Extension methods for multilateral index series

Antonio Chessa
CPI unit, Statistics Netherlands
ag.chessa@cbs.nl

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Overview

- Problem statement
- Characterisation of extension methods
- Comparative study
- Results
- Conclusions

It’s one out of many choices

- Product definition (‘relaunches’)
- Index formula + weighting schemes
- Length of time window (ML methods)
- **Index extension method**

- Important: Impact of all these factors on index!

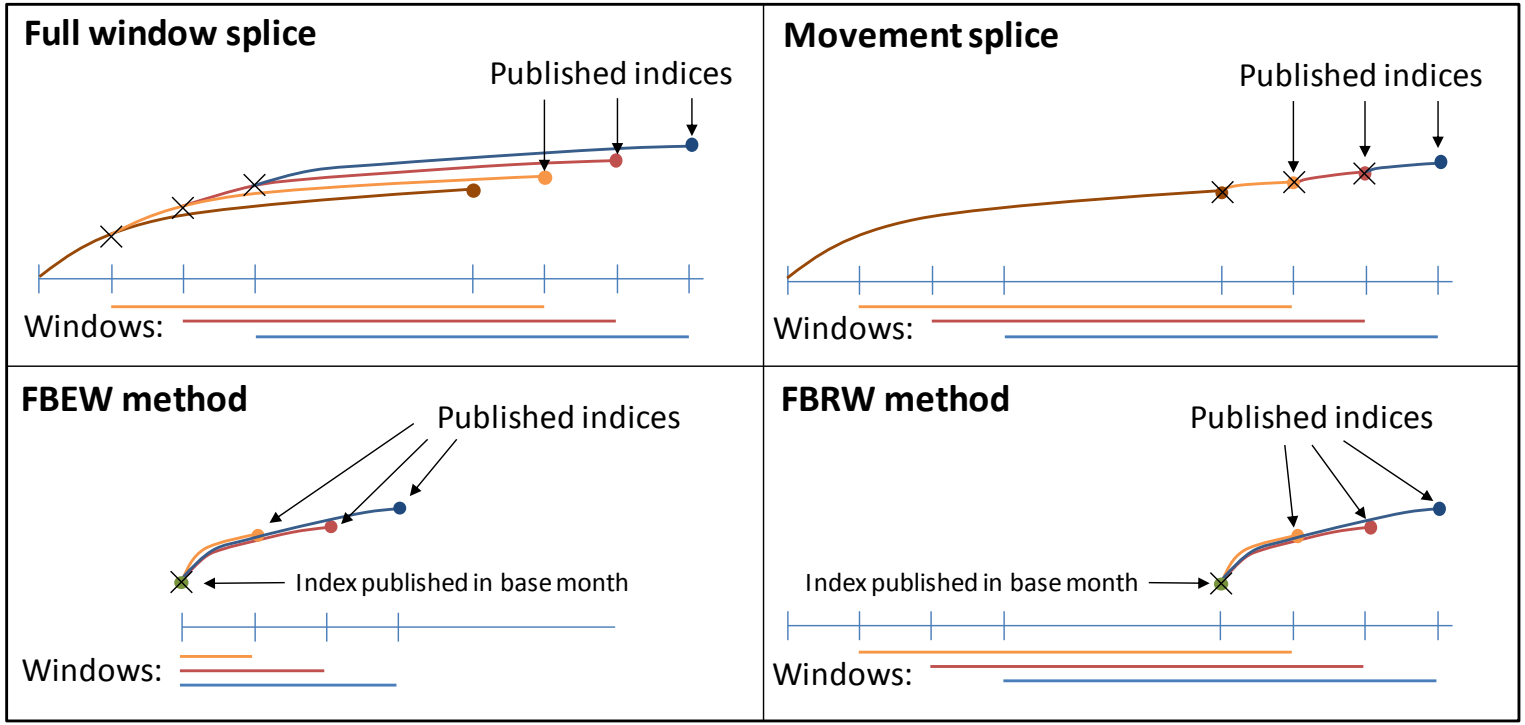
The “revision problem”

- ML methods allow us to compute transitive indices on a fixed time interval/window
- The window must be adapted in order to accommodate data of the next month
- Previously calculated indices may change
- However, indices cannot be revised in the CPI
- How could we link index series of subsequent windows?

Characterisation of extension methods

- Time window:
  - **Length**: e.g. 13 months, 25 months,…
  - **Window type 1**: Fixed-length rolling
  - **Window type 2**: Monthly expanding (with a fixed base month)
- Linking month
- Index in the linking month:
  - Linking on a **recalculated index**
  - Linking on a **published index**

Extension methods illustrated



FBEW = Fixed Base month, Expanding Window; FBRW = same, with rolling window; x = linking month and index

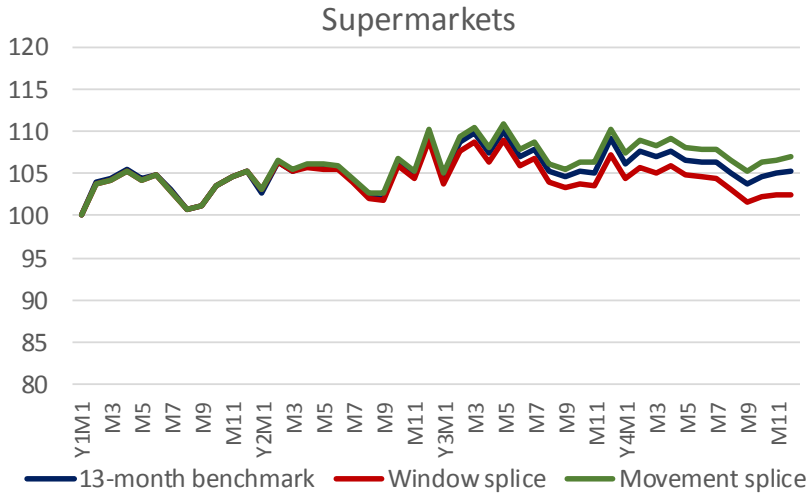
Comparative study: (1) Data

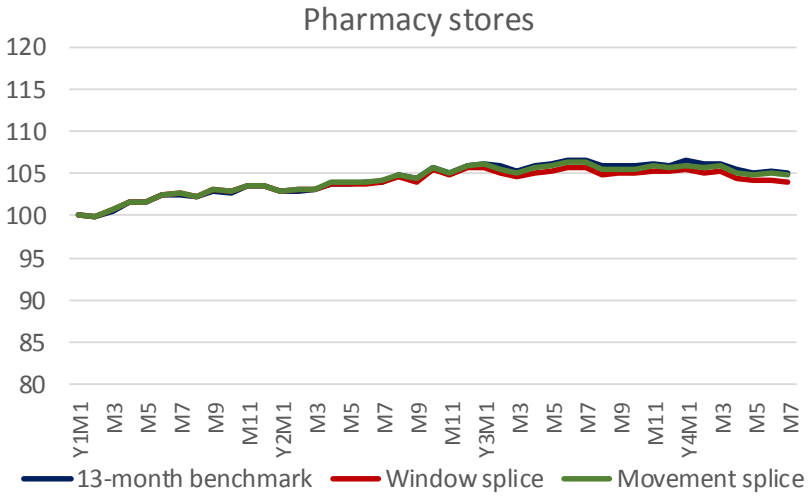
Data set	# months	COICOPs	# product categories
Supermarket chain	48	01, 05, 12	11
Department store chain	47	01, 03, 05, 11, 12	34
Pharmacy store chain	43	06, 12	20

Comparative study: (2) Methods and choices

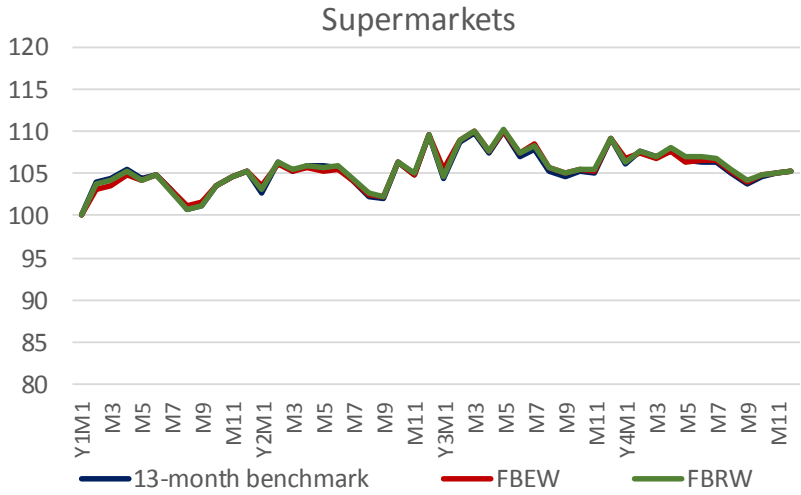
Choice aspect	Choices made in this study
Index extension method	**Splicing:** Window and movement splice (WS, MS) **Fixed base methods:** FBEW and FBRW
Index method	Geary-Khamis (GK) Time Product Dummy (TPD), only for supermarkets
Window length	13 months
Product definition	**By GTIN:** COICOP 01, non-clothing items (dept.stores) **By characteristics:** clothing, pharmacy products

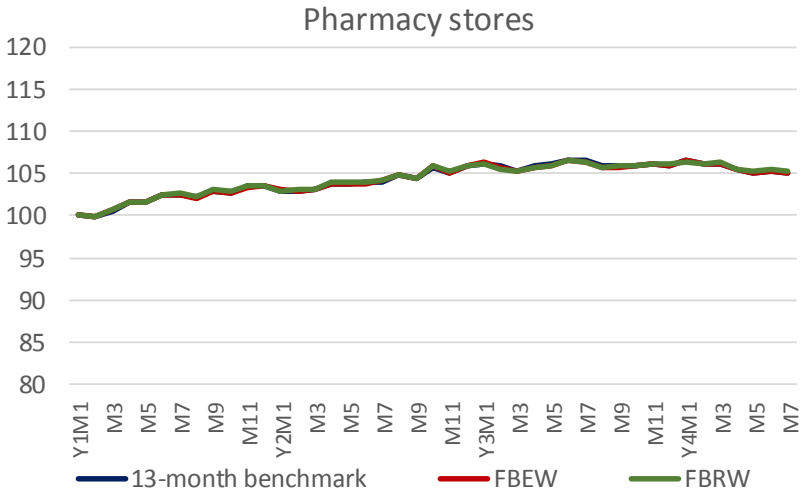
Results: (1) Splicing, GK, chain level



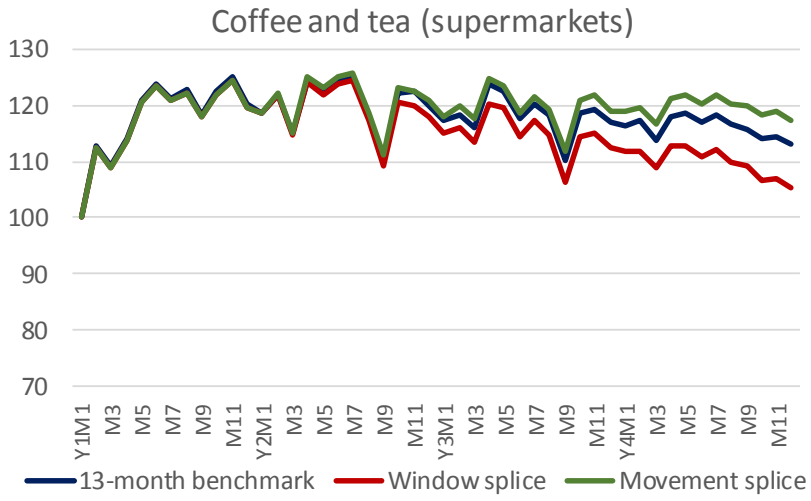


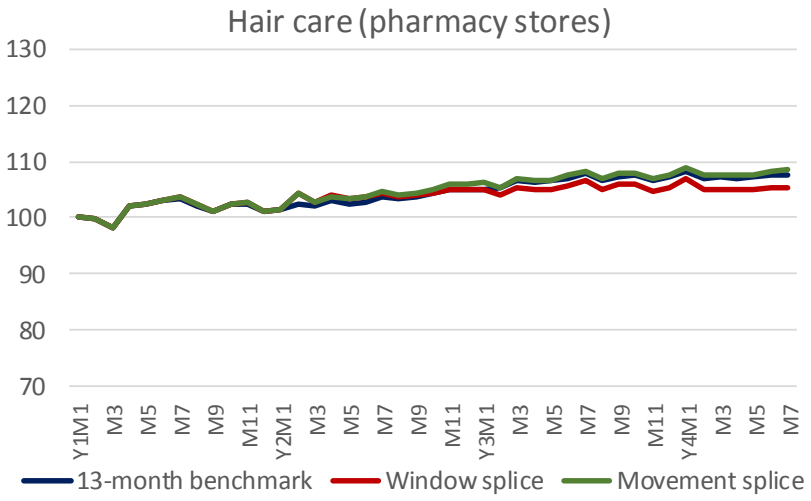
Results: (2) FB methods, GK, chain level



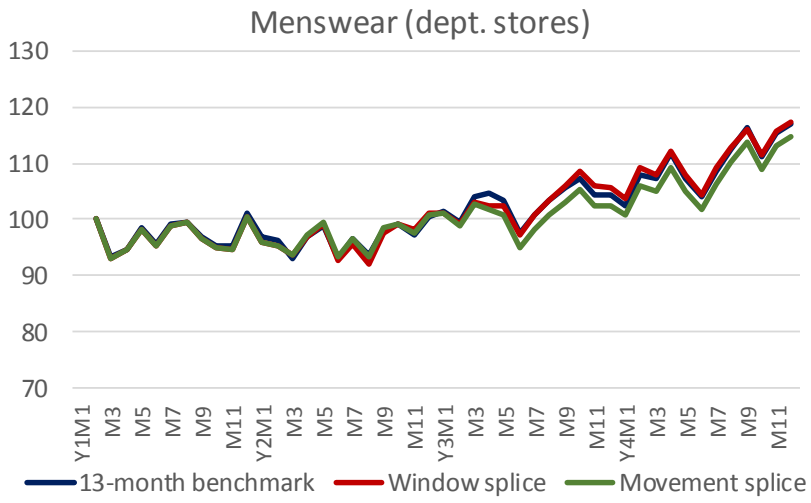


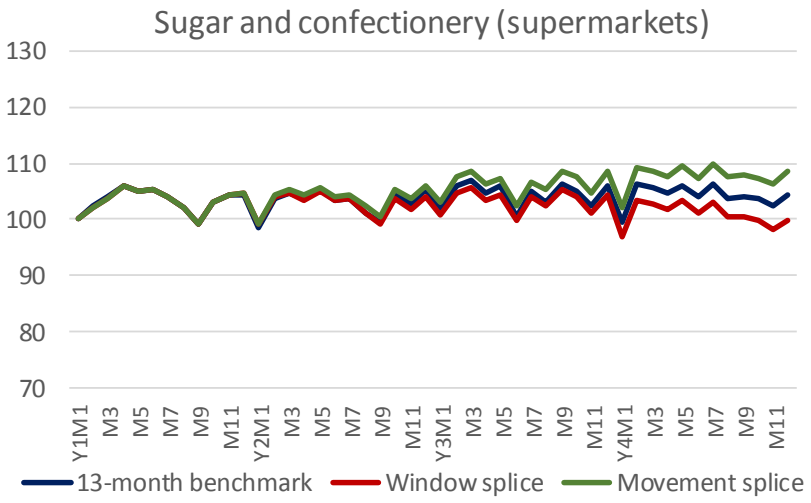
Results: (3) Splicing, GK, lower aggregates



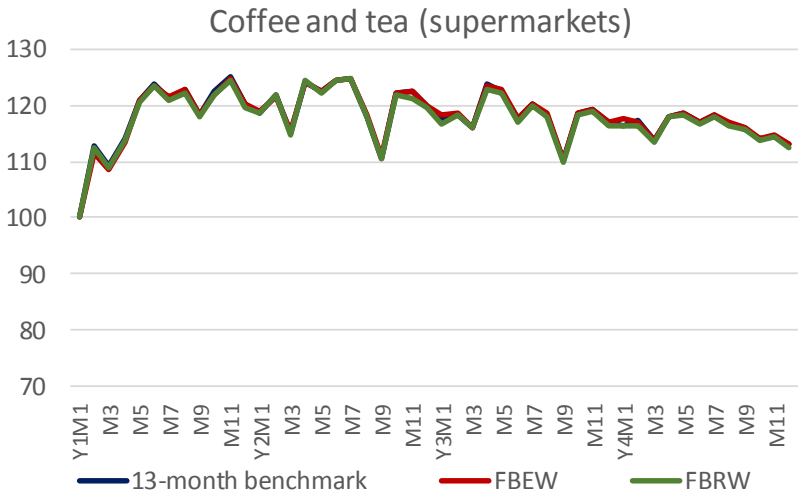


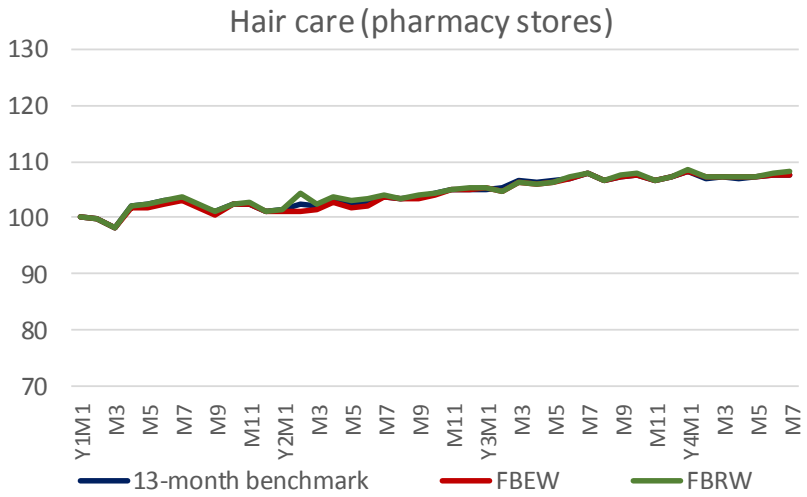
Results: (4) Splicing, GK, lower aggregates



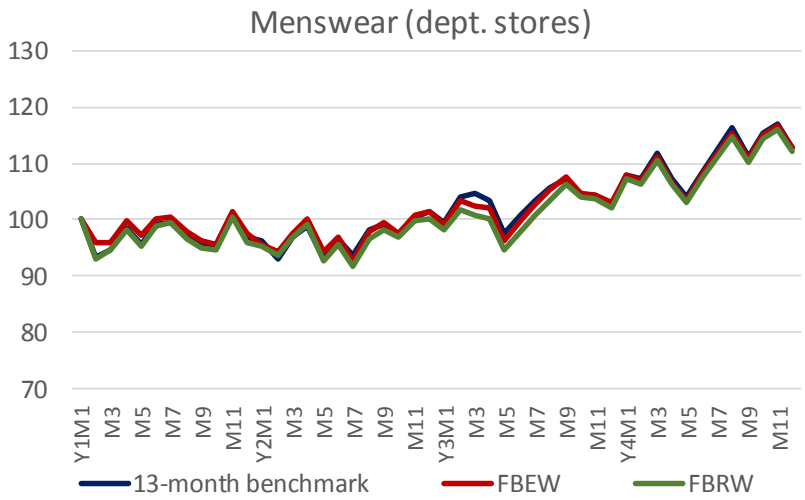


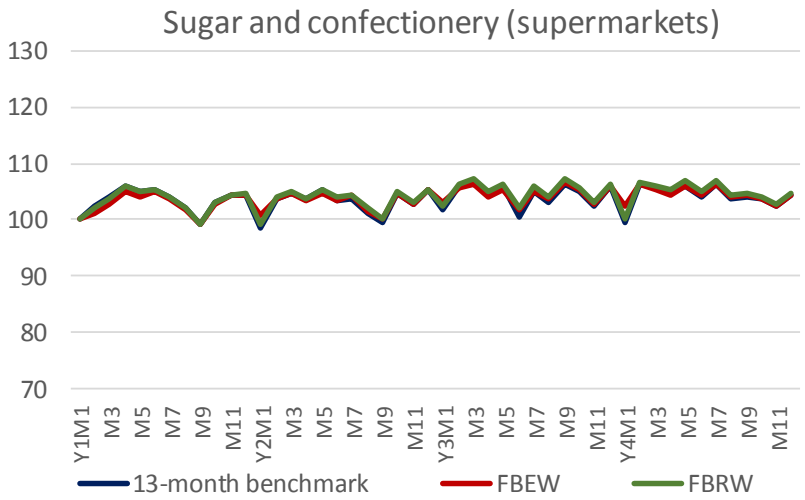
Results: (5) FB methods, GK, lower aggr's



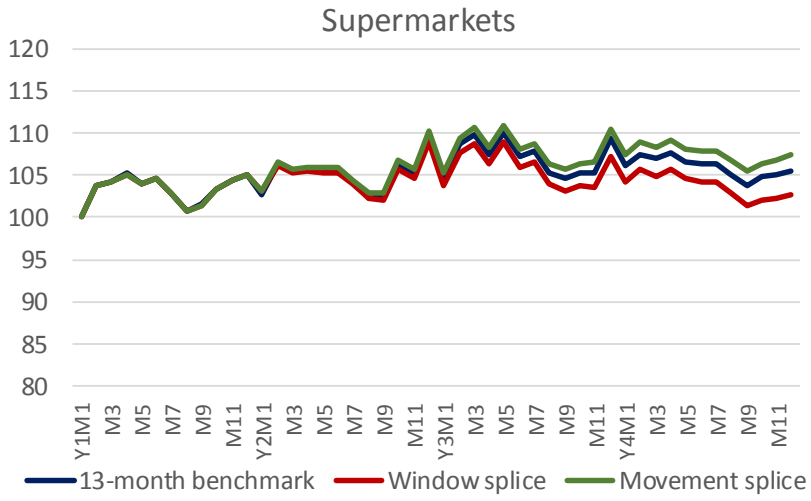


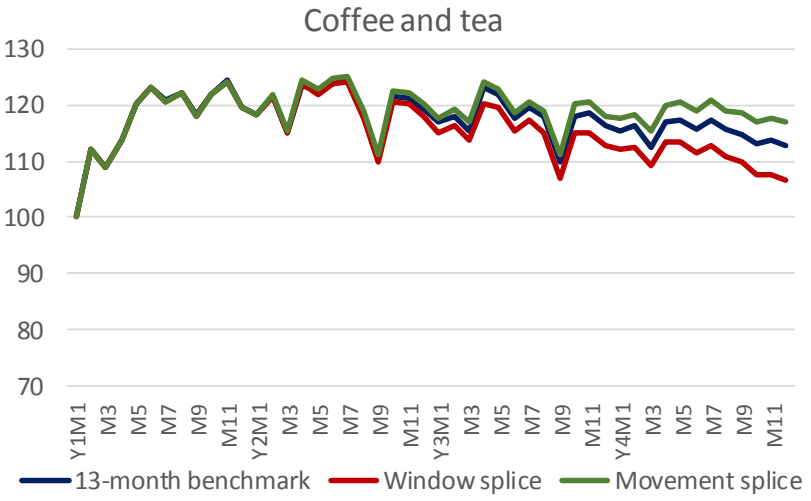
Results: (6) FB methods, GK, lower aggr's



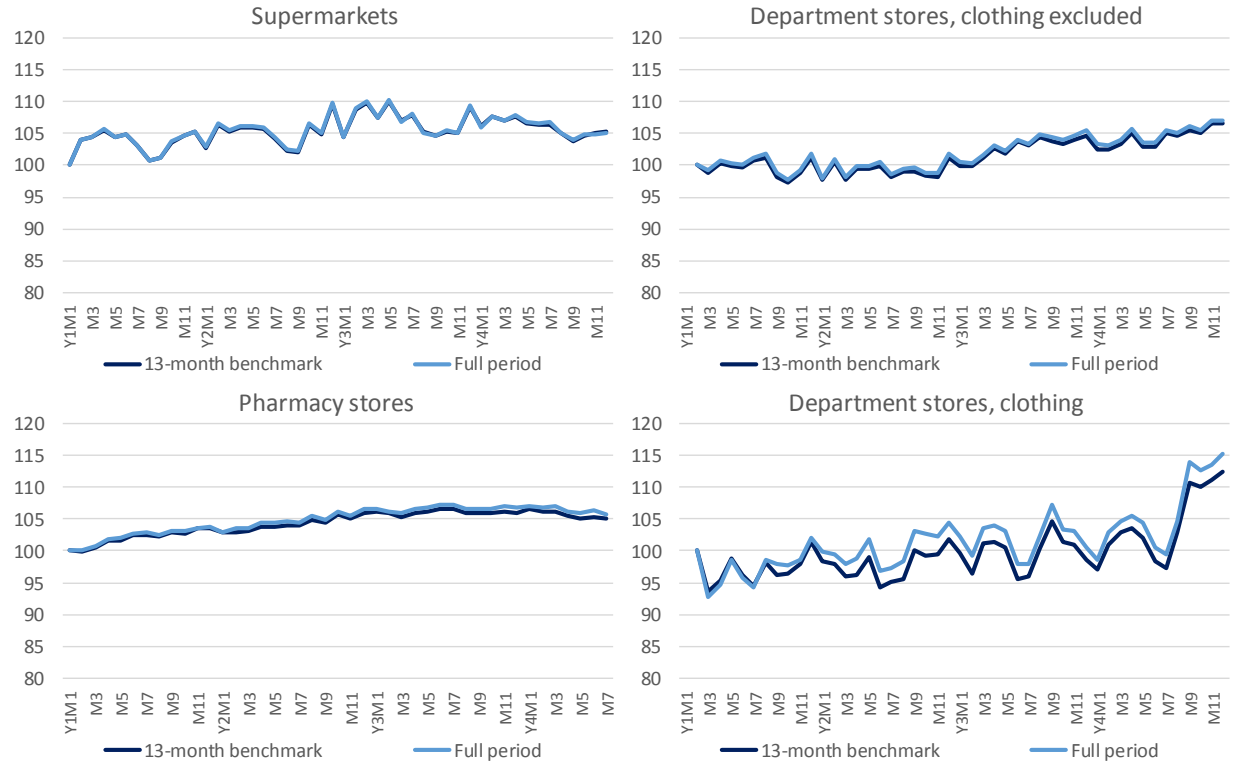


Results: (7) Splicing, TPD method





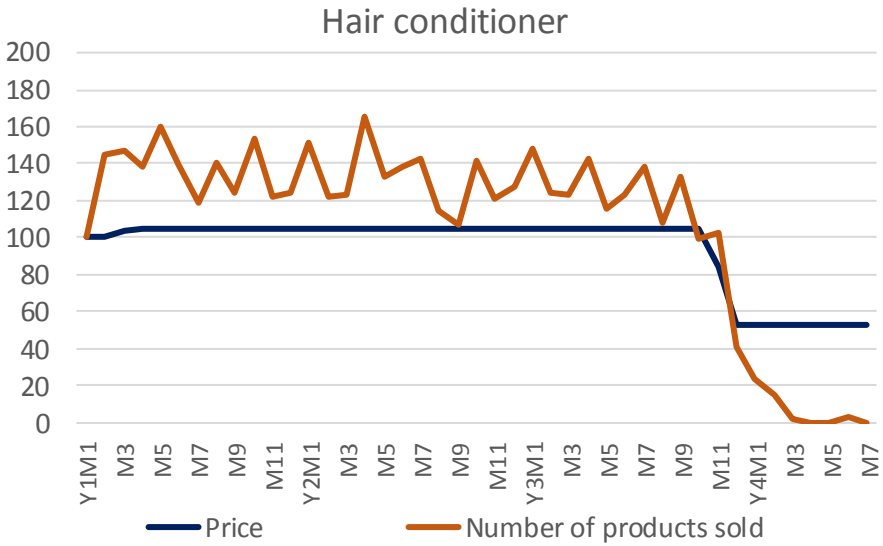
Results: (8) Window length, GK, chain level



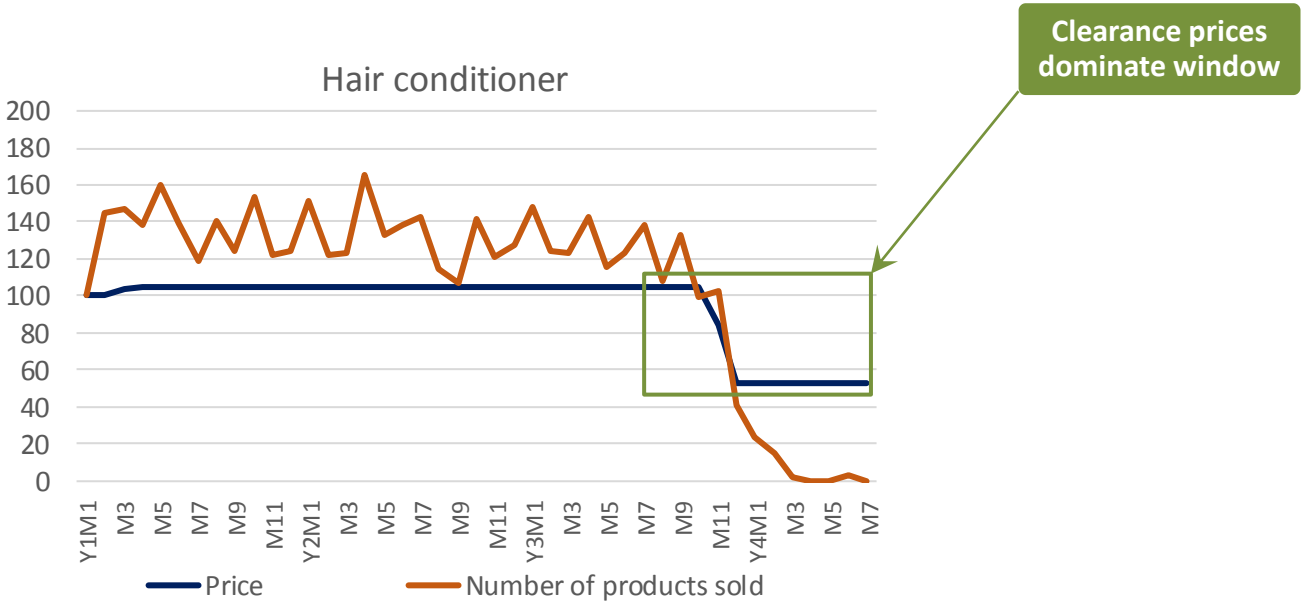
Summary of first results

- Splicing methods:
  - Significant drift
  - Downward drift in WS, mixed behaviour for MS
  - Large deviations in year on year indices at chain level
  - Can be much larger for lower aggregates
- Fixed base methods:
  - Free of drift by construction
  - Much better performance, also for lower aggregates

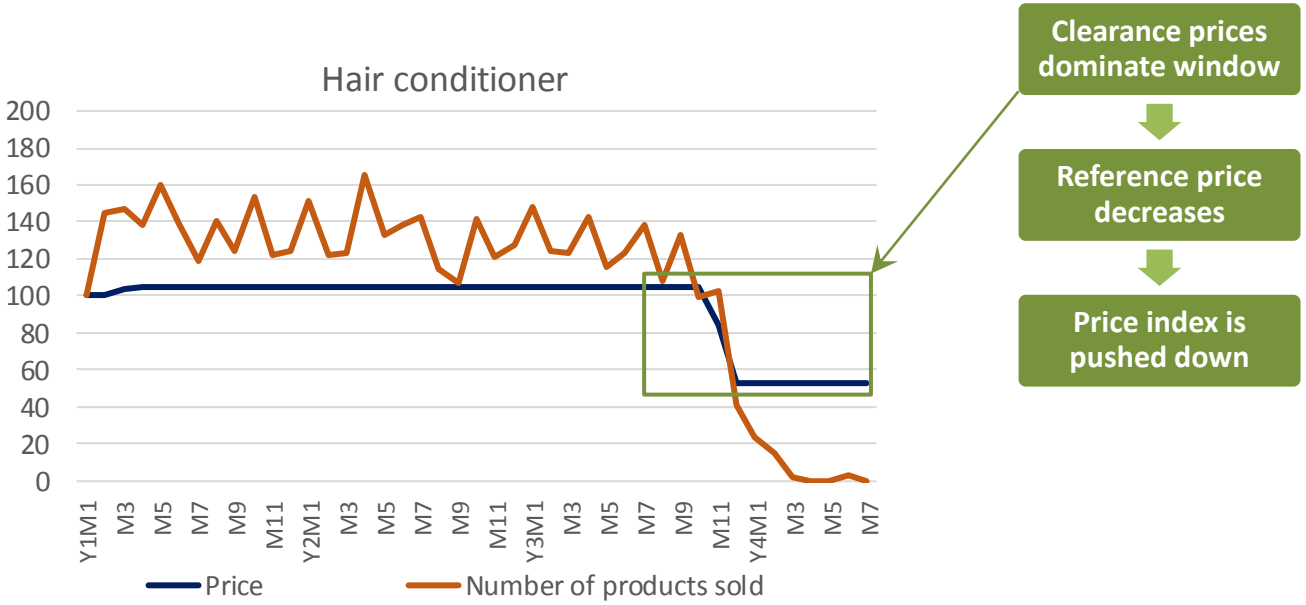
Pitfalls with splicing: Clearance prices



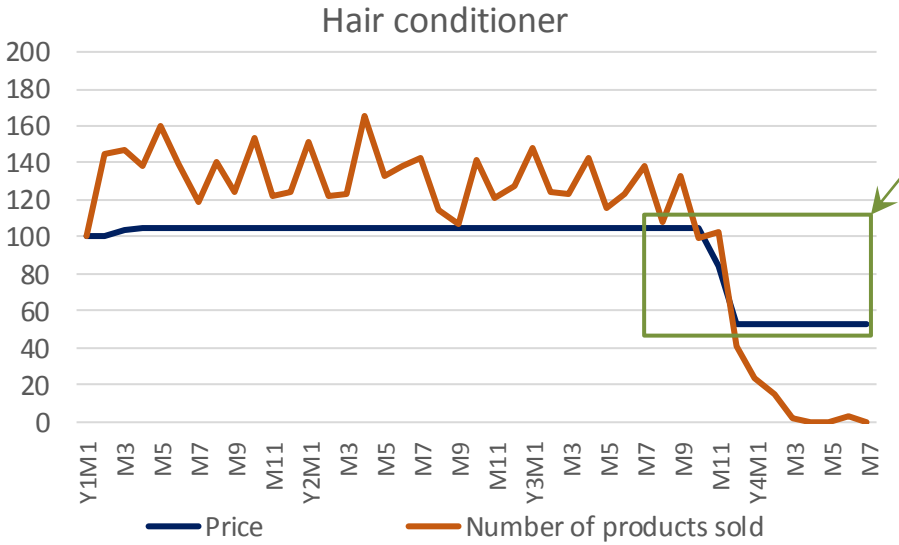
Pitfalls with splicing: Clearance prices



Pitfalls with splicing: Clearance prices



Pitfalls with splicing: Clearance prices



Clearance prices dominate window

Reference price decreases

Price index is pushed down

Linking is on recalculated indices

Drift is likely to persist

Illustration of window splice

WindowSplice.ppsx

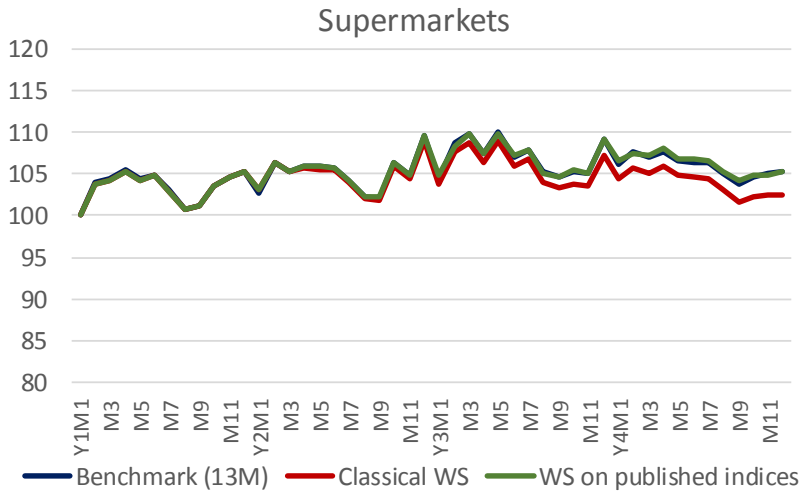
An amended proposal to splicing

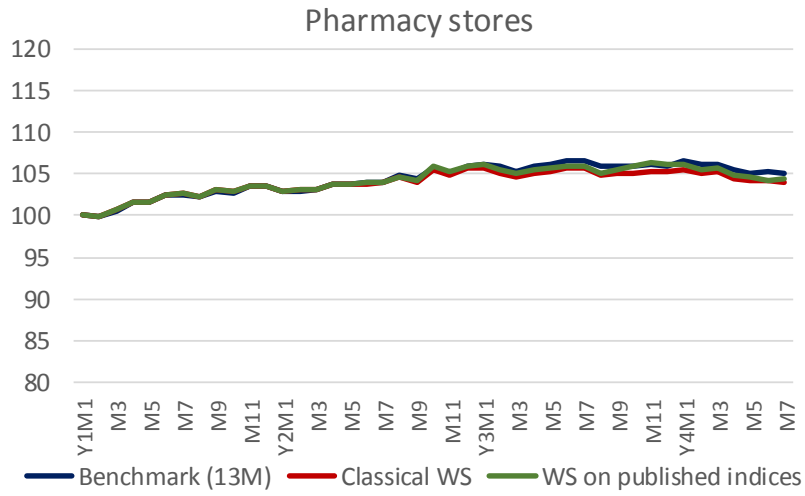
- Behaviour of published series is what matters
- Linking on published indices:
  - Calculated year on year index = Published index
  - This is not the case in classical window splice!
  - Drift in published series is excluded over the length of time window
- Two splicing methods studied:
  - Window splice, with a 13-month window
  - Half splice, with a 25-month window
  - The half splice also links on published indices of 12 months ago

Splicing on published indices

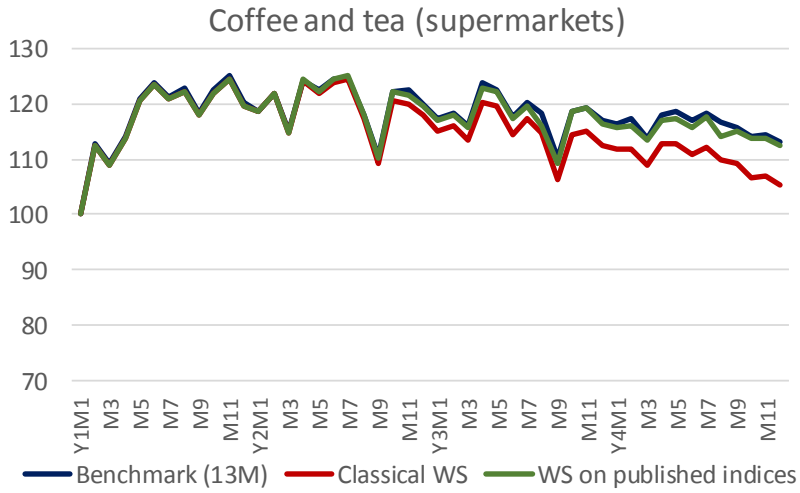
Splicing_On_Published_Indices.ppsx

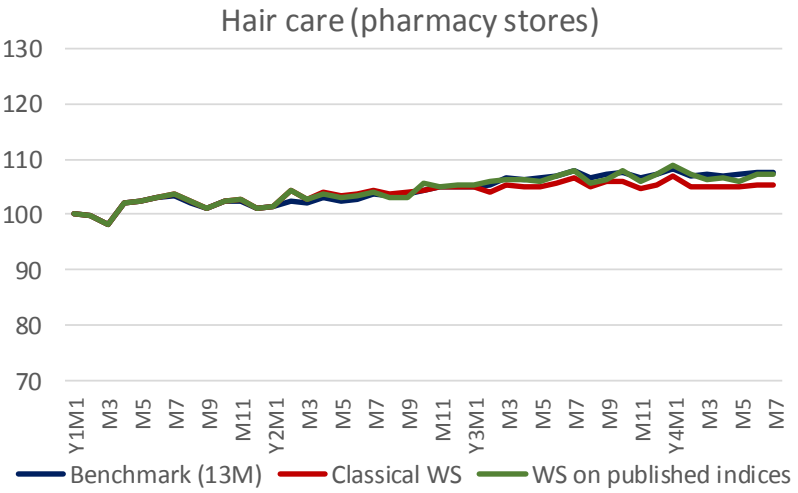
Results: (9) Window splice, GK, chain level



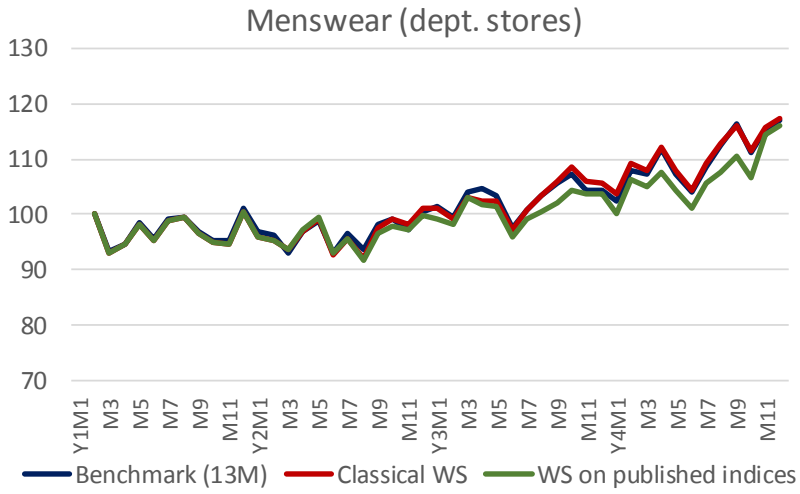


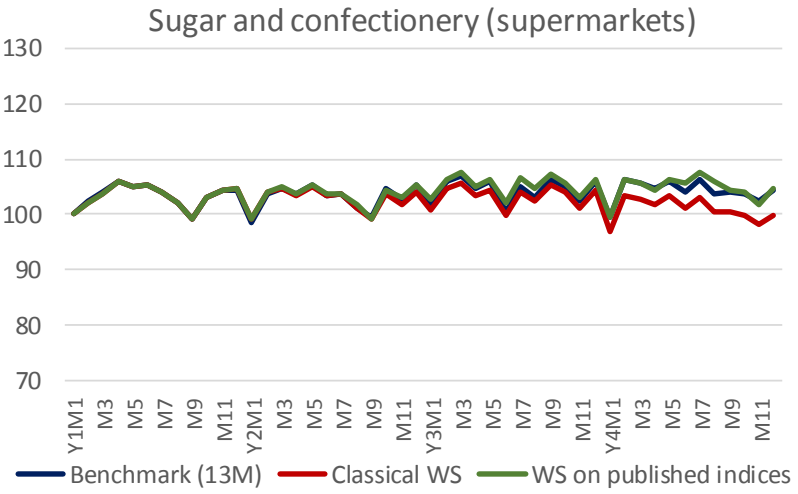
Results: (10) WS, GK, lower aggregates



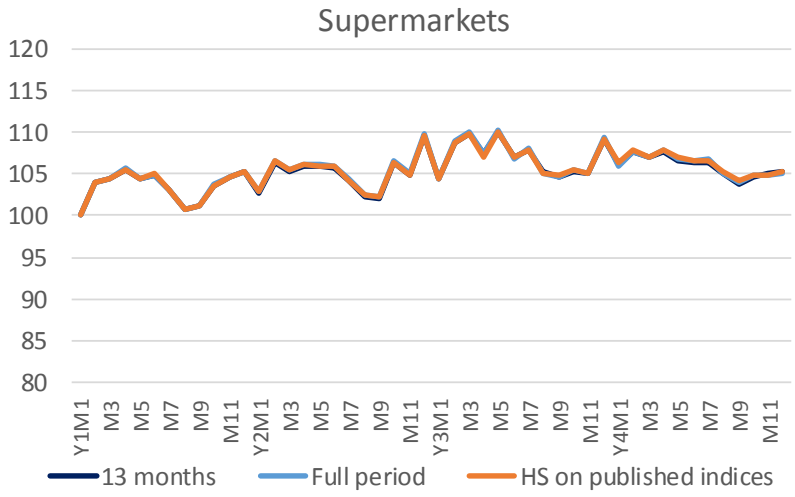


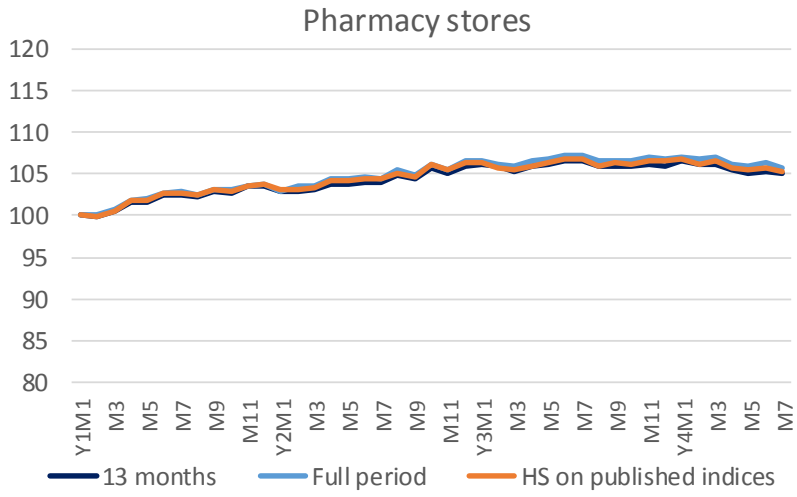
Results: (11) WS, GK, lower aggregates



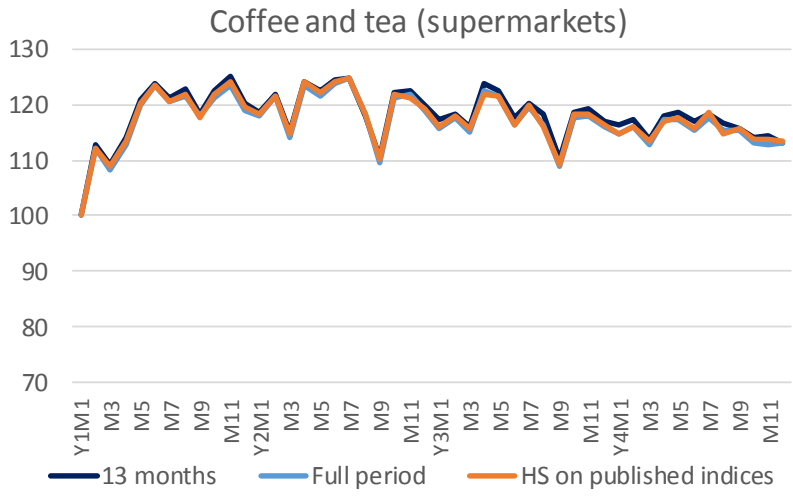


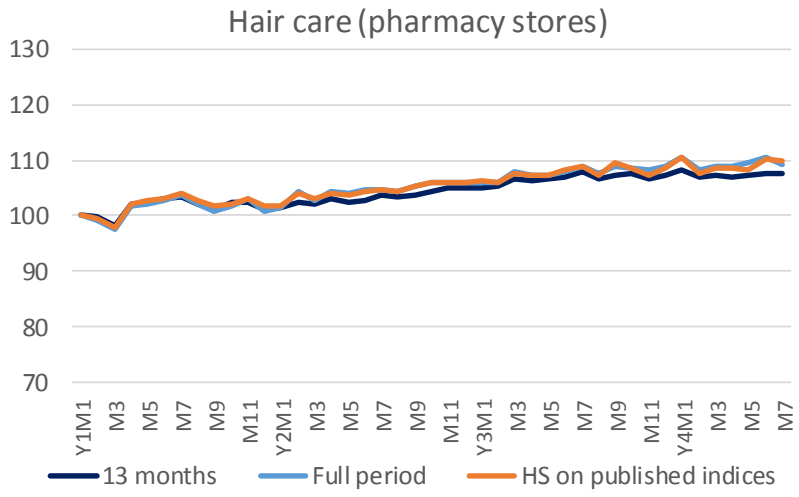
Results: (12) Half splice, GK, chain level



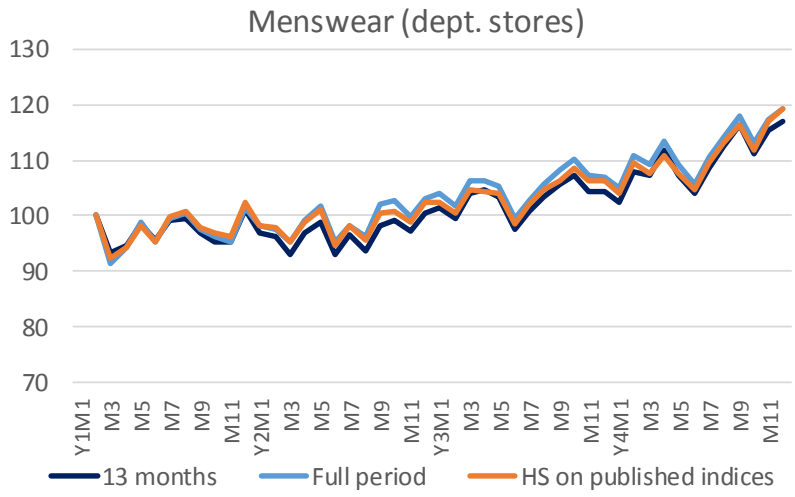


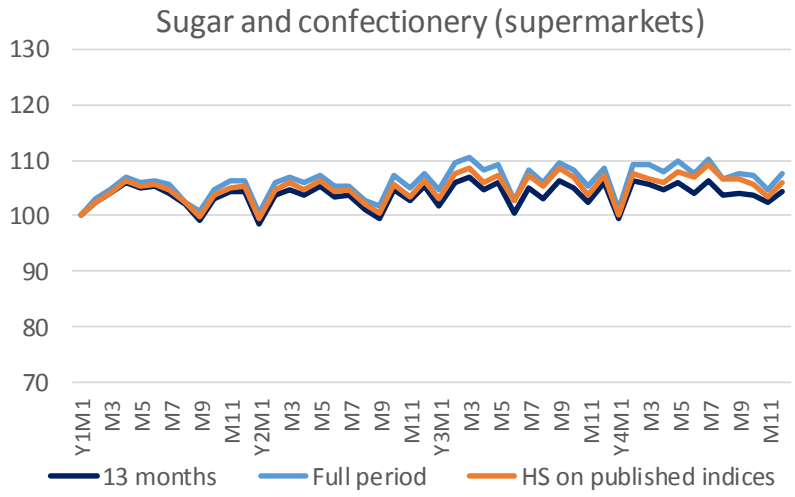
Results: (13) HS, GK, lower aggregates





Results: (14) HS, GK, lower aggregates





Conclusions

- Fixed base extension performs (very) well (no drift)
- Classical splicing methods may lead to severe drift
- Splicing should be done on published indices:
  - Drift is avoided over the length of the time window
  - Window splice shows some variability in MoM changes
  - Half splice is more accurate and stable

Additional remarks on half splice

- Calculated YoY = Published YoY (also for WS)
- Product contributions to index:
  - Easier to compute for YoY
  - Probably more difficult for MoM
- 25M window advantageous for (strongly) seasonal items
- YoY indices should not suffer from switches to new data sources and/or methods in CPI
- Will differences between ML methods be reduced?

Thank you!

Questions?

E-mail: ag.chessa@cbs.nl