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

- **Pharmacies**
  - Unit value
  - Samples

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

- **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

<table>
<thead>
<tr>
<th>QU-method (Geary-Khamis)</th>
<th>Monthly chained Jevons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Same</strong></td>
<td></td>
</tr>
<tr>
<td>Dynamic basket</td>
<td>Dynamic basket</td>
</tr>
<tr>
<td>No chain drift</td>
<td>No chain drift</td>
</tr>
<tr>
<td><strong>Different</strong></td>
<td></td>
</tr>
<tr>
<td>Multilateral</td>
<td>Bilateral</td>
</tr>
<tr>
<td>Weights at product level (based on sales)</td>
<td>Equal product weights</td>
</tr>
<tr>
<td>Hardly affected by clearance prices</td>
<td>Filters used to exclude clearance prices</td>
</tr>
<tr>
<td>Less sensitive to relaunches at GTIN level</td>
<td>Sensitive to relaunches due to equal weights</td>
</tr>
<tr>
<td>No imputation needed</td>
<td>Prices are imputed</td>
</tr>
</tbody>
</table>

### Formulas

\[ P_t = \frac{\sum_{i \in G} p_{i,t} q_{i,t}}{\sum_{i \in G} v_i q_{i,t}} \left/ \frac{\sum_{i \in G} p_{i,0} q_{i,0}}{\sum_{i \in G} v_i q_{i,0}} \right. \]

\[ v_i = \left( \sum_{z=0}^{12} q_{i,z} p_{i,z} / P_z \right) / \sum_{z=0}^{12} q_{i,z} \]

\[ P_t = \prod_{i \in G} \left( \frac{p_{i,t}}{p_{i,0}} \right)^{1/n} \]
### 3. Supermarkets: Set-up and scope

**Classification**
- Coicops: 01, 02, 03, 05, 06, 08, 09, 12

**Elementary aggregates**
- GTINs

**Data**
- 12 supermarket chains
- December 2011 - May 2017

**Index calculation Coicops**
- Laspeyres type indices

**Index calculation EAs**
- Jevons indices
- QU-GK indices

**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

- **CPI overall**

- **Year on year differences (QU minus 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 additive expression for contributions of products to index

Contributions of GTINs to index in 2014-01 (top-30)
## 8. Situation 2018 and future work

### Transaction data: Situation Jan. 2018

<table>
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<tr>
<th>Category</th>
<th>Method</th>
<th>Uses data</th>
</tr>
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### 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