

The Treatment of Owner-Occupied Housing in the U.S. CPI

Robert Martin
Division of Price and Index Number Research
Bureau of Labor Statistics

UN Virtual Sprint
June 22, 2022



Outline

1. Introduction
2. History of BLS OOH Treatment
3. Rental Equivalence
4. Payments

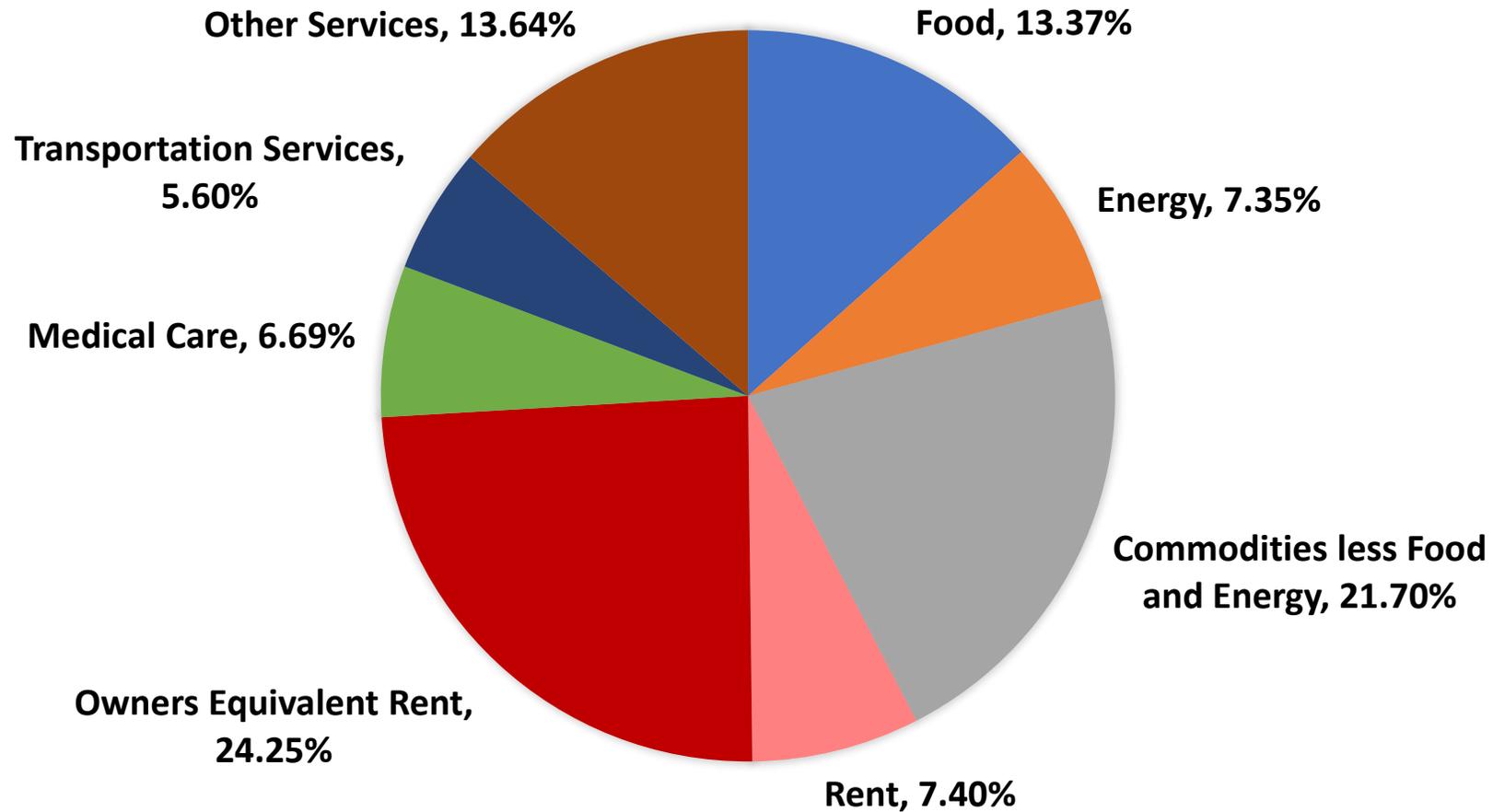


Price Index Timing

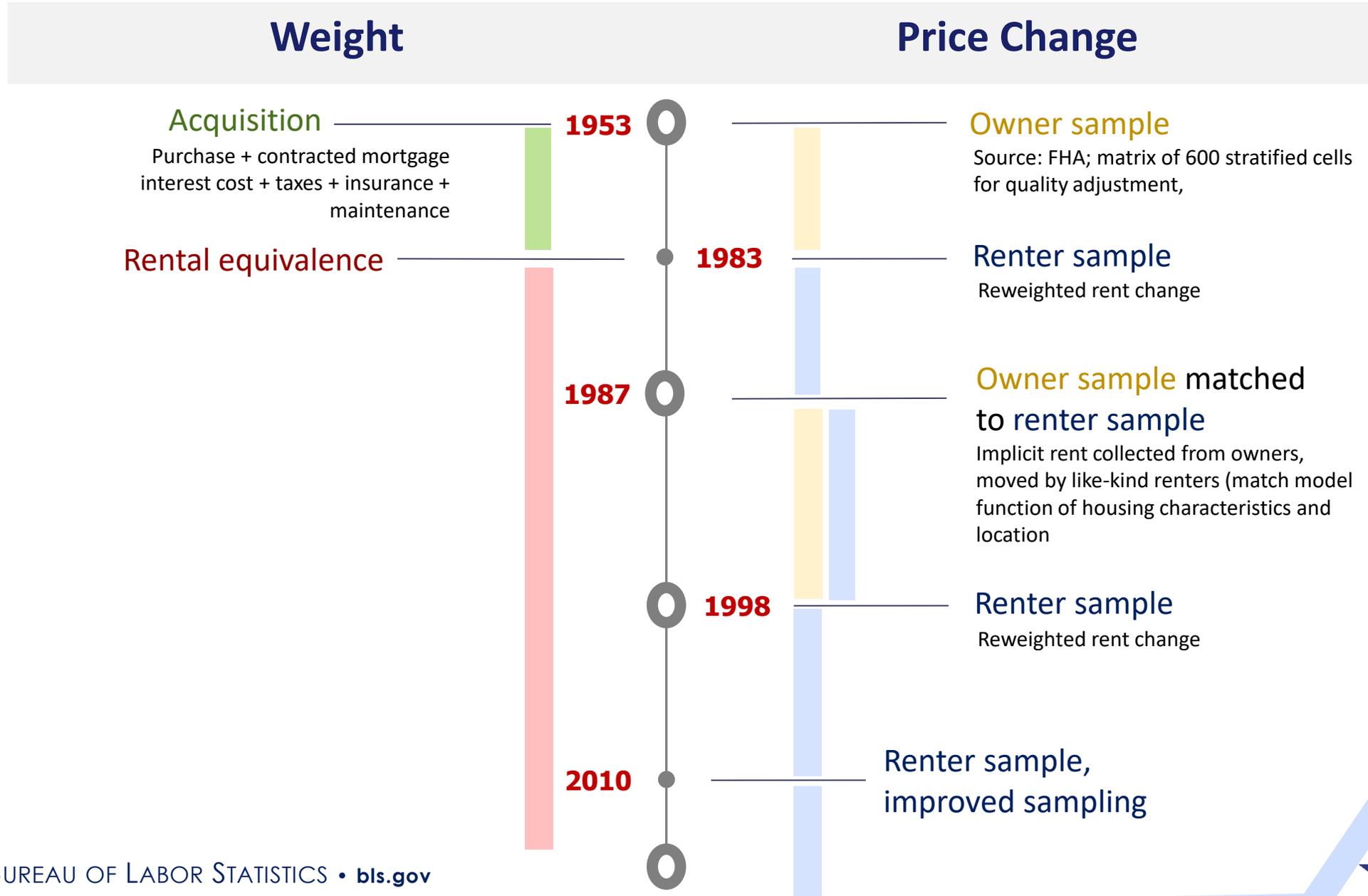
- Acquisition of, use or consumption of, and payment for a good or service may occur in different periods.
- Examples: Owner-occupied housing (OOH), storable or durable goods, advance purchases
- Three approaches to answering “when” and “how much”.
 - ▶ Acquisitions
 - ▶ Use (rental equivalence, user cost)
 - ▶ Payments



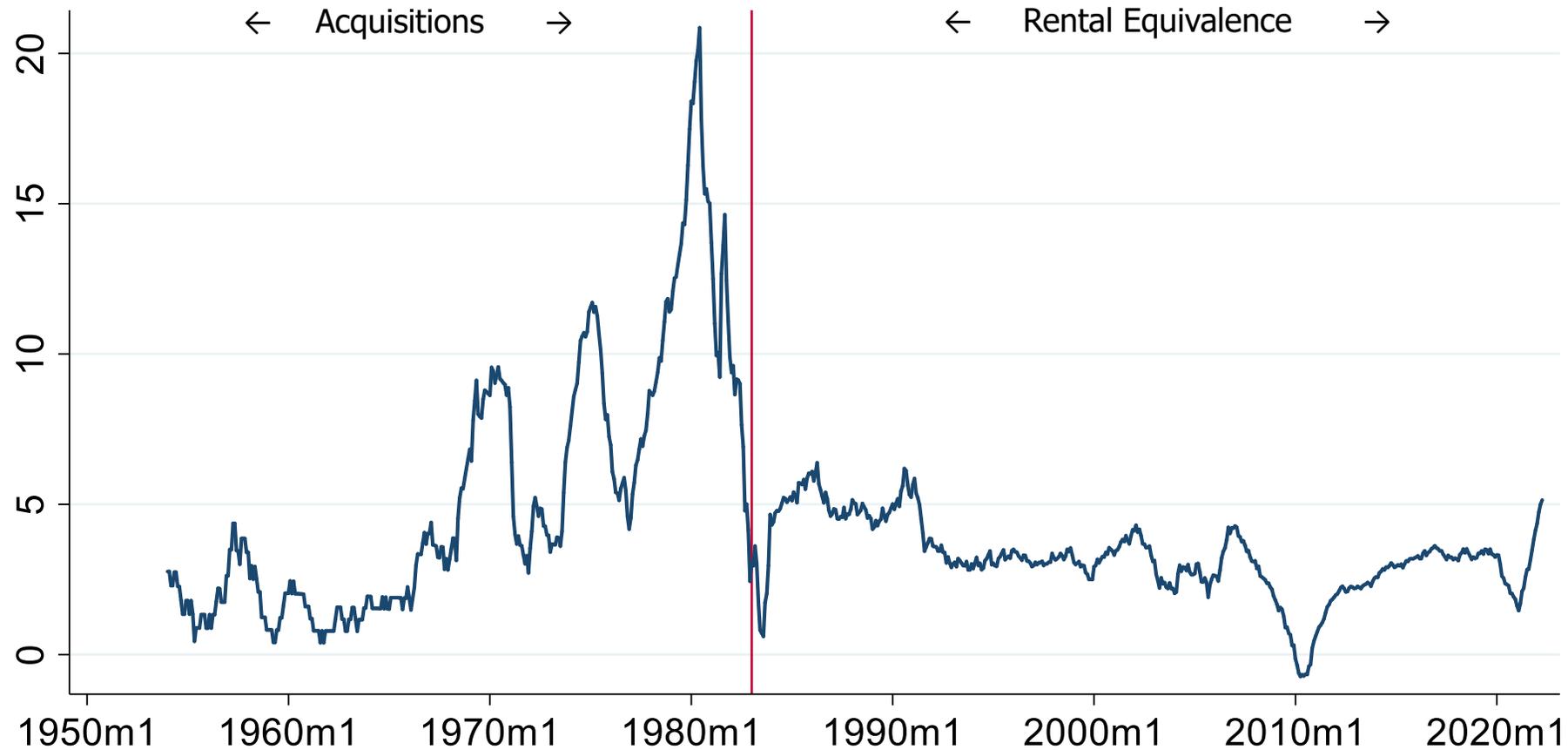
CPI-U Relative Importance, Dec. 2021



History of OOH treatment in US CPI



Acquisitions to Rental Equivalence



CPI: Shelter (12-month Percent Change)



Rental Equivalence

- Consumer Expenditure Survey (CE) questionnaire:

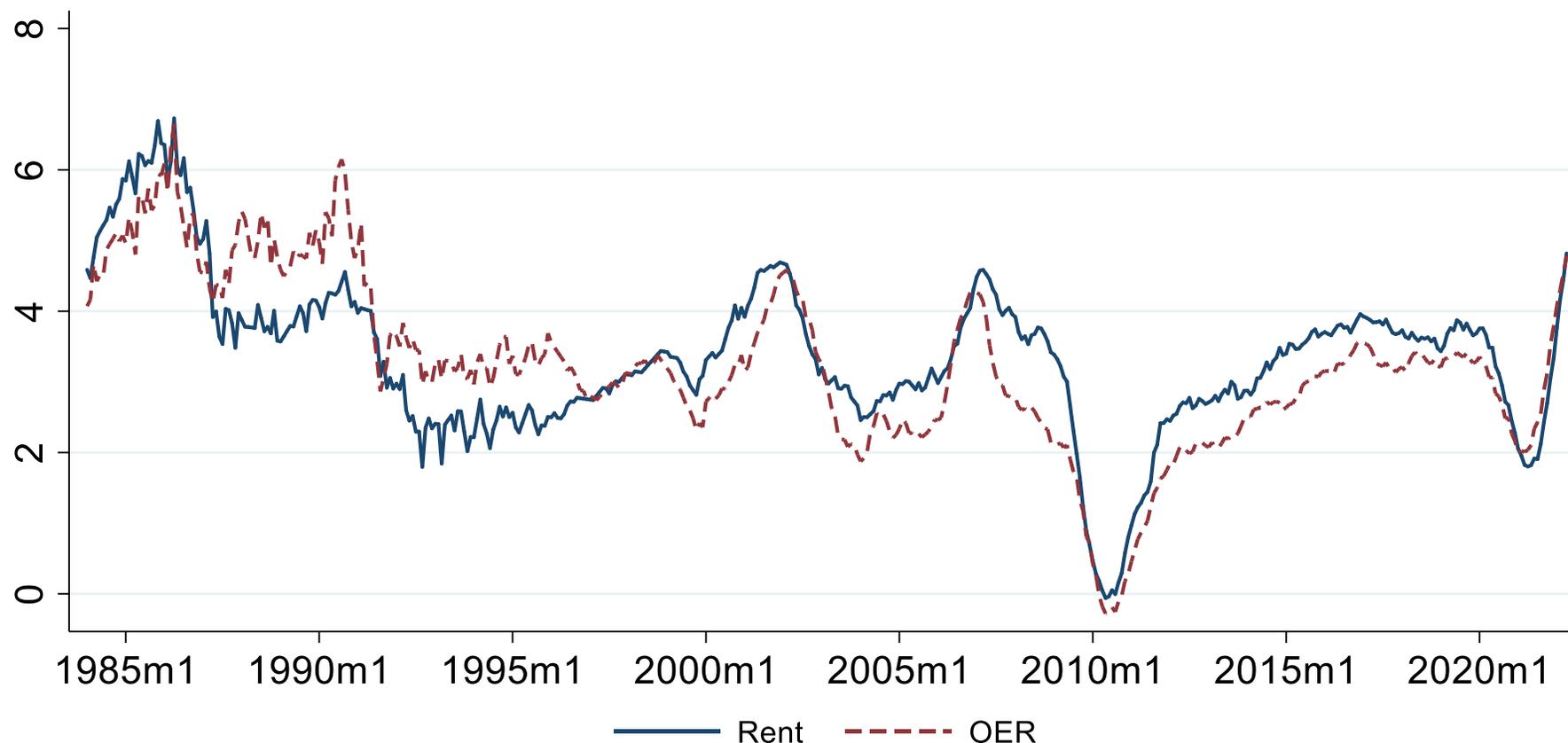
“If someone were to rent this (including part of the property currently being used for business, farming, or rented/home today) how much do you think it would rent for monthly, unfurnished and without utilities?”

BLS Owner Equivalent Rent (OER) Methodology

- **Sampling** – Target sample of 43,000 renters using probability proportional to size for primary sampling units, neighborhoods, and housing units
- **Collection** – Divide sample into six balanced panels and price each panel every six months (t and $t - 6$)
- **Review** – Trigger units based on rent, spec, and message changes to ensure constant quality
- **Estimation** – Produce 32 basic area indexes and aggregates monthly by taking sixth roots of six month rent changes



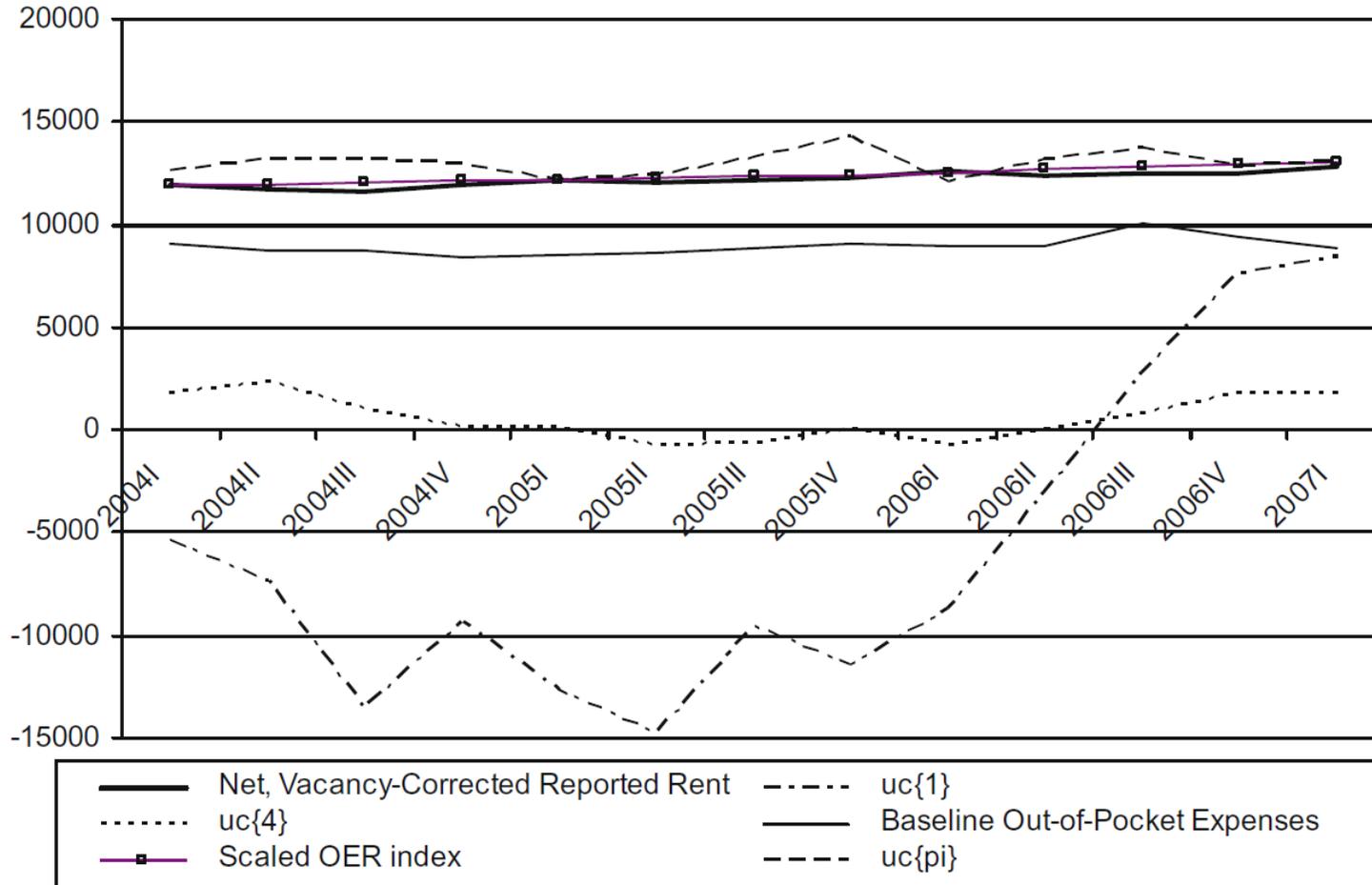
Rent and Owner Equivalent Rent Comparison



CPI: Rent and Owner Equivalent Rent (12-month Percent Change)



Rents vs. User Costs (1-yr.) Over Time



■ User Cost (UC)

= interest
 + depreciation
 + property taxes
 + insurance
 + expected appreciation or depreciation

Source: Garner and Verbrugge (2008). Fig. 7. Alternative Shelter Costs over Time - National

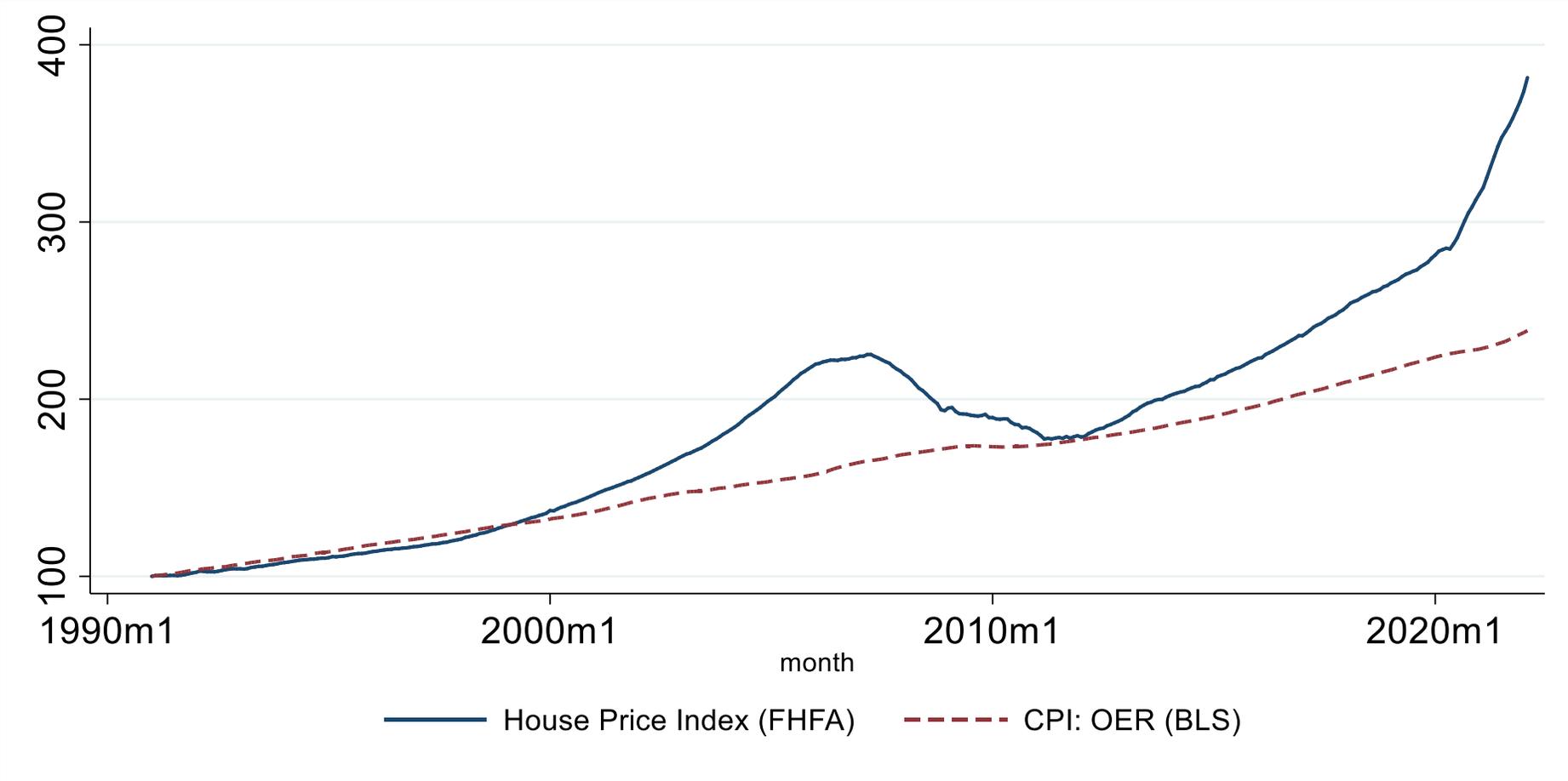


Rental Equivalence: Challenges and Issues

- Using rents to impute OOH – no observed prices
- Comparisons to home values or new tenant indexes
- Lagged rent changes due to $rent_{it}/rent_{i,t-6}$ construction
- Structure-type composition



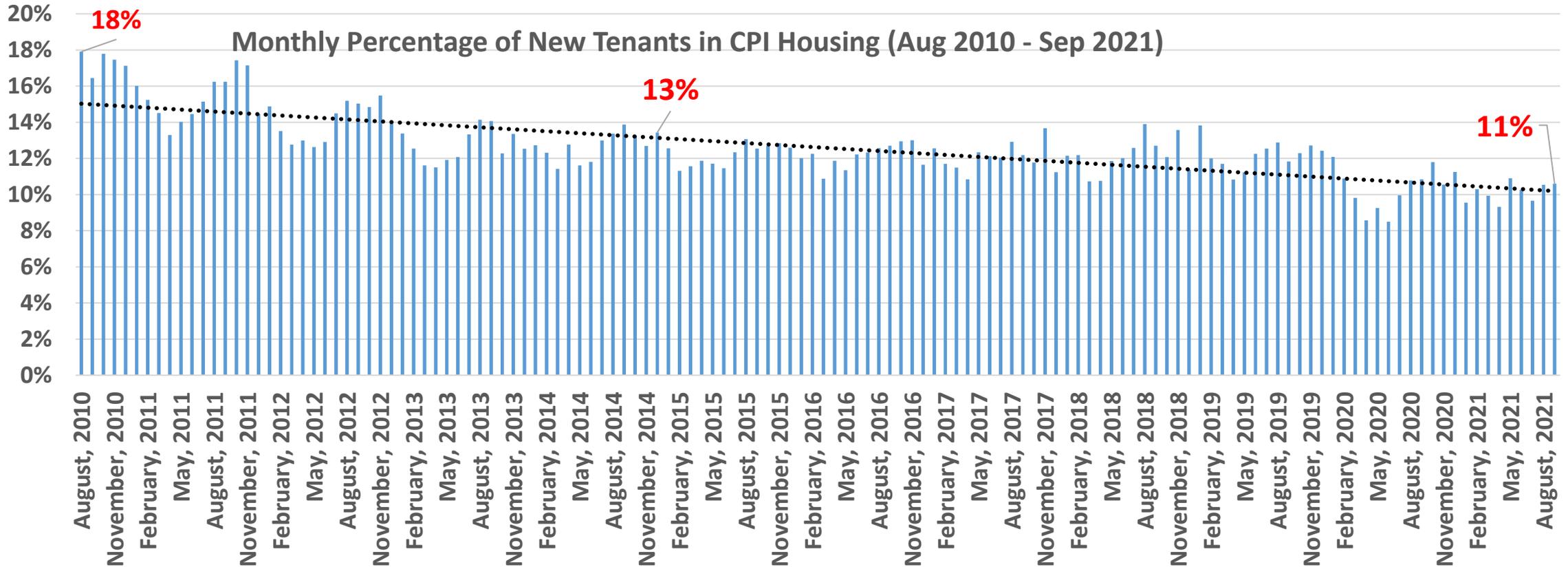
Consumption vs. Investment



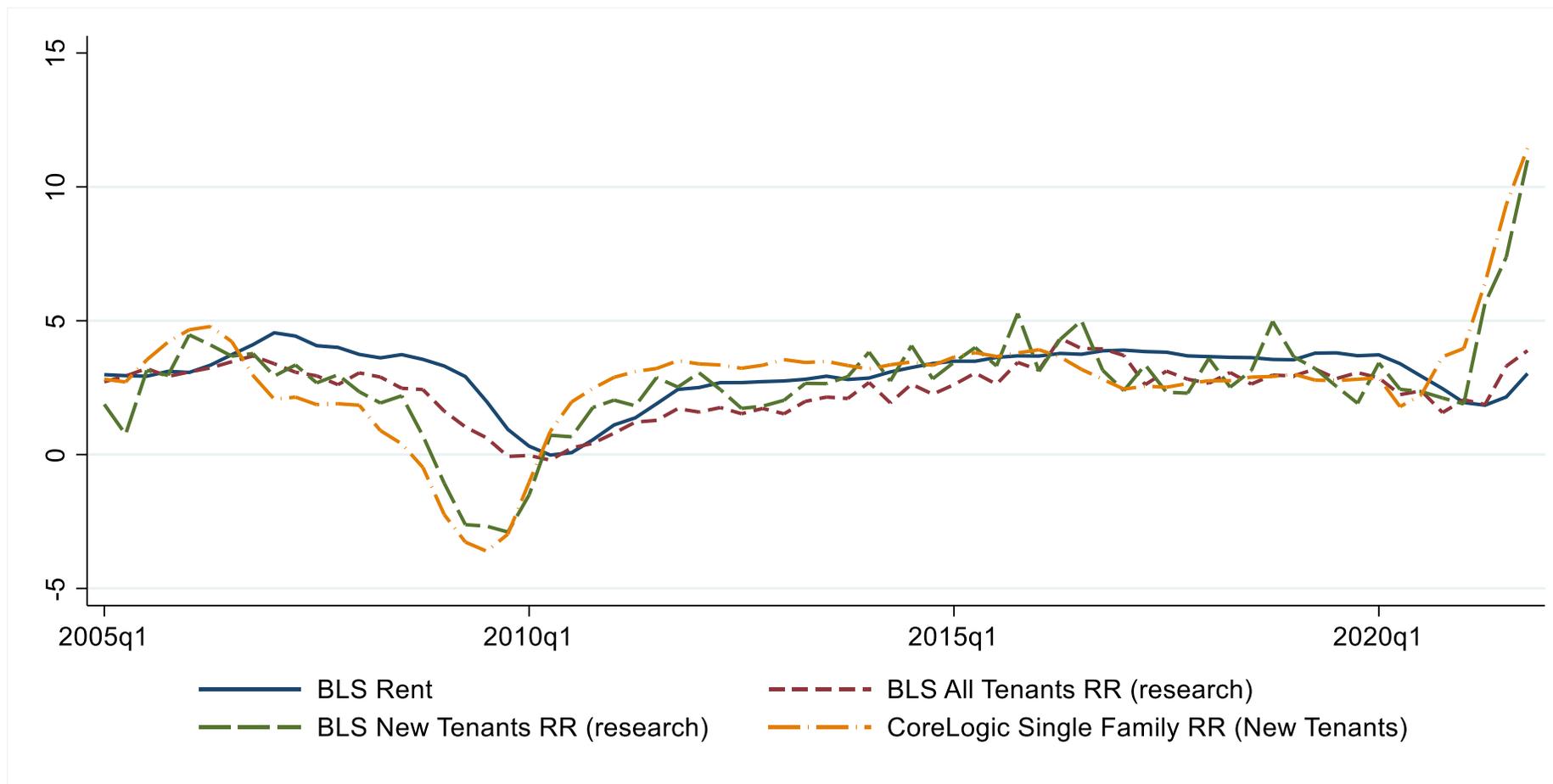
Growth in Different Housing Price Concepts (1991m1=100)



New vs. Same Tenants



BLS Rent Index vs. Alternative Methods



Comparing rent index methods (four quarter percent changes)



Structure-Type Composition

- Adams and Verbrugge (2020) show that the CPI housing rent sample underrepresents single family houses in its OER estimator
 - ▶ 33.6% vs. 86.6%
- Estimated contribution to OER mismeasurement $\approx 0.34\%$ per year from 2013-16
- Using a type-of-structure re-weighting solution could account for the mis-measurement

CNSTAT Recommendations

- Continue to use REQ as primary approach for housing services
- Seek new data sources for single-family homes
- Make use of characteristics in tax data
- Consider a supplementary series with repeat sales approach
- Research user cost and opp. cost approaches as comparisons
- Use same methodology for subgroup cost-of-living indexes



Payments Research

- The Use approach (rental equivalence or user cost) is appropriate for measuring implicit prices of housing services for a consumer price index or cost-of-living index.
- The Payments approach measures the change in explicit expenditures required for the household to access (pay for) housing services.
- Payments captures different aspects of the household experience, particularly for certain subpopulations.



Owner-Occupied Housing

Payments Approach	Rental Equivalence
<ul style="list-style-type: none">• Intended to reflect actual homeownership expenses• Includes property taxes, mortgage interest, full value of regular maintenance, etc.• Usually excludes mortgage principle, major renovations	<ul style="list-style-type: none">• Intended to capture implicit consumption of housing services• Rent as a proxy (OER)• Excludes investment• For some groups, may differ substantially from actual spending (e.g., owners w/o mortgages)



CPI-U Expenditure in 2018: Payments vs. REQ

Major Group	Expenditure (bil. \$)		Share of total	
	PAY	REQ	PAY	REQ
Food	1,047	1,047	16.7%	14.8%
Housing	2,127	2,948	34.0%	41.7%
Apparel	216	216	3.5%	3.1%
Transp.	1,145	1,145	18.3%	16.2%
Medical	609	609	9.7%	8.6%
Recreation	408	408	6.5%	5.8%
Education & Communication	484	484	7.7%	6.8%
Other	215	215	3.4%	3.0%
Total	6,251	7,072	100%	100%



CPI-U Expenditure in 2018: Payments vs. REQ

Select Items within Housing

OER
currently {

ITEM	Description	Expend. (bil. \$)		Share of total	
		PAY	REQ	PAY	REQ
HC01	Primary residence expenses	623.5	1,585.4	10.0%	22.4%
HC09	Unsampled secondary residence exp.	22.3	85.0	0.4%	1.2%
HD01	Tenants' and household insurance	59.3	27.4	0.9%	0.4%
HH01	Floor coverings	16.0	4.7	0.3%	0.1%
HK01	Major appliances	27.7	5.4	0.4%	0.1%
HK02	Other appliances	10.6	10.0	0.2%	0.1%
HK09	Unsampled appliances	0.2	0.1	0.0%	0.0%
HM01	Tools, hardware, and supplies	23.9	15.7	0.4%	0.2%
HM09	Unsampled tools, hardware, ...	78.4	13.5	1.3%	0.2%
HP04	Repair of household items	65.1	9.0	1.0%	0.1%
HP09	Unsampled household operations	13.9	5.2	0.2%	0.1%
Sum		940.7	1,761.5	15.0%	24.9%

CPI-U Expenditure in 2018: Payments vs. REQ

Payments HC01: Primary Residence Expenses

Sub-Item	2018 Share
Ground Rent	0.10%
Property Tax	4.42%
Mortgage Interest	5.33%
Parking	0.02%
Property Management	0.11%

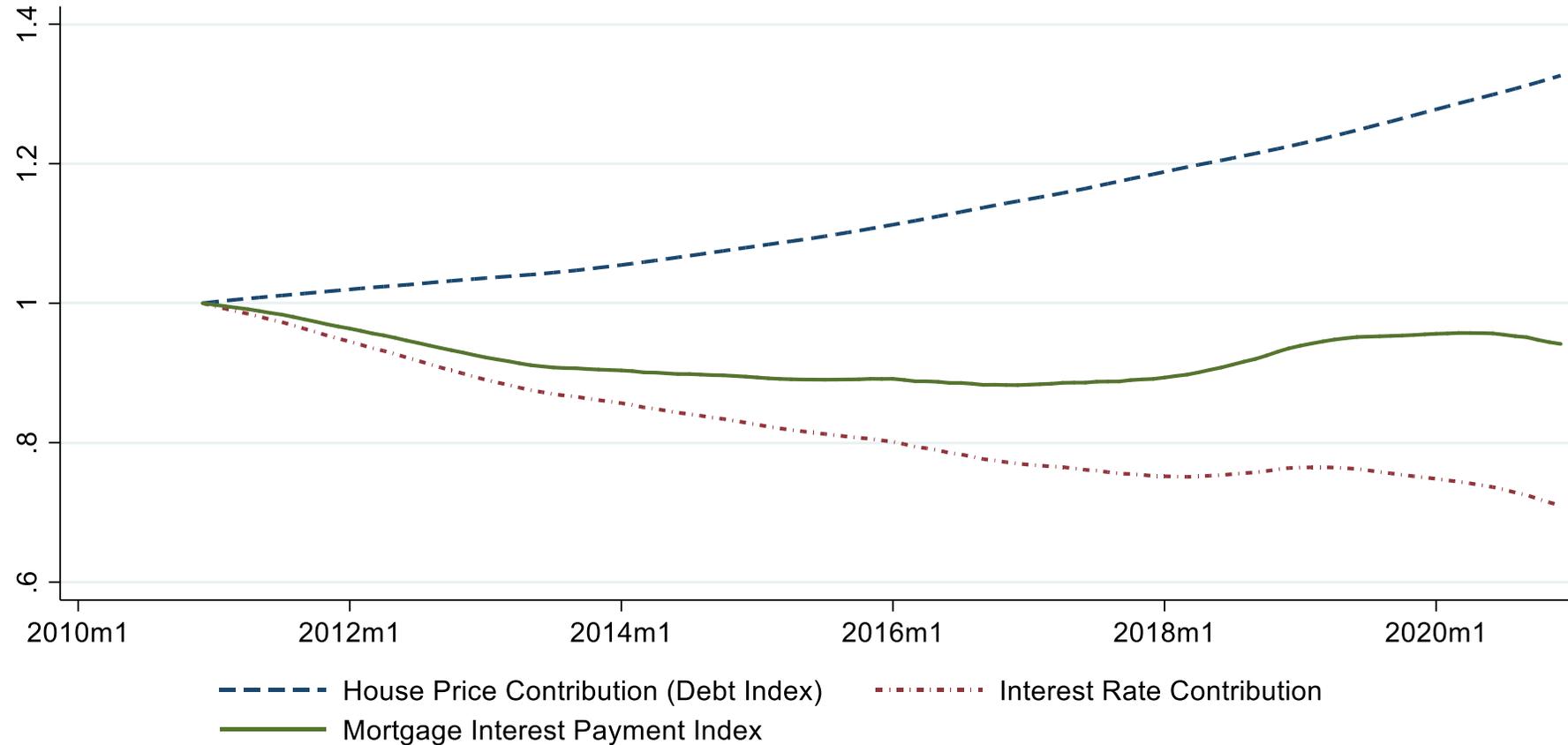
Preliminary Price Analysis: Data

- Repurposing existing datasets
- Consumer Expenditure Survey
 - ▶ Property tax expenditures, Property values
 - ▶ Mortgage loan information (restricted to 30-year fixed rate)
- Federal Housing Finance Agency House Price Index
- Freddie Mac Primary Mortgage Market Survey

Preliminary Price Analysis: Methods

- Following ILO (2004, Ch. 10) recommendations for
 - ▶ Fixed loan-age approach for mortgage interest payment index
 - Requires long timeseries...0 to 360 months prior to index base period
 - ▶ Multiplying percentages (i.e., interest rates or property tax rates) by monetary bases (a debt index or house price index)
- Ongoing discussion: Should a payments index include the impact of home prices when these reflect (potentially unrealized) capital gains or losses to the household?

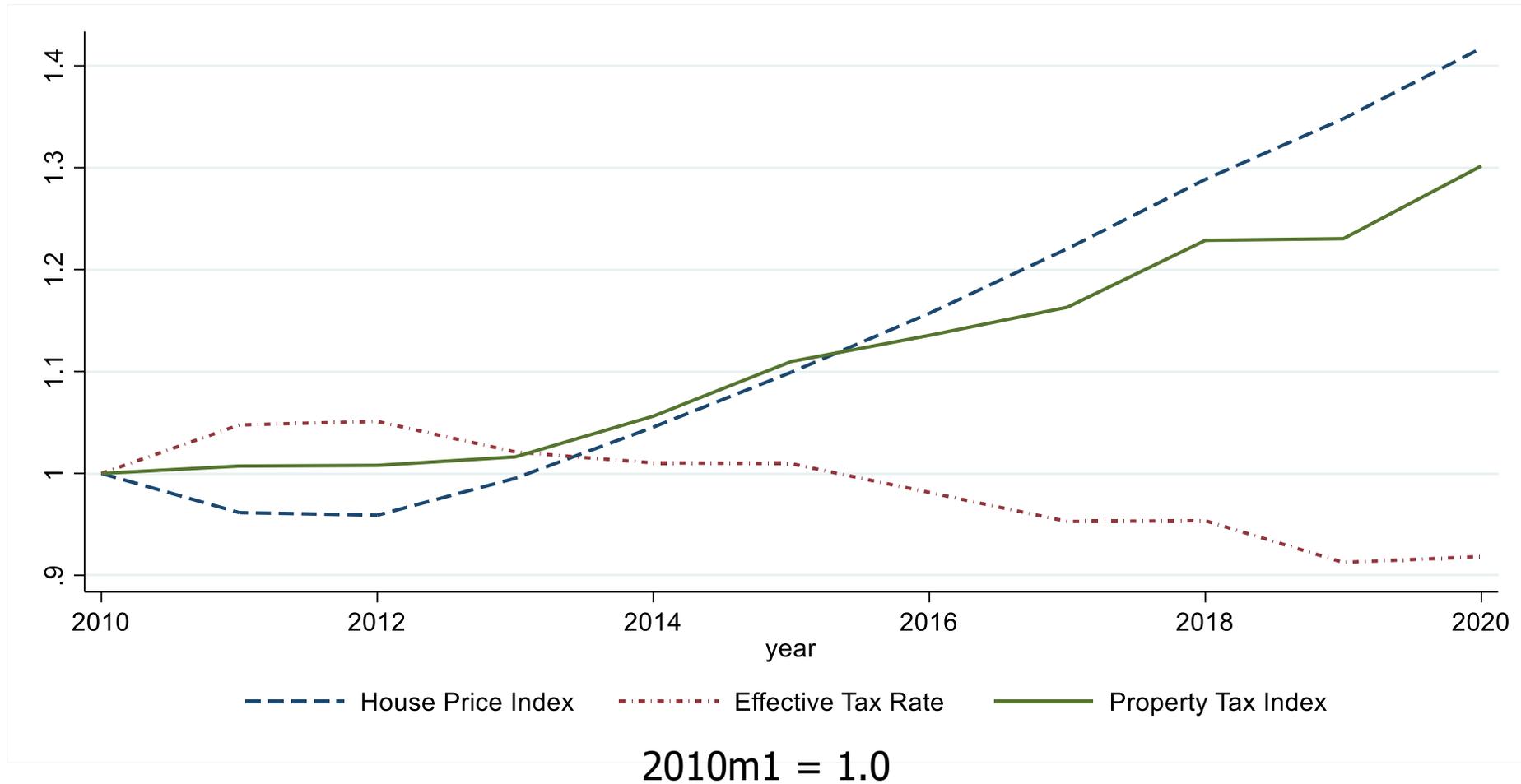
Mortgage Interest Payments



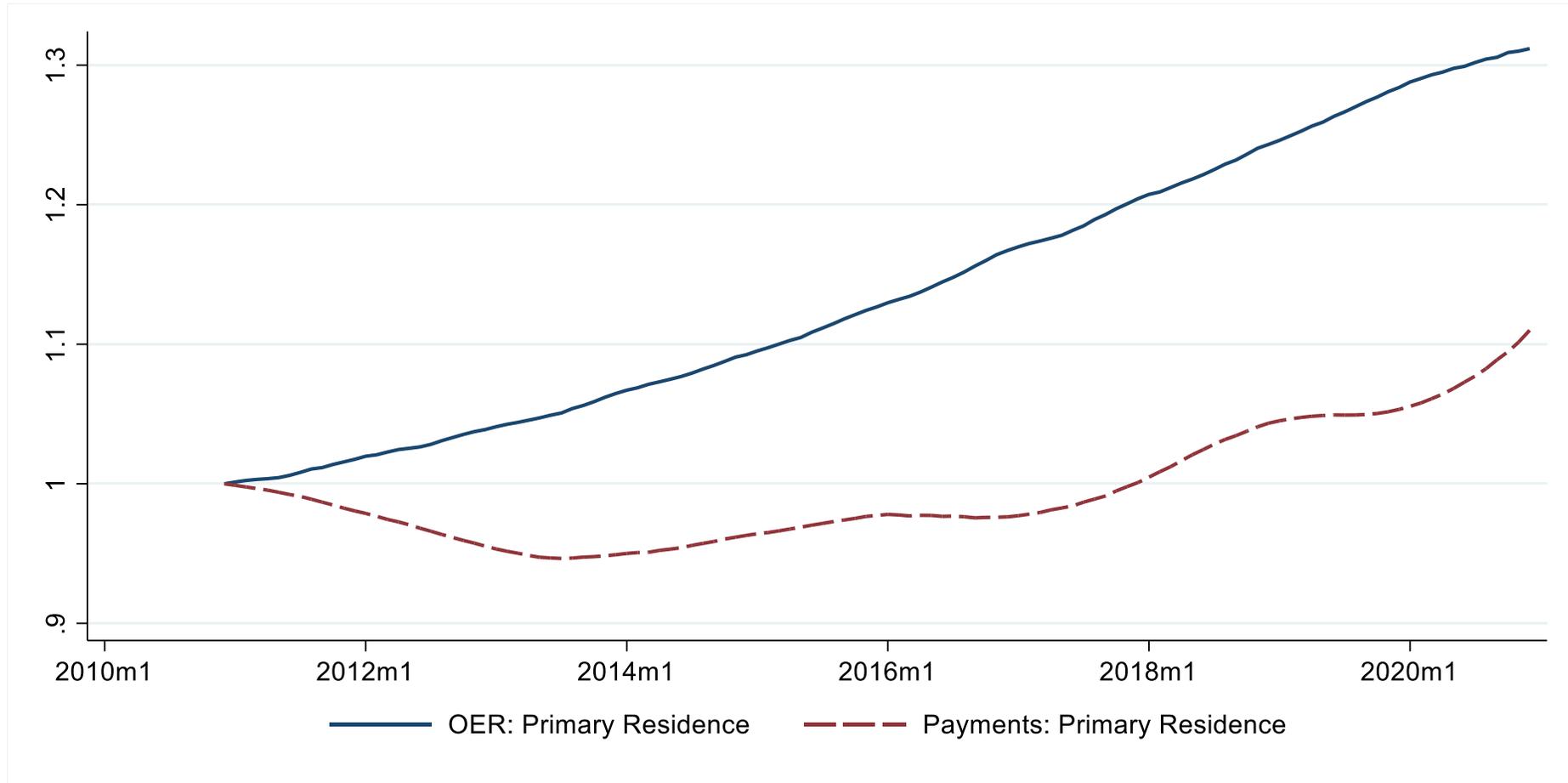
2010m12 = 1.0



Property Tax Payments



Payments Index vs. OER



2010m12 = 1.0



Closing Thoughts

- Rental equivalence designed to measure the implicit prices of housing services.
 - ▶ Key considerations include timing, structure type, and quality change.
- The Payments approach aims to measure explicit prices paid to access housing services, which may differ considerably from implicit rents.
 - ▶ Key questions surround eligibility of specific expenditures and sources of price change.
 - ▶ We look forward to learning from the NSOs who use Payments

Thank you!

Robert Martin

Division of Price and Index Number Research

Bureau of Labor Statistics

martin.robert@bls.gov



Selected References

- Adams, B. and Verbrugge, R. (2020) “Location, Location, Structure Type: Rent Divergence within Neighborhoods.” BLS Working Paper 533.
<https://www.bls.gov/osmr/research-papers/2020/pdf/ec200150.pdf>
- Adams, B. Lowenstein, L., Montag, H. Verbrugge, R. (2022) “Disentangling Rent Index Differences: Data, Methods, and Scope.” Work in progress
- Cage, R. A., Klick, J., & Johnson, W. (2018). Population Subgroup Price Indexes: Evidence of Heterogeneity or Measurement Error? Meeting of the Group of Experts on Consumer Price Indexes, United Nations Economic Commission for Europe Geneva, Switzerland, May 7-9, 2018.
https://www.unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.22/2018/United_States.pdf.
- CoreLogic (2022). “Single Family Rent Index Report.” <https://www.corelogic.com/tag/single-family-rent-index-report/>.
- Federal Housing Finance Agency. (2021). *House Price Index Datasets*. Retrieved from
<https://www.fhfa.gov/DataTools/Downloads/Pages/House-Price-Index-Datasets.aspx>
- Freddie Mac. (2021). *Primary Mortgage Market Survey - Archive*. Retrieved from Primary Mortgage Market Survey:
https://www.freddiemac.com/pmms/pmms_archives.
- Garner, T. I., & Verbrugge, R. (2009). Reconciling user costs and rental equivalence: Evidence from the US consumer expenditure survey. *Journal of Housing Economics*, 18(3), 172-192.
- ILO/IMF/OECD/UNECE/Eurostat/World Bank. (2004). *Consumer Price Index Manual: Theory and Practice*. (P. Hill, Ed.) Geneva: International Labor Organization.
- Poole, R., Ptacek, F., & Verbrugge, R. (2005). Treatment of Owner Occupied Housing in the CPI. Bureau of Labor Statistics, Washington, DC. Paper and presentation submitted to the Federal Economic Statistics Advisory Committee meeting on December 9, 2005.

