SUB-GROUP PRICE INDEXES Current and Planned BLS Work

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BLS consumer inflation products

INDEX	COHORT		NOTE	WEBSITE				
OFFICIAL:								
CPI-W	Wage-earners and clerical workers	1921	Used for Social Security Cost of Living Adjustment (COLA)	6.0%				
CPI-U	All urban consumers	1978	Headline index	93.1%				
Chained CPI-U	All urban consumers	2002	Published with ~ 1-year lag; used for federal tax bracket adjustments	0.9%				
RESEARCH:								
R-CPI-E	Elderly consumers	1988	Alternative to CPI-W for Social Security COLAs	0.0%				
R-CPI-U-RS	All urban consumers	1999	Used by Census in calculation of real median income statistics	0.0%				

For a complete list of research products see: <u>https://www.bls.gov/cpi/research-series/</u>





CPI two-stage estimation process



 Aggregate 100,000+ sampled items into component indexes

STAGE 1

- 243 item x 32 area = 7,776 indexes
- Termed 'elementary indexes'
- U population only
- Hybrid use of Laspeyres and Geomean formula

- Aggregate elementary indexes into products
- Lowe formula used for CPI-U, CPI-W, R-CPI-E
- Tornqvist formula used for Chained CPI-U (but published with ~one year lag)
- Population spending weights derived from CE Surveys



CPI-W versus R-CPI-E

Percent of urban sample, Consumer Expenditure Interview Survey





- Both use set of n=7,776 CPI-U elementary indexes as input
 - No control for price change heterogeneity in outlet patronage nor specific goods and services purchased
- Both are reweighted Lowe aggregations using cohort elementary spending weights derived from household spending survey
 - Higher sampling error than CPI-U
- Chained Tornqvist versions not produced



Elementary index weight sample size diagnostics

Percent of elementary cells with no expenditure data reported, 1999 to 2017 n = 210 items x 38 areas = 7,980 cells per month t = 12 months x 19 years = 228 months

n x t = 1,819,440 total item-area-month cells

				Lowest
		Wage-		income
CATEGORY	Urban	earner	Elderly	quintile
Item-area-month	17.5%	41.3%	45.2%	63.4%
Item-area-month ratio allocated ¹	2.7%	9.0%	12.1%	24.0%
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Item-U.Smonth	0.6%	1.4%	2.2%	4.5%
Item-area-biennial ²	1.4%	4.8%	6.9%	13.7%

NOTES:

1. Statistical smoothing procedure used in Chained CPI-U weights.

2. Level of aggregation for CPI-U weights, prior to statistical smoothing.



BLS subgroup index research plans

- Date: research started in 2018
- Goals:
 - Improve accuracy of CPI-W
 - Improve relevance by publishing new products, e.g. CPI for low-income households
 - Control for price change heterogeneity in stage 1
 - Eventually adopt Tornqvist for stage 2 aggregation

Motivation:

- Declining sample size of CPI-W; contradictory classification of CPI-W relative to CPI-E
- Potential user demand for CPI low-income product
- 2002 CNSTAT At What Price? recommendations
 - Collect prices in a way that allows them to be associated with household characteristics (Recommendation 8.1)
 - 2019: point of purchase questions added to Consumer Expenditure Surveys (replacing TPOPS)





Current activities

- Focus on methodological improvements achievable with current survey data sources and funding levels
 - 1. Cohort definition
 - Larger subgroup cohort definitions mitigate sampling error in CE
 - Cohort definitions largely defined by users (e.g., Congress)
 - No plans to change CPI-W definition at this time
 - 2. Treatment of owner-occupied housing
 - Considering adopting payment approach instead of rental equivalence for all subpopulation group index products
 - FY20 focused on spending weight methodology
 - FY21 will explore pricing aspect
 - 3. Aggregation across households in cohort
 - Leaning toward replacing plutocratic weighting with democratic weighting





Potential impact of payments approach on budget shares

	Category	NL	NM	NH	SL	SM
A1	1 Adult clothing		0.1%	0.2%	0.3%	0.3%
A2	Children and infant clothing	0.1%	0.0%	0.0%	0.0%	0.0%
E0	Telephone and electronics	0.7%	0.6%	0.4%	1.7%	1.6%
E1	Tuition	0.3%	0.2%	0.4%	0.1%	0.1%
F1	Food at home	1.5%	1.1%	0.6%	3.3%	2.9%
F2	Food away from home	0.4%	0.5%	0.4%	1.0%	1.1%
F3	Alochol and tobacco	0.2%	0.1%	0.1%	0.3%	0.3%
H0	Shelter	-6.3%	-6.1%	-5.0%	-16.2%	-18.4%
H1	Household utilities	0.7%	0.5%	0.3%	1.9%	1.8%
H2	Housefurnishings and operations	0.2%	0.3%	0.4%	0.7%	1.0%
M0	Medical Care	0.6%	0.7%	0.5%	3.2%	3.9%
R0	Entertainment and recreation	0.3%	0.4%	0.4%	0.7%	1.0%
т0	Vehicles	0.4%	0.6%	0.6%	0.9%	1.9%
T1	Gasoline and vehicle maintenance	0.9%	1.0%	0.6%	1.9%	2.3%
T2	Public transportation	0.1%	0.1%	0.1%	0.2%	0.2%

NL Non Social Security, Low Income Quintile

NM Non Social Security, Middle Income Quintiles

NH Non Social Security, High Income Quintiles

SL Social Security, Low Income Quintile

SM Social Security, Middle Income Quintiles

SOURCE: Cage, et. al. Population subgroup price indexes, evidence of heterogeneity or measurement error? UNECE Geneva meeting, May 2020

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Future activities

- Methodological improvements likely requiring nontraditional data sources or expanded funding
 - 1. Aggregation across items in market basket
 - Goal is to adopt Tornqvist aggregation in stage 2 for all population subgroup products



- Research and evaluate the extent to which the set of 7,776 allurban elementary indexes is a poor proxy for subgroups
- Expand survey sample sizes to enable independent sample selection by population cohort





Proposal: add population as monthly elementary index dimension



Questions for CNSTAT Panel

In the construction of sub population group indexes...

- 1. Should BLS adopt the payment approach for owner-occupied housing?
 - a. If so, should the expenditure definition include mortgage principal, either in part or in total?
- 2. Should BLS adopt democratic aggregation across households?
- 3. How should BLS control for potential price change heterogeneity within elementary item-area components?
- 4. Are there other methodological improvements BLS should prioritize?

