Quick Review

- 3 regularities of urban spatial structure
- Monocentric city model
- The concept of spatial equilibrium within a city

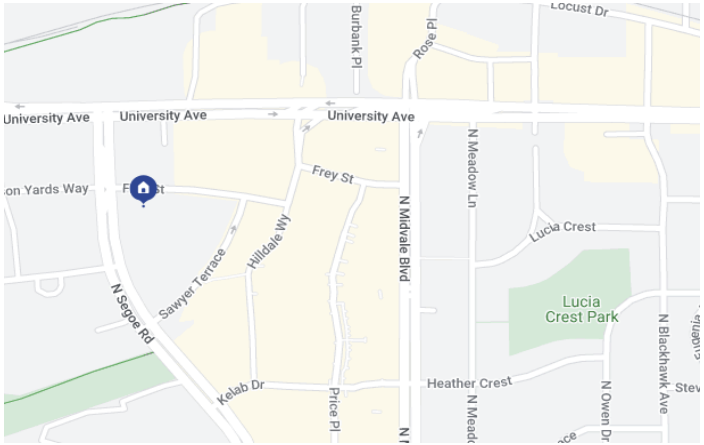
Housing Valuation I

RE420: URBAN AND REGIONAL ECONOMICS

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 >



Two Different Approaches for Value

1. The User Cost Model
2. Hedonic Approach

Two Different Approaches for Value

1. **The User Cost Model**
2. Hedonic Approach

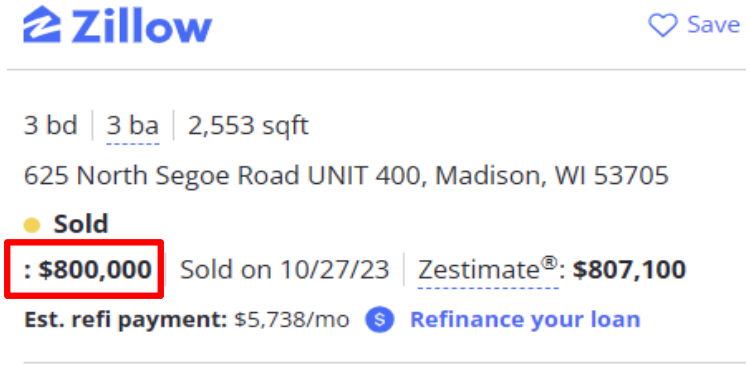
User Cost Model: Introduction

- 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!

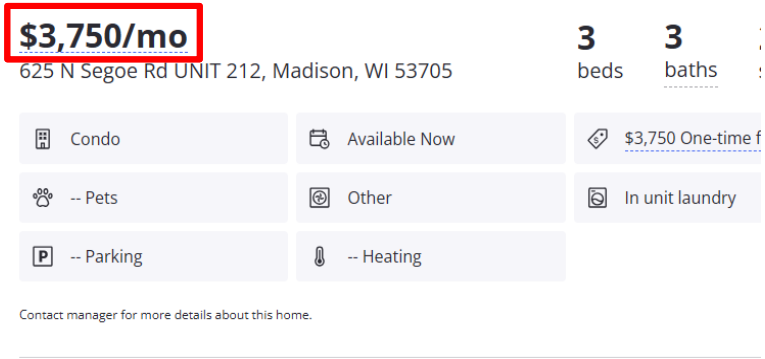
User Cost Model: Introduction

- 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>



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

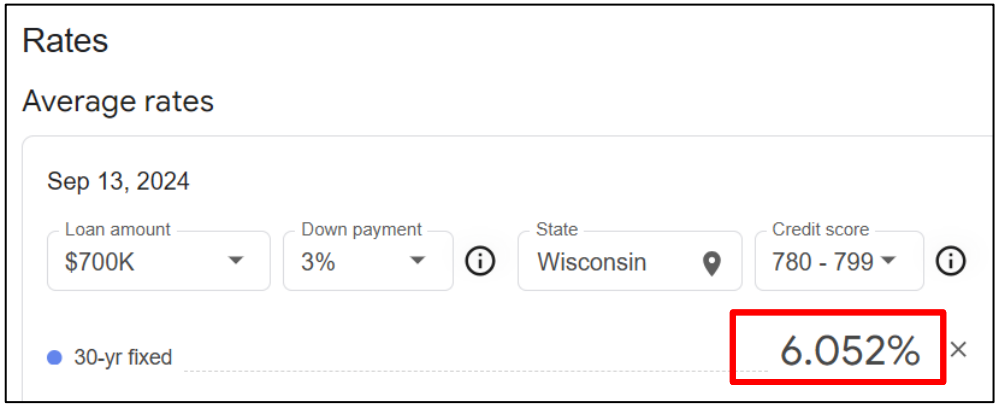
- If the consumer rents the same house, he pays the annual rent payment: $\$rent$
- The dollar cost of owning and renting should be equal
  - Otherwise, the option with the lower cost should ultimately be the better choice

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

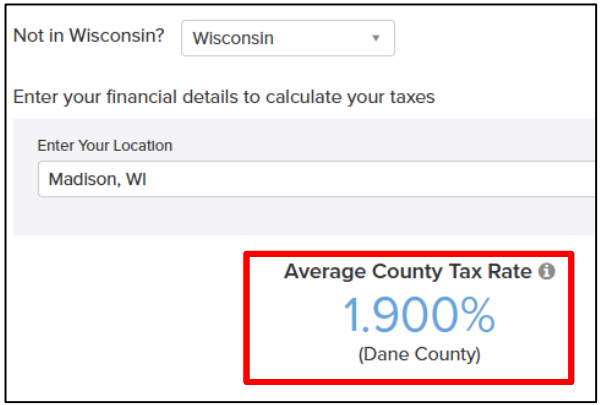
User Cost Model: Actual Value Calculation

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

<Market Mortgage Rate>



<Average Property Tax Rate>



User Cost Model: Actual Value Calculation

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

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

User Cost Model: Actual Value Calculation

- 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**

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: $g \times V$

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

User Cost Model: Actual Value Calculation

- 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)

$$\Rightarrow Annual\ Real\ Home\ Value\ Growth = g = 9.9 - 4.1 = \mathbf{5.8}\%$$

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

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

User Cost Model: Actual Value Calculation

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

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

User Cost Model: Actual Value Calculation

- 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%?

User Cost Model: Actual Value Calculation

- 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.