Panel on Improving Cost-of-Living Indexes and Consumer Inflation Statistics in the Digital Age

Open Session: Use of high-frequency and other alternative data sources in price measurement

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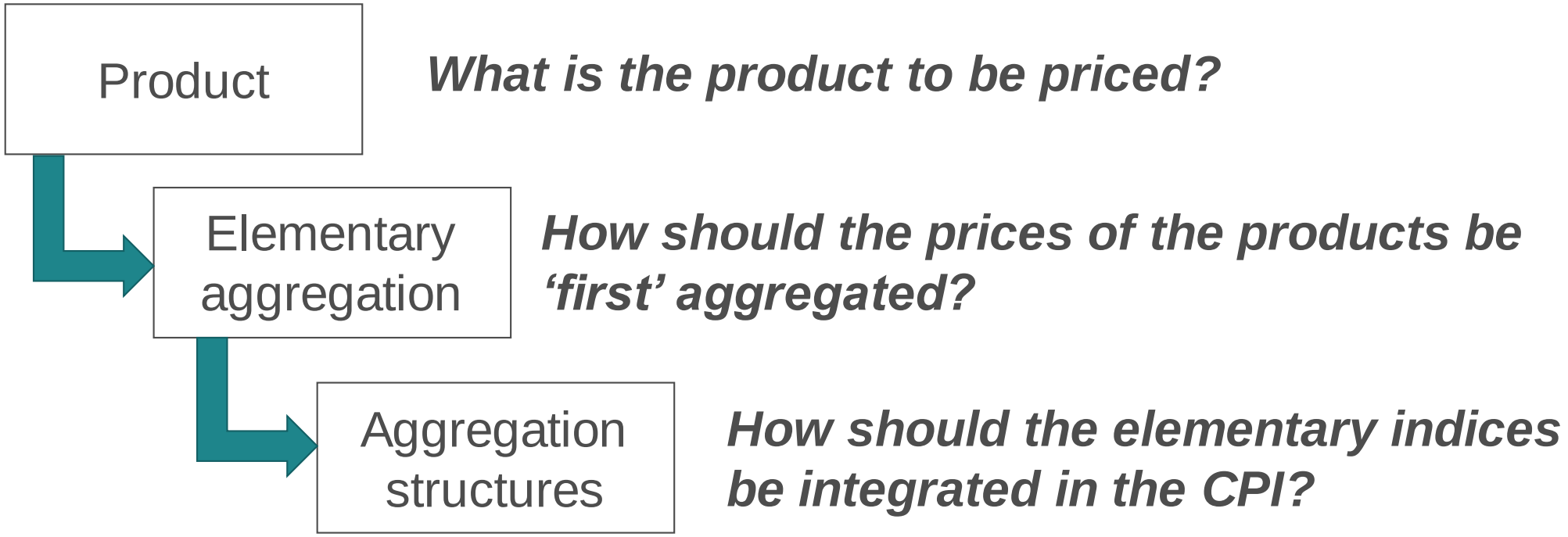
Claude Lamboray | Eurostat

claude.lamboray@ec.europa.eu

Outline



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What is the product to be priced ?

The three main dimensions: time, outlet, product

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What is the product to be priced? Time

- Unit values for **scanner data** over the reference period (e.g.) month
- Unweighted averaging of price quotes in the case of **web-scraped data** ?
- **Field price collectio**n: prices collected at a certain point in time

Further complications of the time dimension for some products (airfares etc.)?

What is the product to be priced? Outlet

- Is it best to **work at outlet level** or is **aggregation across outlets** (of the same type/chain/region) acceptable?

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What is the product to be priced? Product

- Use of GTIN/SKU/UPC as a **product identifier**, sometimes only broader product identifier are available in the data sets (leading to some unit value bias)
- ***'The primary obstacle to dealing with transaction data in the CPI has been dealing with product lifecycle effects.'*** *(Big Data in the U.S. Consumer Price Index: Experiences & Plans)*
  - Matching of outgoing and incoming item codes in order to capture relaunches
  - Adjust for package size at this level (for example chocolate bar from 80g to 75g)
  - Dumping filters
  - Combining brand and generic pills (CorpY), homogenous products
- Which type of **discounts** are captured in the standard CPI methodology and which ones are captured in the ADS?

Elementary aggregation

Multilateral methods instead of bilateral methods?

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Elementary aggregation: Bilateral Methods

- **Unweighted** index formulas: Jevons
  - Use either all the data, or only a sample (weights can be taken into account in the sampling process)
- **Weighted** index formulas: Geometric Laspeyres, Törnqvist,…
  - Frequently chaining is not recommended

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Elementary Aggregation: Multilateral Methods

- **Multilateral method** as a way to take into account all the data (prices and weights), and cope with a dynamic product universe
- Examples:
  - Belgium: GEKS-T; 25 month rolling window; Half splice
  - Australia: GEKS-T; 9 quarters rolling window; Mean splice
  - UK: GEKS-Jevons; Movement Splice; for web scraped data
- **Hedonic extensions of the multilateral methods**, taking into account prices, weights and product characteristics

Elementary Aggregation: Discussion

How should we decide on a (multilateral) index?

- Some **broad principles** (UK, Australia): Resources, Theoretical properties, Flexibility, Interpretability, Transitivity versus characteristicity

More concretely:

- The **link with bilateral indices** (GEKS-T/CCDI, GEKS-Jevons)
- **Theory**: For example substitution bias of multilateral index formulas
- **Test approach**: to be further investigated
- A lot of **empirical work**! (but what to conclude from it !?)

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Elementary Aggregation: Discussion

Some challenges:

- For multilateral methods: decisions must be made on technical aspects such as **window length, splicing technique**
- How do the new compilation techniques relate to the usual CPI treatments: **seasonal products**, **replacements and quality adjustment**
- For web scraping: the **absence of weights**

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Aggregation structures

Examples from the UK, Australia and Belgium

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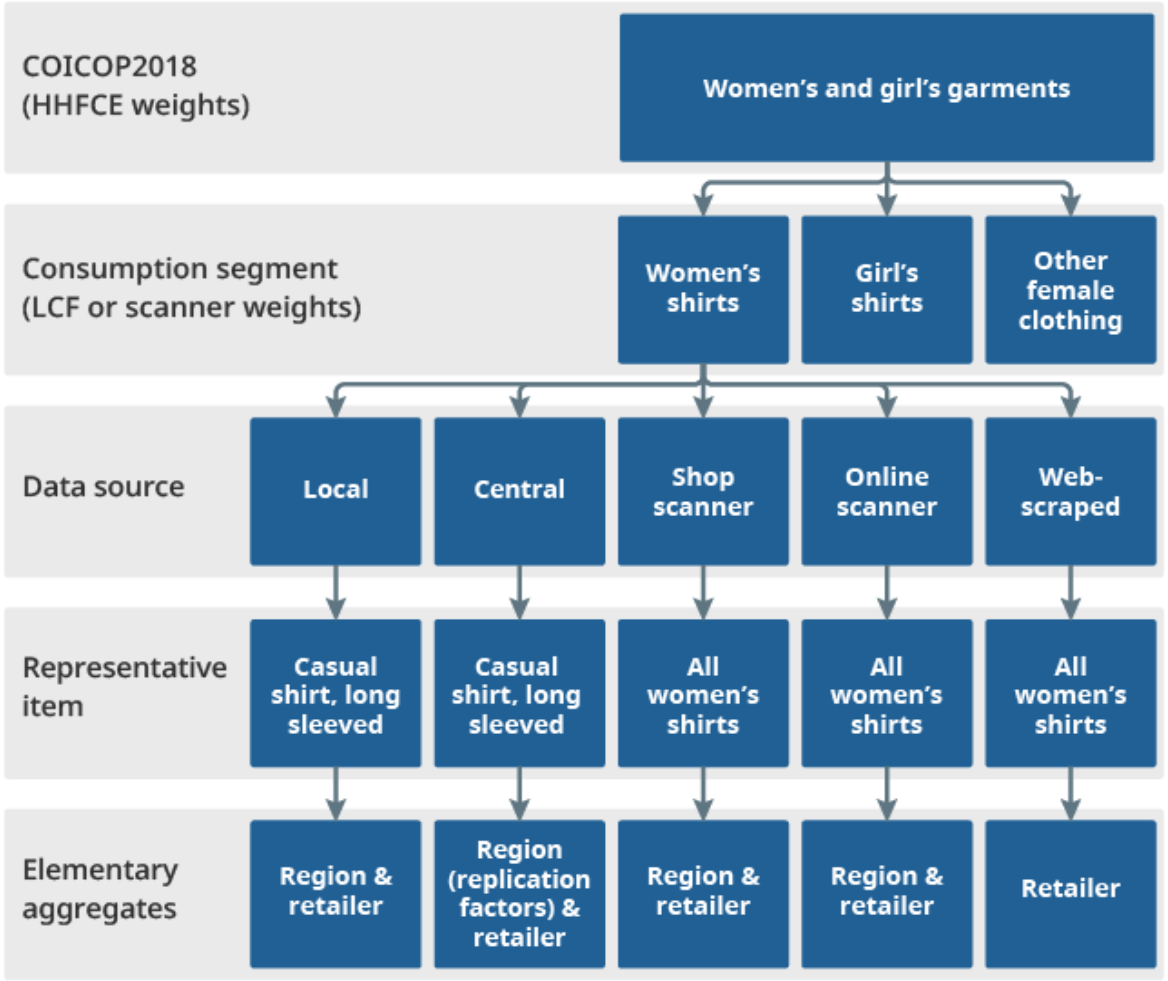
Aggregation structures: UK



- Integration of ADS at the level of a 'consumption segment'
- Local/Central price collection follows the usual approach
- The relatively tight representative items are not used for the ADS
- Stratification of scanner data by 'retailer' and by 'region'; no need for a regional stratification of the web-scraped data

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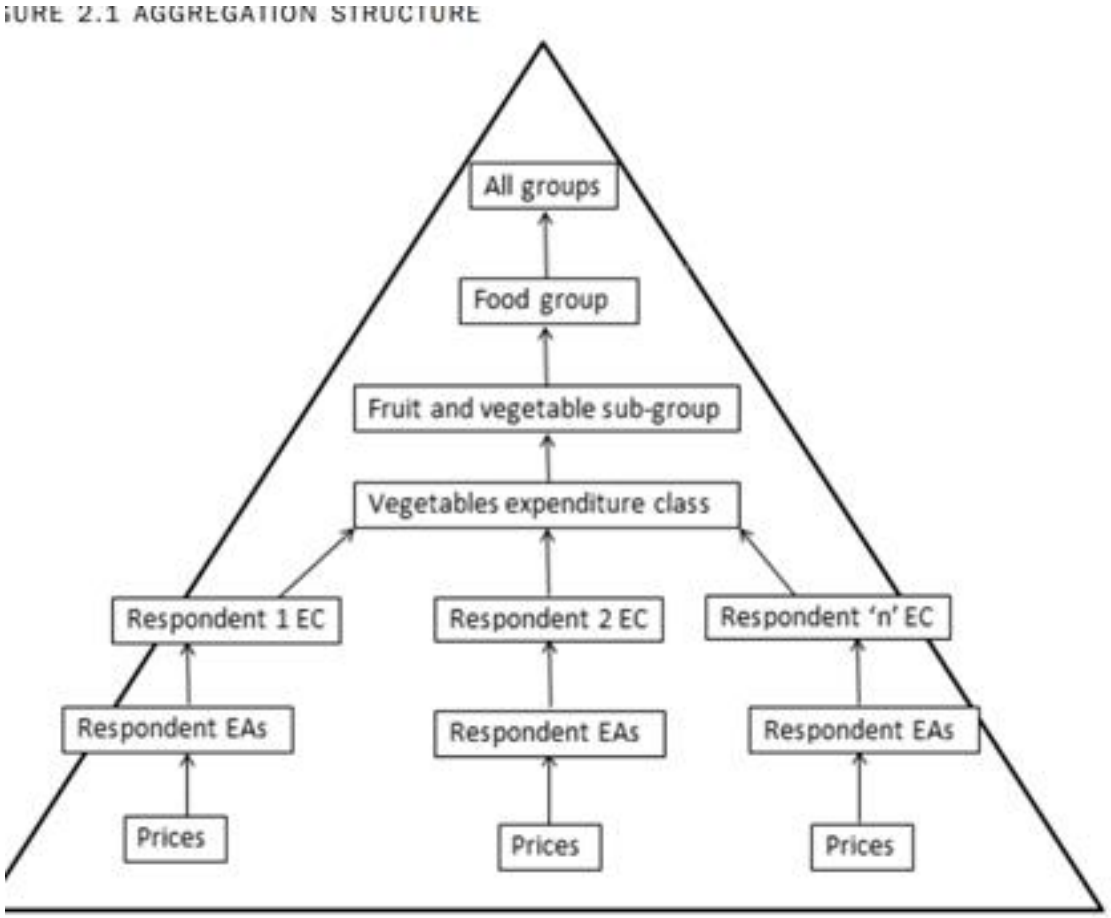
Aggregation structures: Australia



- Integration at the level of the 'expenditure class'
- Stratification by 'respondent', and then by respondent-specific product categories ('Respondent EAs').
- Use of a Törnqvist index to combine the respondent-specific product categories.

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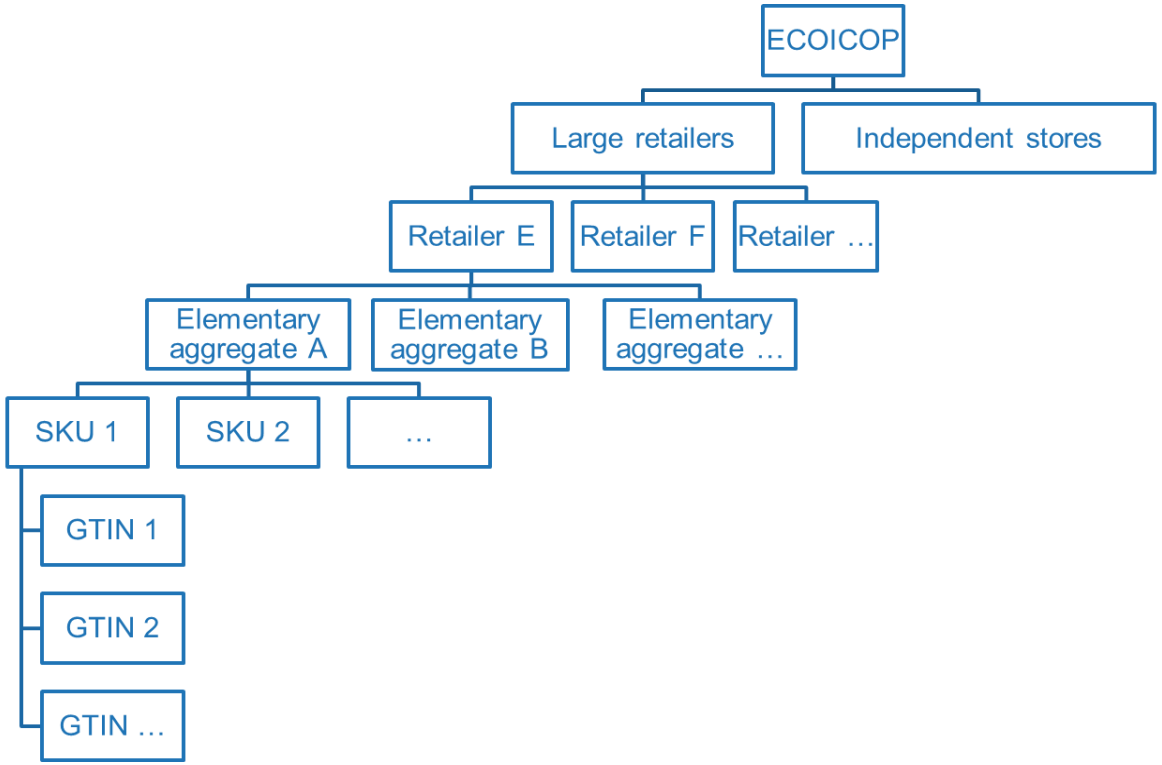
Aggregation structures: Belgium



- Integration at the level of ECOICOP (5-digit subclass) and type of outlet.
- Stratification of scanner data by ‘retailer’, and then by retailer-specific product categories (‘Elementary aggregates’).

Aggregation structures : Discussion

- The new data sources are separate strata of the target universe for which a weight and a price index must be compiled.

- The level of integration may depend on publication policy, user needs, and the willingness to take into account the increased (product/outlet/regional) coverages of the ADS, the flexible weights of the ADS (for scanner data).

Aggregation structures : Discussion

- What do the **weights of the ‘data source’ or the ‘retailer’** represent? What are the data sources for the weights?
- How should the **price indices within and across data sources be aggregated**?

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Thank you

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