Land Values and Building Heights

- Office buildings taller in CBD than in suburban areas
- Why?
7+Fig – (7th and Figueroa)
New building proposed for downtown LA
50 stories, 1 million sq. ft. of office space
Estimated construction cost $300 million
Does It Pencil Out?

- Commercial space in downtown LA rents for about $25 per square foot per year
- Rent is about $25 million
- Construction is one-time cost
- Compare cost and present value of future rents
Present Value of Future Rents

\[ V_0 = \frac{R_1}{i - g} \]

\( R_1 = \$24.00 \) per square foot
\( i = 0.07 \)
\( g=0.03 \)

\( V_0 = \frac{24}{0.04} = \$600 \) (per square foot)
Compare Cost and Present Value

☐ Total cost = $300 million
☐ Office space = 1 million square feet
☐ Cost per sq. ft = $300
☐ Profit per sq. ft. = $600-$300 = $300
☐ Why not build higher?
A Simple Example

TC=300xQ^2  
TC=cost in millions
Q=sq.ft in millions.

If Q =1, TC =300 million
If Q = 0.5, TC = 75 million
Doubling size quadruples cost
A Simple Example

Total Cost

$300 m

$75 m

$18.75 m

0.25 0.5 1

square feet (millions)
Marginal Cost

\[ \text{TC} = 300 \times Q^2 \]

\[ \text{MC} = 600 \times Q \]
How high to build?

$600 \quad \text{Square feet (millions)}

$ per sq. ft.  

Marginal Cost
Maximum Bid

Maximum developer would be willing to pay for land

\[ = \left( \$600 - \$300 \right) \times 1,000,000 \]
Developers Compete

☐ Every developer has access to same building technology
☐ Each will be willing to pay about the same
☐ Land will go to highest bidder
☐ Land value exhausts surplus-difference between revenue and costs
Land Value

PV of office rent per sq. ft.

Marginal cost of square feet

Land Value

square feet
Higher Rent, Taller Building

Square feet

$ per sq. ft.

p

p'

MC

Square feet
Higher Rent, Higher Land Value

Square feet

$ per sq. ft.

MC

Increase in land value

$ p'

$p

Square feet
Relationship between office rent and land value

☐ Office rent increases as we move closer to CBD

☐ Land value also increases

☐ Proportional to office rent? Faster? Slower?
Suppose Linear Relationship between Rent and Distance

Rent per sq. ft per year

X: distance to CBD
Changes in Land Value

PV of rent per sq. ft.

Same change in rent

Bigger change in land value

MC

Office space per square foot of land
Land Values Rise Faster than Office Rents Approaching CBD

Office Rent

Land Values

$x$: distance from CBD
Put Another Way

- Land values are very high in CBD (even though office rents may not be much higher)!
A Caution

☐ Building long lasting
☐ Suppose a 10 story building
☐ If vacant land, would build a 20 story building
☐ Should we tear down and build taller?
☐ Not necessarily
☐ Construction costs of old building are now sunk costs
Example

- Rents from old building minus maintenance costs generate present value of $20 million.
- It would cost $15 million to build it today.
- New building would generate $50 million and cost $40 million
- Should we tear down old building and build new one
Not necessarily

☐ Compare $50m-$40m to $20m
☐ Not $50m-$40m to $20m-$15m
☐ Construction costs of old building are sunk and thus not relevant
☐ Office rents have risen over time
☐ Optimal size of building has grown
☐ Old, short building among new, tall buildings.
Southern Pacific Building, SF
Wrap Up

- Relationship between land values and distance from CBD
- Focus on commercial uses
- Next time—residential uses
- Read section from O’Sullivan
Project

- Data from 1970, 1980, 1990, and 2000 census for your tract and MSA
- Population, households, and average household income
- Not median household income!
- Check population and households against your data. Did I get the right tract?