Review and Preview

- Wednesday: Mortgages
- Today: Is it better to own or rent?
- Monday: Was there a housing price bubble?
Homeownership

- In 2000 Census, 66% of households were homeowners
- But, homeownership highly correlated with household income
<table>
<thead>
<tr>
<th>Household Income</th>
<th>Percent</th>
<th>Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $5,000</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td>$5,000 to $9,999</td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>$10,000 to $14,999</td>
<td>47%</td>
<td></td>
</tr>
<tr>
<td>$15,000 to $19,999</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>$20,000 to $24,999</td>
<td>54%</td>
<td></td>
</tr>
<tr>
<td>$25,000 to $34,999</td>
<td>59%</td>
<td></td>
</tr>
<tr>
<td>$35,000 to $49,999</td>
<td>67%</td>
<td></td>
</tr>
<tr>
<td>$50,000 to $74,999</td>
<td>77%</td>
<td></td>
</tr>
<tr>
<td>$75,000 to $99,999</td>
<td>84%</td>
<td></td>
</tr>
<tr>
<td>$100,000 to $149,999</td>
<td>88%</td>
<td></td>
</tr>
<tr>
<td>$150,000 or more</td>
<td>89%</td>
<td></td>
</tr>
</tbody>
</table>
Why Is Homeownership Related to Income?

- Down payment
- Mobility
  - Owning has high transaction cost
  - Don’t own unless you plan to stay
  - Young households are mobile
  - Young households are poorer
- Income Tax Incentives—focus today
A World Without Income Taxes

- What is equilibrium rent for a house?
- What would it cost in annual terms to own a house?
The Landlord’s Perspective

- Rent on house is $R$
- Value of house is $V$
- Mortgage is $\theta V$
- Annual interest payment is $i\theta V$
- Maintenance is $M$
- Property tax is $\tau V$
- Assume no capital gains—next time
Landlord’s Net Income

\[ \text{Income} = R - i\theta V - \tau V - M \]

Landlord’s equity: \((1-\theta)V\)

Opportunity cost of equity: \(i(1-\theta)V\)
Equilibrium

Income = opportunity cost

\[ R - i\theta V - \tau V - M = i(1-\theta)V \]

\[ R = iV + \tau V + M \]
The Homeowner’s Perspective

- Value of house is \( V \)
- Mortgage is \( \lambda V \)
- Annual interest payment \( i\lambda V \)
- Maintenance is \( M \)
- Property tax is \( \tau V \)
- Assume no capital gains—next time
Homeowner’s Cost

- Out of pocket
  \[ i\lambda V + \tau V + M \]
- Opportunity cost of equity
  \[ i(1-\lambda)V \]
- Total cost
  \[ i\lambda V + \tau V + M + i(1-\lambda)V = iV + \tau V + M \]

(Same as R)
Summing Up-No Taxes

- Rent = $iV + \tau V + M$
- Homeowner’s cost = $iV + \tau V + M$
- Rent is the same as cost
- Renting has the same cost of owning
- Are maintenance costs really the same for landlords and homeowners
  - renter externality
Other Factors

- Owning involves fixed transaction costs
  - Rent unless plan to stay for a long time
- Owning requires a downpayment
  - Wouldn’t people prefer to diversify
A World with Income Taxes

- Tax breaks for landlord’s
  - Accelerated depreciation

- Tax breaks for homeowners
  - Mortgage interest is tax deductible
  - Property taxes are deductible
  - More accurately: interest and property taxes are deductible but imputed rent is not taxable
Landlord’s Depreciation Tax Shield

- House has a tax life
- Now 27 years
- Each year, 1/27 of value deducted as depreciation
- When house sold, capital gain on difference between price and depreciated value
More on Tax Shield

- Depreciation doesn’t change total tax over life of house
- Pushes it back in time
- Deferring taxes, reduces present value
- $PV = \text{present value of depreciation allowance}$
- $D = \text{annualized value of PV}$
Landlord’s After Tax Income

\[ \text{R-i} \theta \text{V-} \tau \text{V-M} - t_L (R-i \theta \text{V-} \tau \text{V-M-D}) \]

income taxes
\[ t_L = \text{marginal tax rate for Landlord} \]

\[ = (1-t_L)(R-i \theta \text{V-} \tau \text{V-M}) + t_L \text{D} \]
Landlord’s Opportunity Cost

- Opportunity cost of equity
  \[ (1-t_L)i(1-\theta)V \]
- Opportunity cost = income
  \[ (1-t_L)(R-i\theta V-\tau V-M)+t_L D=(1-t_L)i(1-\theta)V \]

\[ R=iV+\tau V+M-(t_L/(1-t_L))D \]

Same as without taxes except for D

Rent lower than without taxes
Who Would Be Landlords?

- Value of depreciation tax shield increases with marginal tax rate
- Higher income households have higher tax rates
- Landlords tend to come from high tax brackets, have high tax rates
Tax Breaks for Homeowners

- Deduct interest and property taxes
  \[ t(i\lambda V + \tau V) \]
- Reduction in taxes
  \[ (1-t)i(1-\lambda)V \]
- Opportunity cost of equity
- Cost
  \[ i\lambda V + \tau V + M - t(i\lambda V + \tau V) + (1-t)i(1-\lambda)V \]
  \[ = (1-t)(iV + \tau V) + M \]
Marginal Tax Rates

- State income tax is deductible on federal return
- $1 of income $\rightarrow t_s$ in state taxes
- Federal taxable income $= 1 - t_s$
- Federal taxes $= t_f(1-t_s)$
- Total taxes from $1$

$$t_s + t_f(1-t_s) = t_s + t_f - t_f t_s$$
Applying the Formula

<table>
<thead>
<tr>
<th>Taxable Income</th>
<th>US Rate</th>
<th>CA Rate</th>
<th>Total Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5,000</td>
<td>0.10</td>
<td>0.01</td>
<td>0.111</td>
</tr>
<tr>
<td>$75,000</td>
<td>0.28</td>
<td>0.093</td>
<td>0.399</td>
</tr>
<tr>
<td>$200,000</td>
<td>0.35</td>
<td>0.093</td>
<td>0.476</td>
</tr>
</tbody>
</table>
An Example

\[ V = $500,000, \ i = 0.06, \ \tau = 0.01, \ M = $10,000 \]
\[ C = (1-t)(iV+\tau V)+10,000 \]

<table>
<thead>
<tr>
<th>Tax. Inc.</th>
<th>t</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5,000</td>
<td>0.111</td>
<td>$41,465</td>
</tr>
<tr>
<td>$75,000</td>
<td>0.399</td>
<td>$31,035</td>
</tr>
<tr>
<td>$200,000</td>
<td>0.476</td>
<td>$28,340</td>
</tr>
</tbody>
</table>
Rent or Own?

Rent if no tax subsidy

Rent, Cost ($/yr)

Cost of Owning

Income

Renters

Owners

Rent with depr. tax shield
Other Reasons for Owning and Renting

- Mobility
- Renter externality
- Pride of homeownership
- Tax system tilts towards owning
Consequences of Owning

- Homeowners have financial interest in schools and communities
- Big part of wealth is not diversified
- Housing market is volatile
- Next time examine volatility
- Was there a bubble in the housing market?
Reading for Wednesday