



Choice of window length and linking method for extending multilateral index series

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Outline

- Motivation of study
- Problem statement and characterisation
- Empirical study
- Results
- Main findings and next steps

Motivation of study

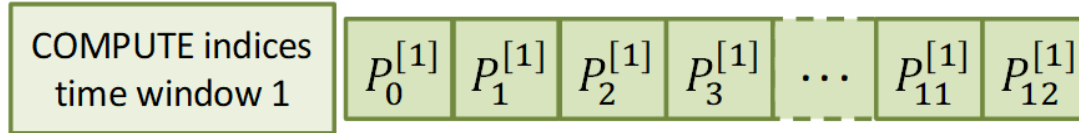
- Current extension method (FBEW) will be replaced in our CPI in 2023
- A set of components and prerequisites are being defined as part of our implementation plan
- New methodological questions:
 - How do different extension methods behave during lockdown?
 - Same question with regard to high inflation in 2022

Past work on extension problem

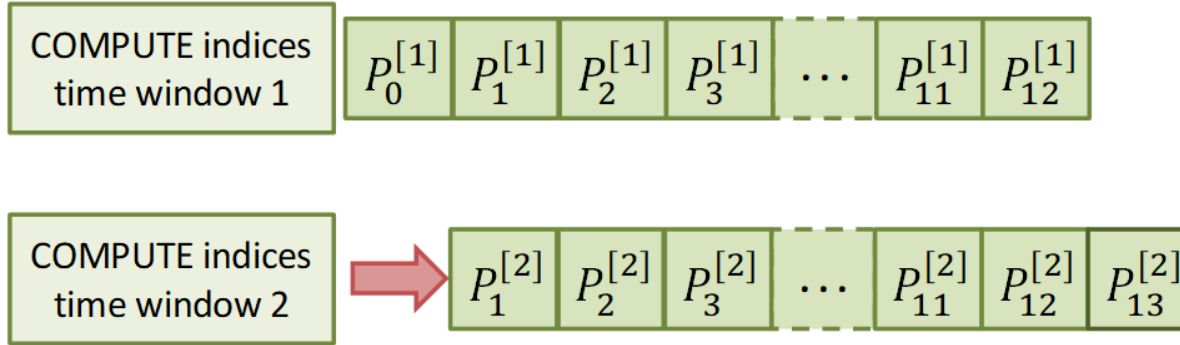
- Initial work (< 2020, ref's at the end):
 - Focus on window length $W = 13$ months
 - Studies differ in size and scope (methods, product groups)
 - Results are difficult to compare, do not point towards a preferred method
- More recent work:
 - Big differences for seasonal items (Chessa, 2021)
 - Methods show drift for $W = 13$
 - Community now seems to converge towards $W = 25$
- Behaviour of methods still needs to be better understood (see also previous slide)



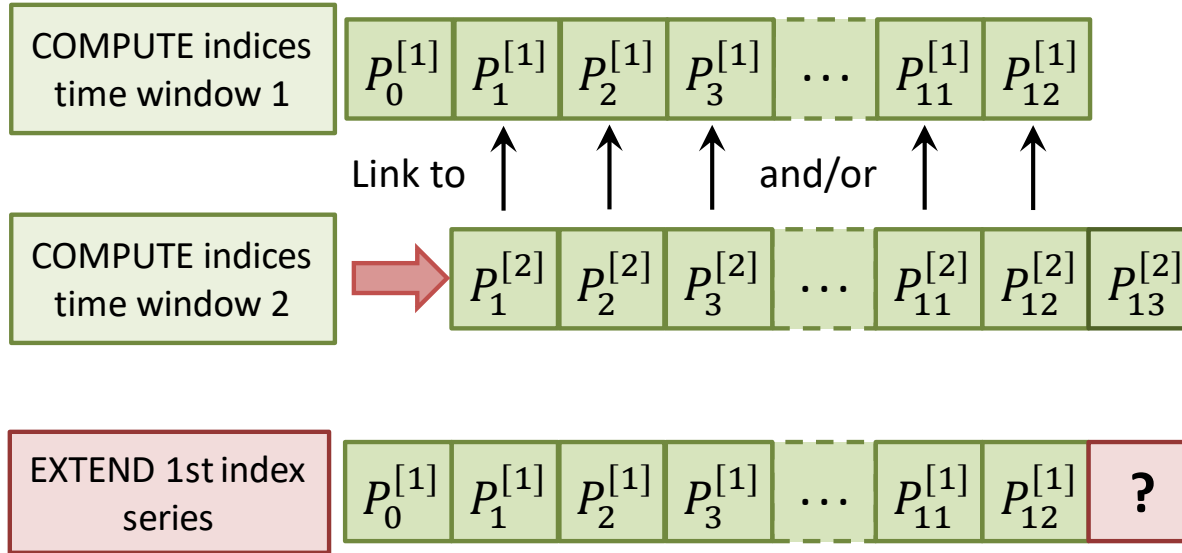
Extension problem: (1) Compute 1st index series



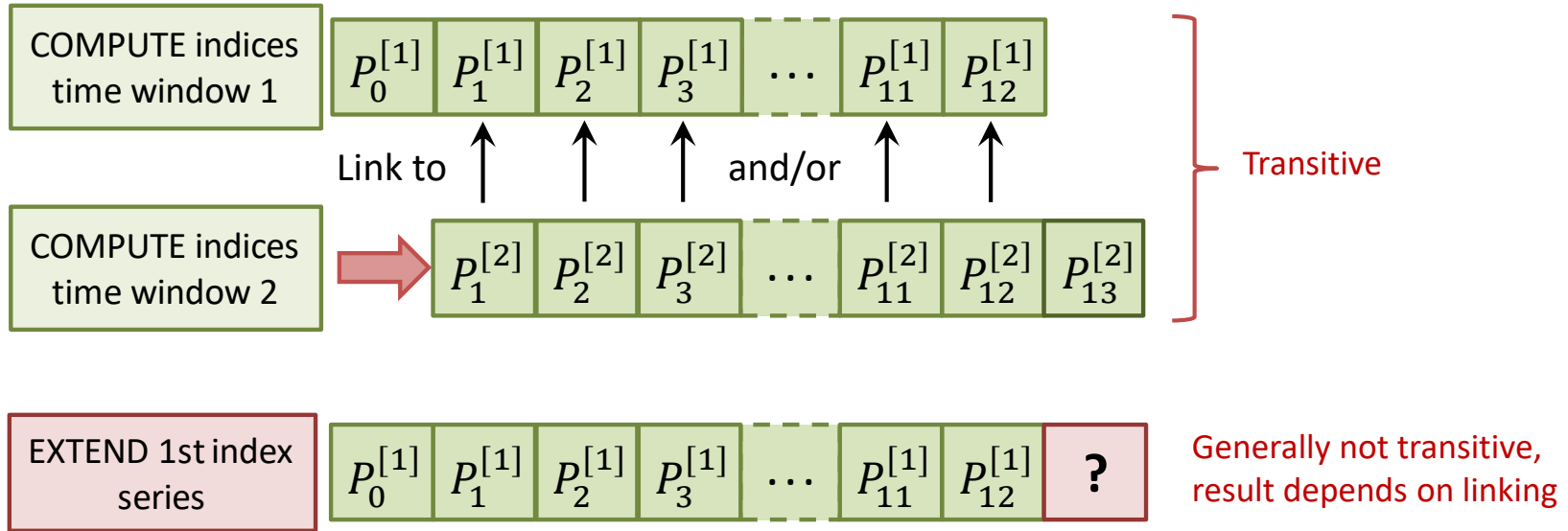
(2) Shift window, calculate 2nd series



(3) Link and extend series 1



(3) Link and extend series 1



Implications

- Characterisation of extension methods needed
- Loss of transitivity \Rightarrow
 - How can “drift” be controlled in extended (i.e. published) indices?
 - Benchmark needed

Characterisation of extension methods

- Time window variables:
 - Window length (W)
 - Temporal window adjustment
- Linking variables:
 - Linking period(s) or interval (L)
 - Index in linking period(s)

Examples of extension methods

Method	Window length	Window adjustment	Linking month	Linking index	Extension
Window splice	13 months	Rolling	First month window	Last recalculated	Year on year
Movement splice	Arbitrary	Rolling	Penultimate month	Published	Month on month
FBRW	≥ 13 months	Rolling	Base month	Published	Fixed base
FBEW	Starts with 2 mths	Expanding	Base month	Published	Fixed base
WISP	13 months	Rolling	First month	Published	Year on year
HASP	25 months	Rolling	Central month	Published	Year on year
Mean splice	Any	Rolling	All possibilities	Recalc./publ.	Average index

FBRW = Fixed Base Rolling Window

FBEW = Fixed Base Expanding Window

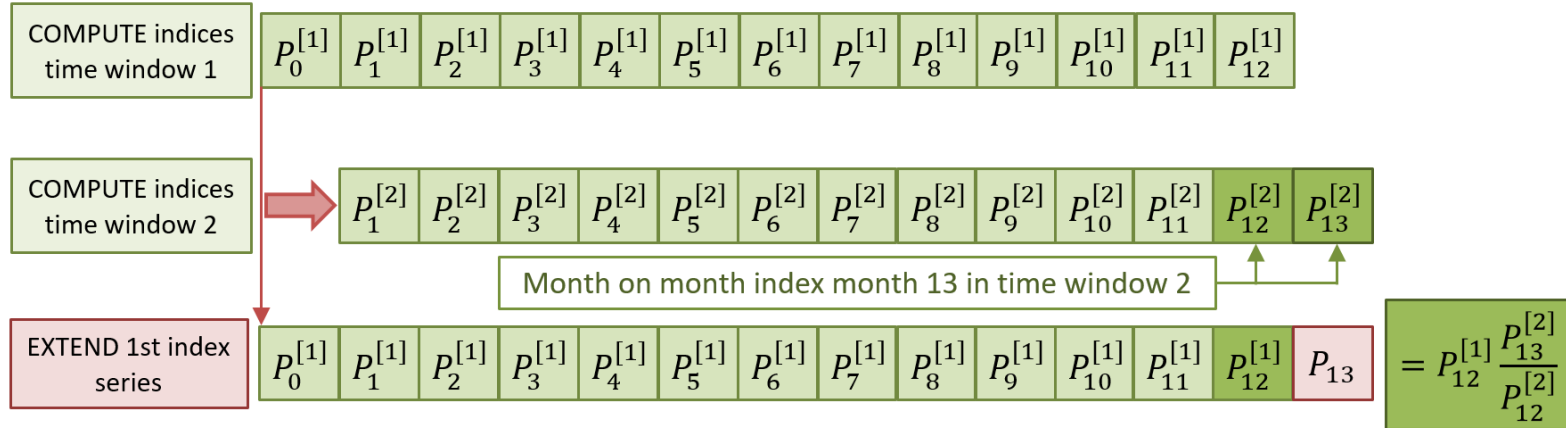
WISP = Window Splice on Published indices

HASP = Half Splice on Published indices

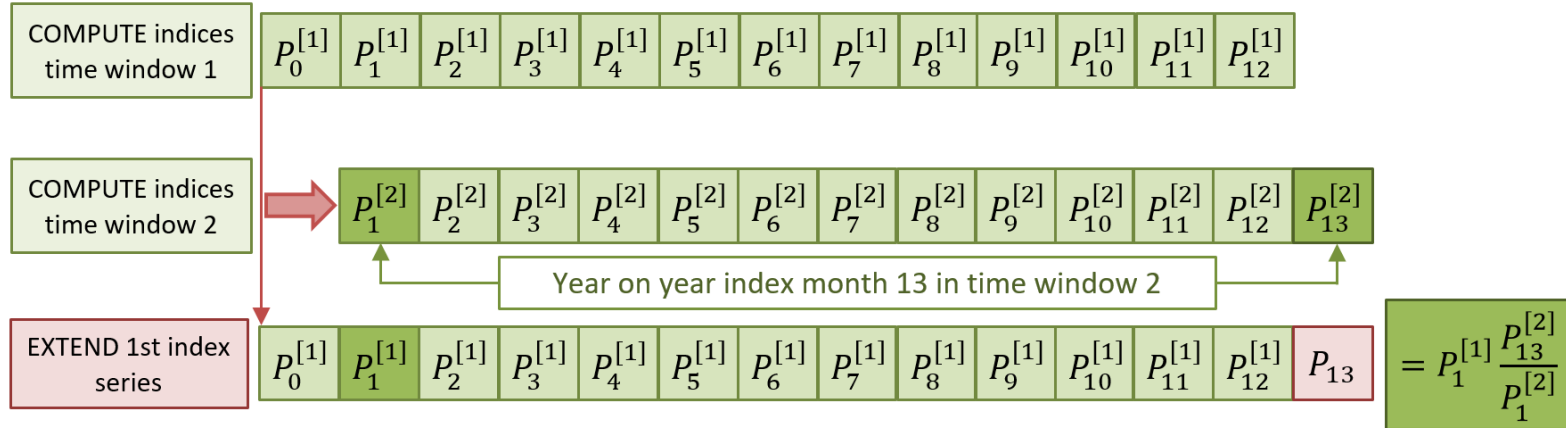
Note: Combination of variables (blue columns) leads to type of index extension (green column)



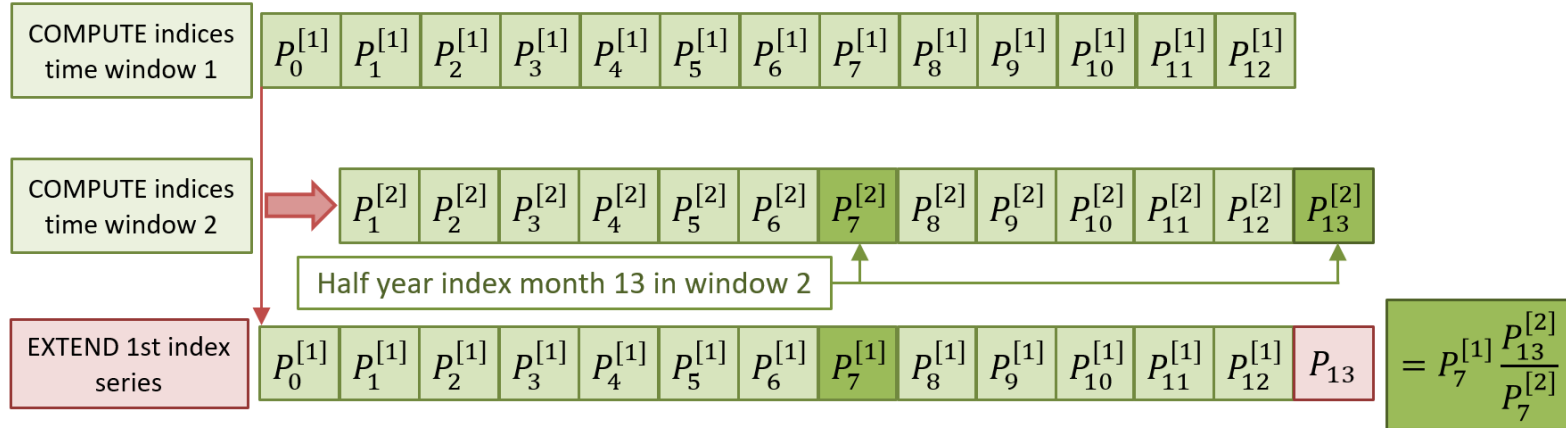
Example 1: Movement splice (W = 13)



Example 2: WISP (W = 13)



Example 3: HASP (W = 13)



Empirical study: (1) Data sets

- Main study:
 - Transaction data sample covering 11.6% of Dutch CPI
 - Product groups in almost all COICOP divisions (2-digit level)
 - Period: 4-5 years
- Additional study:
 - Focus on high inflation in 2022
 - Selection of product groups (e.g. oils and fats, cereals)

Empirical study: (2) Methods

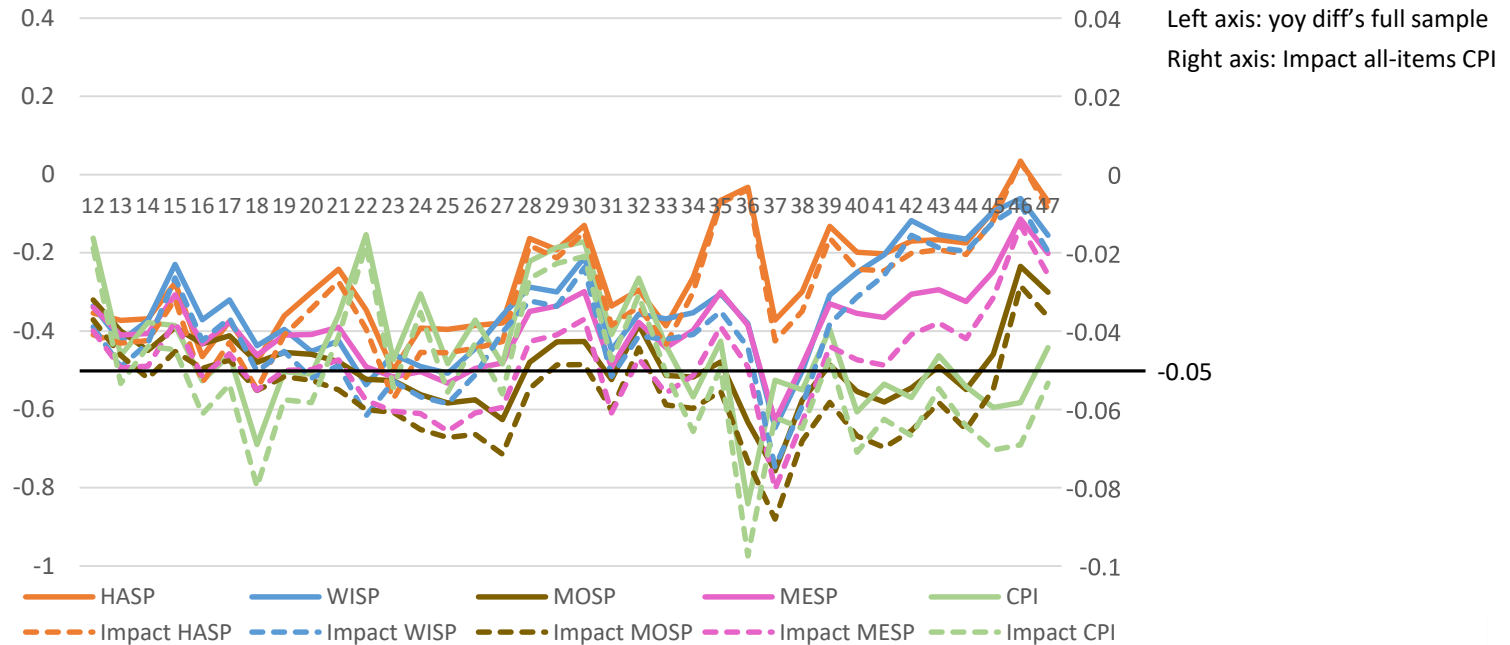
- **Window length:**
 - $W = 13, 25, 37$ months
 - Full period (used to compare extended index series)
- **Extension methods:**
 - WISP, HASP, MOSP (movement splice), MESP (mean splice)
 - Compared with CPI (FBEW method is used for most T-data sets)
 - Index method: Geary-Khamis (Dutch CPI since Jan. 2016)
- **Implementation:**
 - Data are stored on SQL Server
 - Transact SQL procedure used for index calculations



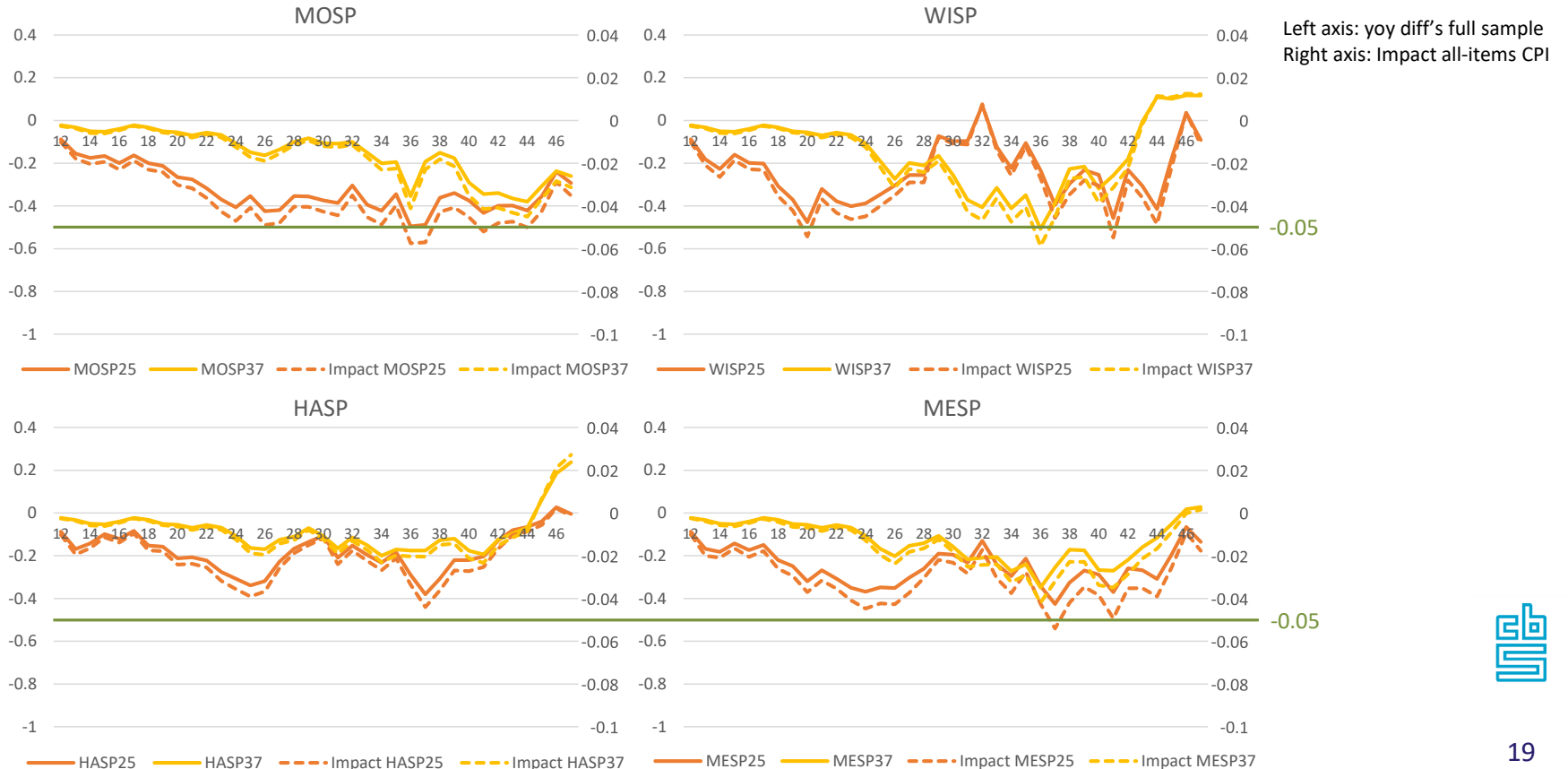
Empirical study: (3) Assessment

- yoy indices extended series minus yoy full window series
- Impact of yoy differences in CPI:
 - Measured at all-items level
 - Absolute differences with benchmark < 0.05 pp
 - See also Article 2(21) of EU Regulation 2016/792

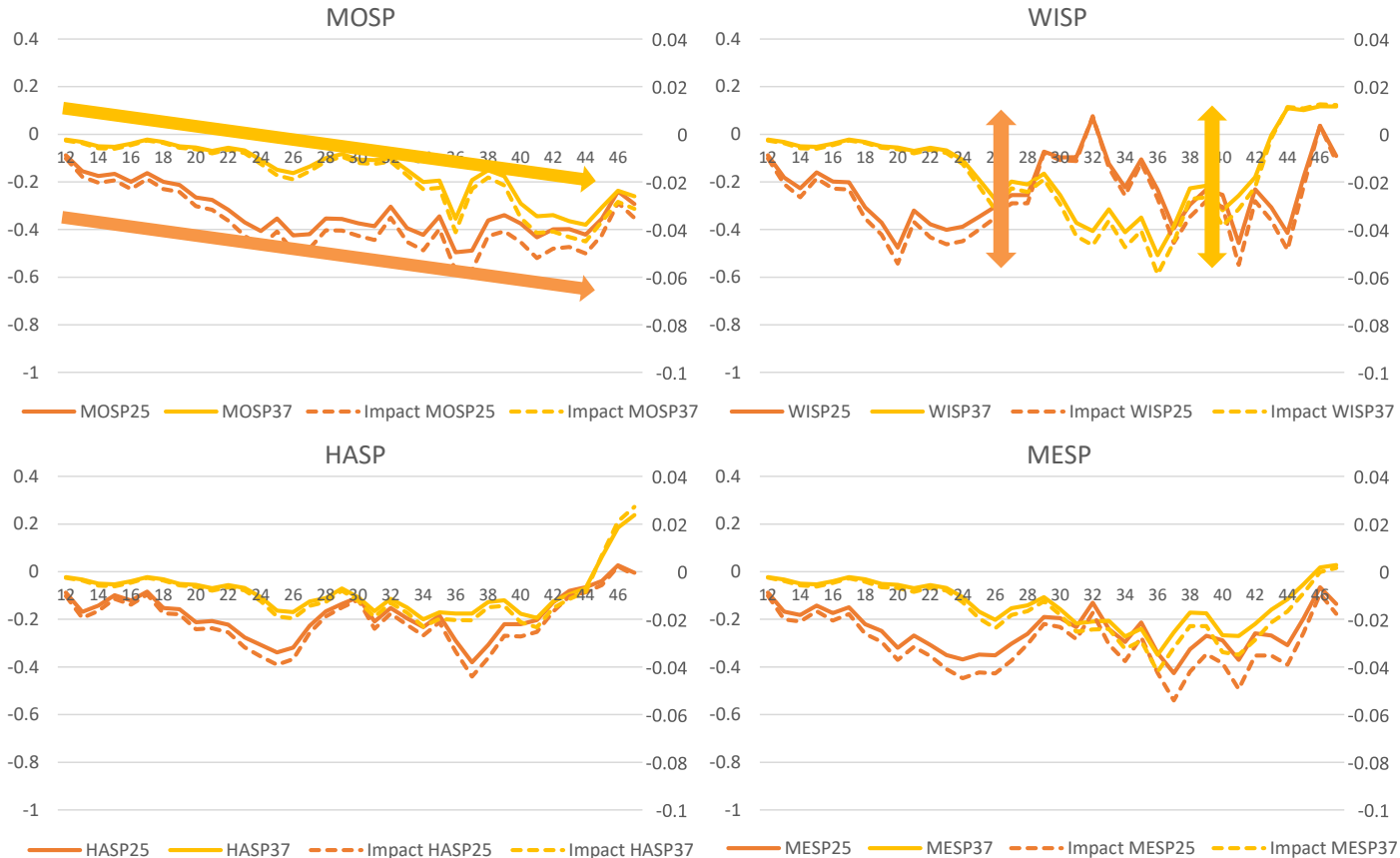
Results: (1) Full sample, W = 13



Results: (2) Full sample, W = 25 and 37



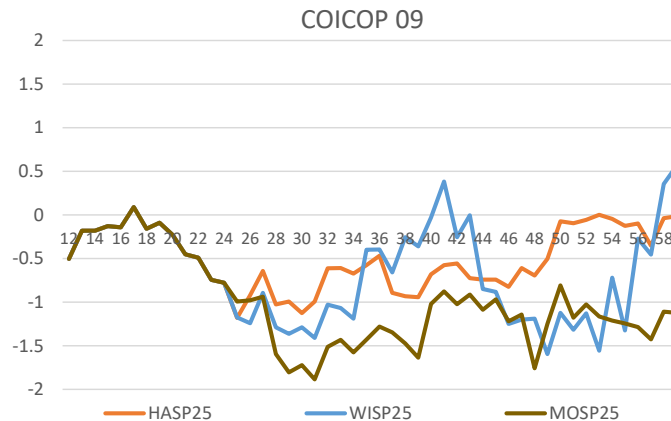
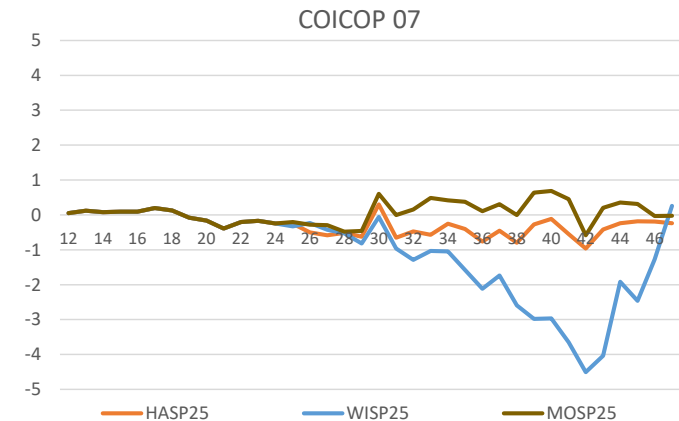
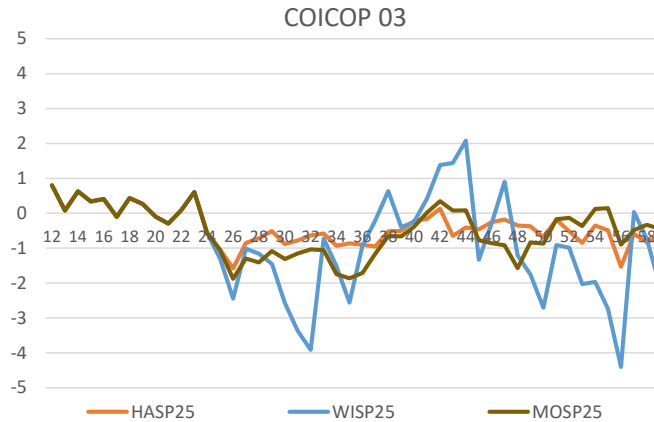
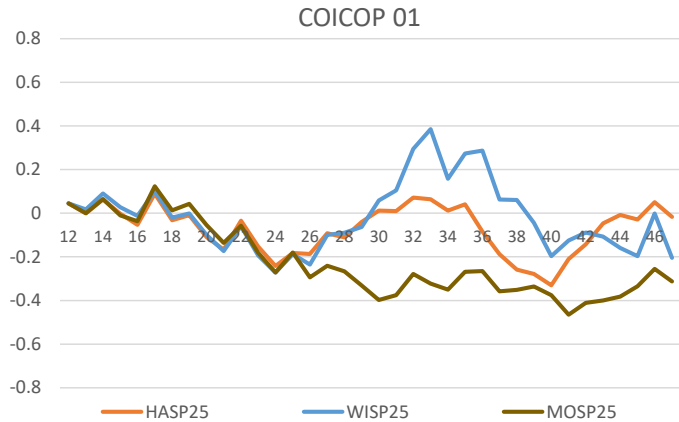
Results: (3) Drift and volatility



Left axis: yoy diff's full sample
Right axis: Impact all-items CPI

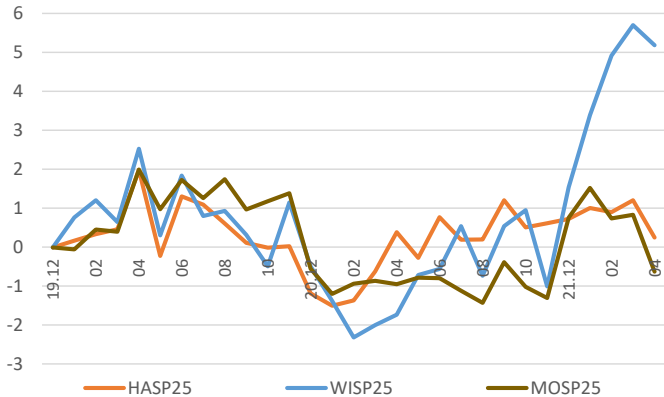


Results: (4) yoy deviations 2-digit level, W = 25

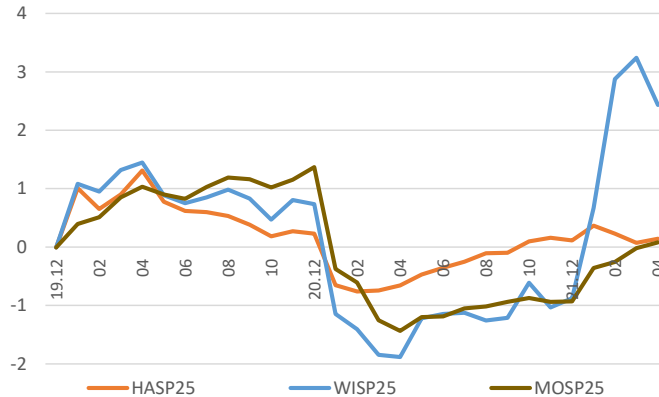


Results: (5) High inflation 2022, W = 25

COICOP 011540: HASP - WISP - MOSP



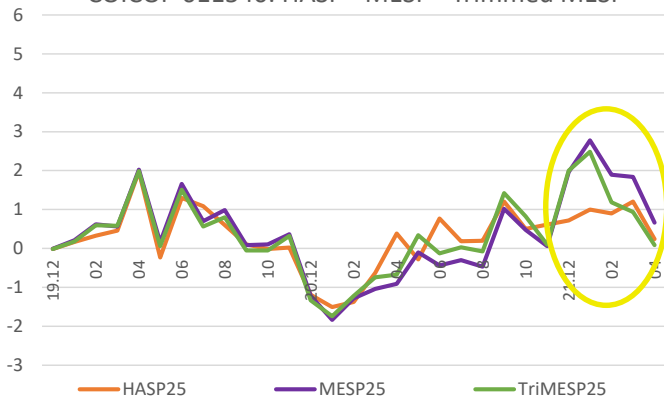
COICOP 011810: HASP - WISP - MOSP



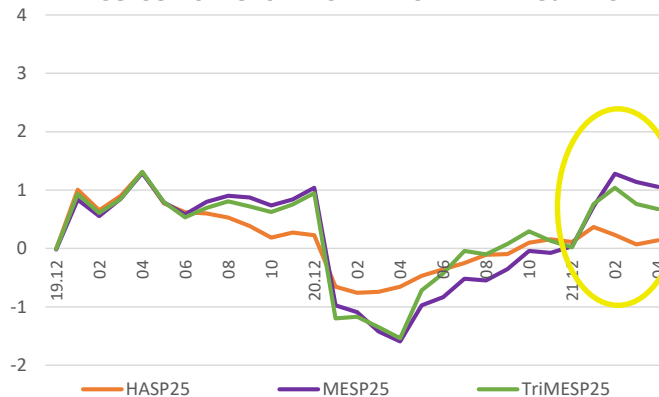
Graphs show yoy extended series – yoy full window (pp)

Trimmed mean splice: Linking between 6 and 18m ago

COICOP 011540: HASP - MESP - Trimmed MESP



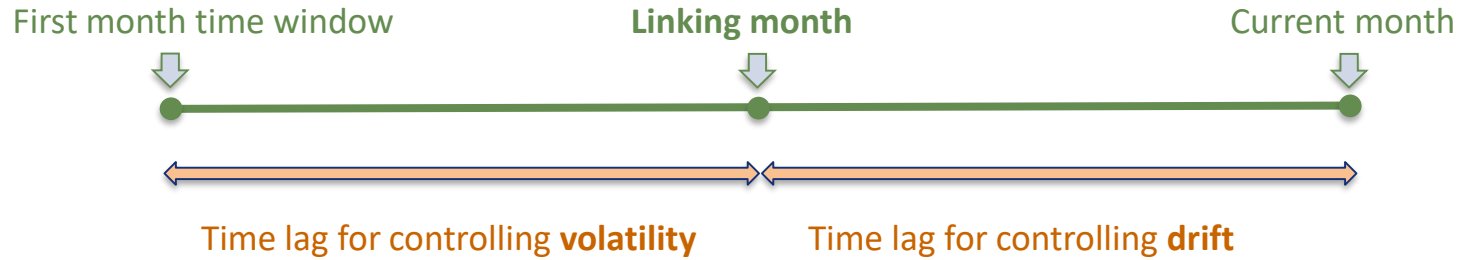
COICOP 011810: HASP - MESP - Trimmed MESP



Deviations in yoy indices

- **Drift:**
 - $W = 13$ is often too short, not only for seasonal items
 - MOSP is particularly affected (mom chaining), irrespective of W
- **Volatility:**
 - First months of window not suited as linking months either
 - Lead to data censoring problems, e.g.:
 - When products leave after linking month at discount prices
 - Also in other situations with changing price and sales dynamics around linking month
 - Problem in WISP, irrespective of W , but not in HASP
- Above effects do not simply average out in MESP

Message: Centrality in linking month



Next steps in Dutch CPI

- Switch to HASP-25 for all product types (T-data)
- Monitoring options in production:
 - Compare with HASP(W=37, L=12), e.g. in cases with sparse data
 - Compare with most recent 25-month transitive series, which is useful for detecting new entries with high introduction prices

Thank you!

Questions?

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