<table>
<thead>
<tr>
<th>Location</th>
<th>Median Household Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westwood (CT 2651)</td>
<td>$135,487</td>
</tr>
<tr>
<td>Hancock Park (CT 2110)</td>
<td>$96,691</td>
</tr>
<tr>
<td>Koreatown (CT 2126.10)</td>
<td>$24,221</td>
</tr>
<tr>
<td>MacArthur Park (CT 2089.03)</td>
<td>$18,520</td>
</tr>
</tbody>
</table>
Median Household Income
Los Angeles CMSA Census Tracts - 1999

Data Classes
Dollars
- 0 - 34886
34911 - 53188
53209 - 74773
74886 - 109746
110262 - 200001

Features
- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody

Approx. 65 miles across.

Items in gray text are not visible at this zoom level.
Median Household Income
San Francisco CMSA Census Tracts - 1999

Data Classes
Dollars
- 0 - 43162
- 43431 - 64191
- 64250 - 87081
- 87481 - 123115
- 127241 - 200001

Features
Major Road
Street
Stream/Waterbody
Stream/Waterbody

Items in gray text are not visible at this zoom level

Approx. 65 miles across
Median Household Income
Chicago CMSA Census Tracts - 1999

Data Classes
- Dollars
- 0 - 43162
- 43431 - 64191
- 64250 - 87081
- 87481 - 123115
- 127241 - 200000

Features
- Major Road
- Street
- Stream/Waterbody

Approx. 65 miles across.
Median Household Income
North Chicago Census Tracts - 1999

Data Classes
- Dollars
  - 0 - 43162
  - 43431 - 64191
  - 64250 - 87081
  - 87481 - 123115
  - 127241 - 2000000

Features
- Major Road
- Street
- Stream/Waterbody

Items in gray text are not visible at this zoom level.
Reasons for Higher Income Households to Live Closer?
Reasons for Higher Income Households to Live Closer

☐ Commuting costs related to value of time

☐ Higher income households have higher value of time

☐ Higher income households will want to live closer because they place a higher value on reducing commuting time
Reasons for Higher Income Households to Live Farther Away?
Reasons for Higher Income Households to Live Farther Away

☐ Housing prices are lower farther from CBD
☐ Higher income households consume more housing
☐ Higher income households save more in total housing expenses by living farther away
Reconciling Forces

- Two forces
- Use housing price function to reconcile
- Housing price function—prices that make households indifferent among locations
- Functions may differ for low and high income households
Rich Live Closer

$/sf

$P_h^{rich}(u)$

$P_h^{poor}(u)$

Rich area

Poor area

u
Poor Live Closer

$/sf

$P_{h^{\text{poor}}}(u)$

$P_{h^{\text{rich}}}(u)$

poor area  rich area  $u$
The Issue

- At intersection, which is steepest
- If housing price function of rich is steepest, rich live closest
- If housing price function of poor is steepest, poor live closest
- What determines slope of housing price function
Reviewing Housing Price Function

- Distance from CBD: \( u \)
- Commuting costs: \( t_h u \)
- Housing costs: \( P_h(u)H \)
- Sum must be constant:
  \[
P_h(u)H + t_h u = A \quad (a \ constant)
\]
Slope of Housing Price Function

\[ P_h(u)H + t_h u = A \]

Differentiate with respect to \( u \)

\[ P'_h(u)H + t_h = 0 \]

\[ P'_h (u) = - \frac{t_h}{H} \]
How Will Income Affect Slope?

\[ P'_h(u) = -\frac{t_h}{H} \]

Both \( t_h \) and \( H \) are function of income
Material Cost of Commuting

- 20 work days per month
- 2 miles travel per mile distance from CBD
- 40 miles traveled per month per mile from CBD
- 20 miles per gallon
- 2 gallons per mile from CBD
- $2.50 per gallon
- $5.00 per mile per month
Time Cost of Commuting

☐ 20 work days per month
☐ 2 miles travel per mile distance from CBD
☐ 40 miles traveled per month per mile from CBD
☐ 40 miles per hour
☐ 1 hour for mile from CBD
☐ $20 per hour ($40,000 per year)
☐ $20 per mile per month
Total Cost of Commuting

$ per mile per month

$65

$45

$25

$5

$0 $20 $40 $60 wage rate
Commuting Costs and Income

- Because material costs are small, commuting costs increase almost proportionally with wage rate
- Caveats
  - Mode of commuting
  - Value of time in commuting
Housing and Income

- An empirical question
- Housing expenditures proportional to income
- $H$ increases proportionately with wage rate

Caveats
- Two earners in a household
- Household size
Putting It Together

- Commuting costs proportional to income
- Housing demand proportional to income
- Slope of housing price function doesn’t change much with income
Housing Price Functions Similar

\[ P_h^{\text{poor}}(u) \]

\[ P_h^{\text{rich}}(u) \]
An Interpretation

- High-income households have comparative advantage living close because higher commuting costs
- High-income households have a comparative advantage living far away because housing demand is higher
- Two advantages offset each other
- Simple model doesn’t have strong predictions of where households of different income live
Other Factors May Cause Separation

- Terrain is a factor
  - Lake Michigan
  - Oakland Hills

- Air quality
  - Westside of LA versus Riverside
Mode of Commuting

☐ Next time:
- LeRoy and Sonstelie, “Paradise Lost…”
- Your first academic paper
Explaining DC