1. Harmonisation of methods and IT-system

Transaction data: 2010-2017

Supermarkets
- Chained Jevons
- Uses almost all data

Department stores
- Unit value
- Sample of data

DIY stores
- Laspeyres
- Samples

Smartphones
- **QU-method**
- Uses all data

Pharmacies
- Unit value
- Samples

Travel agencies
- Chained Jevons
- Uses all data

Future aims: 1. Index methods

- Less methods for different data sources
- **QU-method** for all transaction data?
- Different types of consumer goods are carefully studied; QU is compared with other methods
- Consumer electronics is currently studied
- Process all transaction data, limit use of samples

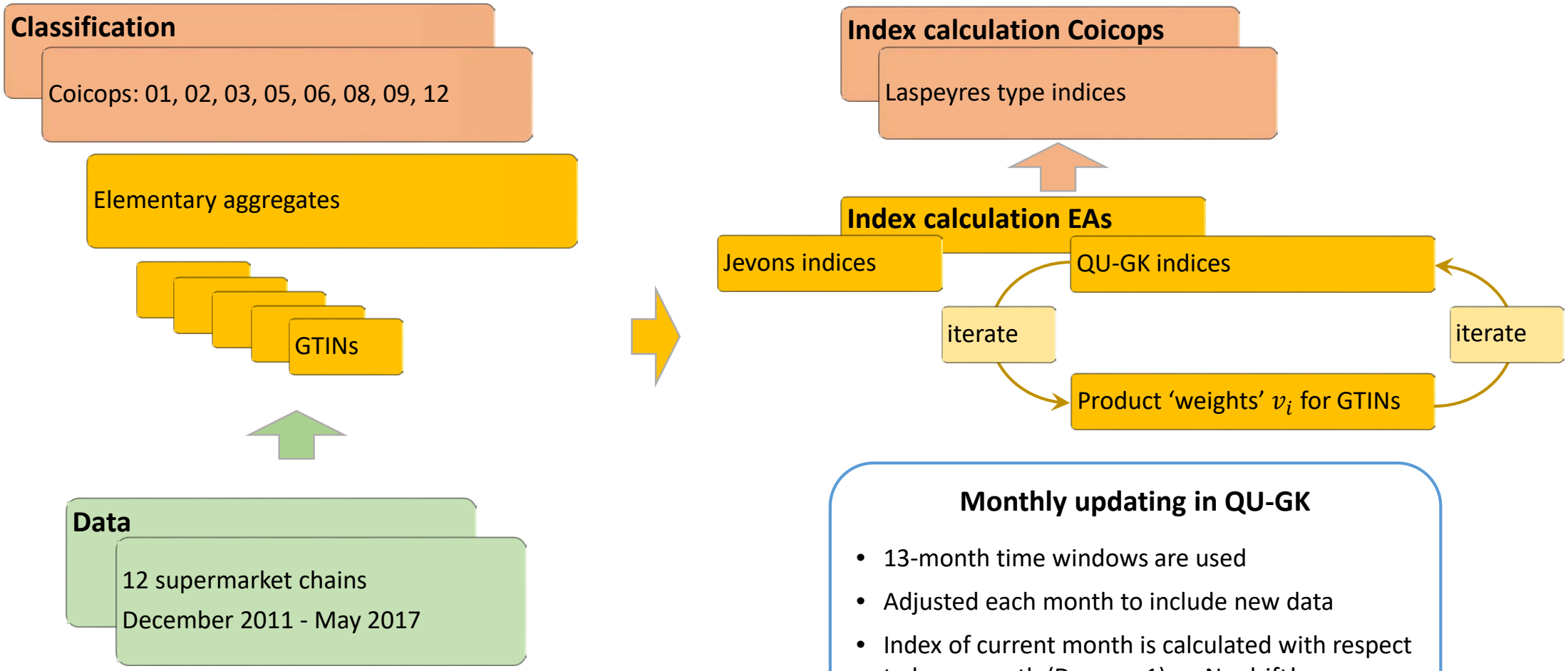
Future aims: 2. IT-system

- Different tools for computation and analysis are used
- A new system is currently built for the whole process
- Covers stages from data input to output and analysis
- The system will integrate all index methods, analysis and classification tools, for different data sources

2. QU-method vs Jevons

	QU-method (Geary-Khamis)	Monthly chained Jevons
Same	Dynamic basket	Dynamic basket
	No chain drift	No chain drift
Different	Multilateral	Bilateral
	Weights at product level (based on sales)	Equal product weights
	Hardly affected by clearance prices	Filters used to exclude clearance prices
	Less sensitive to relaunches at GTIN level	Sensitive to relaunches due to equal weights
	No imputation needed	Prices are imputed
	$P_t = \frac{\sum_{i \in G} p_{i,t} q_{i,t} / \sum_{i \in G} p_{i,0} q_{i,0}}{\sum_{i \in G} v_i q_{i,t} / \sum_{i \in G} v_i q_{i,0}}$ $v_i = \left(\sum_{z=0}^{12} q_{i,z} p_{i,z} / P_z \right) \Big/ \sum_{z=0}^{12} q_{i,z}$	$P_t = \prod_{i \in G} \left(\frac{p_{i,t}}{p_{i,0}} \right)^{1/n}$

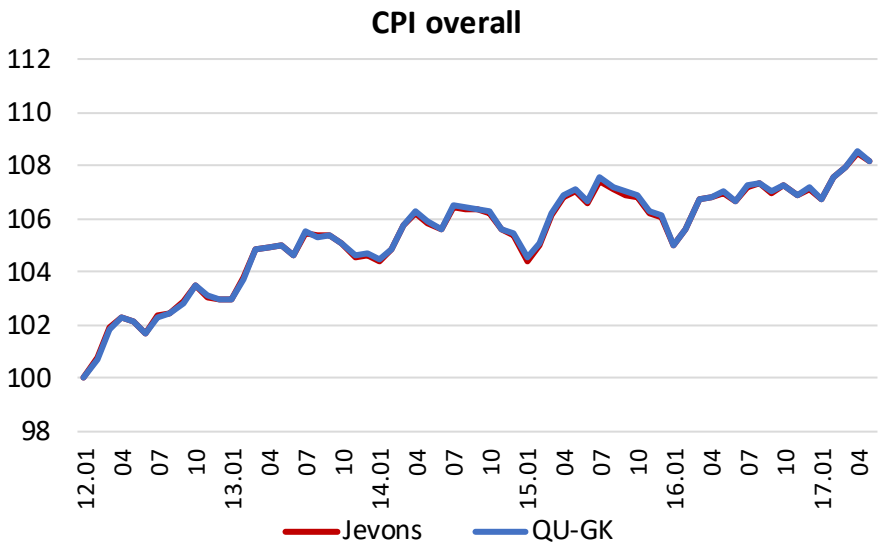
3. Supermarkets: Set-up and scope

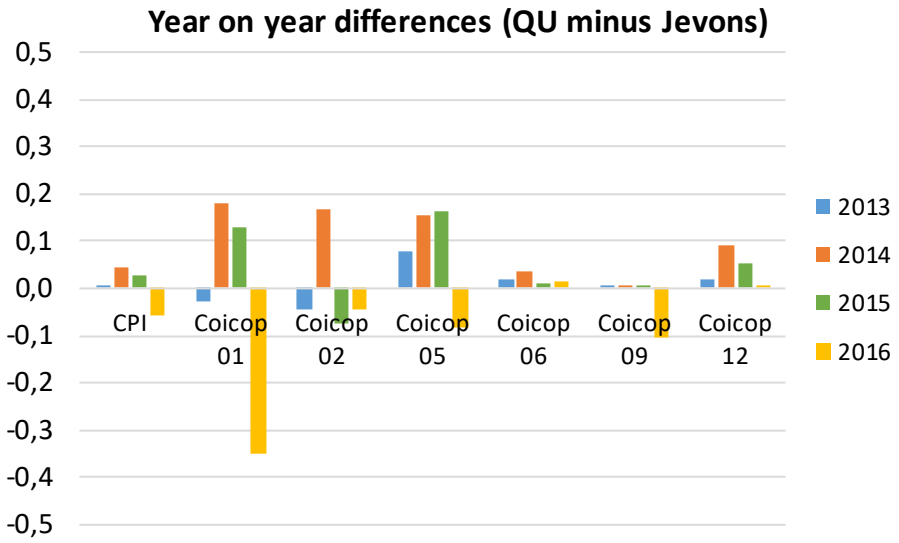


Monthly updating in QU-GK

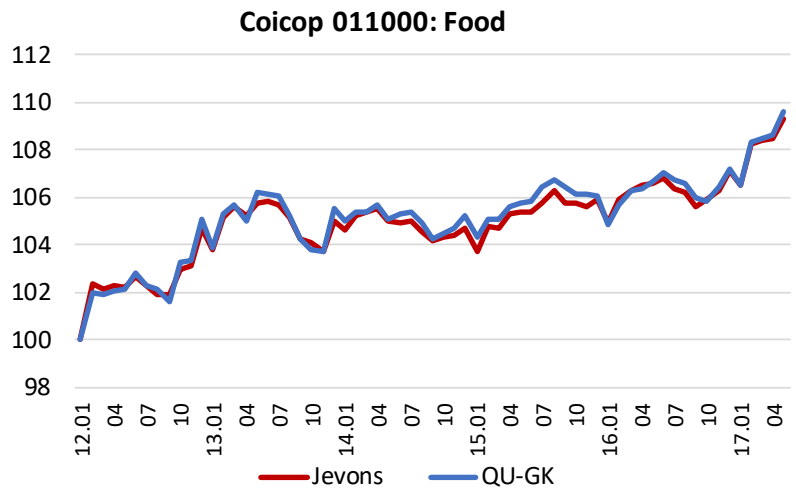
- 13-month time windows are used
- Adjusted each month to include new data
- Index of current month is calculated with respect to base month (Dec. $y-1$) $\Rightarrow$ No drift!

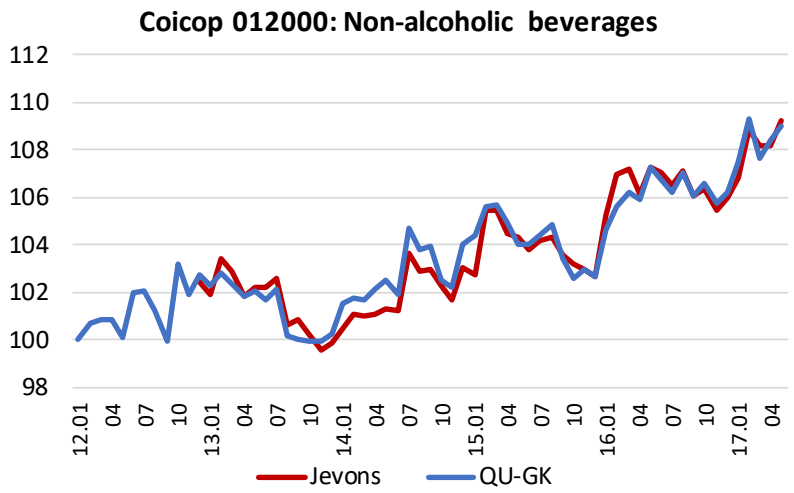
4. Results: QU-GK vs Jevons

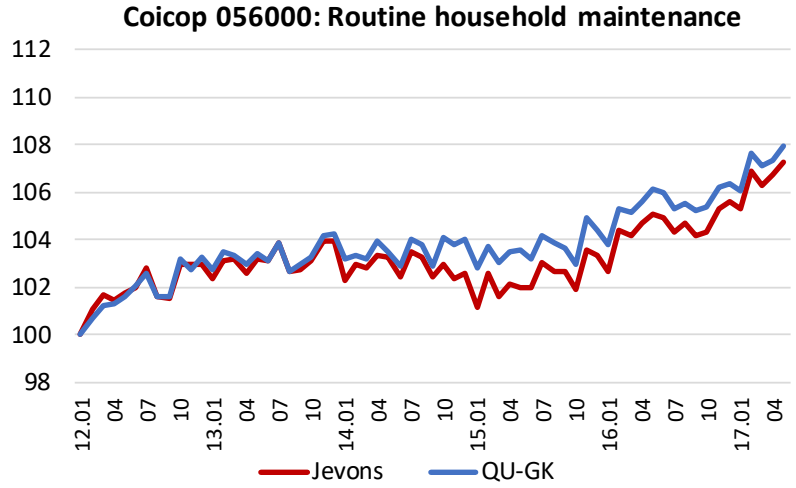


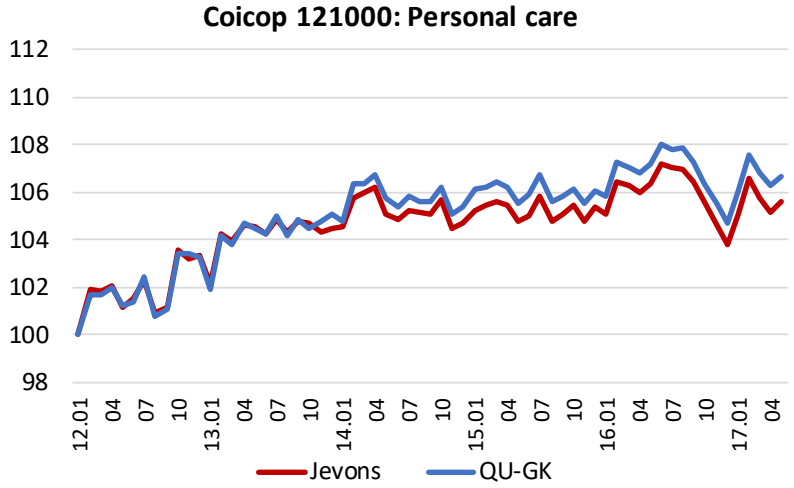


5. Differences for 3-digit Coicops





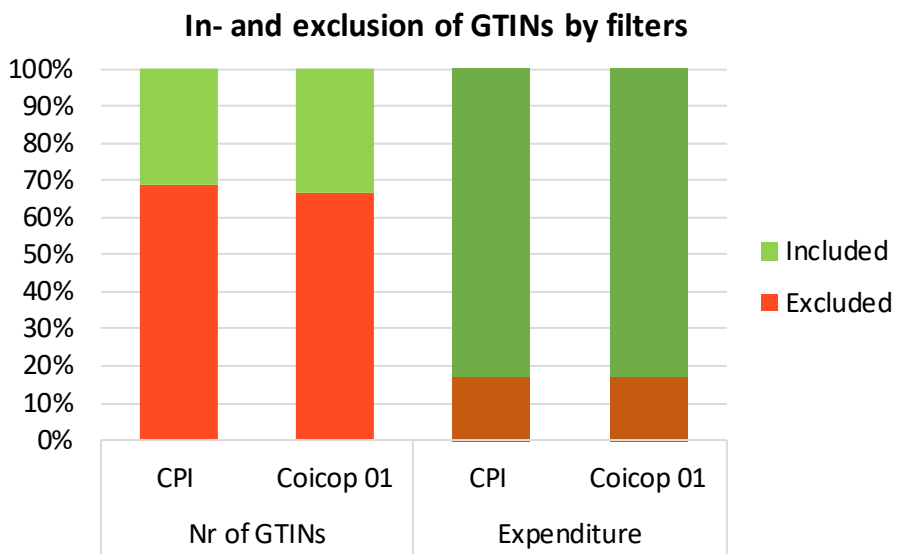




Summary of differences

- Very small differences at CPI level (within 0.05 %-pts)
- Differences at two-digit level are also small, but are larger than 0.1 %-pt in some years
- Differences become larger for lower aggregates
- Impact of weighting: Downward trends in Jevons due to clearance prices (relaunches) in Coicops 056 and 121

6. Impact of filters in Jevons method



Remarks about filters

- Filters in Jevons method introduced for:
  - Clearance prices
  - GTINs with “low” expenditures
- Not all clearance prices are filtered out ⇒ indices remain sensitive to downward trend
- Imputations can also lead to distorted indices
- QU-method: all GTINs enter index calculations

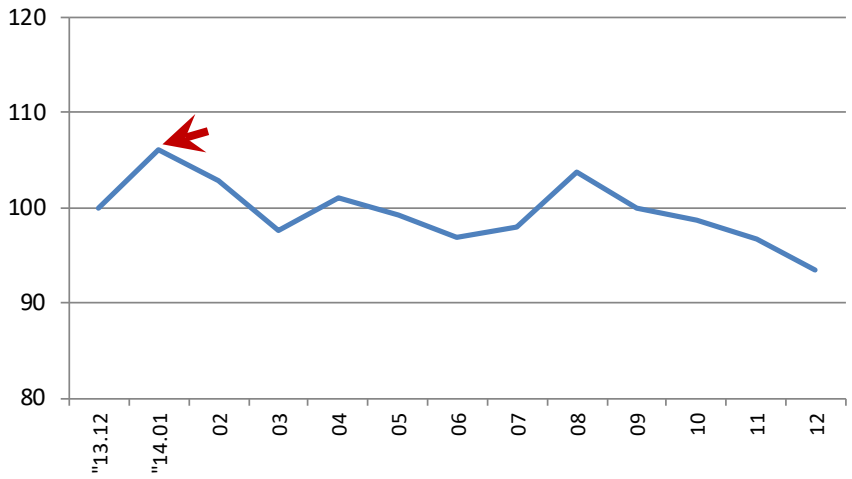
7. QU-method in CPI: Analysis of indices

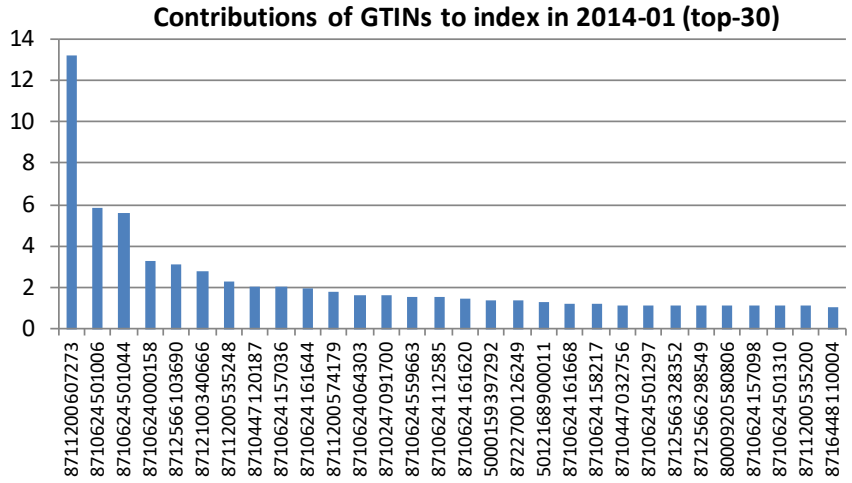
QU-GK: From index compilation to analysis

- Jevons replaced by QU-GK for all supermarket chains since January 2018
- Processing of large data sets is still expanding

Top-down analysis of indices

- QU-method offers <u>additive</u> expression for contributions of products to index





8. Situation 2018 and future work

Transaction data: Situation Jan. 2018

Supermarkets
QU-method
Uses all data

Smartphones
QU-method
Uses all data

Department stores
QU-method
Uses all data

DIY stores
QU-method
Uses all data

Travel agencies
Chained Jevons
Uses all data

Pharmacies
Unit value
Samples

Summary: Better quality with QU-GK

- QU-method uses sales based product weights
- No filters, no imputation
- Less sensitive to relaunches

Future: Product stratification

- 1st method: MARS = (product) match adjusted R^2
- First results look very promising
- Relaunches can be detected
- Special focus on package volume changes

Statistics Netherlands