

Expanding the family of US Consumer Price Indexes

**Anya Stockburger, Bill Johnson, Joshua Klick,
Paul Liegey, Robert Martin,**

Bureau of Labor Statistics

Meeting of the Group of Experts on CPIs

June 8, 2023



CPI Family of Indexes

Production Indexes

CPI-U

Chained
CPI-U

CPI-W

R-CPI-E

Research Indexes

Chained
R-CPI-Income

R-CPI-Income

Household
Cost Index

Outline



Motivation



Income-based indexes



Household Cost Indexes



Next steps

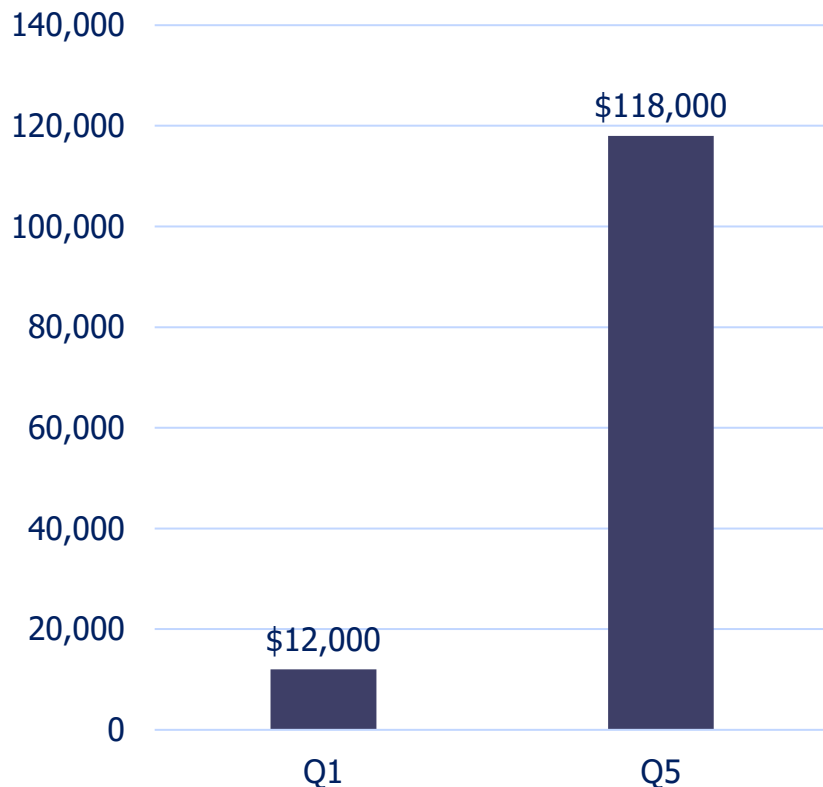
Motivation – Increased need for data granularity

- Committee on National Statistics recommendation
- Federal Reserve Bank interest
- Office of Management and Budget, Bureau of Economic Analysis, and other government interest
- General user interest (major media)
- Publications: [Initial working paper](#), [Spotlight on Statistics](#)



CPI by Income Methodology

Median Equivalized Income
(Interview Survey - 2021)



Expenditure weights

Group CE respondents into weighted ranking of equivalized income quintiles

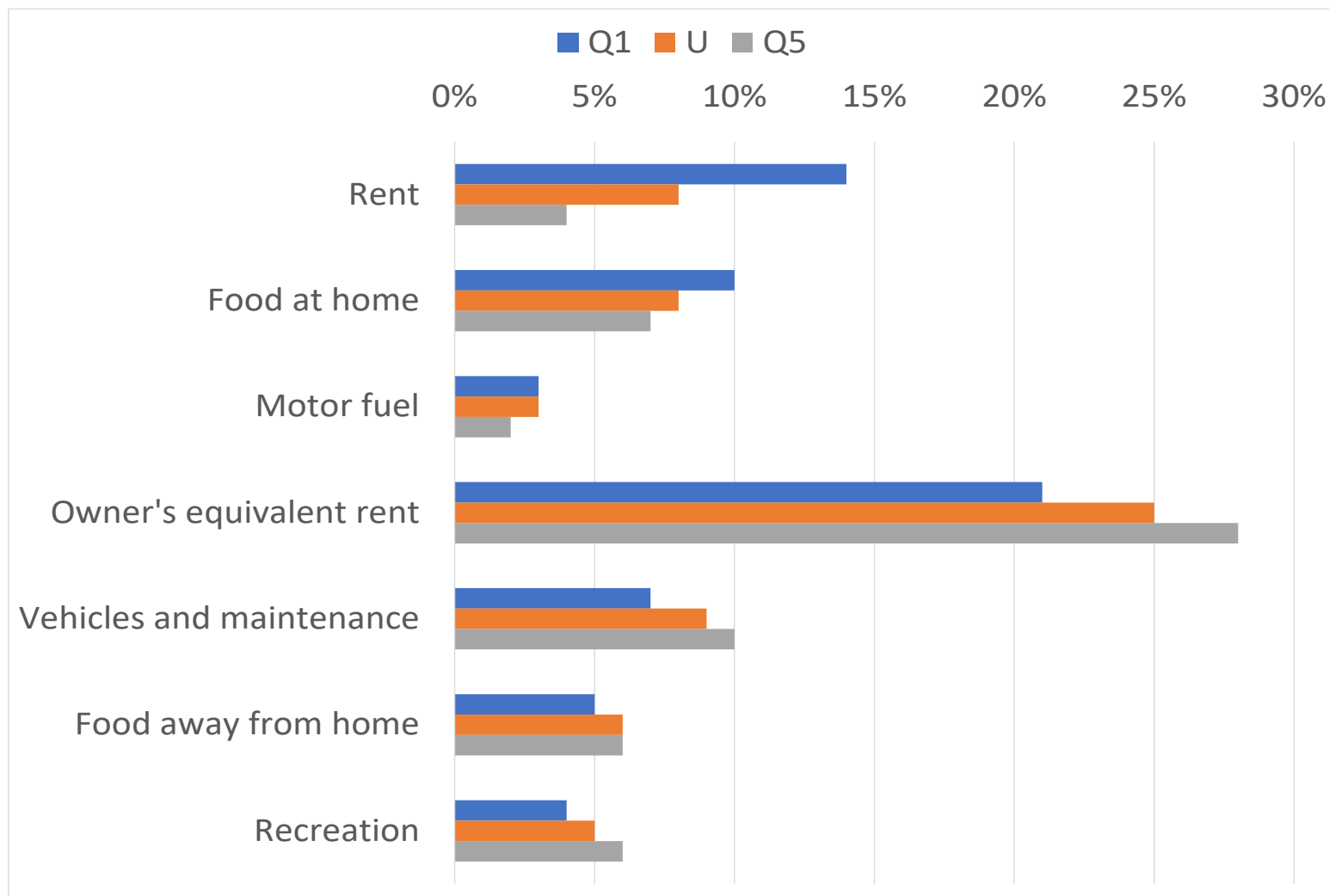
Prices/rents

All lower-level data the same (prices, outlets, rents)

Index aggregation

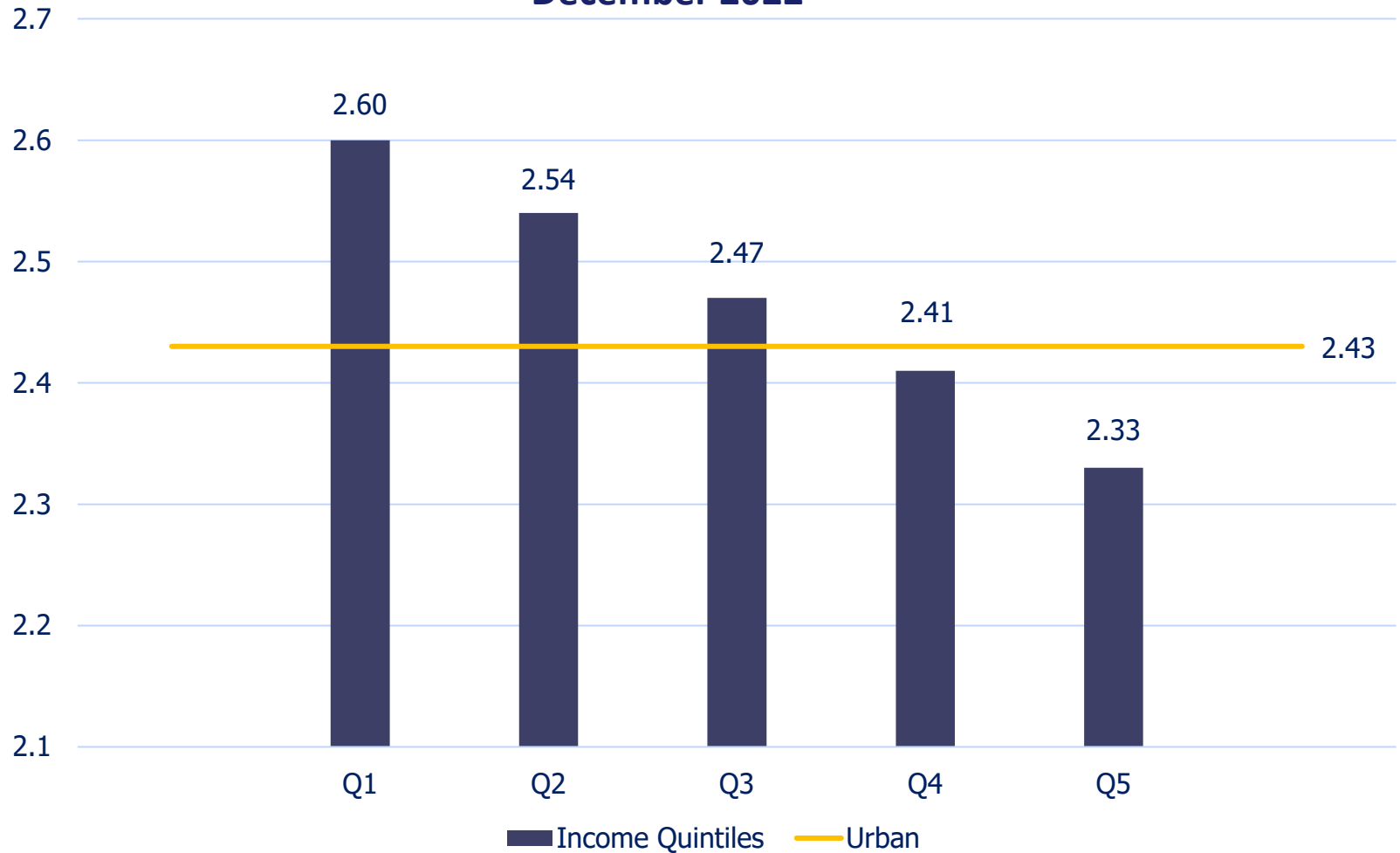
Lowe, Tornqvist aggregation from lowest-level basic indexes

Snapshot of spending weights by population, 2019-2020 biennial expenditure weight share, equivalized income



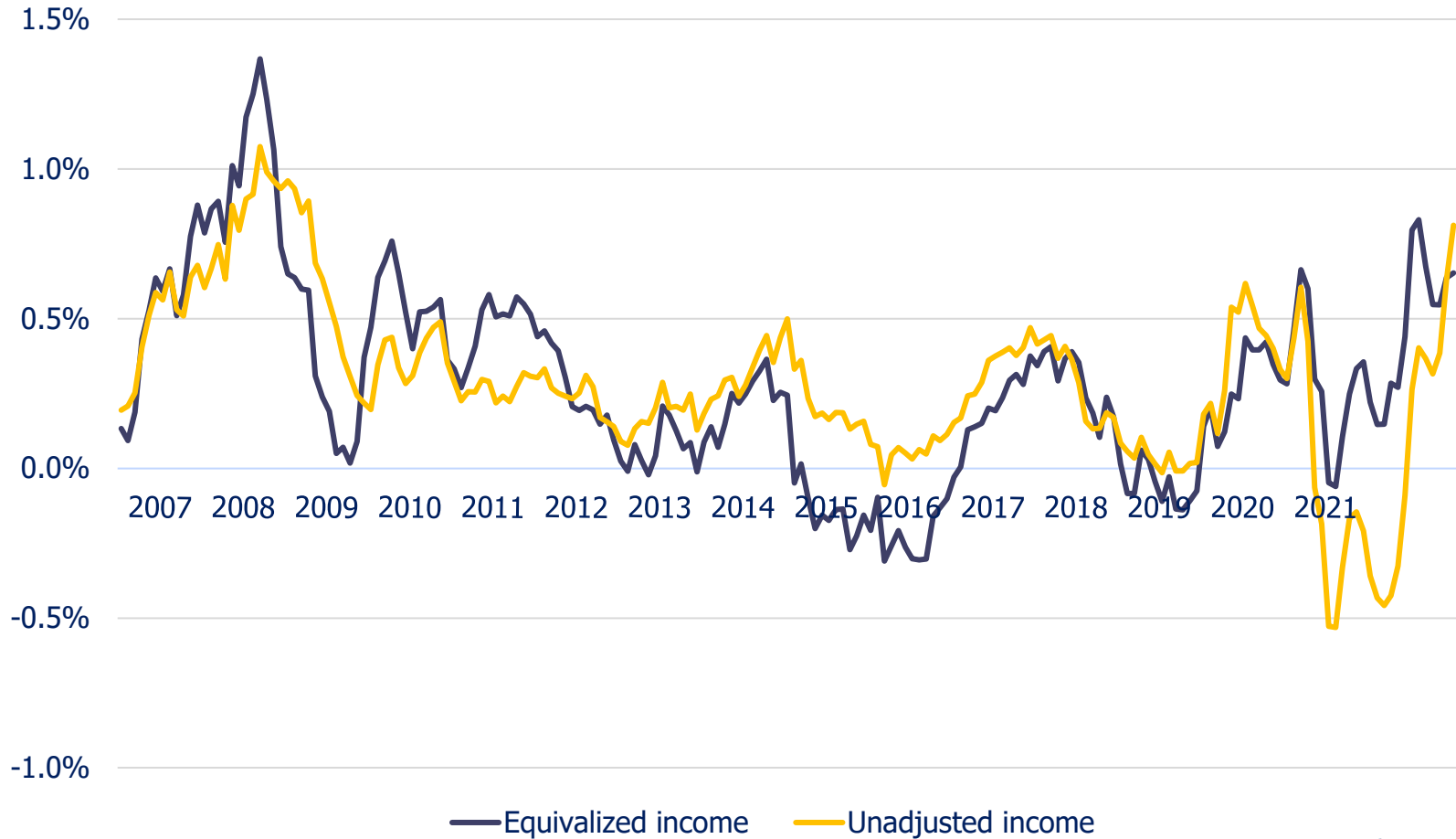
Annualized Inflation Gap

Annualized inflation rate, CPI by income quintile, Lowe Formula, December 2005 - December 2022

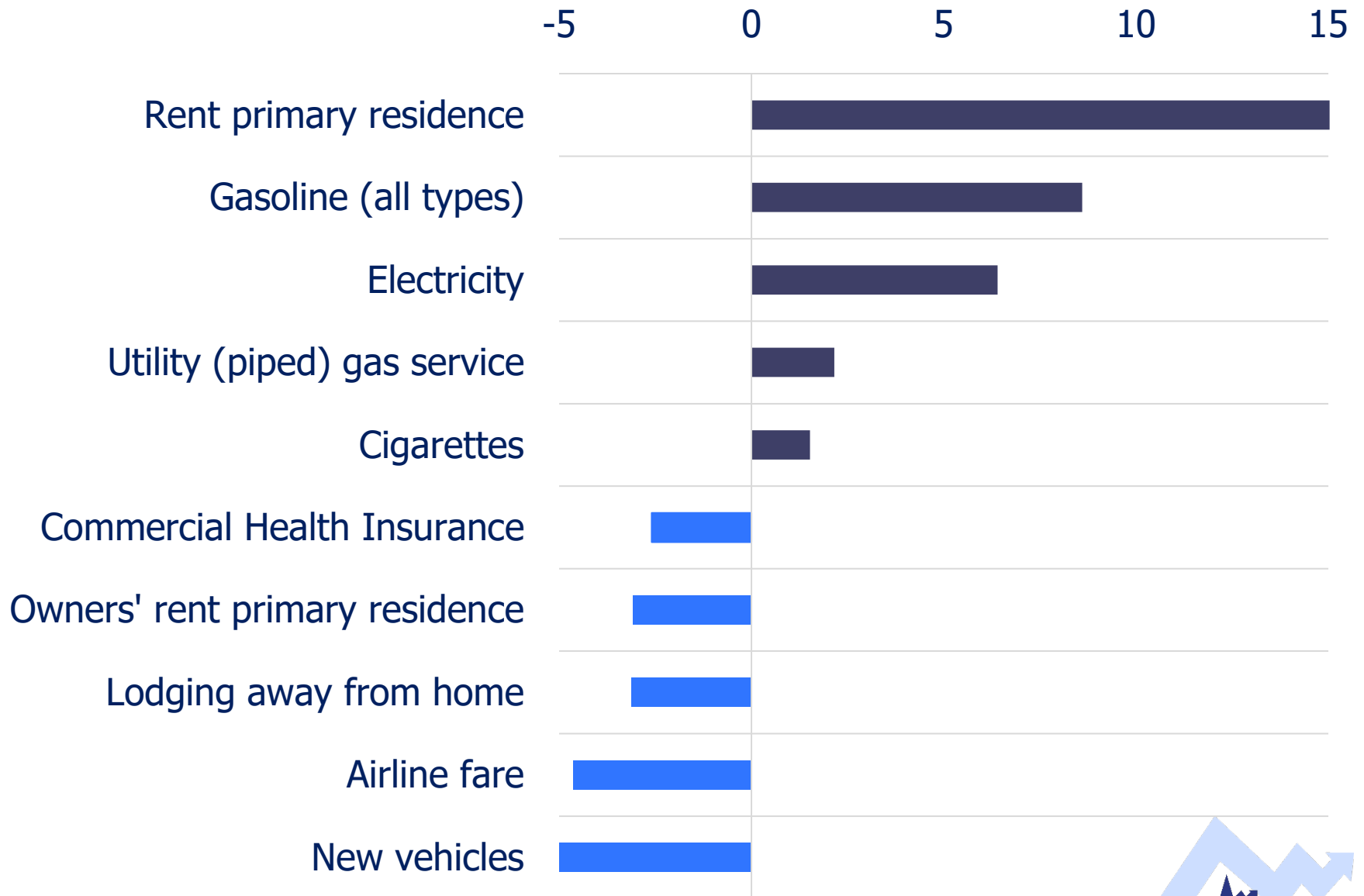


Inflation Gap Variation

Lowest income quintile – Highest income quintile
Annual 12-month percent change
December 2006 – December 2022



Items contributing to inflation gap (2022)



Limitations and Future Improvements

- Lower-level price heterogeneity
 - ▶ High levels of aggregation under-estimate inflation gap (Jaravel 2019)
 - ▶ Re-weighting housing prices shows little impact (Larsen and Molloy 2021)
- BLS future research
 - ▶ Further investigate housing adjustments
 - ▶ Re-weighting alternative data (gasoline, new vehicles)
 - ▶ Interested in a scanner data program (CNSTAT recommendation), but funding...



Household Cost Index

- Inspired by Office for National Statistics and Statistics New Zealand
- Definition: Measure the change in cash outflows required, on average, for households to access the goods and services they consume
- Methodology:
 - ▶ Household-weighted (democratic) aggregation,
 - ▶ Payments-approach to owner-occupied housing
 - ▶ Urban population

Household-weighted (Democratic) Aggregation

- Create household-level expenditure shares
 - ▶ Consumer Expenditure Surveys (Diary and Interview) sample different households
 - ▶ Eligible expenditures from the Diary survey imputed to the Interview sample using a matching procedure based on Hobijn, et. al. (2009)
- Aggregation
 - ▶ Aggregate across items/areas first for each household using Lowe formula with lagged expenditure weights
 - ▶ Average equally across households

Payments Approach – Mortgage Interest Payment

■ Weights

Consumer Expenditure Survey

■ Prices

Mortgage interest payment index =

Debt index * Interest rate index

Data sources:

- Federal Housing Finance Agency's All Transactions House Price Index
- Freddie Mac Primary Mortgage Market Survey

Payments Approach – Property Tax Payments

- Weights

Consumer Expenditure Survey

- Prices

Property Tax Payment Index =

$$\frac{\text{Total property tax payments}}{\text{Total housing stock value}} * \text{Constant quality home price index}$$

Data source: CE

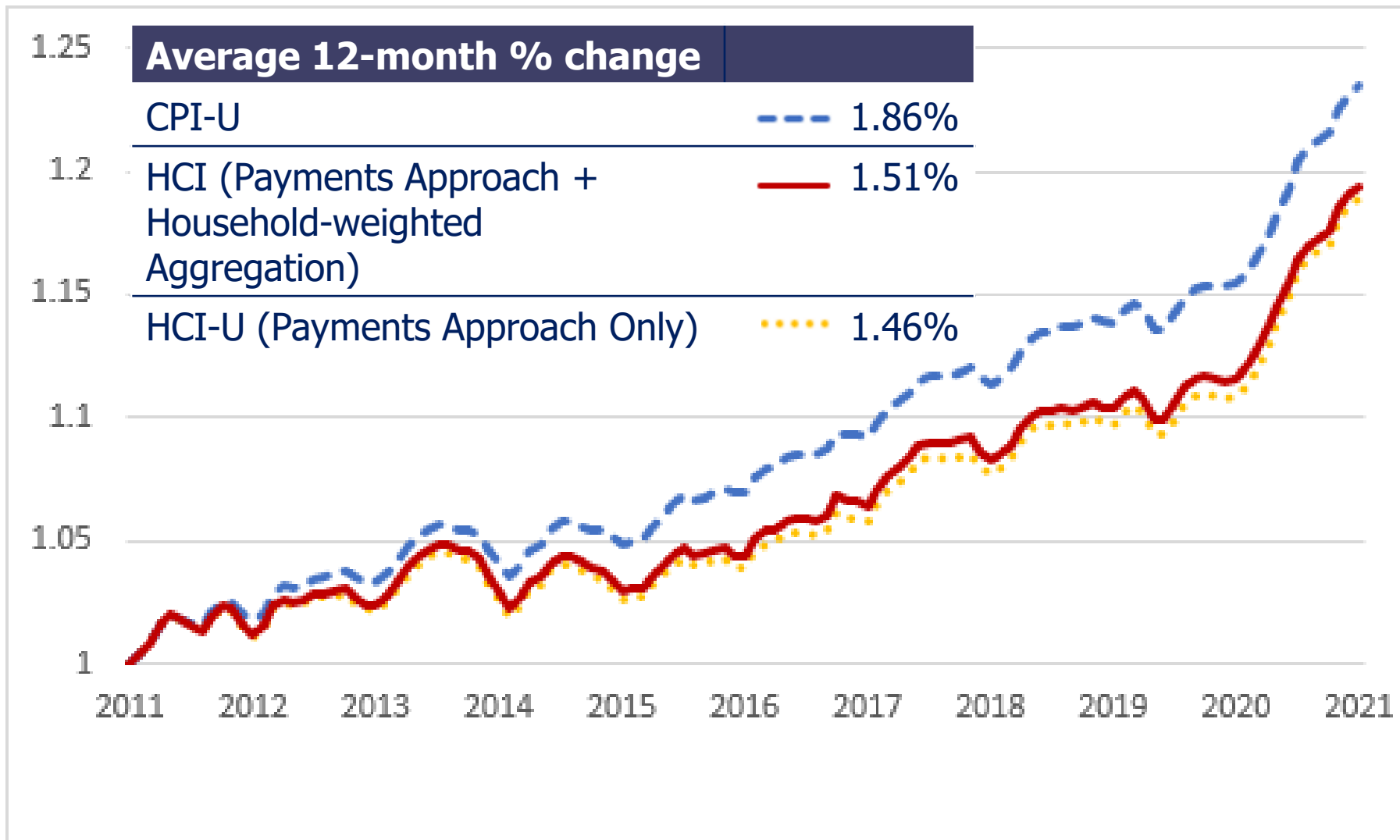
HCI – Relative Importance

December 2020

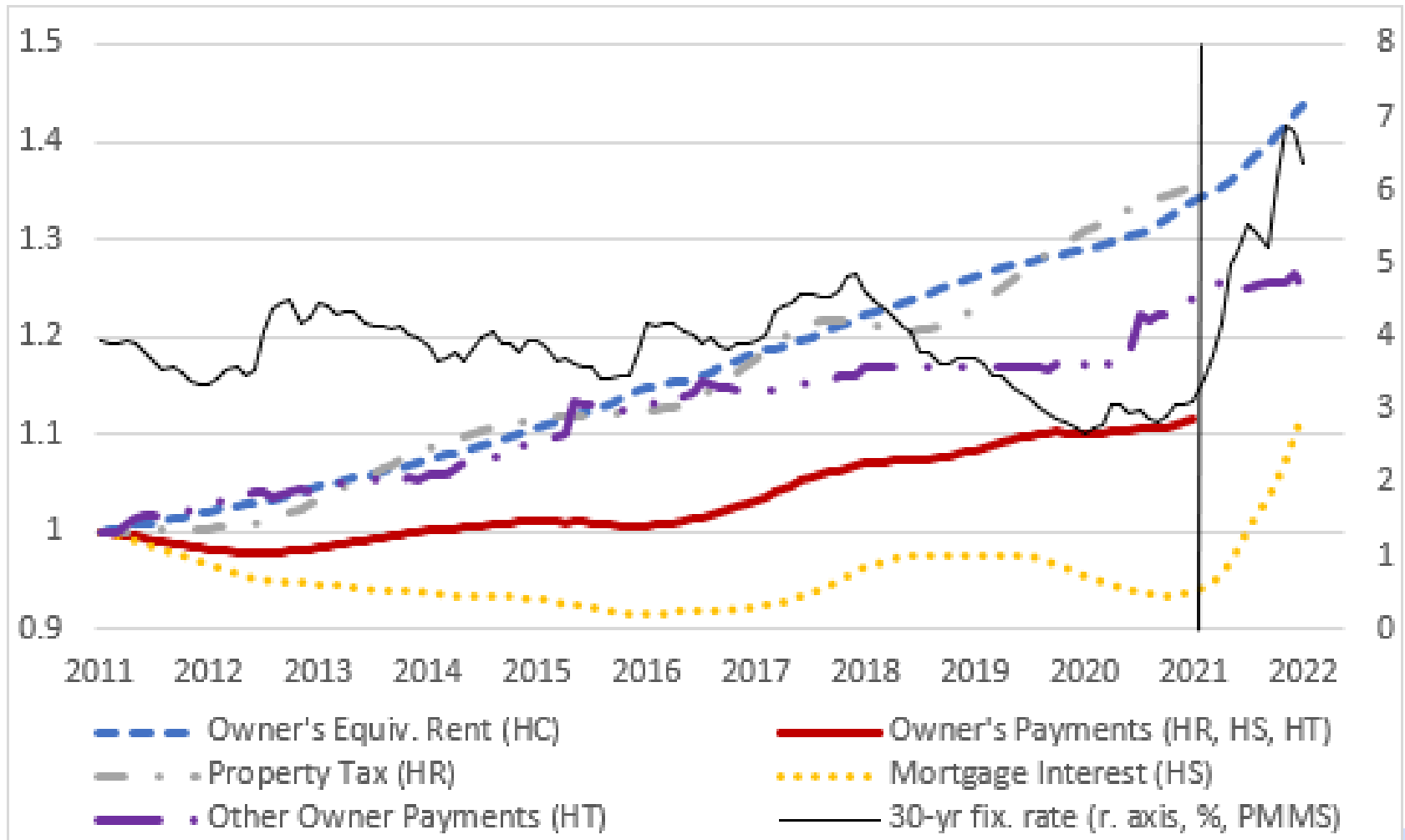
Major Group	CPI-U	HCI-U
Food and Beverages	15.2	20.1
Housing	42.4	34.3
Apparel	2.7	3.1
Transportation	15.2	14.3
Medical	8.9	11.1
Recreation	5.8	6.6
Education and Comm.	6.8	6.7
Other	3.2	3.7



HCI – Index Results



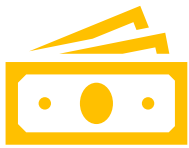
Explaining the HCI results



Limitations - HCI

- Household-weighted aggregation
 - ▶ Infrequent purchases (challenge especially with Tornqvist)
 - ▶ Include in HCI given small impact?
- Payments approach
 - ▶ Investigate a microdata approach for mortgage interest index
 - ▶ Investigate including mortgage principal

What's next?



Improve methodology

Income-group specific lower-level indexes

Next step for HCI research?



Stakeholder outreach

Group of Experts
BLS advisory committees
Federal Committee on
Statistical Methodology



Publish regular updates

R-CPI-Income
C-CPI-Income
HCI?

Contact Information

Anya Stockburger

Chief, Branch of Revision Methodology

Division of Consumer Price Indexes

www.bls.gov/cpi

stockburger.anya@bls.gov

