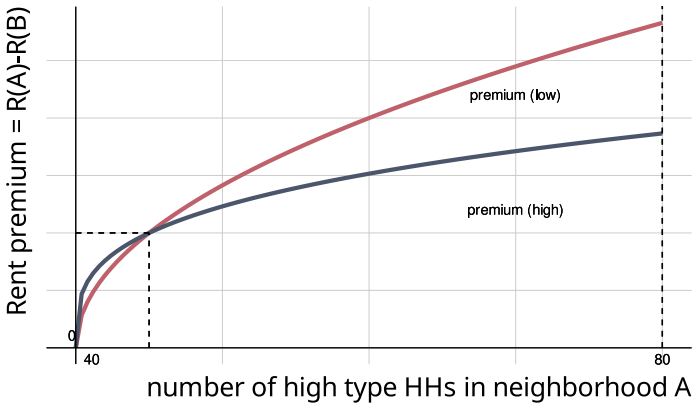
- Is 45 highs in A stable? Yes (you think about why)

Mixed Eq



- **Note**: Full segregation here is *not* an equilibrium for a similar reason to the last example

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- Is 45 highs in A stable? Yes (you think about why)

A Heuristic

1) Draw a vertical dashed line at every intersection point

2) For every region between the vertical dashed lines, it must be the case that one of the rent premium curves is above the other

- If the rent prem curve for the group listed on the axis is **higher**, then this group will increase in number. Draw rightward arrows on the axis
- If the rent prem curve for the group listed on the axis is **lower**, then this group will decrease in number. Draw leftward arrows

A Heuristic

3) If there are rightward arrows pushing toward 100% in one nbhd, then 100% (complete segregation) is an eq even if the rent prem curves do not intersect there

4) For every eq. value, look at its immediate vicinity

- If there are arrows moving towards it, it is a **stable eq**
- If there are arrows moving away from it on one or both sides, it is a **unstable eq**

Neighborhood Sorting

Externalities for kids:

- Good/bad role models as adults
- Classmates in school: focused vs disruptive

Externalities for adults:

- Positive: job information, property valuation
- Negative: property values

In general: positive externalities increase with income and education level. Why?

Neighborhood Sorting

These externalities give rise to the following questions:

(i) Who gets desirable neighbors?

(ii) Will there be segregated or integrated neighborhoods?

(iii) Will there be sorting or mixing with respect to income, age, race, or some combination of those factors?

(iv) What are the implications for the price of land in various neighborhoods?

End of MT material