

How the Consumer Price Index Program Uses CE Data in Cost Weight Estimation

Chris Miller



Outline

■ CE-CPI

- ▶ CPI Program
- ▶ CE-CPI Comparison
- ▶ CE-CPI Structure

■ EWPS

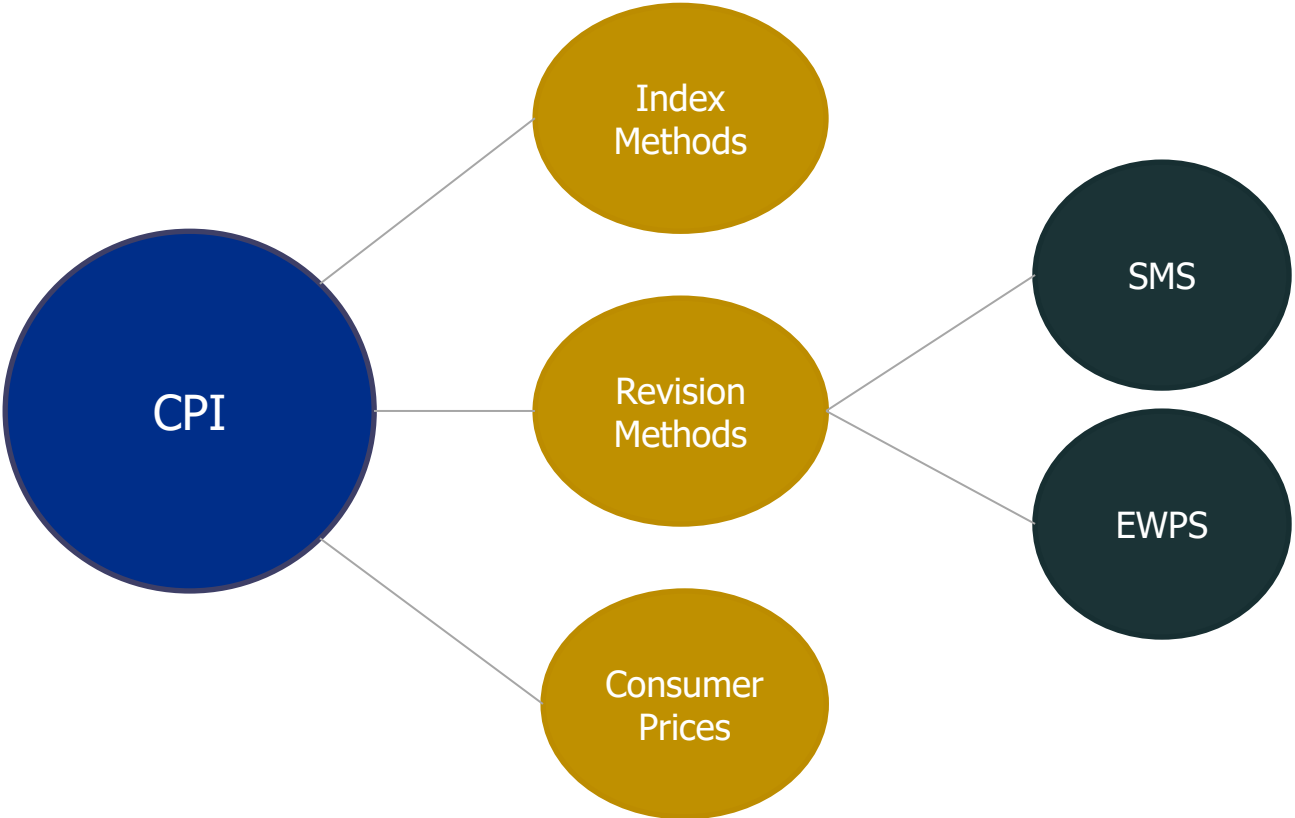
- ▶ Processing CE expenditures for CPI weights
- ▶ Annual and monthly weight products



Division

Branch

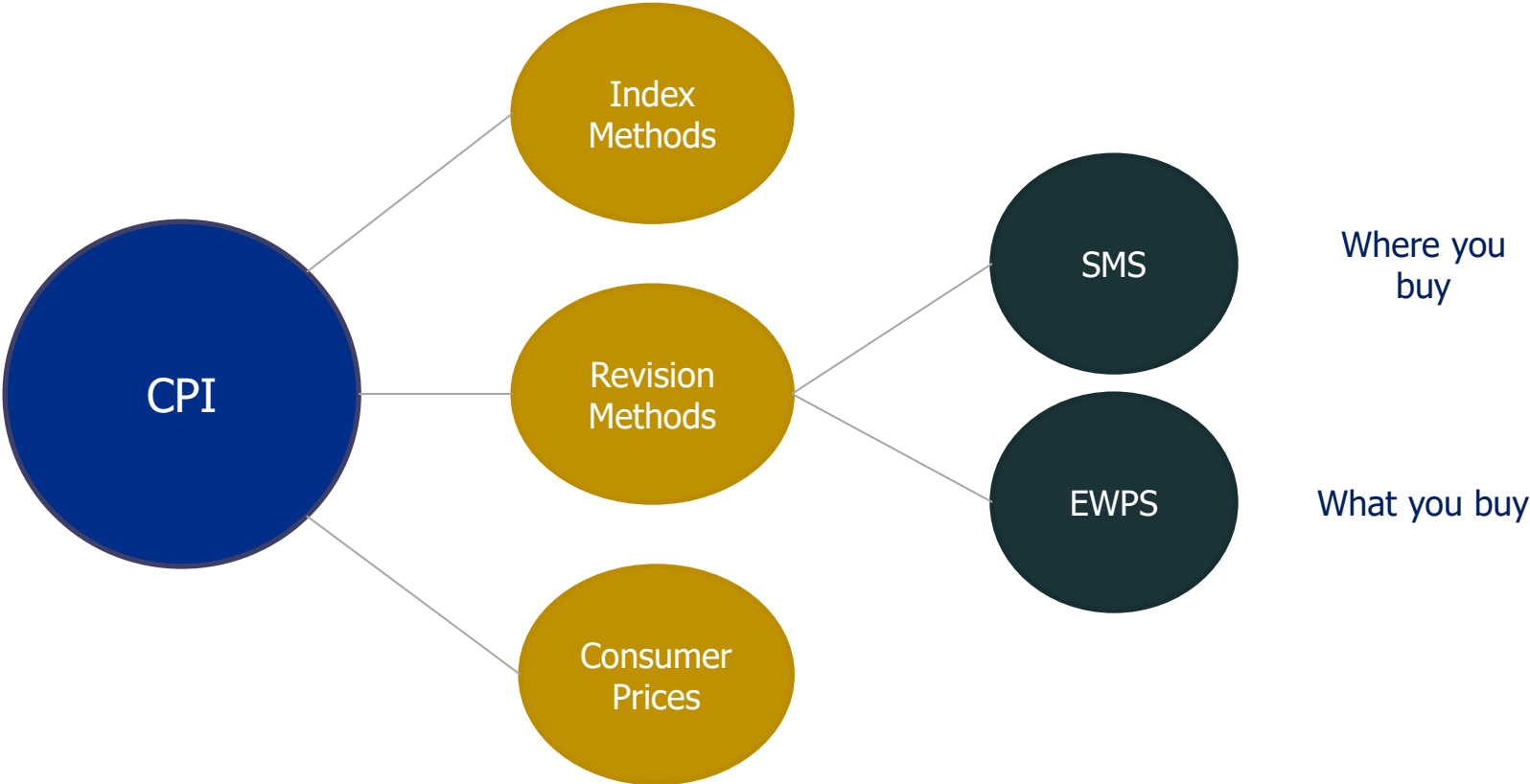
Team



Division

Branch

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Comparing CPI & CE

	CE	CPI
Geographic Sample	2010 Census Definition – 91 PSUs (75 Urban, 16 Rural)	2010 Census Definition – 75 Urban PSUs
Item Classification		
Population Definition		
Housing Expenditures		
Others		



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Others	Collection Period Processing, Biannual/Annual PUMD	Reference Period Processing, Annual and Quarterly Publication of Weights



CE Survey

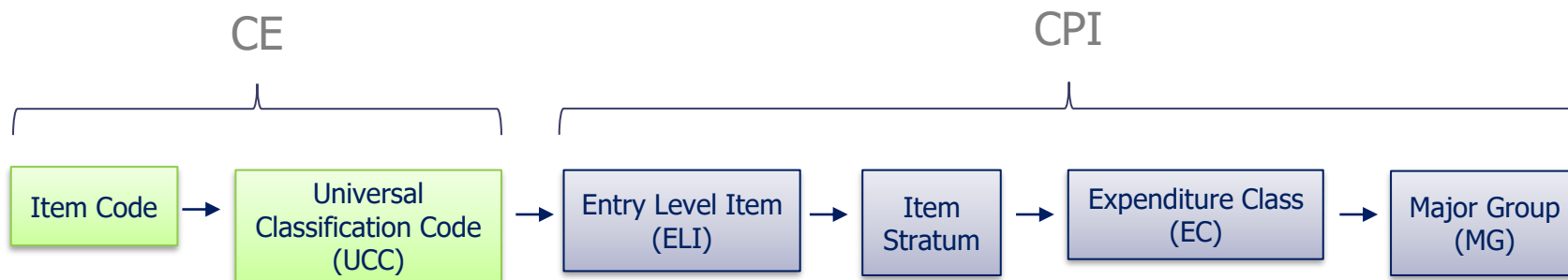
Diary

- Expenditures for 2 1-week periods
- Approx. 3,000 diaries/quarter
- Typically everyday purchases like food
- Revisions annually
- Types of changes
 - ▶ Item descriptions
 - ▶ Item codes
 - ▶ UCCs (universal classification codes)
 - ▶ Diary form

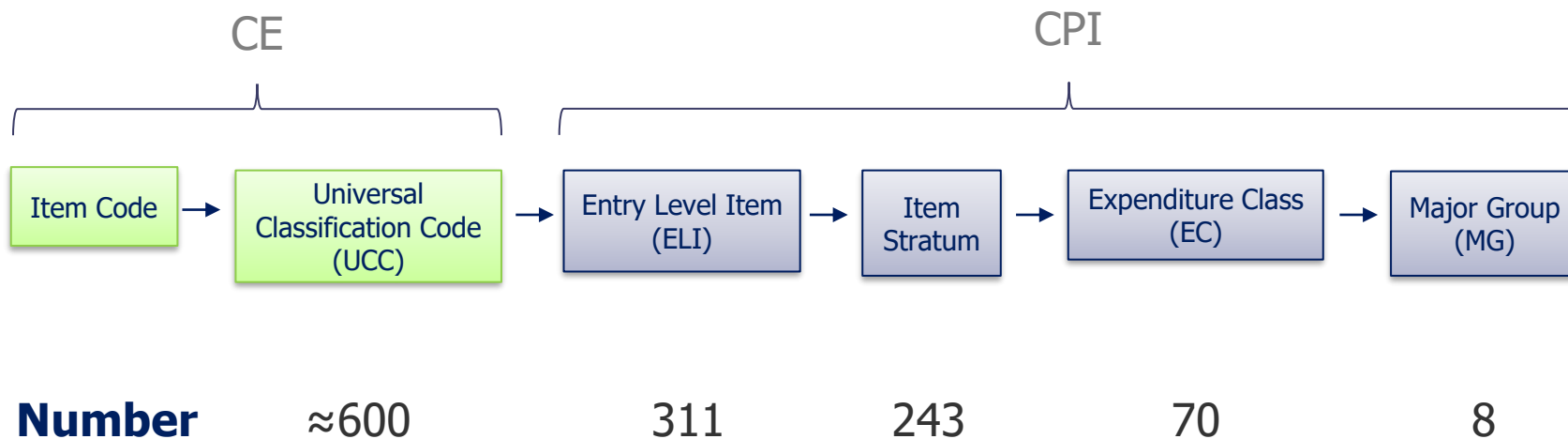
Interview

- Expenditures for 4 1-quarter periods (3-month recall)
- Approx. 6,000 interviews/quarter
- Captures more infrequent purchases like cars, medical expenses, etc.
- Revisions every 2 years
- Type of changes
 - ▶ Information booklet cues
 - ▶ UCCs
 - ▶ Questionnaire

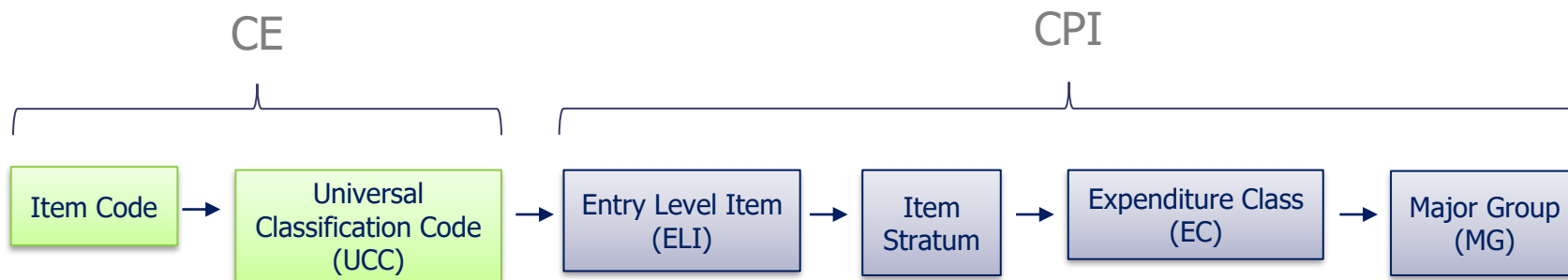
CE-CPI Item Definitions



CE-CPI Item Definitions



CE-CPI Item Definitions



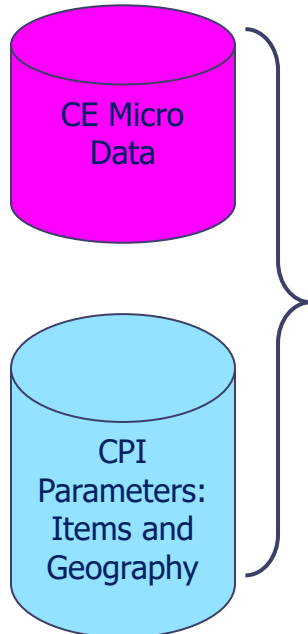
	CE	CPI				
	Item Code	Universal Classification Code (UCC)	Entry Level Item (ELI)	Item Stratum	Expenditure Class (EC)	Major Group (MG)
Number		≈600	311	243	70	8
Example		530110	TG011	TG01	TG	T
		Airline Fares	Airline Fares	Airline Fares	Public Transportation	Transportation

Expenditure Weight Processing System

Inputs

CPI Pre Processing

Outputs

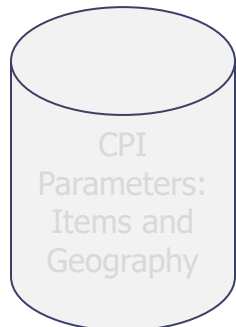
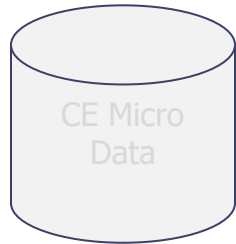


Expenditure Weight Processing System

Inputs

CPI Pre Processing

Outputs



EW Pre-Processor Convert CE Data to CPI Structure.

1. CE UCC structure to CPI Item Structure
2. CE to CPI Geographic Structure
3. Other Expenditure Adjustments
Examples:
 - a. Food on Trips
 - b. Appliances & Maintenance and Repair
 - c. Gasoline

CE

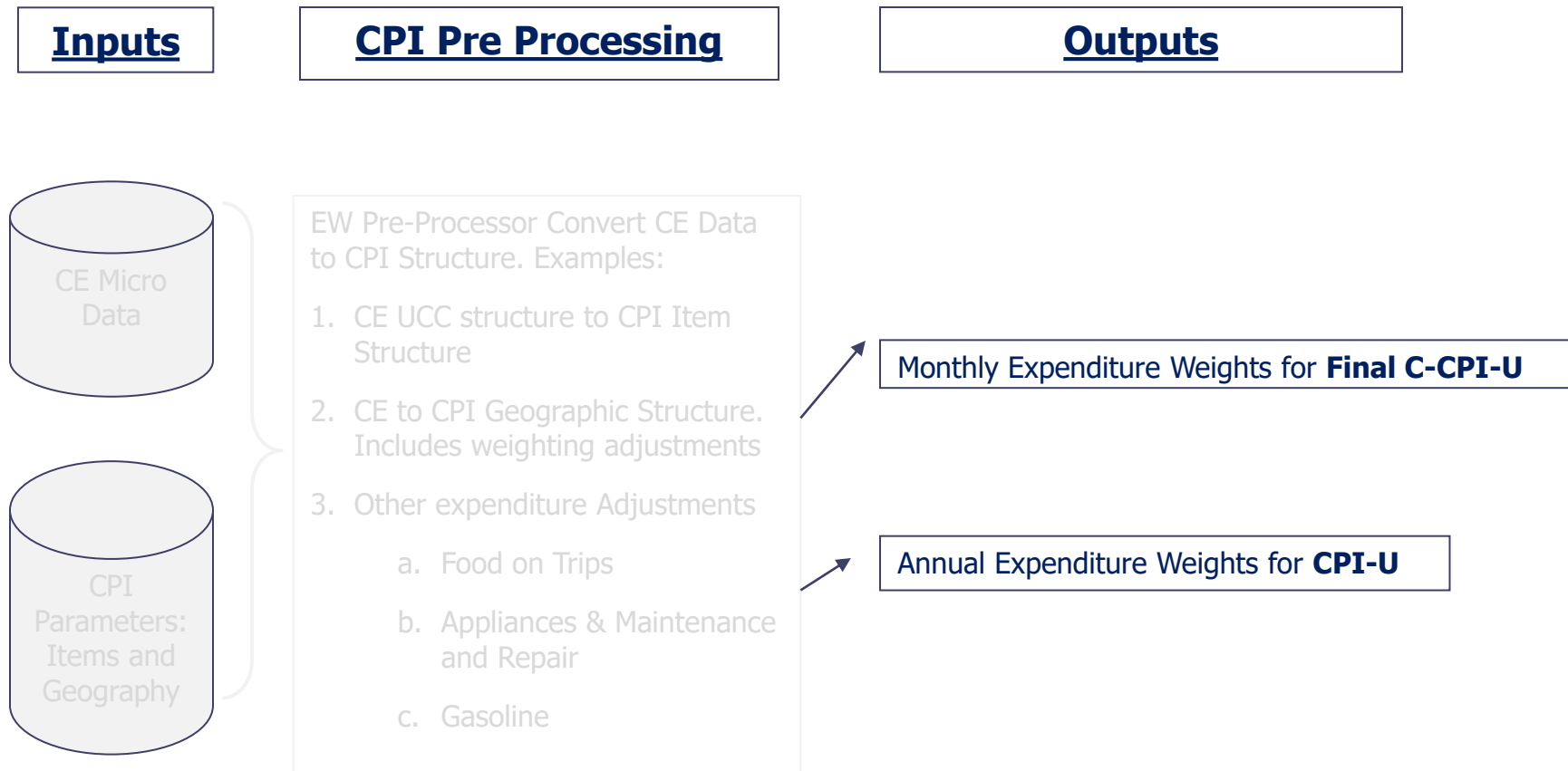
CPI

UCC	UCC Title	ELI	ELI Title
470111	Gasoline	TB011	Regular
		TB012	Mid-Grade
		TB013	Premium

↑
Consumption data from EIA



Expenditure Weight Processing System



CPI Outputs: Weight Products

■ CPI-U Annual Weight Period

Expenditure Reference Period	CPI-U/W Index Months	First Publication Month
2021	2023.01-2023.12	February 2023

CPI Outputs: Weight Products

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■ C-CPI-U Monthly Weight Period

Collection Quarter Data	Expenditure Reference Period		
Q221 D and Q221-Q222 I	2022.01 - 2022.03		

CPI Outputs: Weight Products

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CPI Outputs: Indexes

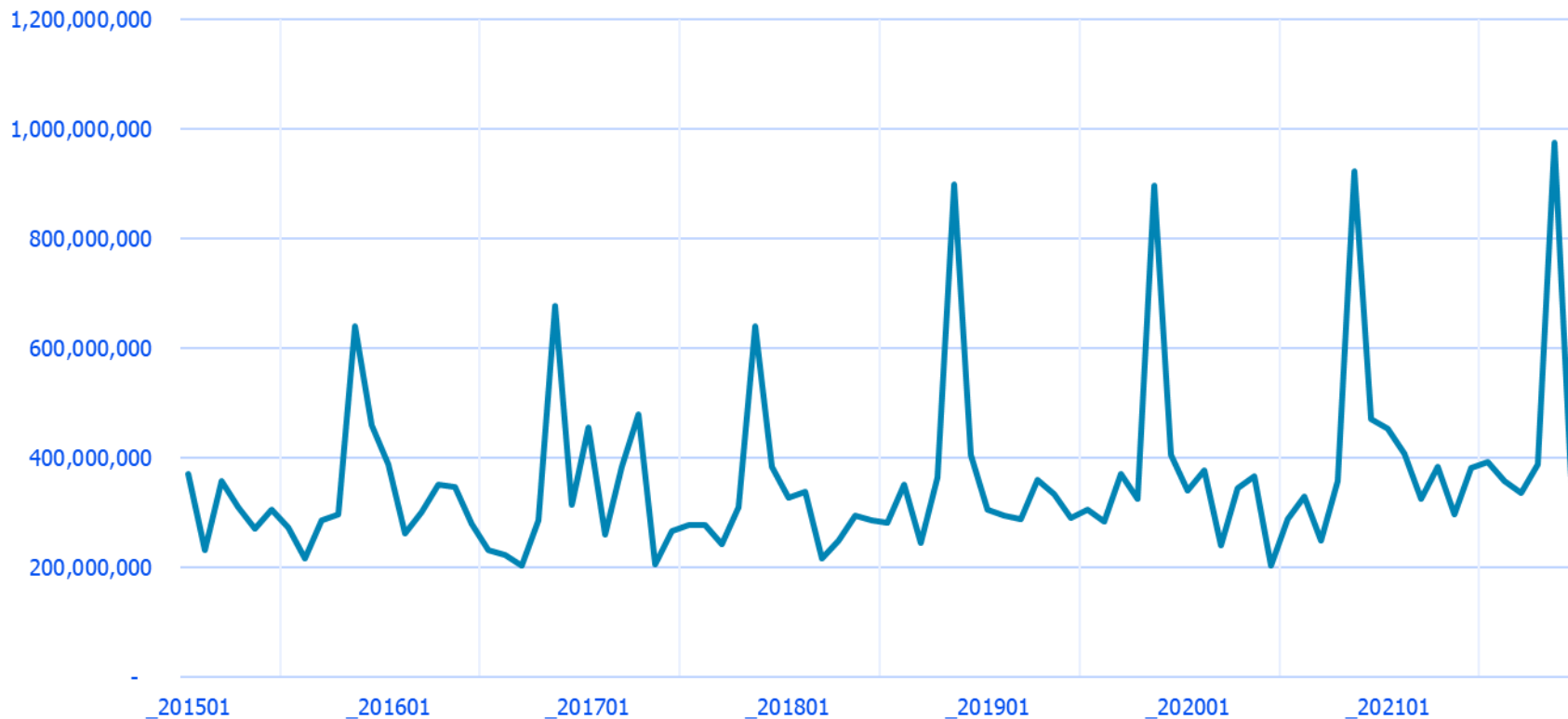
CPI-U Long Term Price Change:

$$I_{I,A,p} IX_{[z;t]}^L = I_{I,A,p} IX_{[z;v]}^L * \frac{\sum_{i,a \in I,A} AW_{\beta}^{i,a,p} * I_{i,a,p} IX_{[\alpha;t]}^{LorG}}{\sum_{i,a \in I,A} AW_{\beta}^{i,a,p} * I_{i,a,p} IX_{[\alpha;v]}^{LorG}}$$

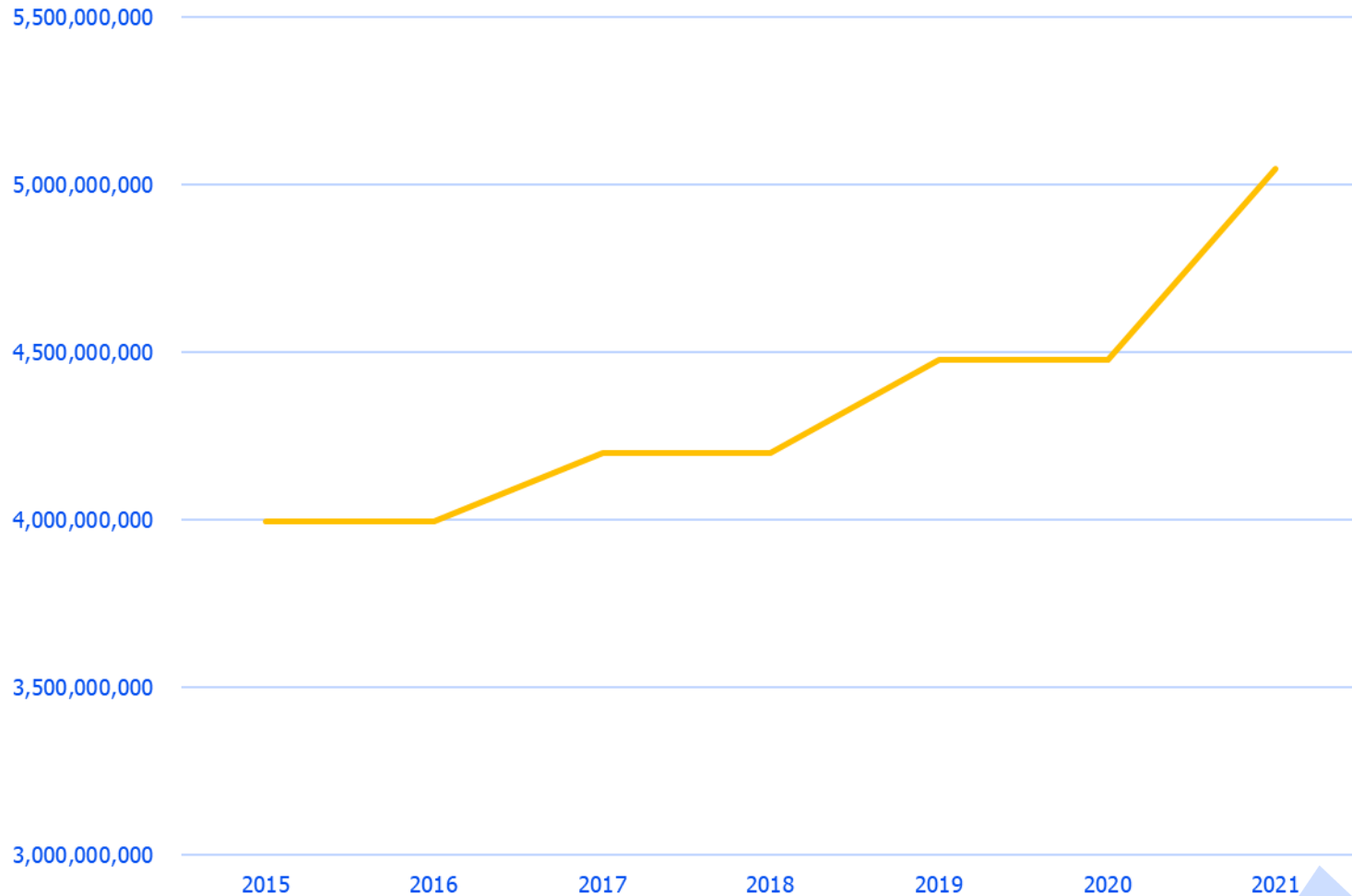
C-CPI-U Long Term Price Change:

$$I_{I,A,p} IX_{[z;t]}^T = I_{I,A,p} IX_{[z;t-1]}^T * \prod_{i,a \in I,A} \left(\frac{I_{i,a} IX_{[\alpha;t]}^{LorG}}{I_{i,a} IX_{[\alpha;t-1]}^{LorG}} \right)^{\frac{S_{t-1}^{i,a,p} * S_t^{i,a,p}}{2}}$$

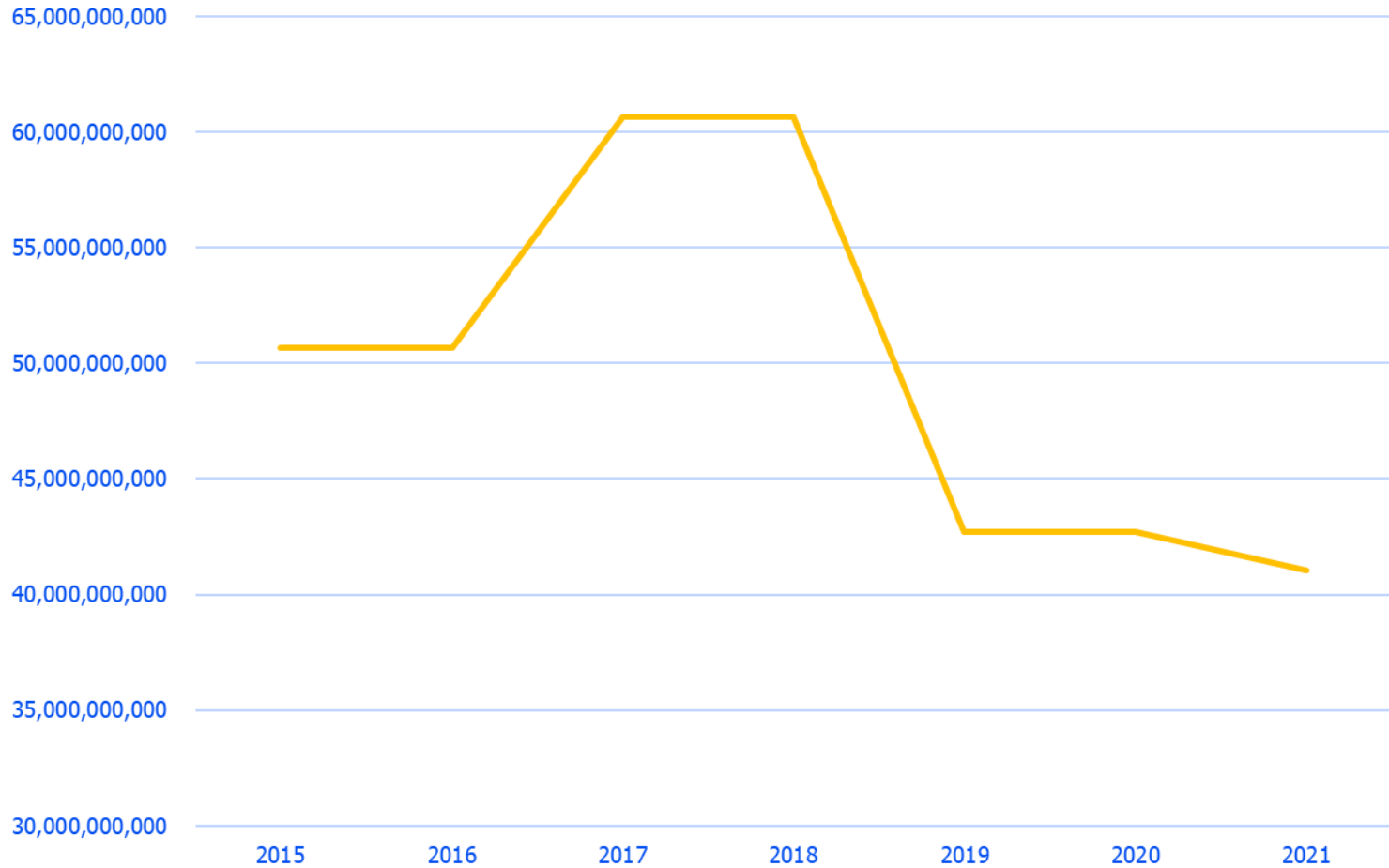
CPI Outputs: Example – FF02



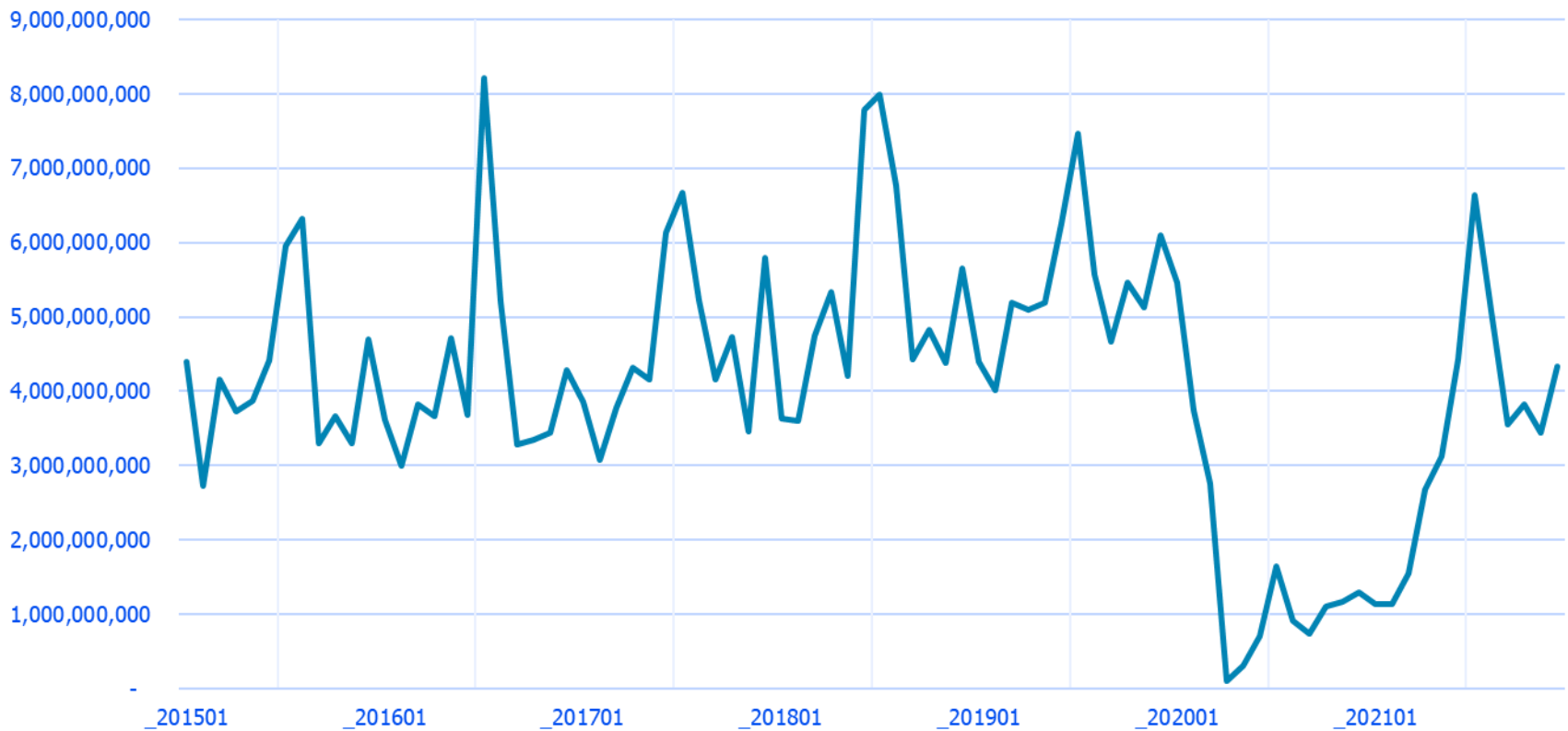
CPI Outputs: Example – FF02



CPI Outputs: Example – TG01



CPI Outputs: Example – TG01



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