

CE Data in the CPI

Production Requirements and Redesign Interests

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Introduction to the CPI

- The CPI is a Cost-of-Living Index (COLI) designed to answer the following question:

“What is the cost, at this month’s market prices, of achieving the standard of living actually attained in the base period?”

- ▶ BLS Handbook of Methods



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Published CPI Index Series

- CPI for All Urban Consumers (CPI-U)
- CPI for Urban Wage Earners and Clerical Workers (CPI-W)
- Chained CPI for All Urban Consumers (C CPI U)



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Major Uses of the CPI

- The CPI is used to adjust:
 - ▶ Social Security benefits
 - ▶ Income bracket adjustments
 - ▶ Income eligibility requirements
 - ▶ School lunch costs
 - ▶ Cost-of-living wage adjustments



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Four Surveys in the CPI

1. Consumer Expenditure Survey (CE)
 - Source of weights
 - Limited source of basic weights for C&S Sample
2. Point-of-Purchase Survey (TPOPS)
 - Sampling frame for C&S Pricing Survey
3. Pricing Survey (C&S)
 - Source of prices for goods and services
4. Housing Survey (HOUSING)
 - Source of prices for rent and OER

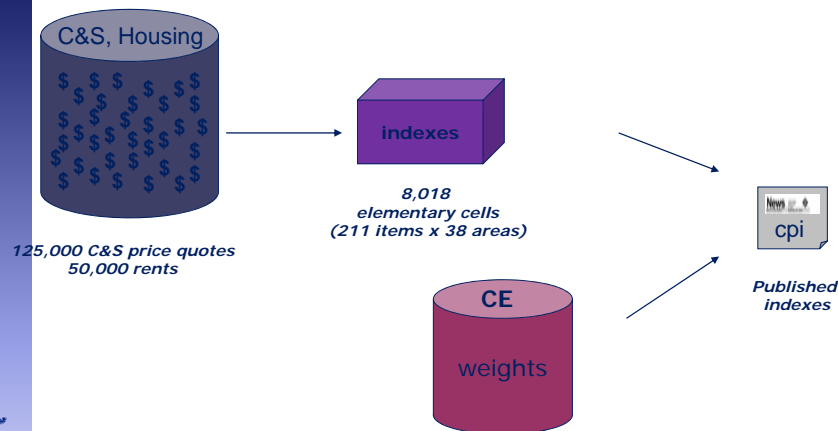


Uses of CE Data in the CPI:

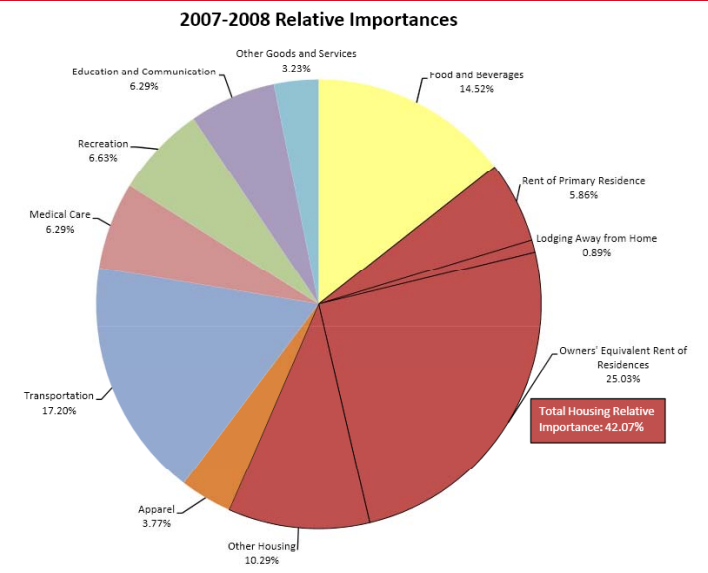
- **Aggregation Weights**
 - ▶ Annualized Expenditure Weights
 - ▶ Monthly Expenditure Weights
- **Commodities and Services Sample**
 - ▶ Item Sample Selection
 - ▶ Percent of POPSCAT (item basic weights)
- **Research**



CPI Estimation Stages



Uses of CE Data in the CPI



Classification of the Market Basket

■ CPI's classification structure is broken down into:

- ▶ 8 Major Groups
 - 70 Expenditure Classes
 - 211 Item Strata
 - ❖ 303 Entry Level Items (ELIs)
 - 750 Universal Classification Codes (UCCs)

Number of UCCs per ELI	1	2	3	4	5	6	7	8	9	12	13	14	18
Percent of ELIs	51%	22%	8%	9%	2%	2%	.9%	.9%	.7%	.9%	.7%	.9%	.7%



Item Detail

HK Appliances → Expenditure Class

HK01 Major appliances → Item Strata

HK02 Other appliances → ELI

HK021 FLOOR CLEANING EQUIPMENT → UCC
 320511 ELECTRIC FLOOR CLEANING EQUIP

HK022 SMALL ELECTRIC KITCHEN APPLIANCES
 320521 SMALL ELECTRIC KITCHEN APPLIANCES

HK023 OTHER ELECTRIC APPLIANCES
 300411 PURCH/INST WINDOW A/C RNTR
 300412 PURCH/INST WINDOW A/C OWND
 320522 PORTABLE HEATING/COOLING EQUIP

690241 SMOKE ALARM PUR/RENT RNTR
 690242 SMOKE ALARM PUR/RENT OWND
 690244 OTH HH APPL RNTR
 690245 OTH HH APPL OWND



Area Detail

- 38 elementary Areas
- 87 PSUs
- 31 PSUs correspond directly to Areas

Region	Area	Area Name	PSU Name	PSU City
	A312	Washington, DC	A312	Washington
South Region	X300	Smaller South Region PSUs	X342	Albany, GA
			X344	Norfolk, VA
			X346	Pine Bluff, AR
			X350	Richmond, VA
			X352	Port Arthur, TX
			X374	San Antonio, TX
			X376	Oklahoma City, OK

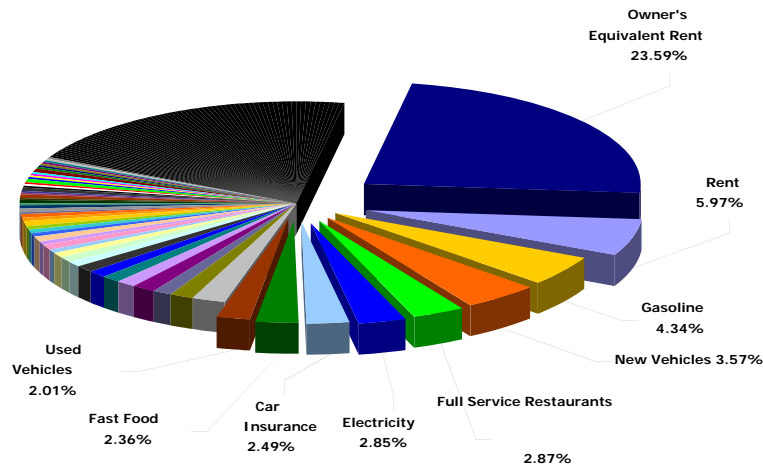


Annual and Monthly Expenditure Weights

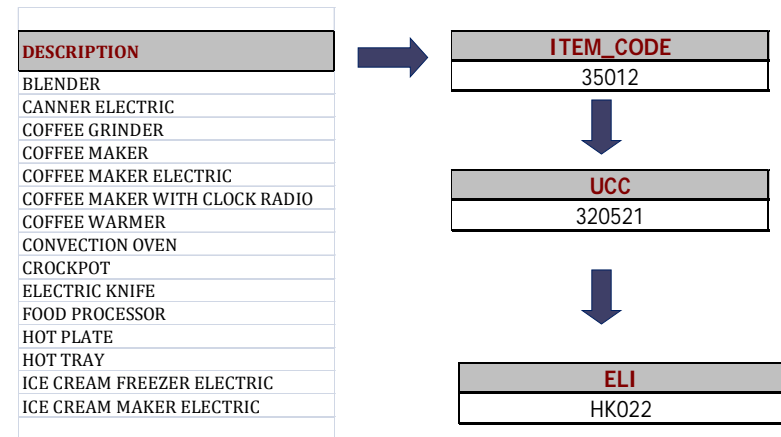
- Biennial Weight Periods used in CPI-U and CPI-W Index Series
- Monthly Weights used in Final C-CPI-U Index Series
- Two stages of CPI Index estimation
 - ▶ Second stage weights provided by CE data



Relative Importance of Basic Goods and Services in the CPI



CE Diary Survey Category Mapping



CE Interview Survey Category Mapping

SECTION 6 - APPLIANCES, HOUSEHOLD EQUIPMENT AND OTHER SELECTED ITEMS (continued)

Part B - Household Appliances and Other Selected Items

SMALL HOUSEHOLD APPLIANCES

1 - Small electrical kitchen appliances, including -

- | | | |
|---------------------|-----------------------|----------------|
| blender | electric frying pan | mixer |
| breadmaker | electric iron | pizza oven |
| coffee grinder | electric knife | popcorn maker |
| coffee maker | electric timer | rice cooker |
| crockpot | electric wine chiller | sandwich grill |
| deep fryer | electric wok | slow cooker |
| electric barbecue | food processor | smoothie maker |
| electric can opener | hot plate | toaster |
| electric grill | ice cream maker | toaster oven |
| electric fondue set | juicer | waffle iron |

ELI
HK022

UCC
320521

ITEM_CODE
560



CPI Adjustments to CE Data

Adjust COST to meet CPI market basket definitions

- **Food on Trips** – increase \$ of Diary UCCs by food-trip expenditures as share of total food expenditures reported in Interview
- **Rental equivalence of Major Appliances** – reduce reported expenditures of owners by probability a like-renter would incur the expense
- **Rental equivalence of Household Maintenance/Repair** – impute \$ of owners, using sample mean of like-renters
- **Gasoline Allocation** – Allocate gasoline \$ into Regular, Mid-Grade, and Premium
- **Medical Care** – convert reported expenditures and reimbursements into net-out-of-pocket expense for each consumer unit
- **Medical Care Insurance** – allocate carrier costs to health care goods and services, leaving “retained earnings” as insurance weight
- **Other adjustments**



CPI Adjustments to CE Data

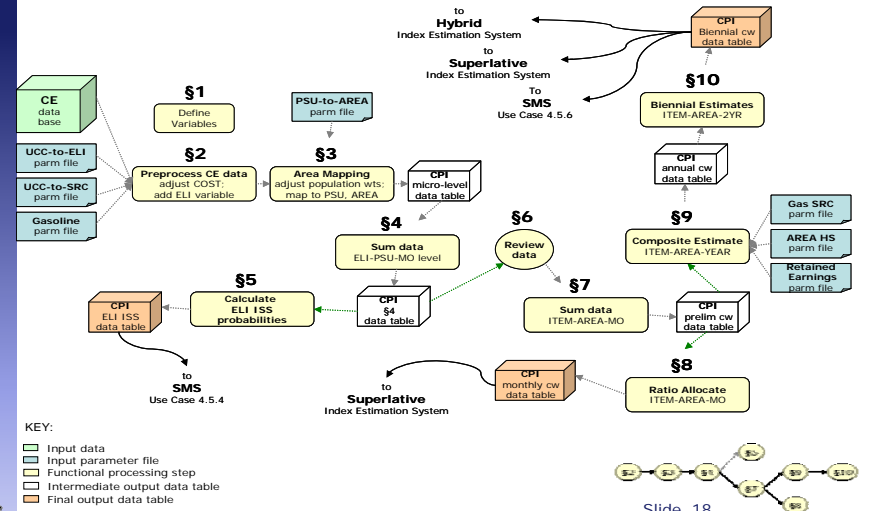
Estimates of average annual expenditure per consumer unit, CPI-U population, 2008:

CPI
\$ 46,730 < **CE**
\$ 50,486

- **Owner Shelter:** CPI=rental equivalence, CE=mortgage interest, taxes
- **Owner Maintenance/Repair/Appliances and Insurance:** CPI reduced to rental equivalence amount
- **Vehicles:** CPI = gross price; CE=net price
- **CPI Excludes:**
 - Cash Contributions
 - Personal Insurance and pensions
 - Vehicle finance charges



Expenditure Weight Processing System



Annual and Monthly Expenditure Weights Summary

- CPI net out-of-pocket-expense
- Urban, wage-earning, and elderly populations
- Month and year of purchase
- Item Strata and Area detail expenditure estimates



Uses of CE Data in the CPI:

- **Aggregation Weights**
 - ▶ Annualized Expenditure Weights
 - ▶ Monthly Expenditure Weights
- **Commodities and Services Sample**
 - ▶ C&S Sample Selection
 - ▶ Percent of POPSCAT (item basic weights)
- Research



C&S Sample Selection

- Multi-step process:
 1. Outlet Selection (done in TPOPS)
 2. ELI Selection
 3. Unique product selection
- For ELI Selection, CPI requires ELI-level expenditure detail from each PSU
 - ▶ In contrast to Item expenditure detail for each Area required for expenditure weights
 - ▶ Creates sample size concerns



C&S Sample Selection

- ITEM = Major Appliances (HK01)
- AREA = Washington, DC (A312)
- SAMPLE ROTATED = August 2011
- OUTLET HITS = 2
- ITEM HITS = 4
- TOTAL SAMPLE SIZE = 8

CE data from years 2007 and 2008 used to calculate selection probabilities



ELI	TITLE	# Reports (A312)	# Reports (South Region)	Share of Total Expenditures	Selected ELIs
1	HK011 Refrigerators & Freezers	19	401	14.8%	1
2	HK012 Washers & Dryers	34	661	65.9%	2
3	HK013 Ranges & Cooktops	11	215	4.6%	0
4	HK014 Microwave Ovens	14	328	14.7%	1



CPI Unique Product Selection (in-store)

Selection of unique appliance for ELI HK012 (Washers & Dryers)

	Sample %	A Spec.		B Spec.
		Spec. Name	Spec. Frequency	
Cluster 01B - Washers	59.0%	A1 - Top Loading	57%	One of 14 Major Brand Names, or Other
		A2 - Front Loading	43%	
Cluster 02B - Dryers	41.0%	A1 - Electric	77%	One of 14 Major Brand Names, or Other
		A2 - Gas	23%	



Percent of POPSCAT

- In TPOPS Survey, data are collected by 'point of purchase survey category'
- Categories divided by like items commonly carried in one store (ex. Stoves and microwave ovens are in one POPSCAT; washers and dryers are in another)



Percent of POPSCAT

- CPI receives expense per store per popscat per psu
- CPI uses ELI level weights from CE, concorded by POPSCAT, to determine expense per store per ELI per PSU



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Other considerations for CPI Use of CE Data

- Access to finalized annual data on September 1 of the following calendar year (ex. 2009 expenditure data is required on September 1, 2010)
- Continuous rotation of surveyed PSUs to coincide with CPI PSU pricing rotation



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Production Requirement Summary

- Expenditure detail for 303 Entry Level Items
- Expenditure estimates for 38 geographic Areas and 87 PSUs
- Monthly expenditure estimates
- Estimates for urban, wage-earning, and elderly populations
- September 1 production deadline
- Sufficient sample size to maintain variance



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CPI INTERESTS IN A REDESIGNED CE SURVEY



Interests for Continued Production of the CPI

- Maintain current level of expenditure detail to the ELI
- Align CE geographic sample with C&S sample
- Collect information to separate purchases by urban, wage-earning, and elderly populations



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Interests for Improved Production of the CPI

- Increase sample size
- Collect point of purchase data
- Maintain research attributes



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Reasons for an increased sample size

	Aggregation Level of 2007-2008 Expenditure Data			
	Item-US-Monthly	Item-Area-Biennial	Item-Area-Annual	Item-Area-Monthly
Cells per Period	211	8018	8018	8018
Number of Periods	24	1	2	2
Number of Expenditure Records per Cell by Percentile				
Minimum	0	0	0	0
10%	26	11	5	0
25%	84	34	17	1
Median 50%	212	99	49	5
75%	576	318	157	16
90%	2379	1221	611	60
Maximum	5923	24354	12399	1266
Percentage of cells with 0 reports	0.41	1.46	2.58	14.92
Percentage of cells with less than 30 reports	11.59	22.26	36.99	83.00



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Interests for Improved Production of the CPI

- Point of Purchase Data
 - ▶ Enhanced demographic indexes
 - ▶ Allows weighting by store rather than by item
 - ▶ Important where wage-earners might shop at different stores than the general urban population



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Interest in Attributes for Research Purposes

- Complete set of expenditures for household-level indexes
 - ▶ Could allow for a household median CPI
 - ▶ Advantages for alternate indexes
- Current set of demographic data (i.e. age, income levels, household size, race, occupation, location)



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