

Owner-occupied Housing

Alternative methods of valuing expenditures



Bettina H. Aten

Background

How to value housing services in the U.S. National Accounts?

- 36% of all dwellings are rented, 64% are owner-occupied
- Rents and Imputed Owner Rents are important components of national and regional accounts:
 - 15% of Personal Consumption Expenditures,
 - 11% of GDP

Conceptual issues and challenges

- Existing method of imputing OOH expenditures in the NIPAs (National Income and Product Accounts)
 - Benchmarks based on the Residential Finance Survey
 - Rental receipts as a % of value of building
 - Rent per value class is multiplied by # of owner-occupied units
 - Depreciation of major appliances subtracted
 - Extrapolations: American Housing Survey; Consumer Price Index
 - Rent index for owners extrapolated by CPI
 - Constant dollar per unit values derived from net stocks/unit stock

Why the need for an alternative?

- RFS discontinued in 2001
- Extrapolations more tenuous as distance from benchmark increases
 - Eg. Static rent to value ratios will likely overstate imputed OOH expenditures during housing booms, as home prices rise disproportionately to rents.
- New surveys and data available
- Need for regional as well as national data

Rent to Value ratios (PUMS)



U.S. Median Rent to Value Ratio (%) and Home Values, 2000–2015

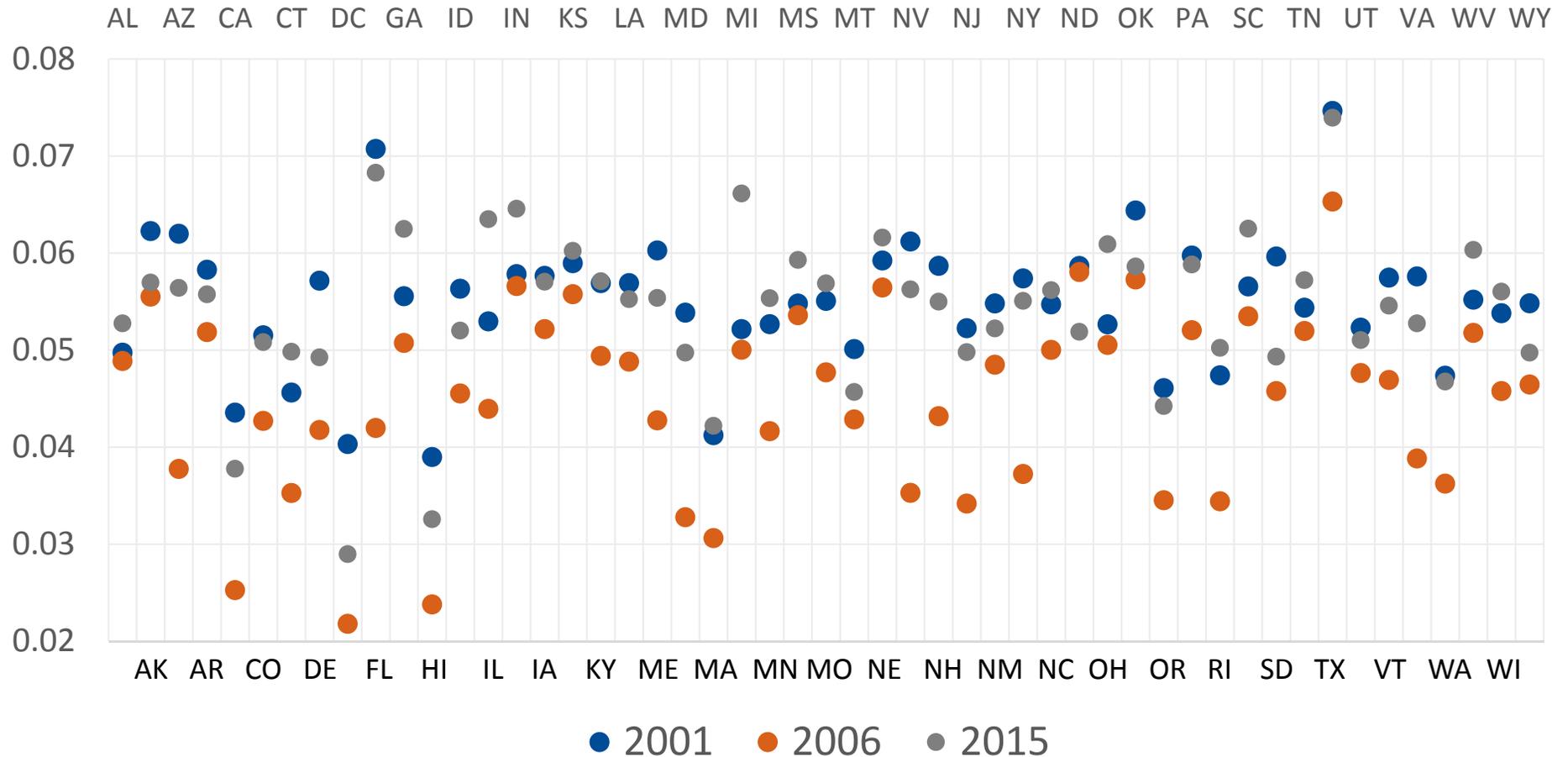


Source: PUMS/ACS and author's calculations

Rent to Values by States:



Rent-to-Value Ratios for U.S. States and DC



A. Comprehensive annual housing survey by Census (ACS) in 2005

- Samples over 10 million households every 5 years - microdata
- Covers all counties, includes contract rents and home values estimated by owners
- PUMS (Public Use) in this paper, about 1.4 million / year

B. Zillow

Literature on Imputing OOH

Two main approaches:

- A. Rental Equivalence using characteristics common to both renters & owners
 - With and without assumption of an owner's premium
- B. User costs
 - Owner estimates of costs (observed)
 - Simplified user cost with assumptions on interest and depreciation rates
- C. Opportunity cost approach

A. Rental Equivalence

1. 'Pure' Rental Equivalence

- Find observed weighted geometric mean of all rented units, stratified by structure type and number of bedrooms (17 classes), total number of rooms (4), age of structure (4) and state (51). Total of 13,872 stratification cells.
- Assign these values to each owner-occupied unit

2. Rental equivalence plus Owner Premium

- Add a percentage premium based on individual owner's assessed value relative to the median value of all owner-assessed values of that structure type and in that state

Suggested premium assumption

- Premium based on β = home value relative to median value by structure type and state

Home value / Median value	Owners' Premium formula	Owners' Premium
$\beta_{ij} \leq 0.5$	RE x 1.05	5%
$0.5 < \beta_{ij} \leq 1.0$	RE x (1.05 + 0.20 ($\beta_{ij} - 0.5$))	5% - 15%
$1.0 < \beta_{ij}$	RE x (1.15 + 0.30 ($\beta_{ij} - 1.0$))	15% +

Eg, If β_i for a single-family home is 1.33 ($\$200k / \$150k =$ state median), add 25% to the rental equivalence estimate

B. User Cost variations

Estimated for each individual unit in a given year (867,000 dwellings in 2015 representing 75.8 million households)

1. Owner cost :

- Mortgage payment + insurance + taxes + (value of home x **depreciation**)

2. User cost: $u_{it} = P_{it} (r_t + \delta_i)$, where $i = \text{individual dwelling}$, $t = \text{year}$

- Value of home x (**interest rate + depreciation rate**) + insurance + taxes

Depreciation assumed to vary by type of structure and size of dwelling (0.5%-2.0%) while interest rates assumed constant across all units.

Mortgage, insurance, taxes and values reported for each household.

C. Opportunity Cost

Again, estimated for each individual unit in a given year:

1. Maximum between Rental Equivalence and User Cost

Applied by Diewert (2009) in time series context with separate land and structure depreciation rates; here applied to each household unit with depreciation varying by structure type and lot size

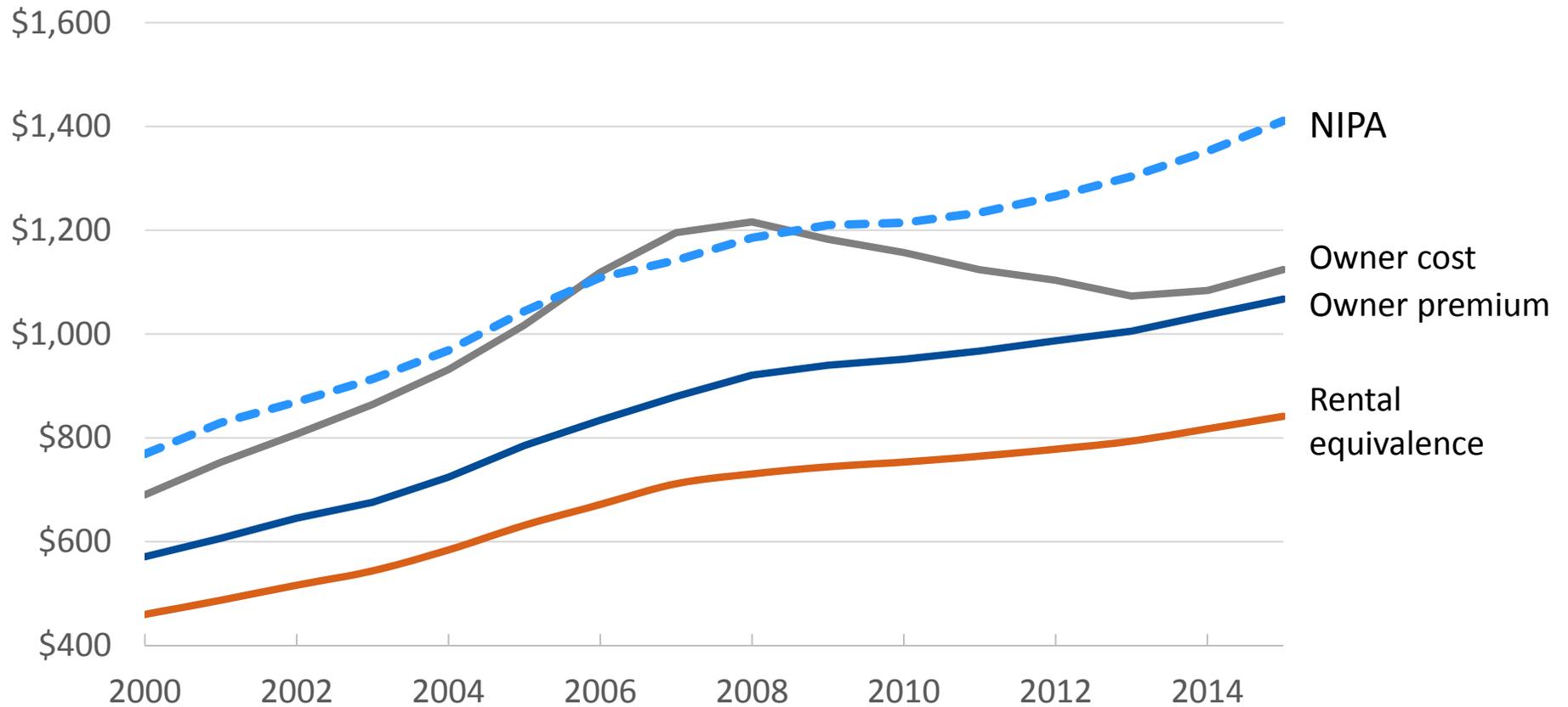
Total Imputed OOH expenditures for all approaches:

- For each owner-occupied housing unit, apply the rental equivalence value – with or without a premium - or estimate the user cost under various interest rate assumptions
- Opportunity cost: compare the two and take the maximum
- Multiply each housing unit by its sampling weight
- Sum across each state, type of structure, size and age

Annual OOH Expenditures



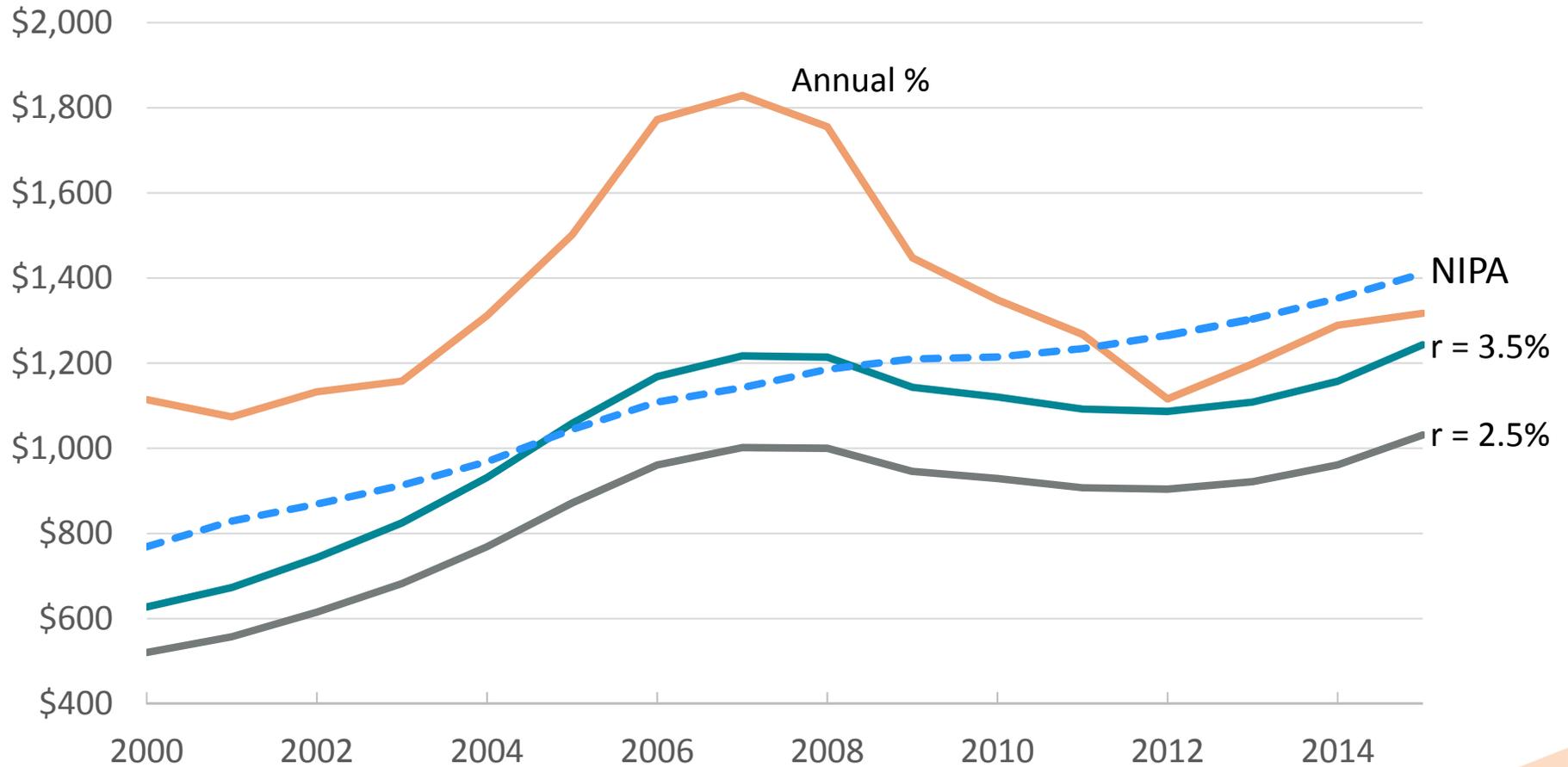
Annual Expenditures (\$billions), 2000–2015
Rental Equivalence, Owner Premium and Owner Cost



Annual OOH Expenditures



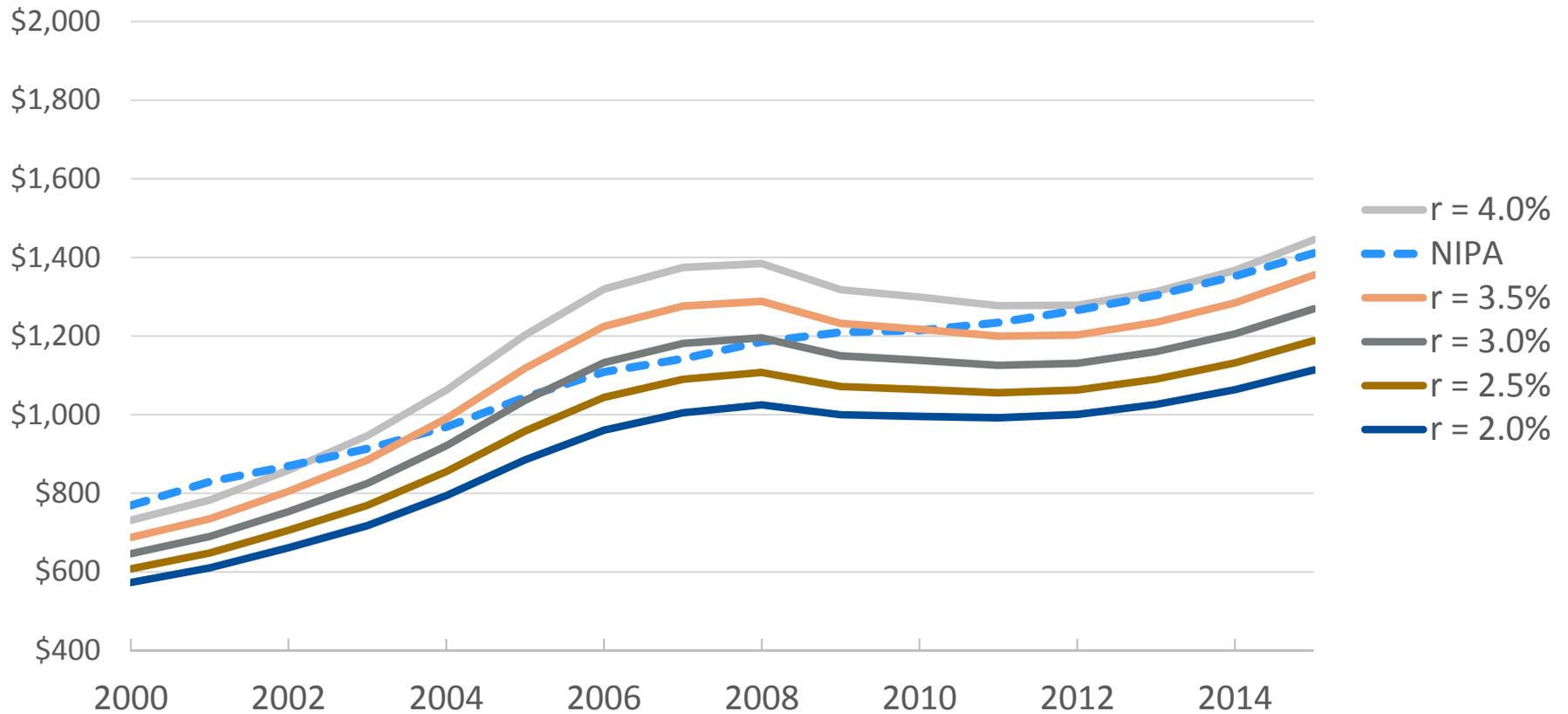
Annual OOH Expenditures (\$billions): User Cost With Different Interest Rates (r)



Annual OOH Expenditures



Annual OOH Expenditures (\$billions) Opportunity Cost With Different Interest Rate (r)



Advantages of alternative approaches



A. Rental Equivalence + owner premium

- Strong rental market in US
- Based on observed contract rents; straightforward
- Premium has intuitive appeal and uses individual owners' valuations of home prices relative to all owner's valuations

B. User cost

- a) Owner cost
 - Owners' stated monthly payments for mortgage, insurance and taxes
- b) Simplified User cost
 - Owner's valuation of home, observed insurance and taxes, plus common interest rate and depreciation

C. Opportunity cost

- May better capture homes at higher end of value spectrum than rental equivalence

Disadvantages

A. Rental Equivalence + owner premium

- generates lowest OOH expenditure, likely understating high-end markets
- requires an assumption on premium distribution

B. User cost

- sensitive to interest rate and depreciation assumptions
- Eurostat uses 2% constant interest rate

C. Opportunity cost

- also sensitive to interest rate and depreciation assumptions
- May mask composition of renters and owners costs

Questions – how to move forward?



1. Rental equivalence methods – should they be modified to reflect higher end of the market which is not well captured by rentals?
 - a) If so, what assumptions to use for this premium?
 - b) How to reconcile with past estimates?

2. User cost approach (or opportunity cost), what assumptions about interest rates and depreciation should be used?
 - a) Should they be fixed rates?
 - b) Should imputed OOH rise/fall with housing booms?