Quick Review

- 3 regularities of urban spatial structure
- Monocentric city model

TOGETHER FORWARD

• The concept of spatial equilibrium within a city



Housing Valuation I

RE420: URBAN AND REGIONAL ECONOMICS



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Introduction

- Imagine you are considering to buy a home listed in Zillow
- How do we determine the listing price is appropriate?

< Weston Place, 625 N Segoe Rd, Madison, WI 53705 >





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Two Different Approaches for Valuation

1. The User Cost Model

2. Hedonic Approach

OGETHER



Two Different Approaches for Valuation

1. The User Cost Model

2. Hedonic Approach



User Cost Model: Introduction

- Two types of tenure choices
 - To owner-occupy
 - To rent
- Purchasing a home & becoming a homeowner is essentially an alternative option to renting the property
- Then, the user cost of the owner should be identical to the user cost of the renter!



User Cost Model: Introduction

- Is \$800,000 overvalued or undervalued?
 - Impossible to simply compare the monthly rent with the lump-sum purchase price

<Recent Sale Price>

<Listing Price for Rent>





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User Cost Model: A Simplified Model

- Let's make the comparison fair
- Consider what aspects are different when a consumer owns & occupies versus rents a home.
 - The homeowner will get a mortgage and make monthly payments
 - The homeowner will pay property taxes



User Cost Model: A Simplified Model

- Suppose the consumer buys the house at \$V using a 100 percent, interest-only mortgage
- Let *i* denote the annual mortgage interest rate, and *t* denote the property tax rate
 - Annual interest payment: $i \times V$
 - Annual property tax payment: $t \times V$
 - The sum of the two cost: $(i + t) \times V$

User Cost Model: A Simplified Model

- If the consumer rents the same house, he pays the annual rent payment: \$*rent*
- The dollar cost of owning and renting should be equal
 - Otherwise, the option with the lower cost should ultimately be the better choice

$$(i+t) \times V = rent$$

 $V = rent/(i+t)$



- Let's calculate whether \$800,000 was reasonable
 - What \$V do you get?

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<market mortgage="" rate=""></market>	<average property="" rate="" tax=""></average>
Rates	Not in Wisconsin? Wisconsin *
Average rates	Enter your financial details to calculate your taxes
Sep 13, 2024 Loan amount Down payment \$700K 3% Image: State with the second	Enter Your Location Madison, WI Average County Tax Rate () 1.900% (Dane County)

$$V = \frac{3,750 \times 12}{6.052\% + 1.9\%}$$

$$V = \frac{45,000}{7.952\%} = \$565,895!!$$



- The calculated home value from the user cost model (\$565,895) is much lower than the actual sale price (\$800,000)
 - Was the buyer stupid?
 - Are we missing something important in our model?



User Cost Model: A Model Including Investment Value

- Owning a house is more than just consuming housing value
- Owner-occupied housing is also an investment, providing "real" capital gains for homeowners
- At the same time, homeowners face the depreciation of their homes



ORWARD

User Cost Model: A Model Including Investment Value

- Denoting *d* and *g* annual depreciation rate and home value appreciation rate, respectively,
- The total user cost of owning a house now includes:
 - Annual interest payment: $i \times V$
 - Annual property tax payment: $t \times V$
 - Annual depreciation: $d \times V$
 - Annual "real" home value growth: $g \times V$

$$(i+t+d-g) \times V = rent \Rightarrow V = \frac{rent}{i+t+d-g}$$



- Let's calculate the home value again!
 - In 2023, the home price growth rate in Madison, WI was 9.9% (FHFA)
 - The average inflation rate in 2023 was 4.1% (BLS)

 \Rightarrow Annual Real Home Value Growth = g = 9.9 - 4.1 = 5.8%

- The residential properties are depreciated over 27.5 years (IRS)

$$\Rightarrow$$
 Depreciation Rate = $d = \frac{1}{27.5} = 3.636\%$



$$V = \frac{3,750 \times 12}{6.052\% + 1.9\% + 3.636\% - 5.8\%}$$

$$V = \frac{45,000}{5.788\%} = \$777,470!!$$



• What happens to the home value, *V*, when Madison's property tax increases to 3%?

• What happens when mortgage interest rate goes down to 5%?



• What happens to the home value, *V*, when Madison's property tax increases to 3%?

$$V = \frac{3,750 \times 12}{6.052\% + 3.0\% + 3.636\% - 5.8\%} = \$653,310.1$$

• What happens when mortgage interest rate goes down to 5%?

$$V = \frac{3,750 \times 12}{5.0\% + 1.9\% + 3.636\% - 5.8\%} = \$950,168.9$$



User Cost Model: Limitations

- 1. Possible missing components in the user cost model:
 - The value of being a homeowner itself
 - Various maintenance and insurance costs
 - Tax deduction of interest payment
- 2. Rent prices are not available for all properties
 - Segmented housing market
- 3. Even if we know the rent price of a house, whether the rent price is fairly priced is still a question



Key Takeaways

- Understand the concept of the user cost model in housing valuation
- Understand the actual calculation of home values using the user cost model
- Understand the limitation of the user cost model
- Optional Readings:
 - Jan K. Brueckner, *Lectures on Urban Economics*. Chapter 6
 - Fox, R., Tulip, P. 2014. Is Housing Overvalued? Reserve Bank of Australia.

