



BANK OF CANADA
BANQUE DU CANADA

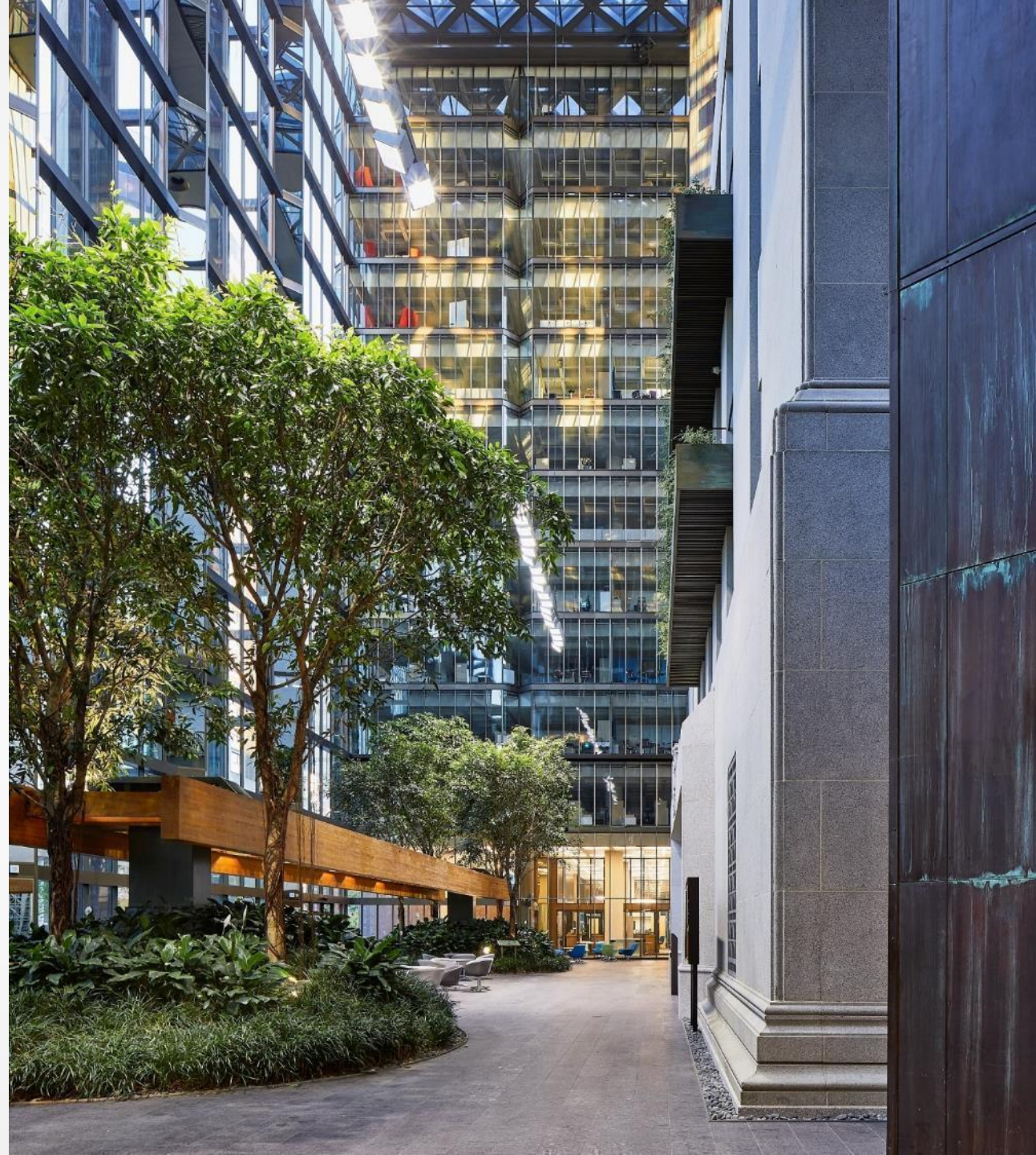
16 OCT 2025

Monetary Policy Framework Renewal: Core Inflation

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Protected B



Plan

1. Context
2. Recent challenges
3. Key questions and latest progress on answers

Core inflation at the Bank of Canada

- The Bank targets total CPI inflation
- But total CPI inflation is noisy
- Core inflation aims to look through noise
 - Helps Bank focus on *underlying* inflation
 - Supports communication of policy decisions

“Core measures act as an **operational guide** to help the Bank achieve its inflation target.”

Core inflation vs underlying inflation

Underlying inflation

Persistent part of inflation tied to macro fundamentals

A concept, not a measure

Unobservable

Core inflation

Filters out noise in total inflation

Many different measures

Helps assess underlying inflation

The Bank's approach to core has evolved over time



1991

- Focal measure: CPI ex. food, energy, taxes (CPIXFET)

2001

- Focal measure: CPI ex. 8 volatile items & taxes (CPIX)

2016

- 3 preferred measures: trimmed mean (CPI-trim), weighted median (CPI-median), and factor model (CPI-common)

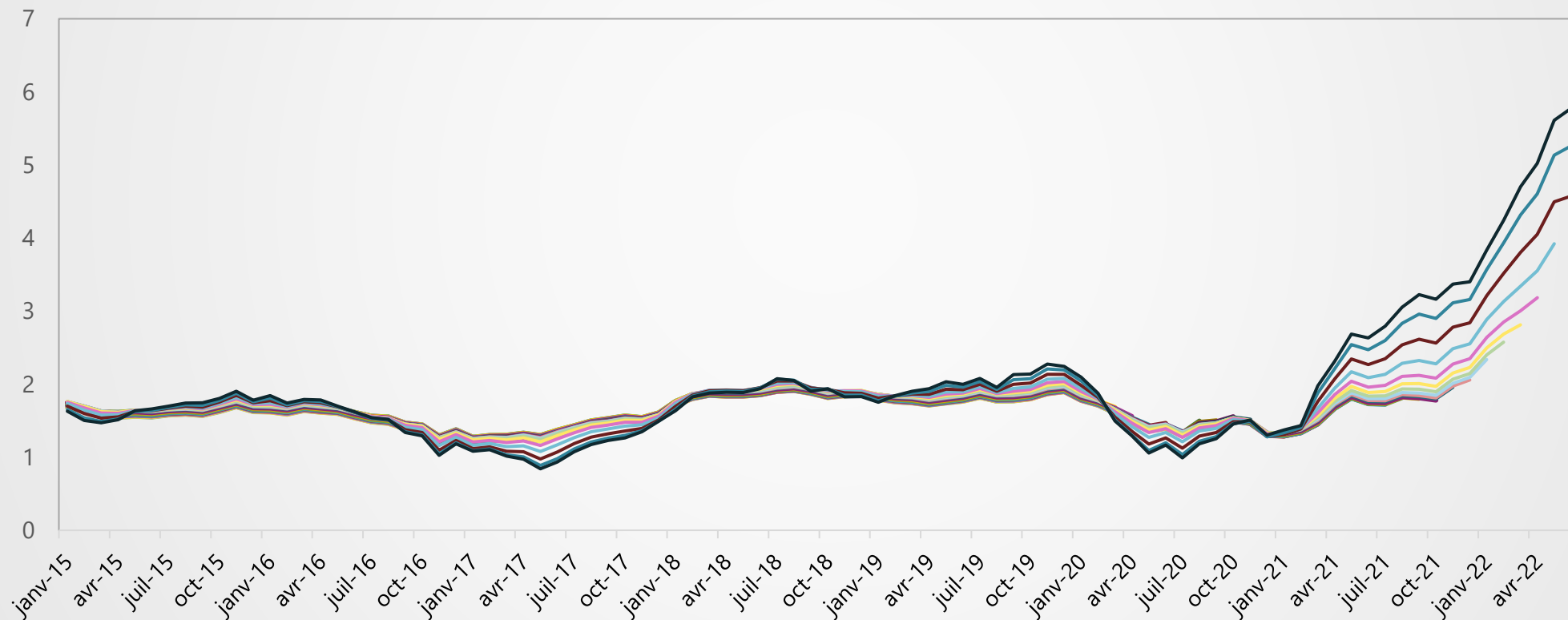


Recent challenges

1. Revisions

Factor model-based measure of core inflation became unreliable in real time

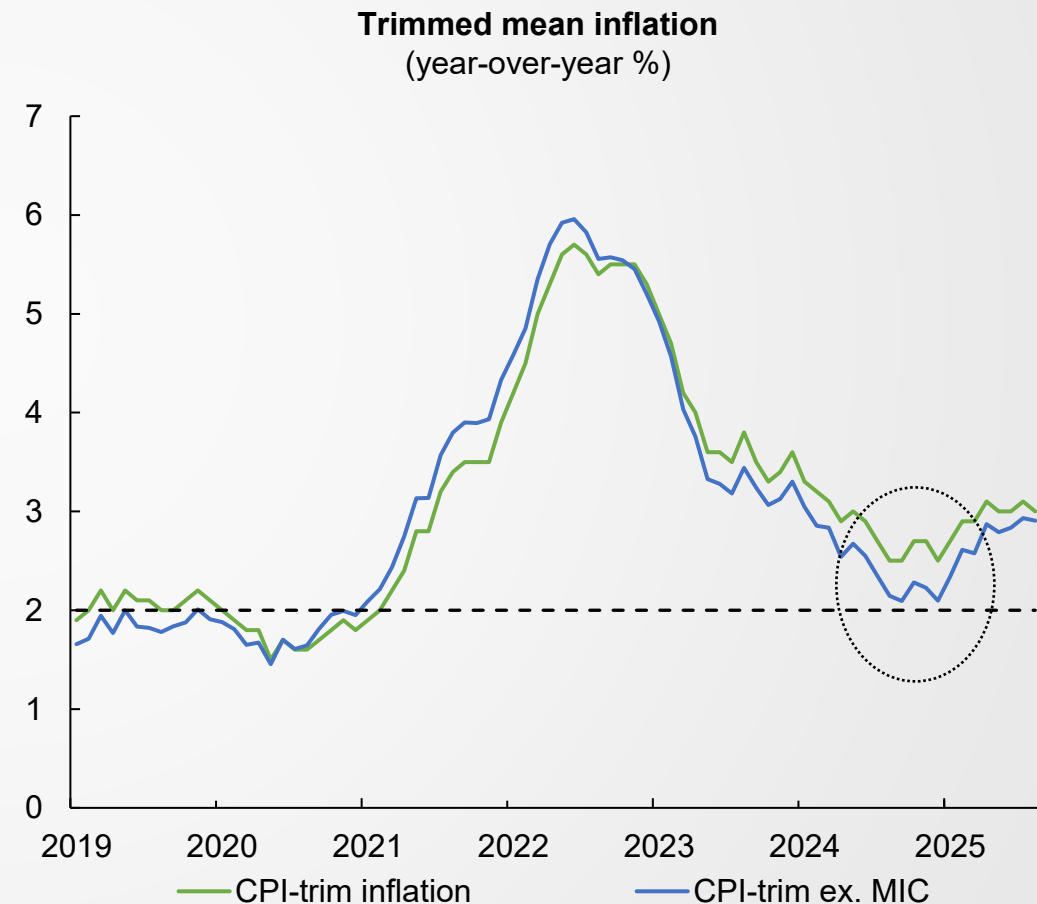
Vintages of CPI-common over the pandemic



Note: This chart is generated by estimating CPI-common from January 1990 to December 2019, and then expanding the estimation window one month at a time up to August 2022.

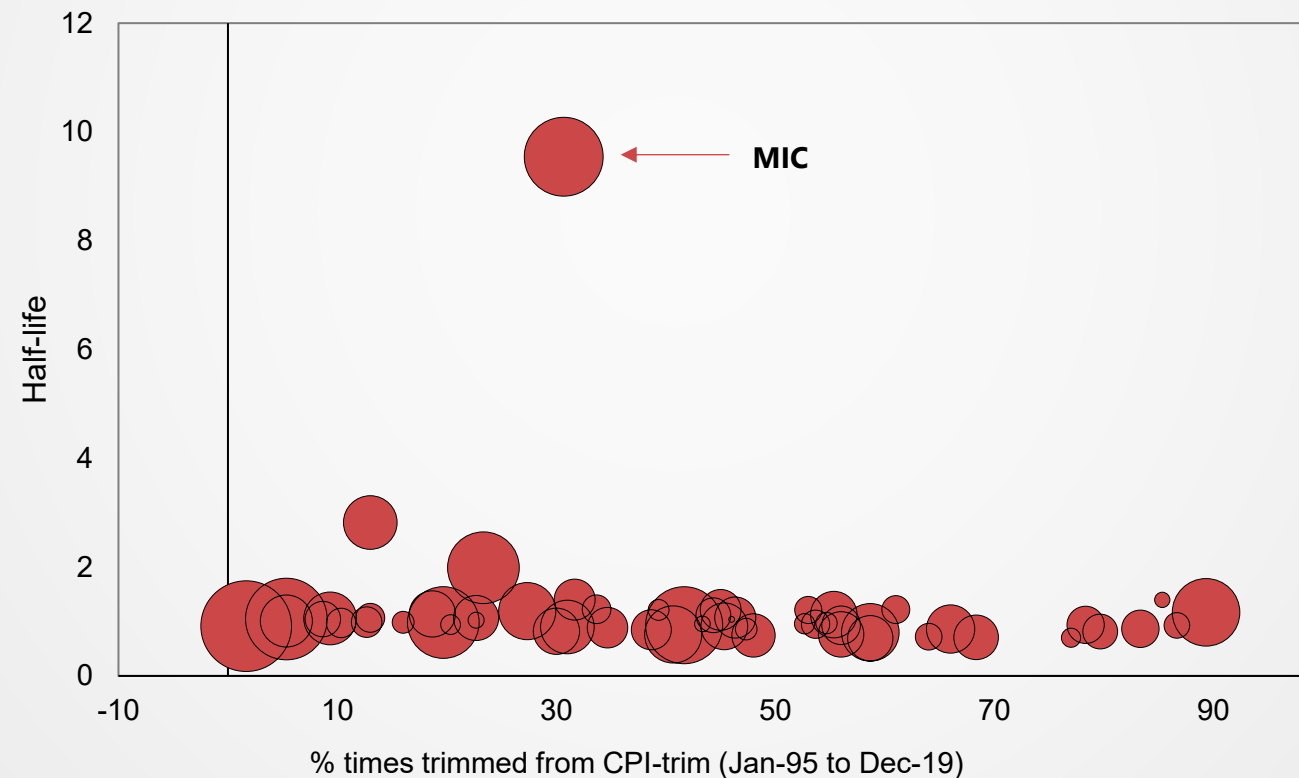
2. Mortgage interest cost

- 2001 view: exclude MIC from CPIX
- 2016 view: Trim and Median will automatically look through MIC when necessary
- 2016 view underappreciated *indirect effect* of persistent MIC exclusion



MIC is special: unique combination of persistence, weight, and frequent exclusion

Half-life vs. % times trimmed from CPI-trim (size of dot is basket weight)



3. Communication

- Over-emphasis on 3 “preferred” measures
 - › Misplaced scrutiny: routine imperfections have become headline news
 - › Disconnect b/w perception vs practice of assessing underlying inflation

Canada's inflation illusion: Debunking CPI-med and CPI-trim

By Matthieu Arseneau and Alexandra Ducharme

Economic Viewpoint

The Bank of Canada Is Misjudging Core Inflation

March 18, 2024

A screenshot of the top portion of a news article from The Globe and Mail. The header is red with the newspaper's name in white. Below the header is a navigation bar with links for HOME, WATCHLIST, and GIFT THE GLOBE. The main headline is in large, bold, black font. The author's name and title are listed below the headline, followed by the publication and update dates.

☰ THE GLOBE AND MAIL* 👤

HOME WATCHLIST GIFT THE GLOBE ▶

Core inflation puts pressure on Bank of Canada to raise interest rates again

MARK RENDELL > ECONOMICS REPORTER

PUBLISHED DECEMBER 21, 2022

UPDATED JANUARY 25, 2023

Key questions

Measurement

- Are there alternative measures to consider?
- How should core measures treat MIC?
- What else should the Bank be tracking?

Communication

- How to effectively communicate views on underlying inflation?

A low-angle, upward-looking perspective of several modern skyscrapers with glass facades. The buildings are arranged in a way that they appear to converge towards the top of the frame, creating a strong sense of height and scale. The glass reflects the sky and clouds, adding to the visual complexity. A semi-transparent dark grey horizontal band is positioned across the middle of the image, serving as a background for the text.

Measurement

Are factor models still useful for assessing underlying inflation?

- Most econometric models challenged by pandemic shocks
 - › Factor models no exception

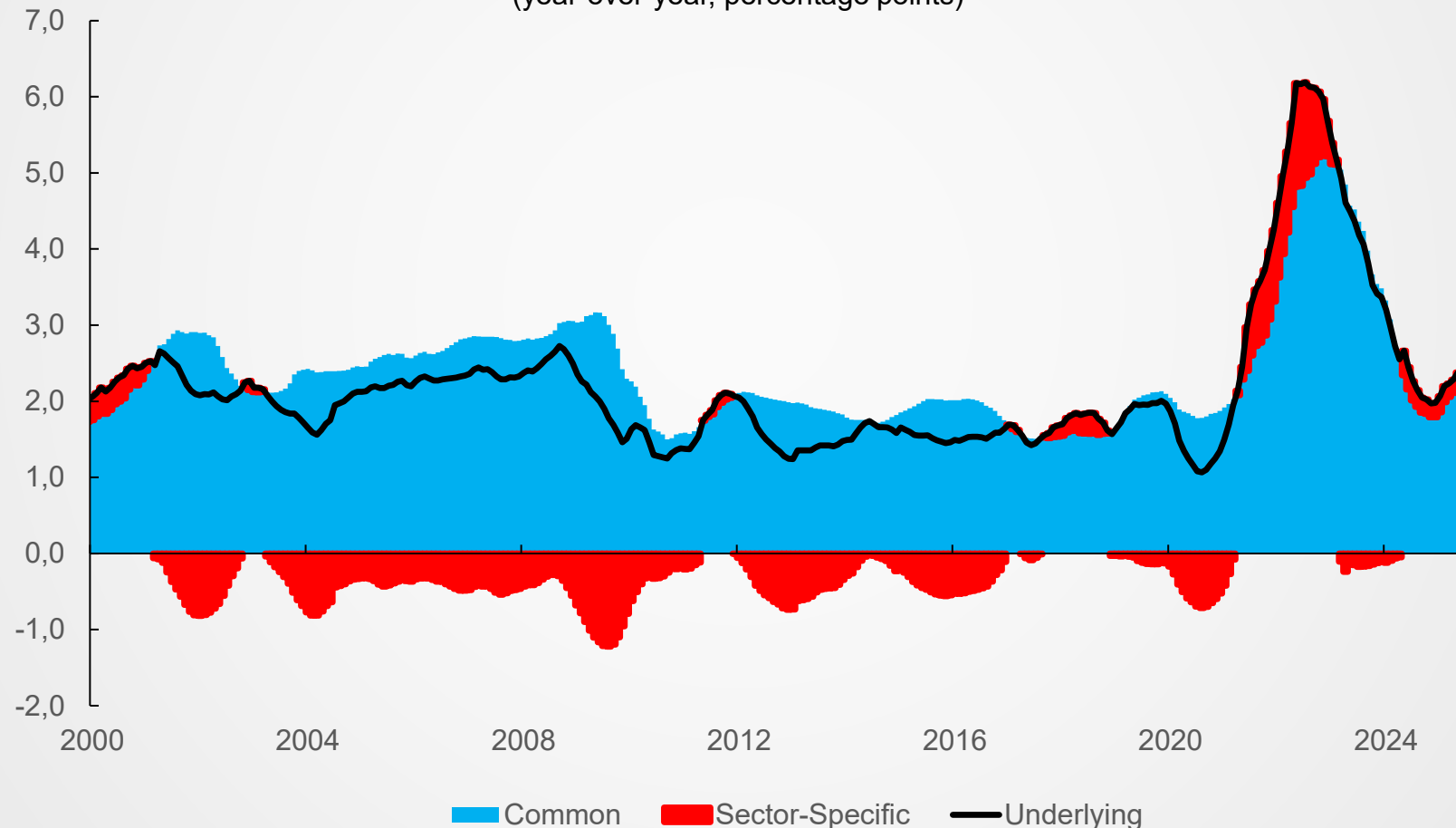
- Factor models with advanced features more robust to recent challenges
 - › Model from Stock & Watson (2016) recently applied by NY Fed to PCE (MCT) and now by BoC to CPI (PULSE)

Key features of the factor model

- Underlying = **persistent common** + **persistent sector-specific** inflation
 - › Time-varying volatility
 - › Outlier-robust
 - › Time-varying loadings

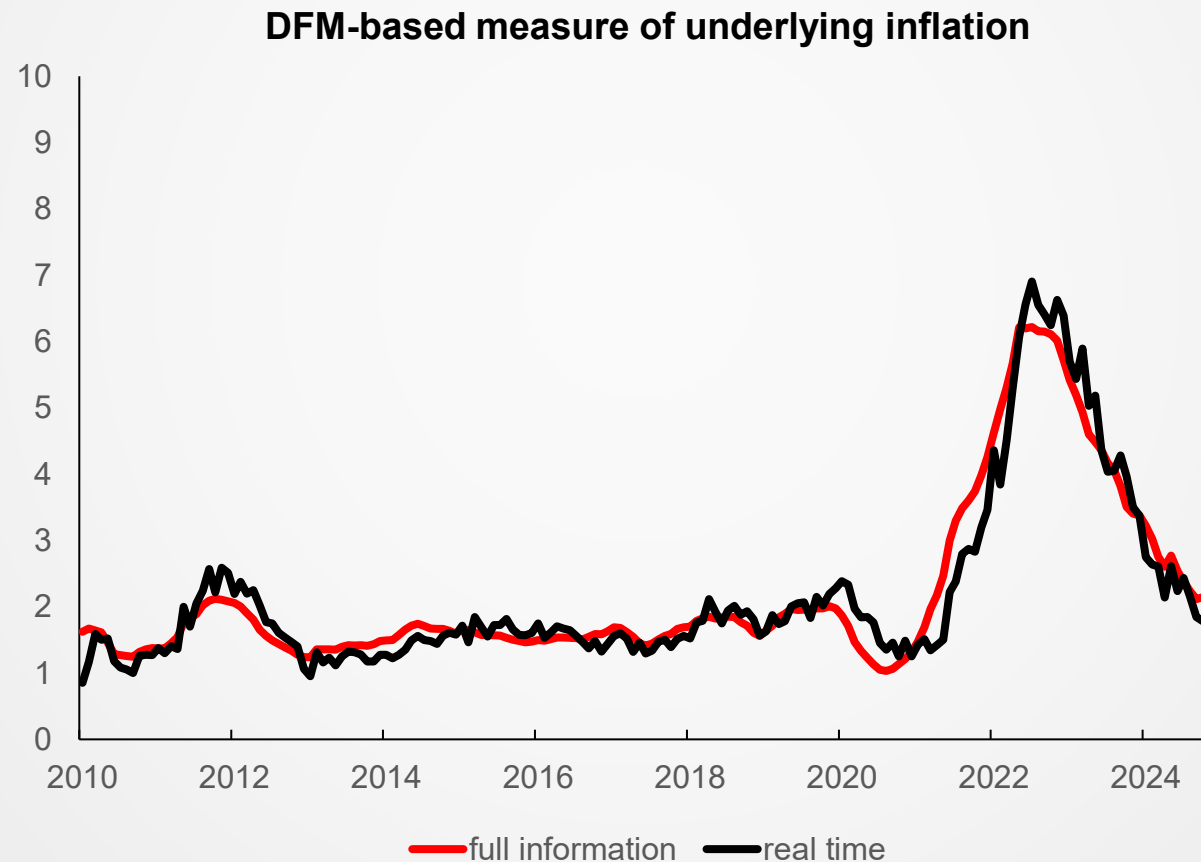
The model provides a rich narrative for underlying inflation

Decomposition of underlying total inflation into a common and a sector-specific component
(year-over-year, percentage points)



Note: Underlying captures common-across-sector and sector-specific sources of persistence.

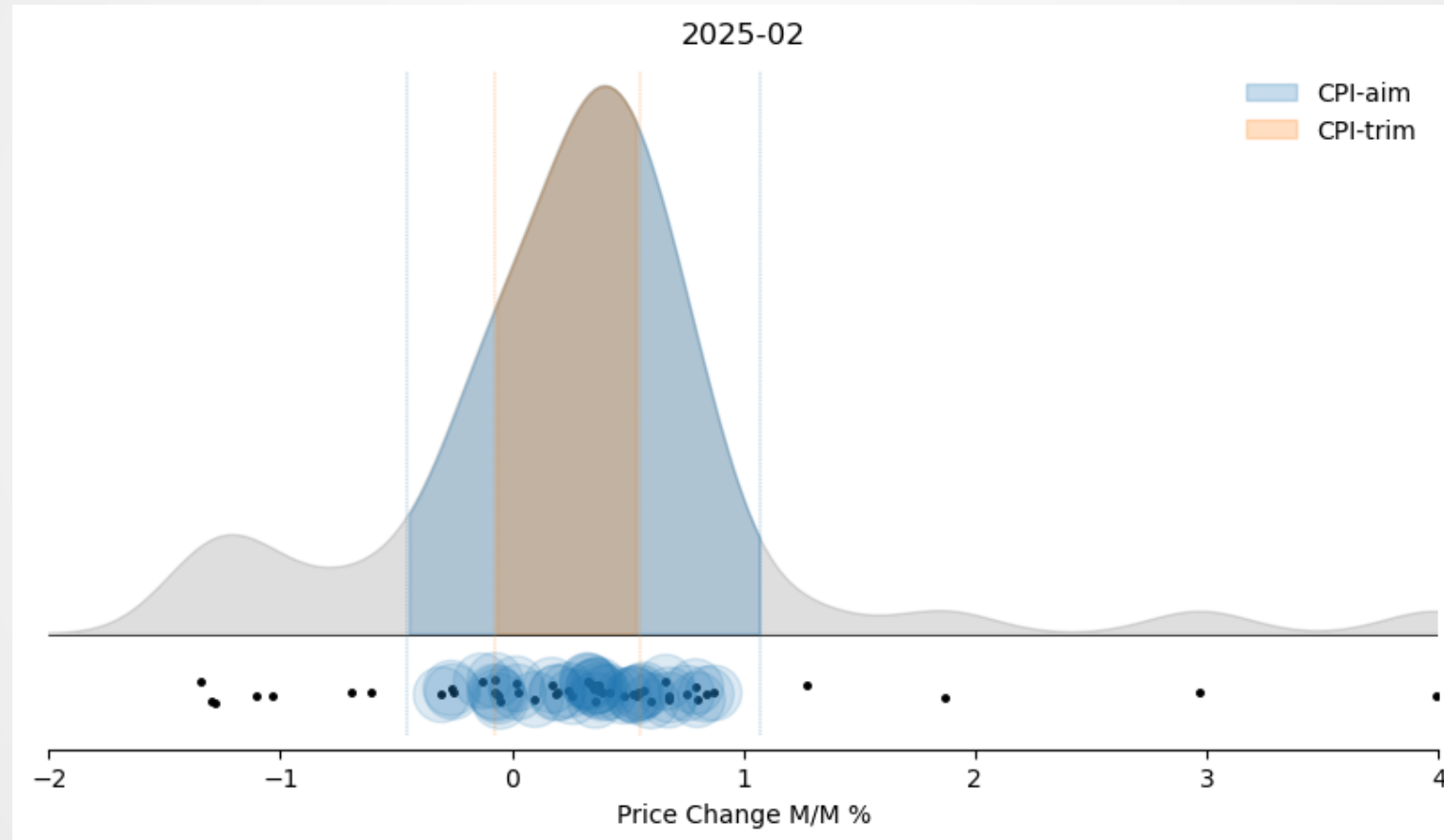
End-of-sample revisions unavoidable but relatively modest



Can we use machine learning to measure core?

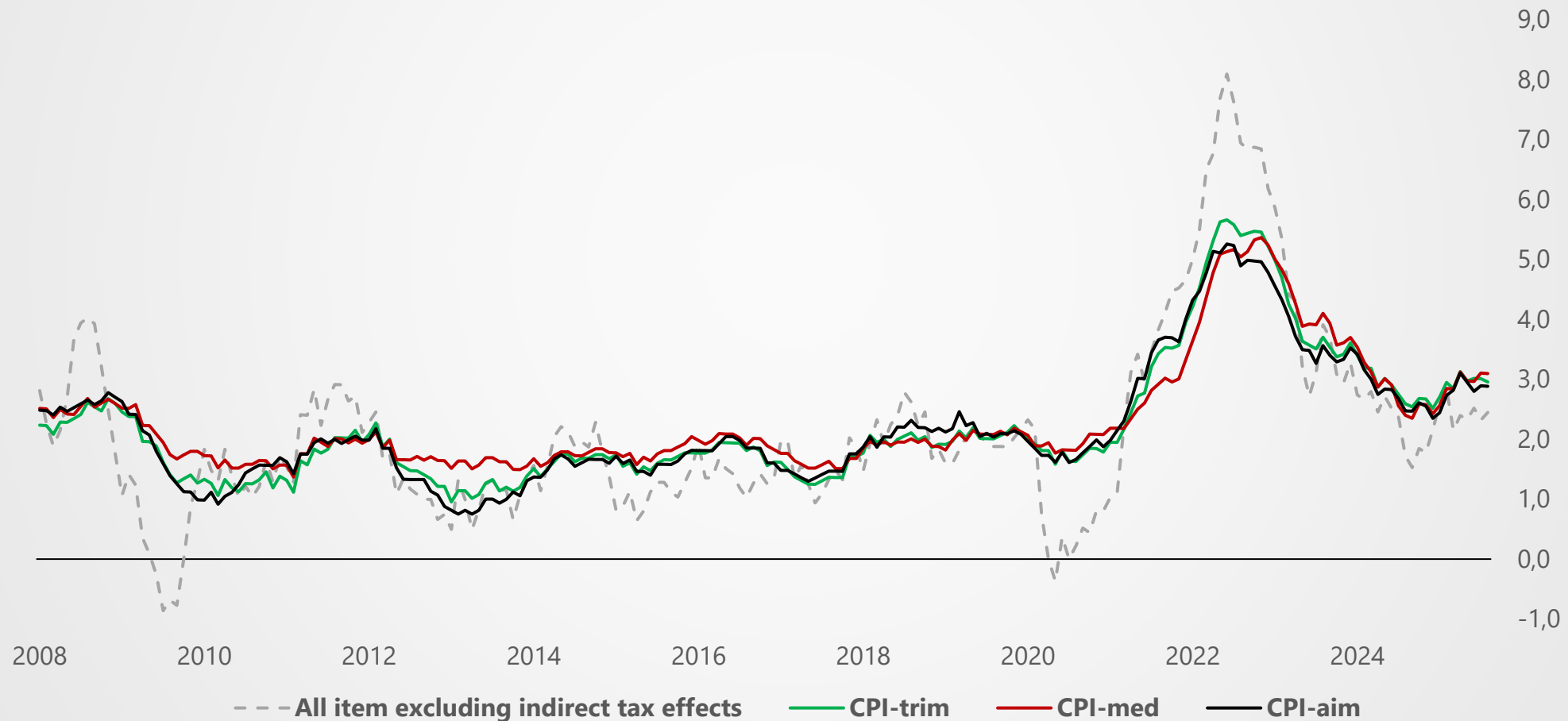
- Ongoing work uses a clustering algorithm (DBSCAN) to examine the distribution of inflation rates each month
- CPI components behaving similarly form a cluster
- Isolated points treated as noise
- Measure labelled Adaptive Inflation Measure (CPI- aim)

The 'core' of the distribution is often wider than assumed

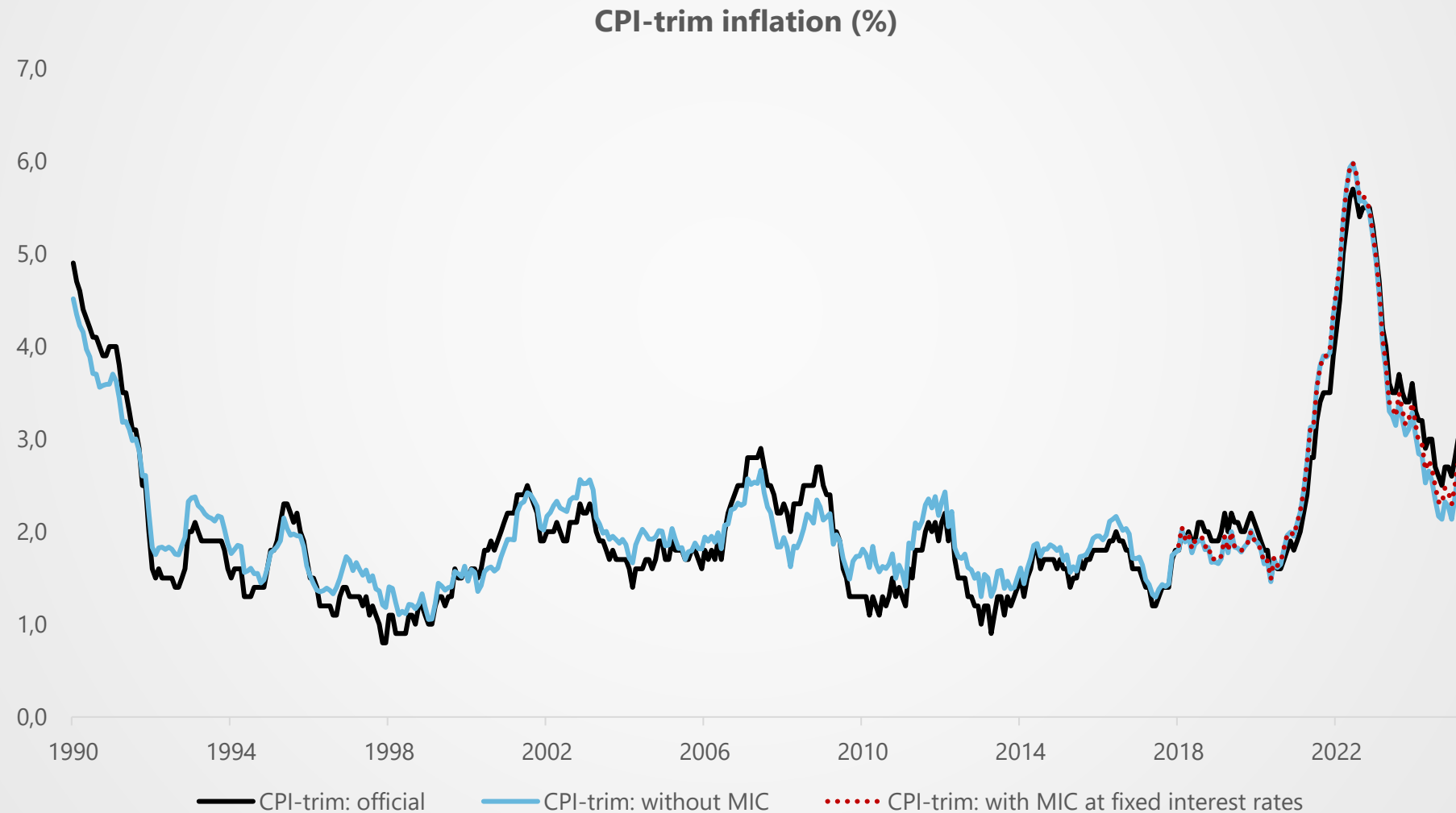


CPI-aim behaves similarly to trimmed mean measures

Inflation measures (y/y, %)



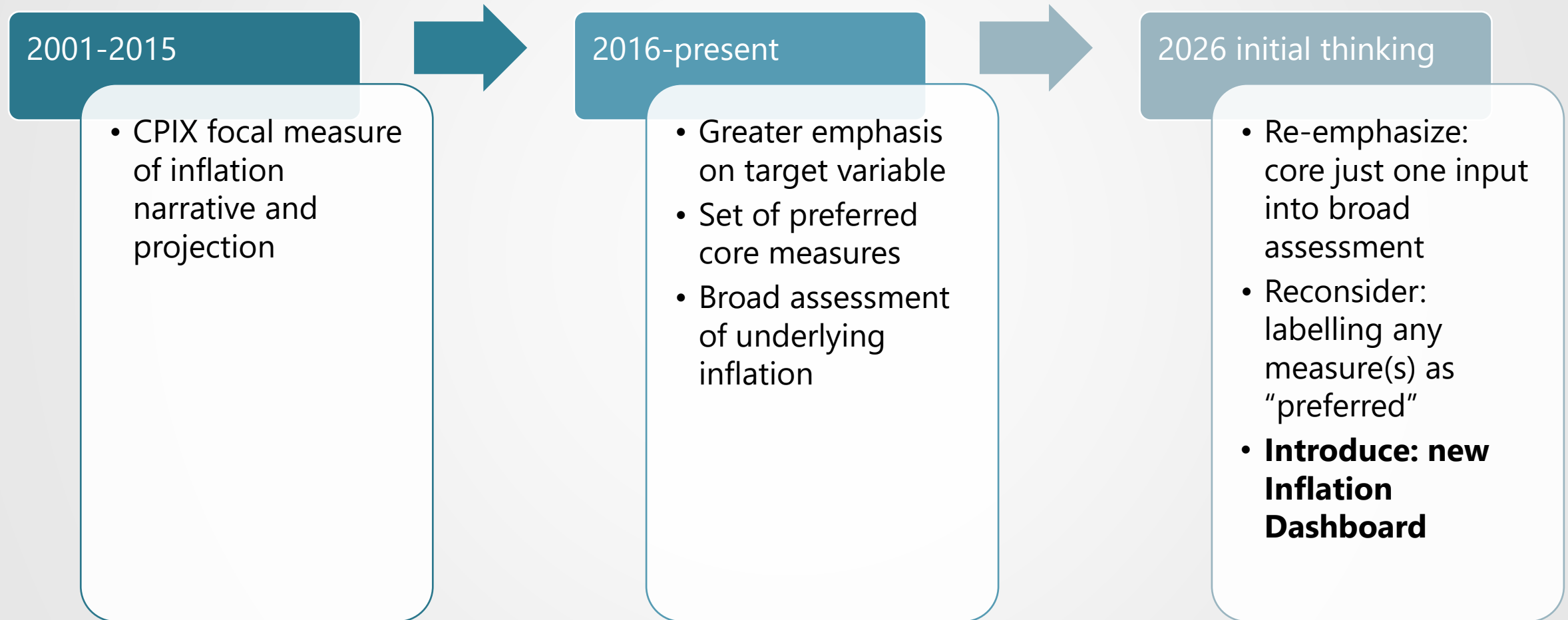
Mortgage interest cost: two possible solutions



A low-angle, upward-looking perspective of several modern skyscrapers with glass facades. The buildings are arranged in a way that they appear to converge towards the top of the frame, creating a sense of height and scale. The glass reflects the sky and clouds, adding to the visual complexity. A semi-transparent dark grey horizontal band is positioned across the middle of the image, serving as a background for the text.

Communication

2026 an opportunity to evolve 2016 framework



The Inflation Dashboard

- Concept: interactive web interface to facilitate broad assessment of underlying inflation
- Data presented in different conceptual buckets, e.g:
 - › Core inflation: various classes of measures
 - › Breadth of inflation: diffusion indices, distributions, heatmaps
 - › Disaggregated dynamics: shelter vs services ex. shelter, regulated vs non-regulated, sticky vs flexible etc.

The Dashboard is not just a collection of data

- Data to be accompanied with explainers
 - › Why do we look at particular cuts of the data? What do they tell us?
 - › What are the pros and cons of different measures?
 - › Under what circumstances are different measures likely to be most/least informative?

Outreach to help clarify communications implications

- Market participants
 - › Consult key stakeholders to seek views

- General public
 - › Surveys to assess public understanding of “core inflation” and “underlying inflation”

A low-angle, upward-looking perspective of several modern skyscrapers with glass facades. The buildings are arranged in a way that they appear to converge towards the top of the frame, creating a sense of height and scale. The glass reflects the sky and clouds, adding depth to the image. A semi-transparent dark grey horizontal band is positioned across the middle of the image, serving as a background for the text.

Background slides

Central bank practices regarding core inflation

	Exclusion-based	Trimmed mean	Weighted median	Volatility-weighted	Factor model	Target Measure	Projection of core inflation?*
U.S. Federal Reserve System	★	☑	☑		☑	Total PCE	Annual (range only)
European Central Bank	★					Total HICP	Annual
Bank of England	☑					Total CPI	None
Bank of Japan	★	☑	☑			CPI ex. fresh food	Annual (range only)
Swiss National Bank	☑	☑				Total CPI	None
Reserve Bank of Australia	☑	★	☑			Total CPI	Semi-annual
Reserve Bank of New Zealand	☑	☑	☑		☑	Total CPI	None
Sveriges Riksbank	☑	☑	☑	☑	☑	CPI with fixed interest rate	None
Norges Bank	★	☑	☑			Total CPI	Annual

★ = focal measure

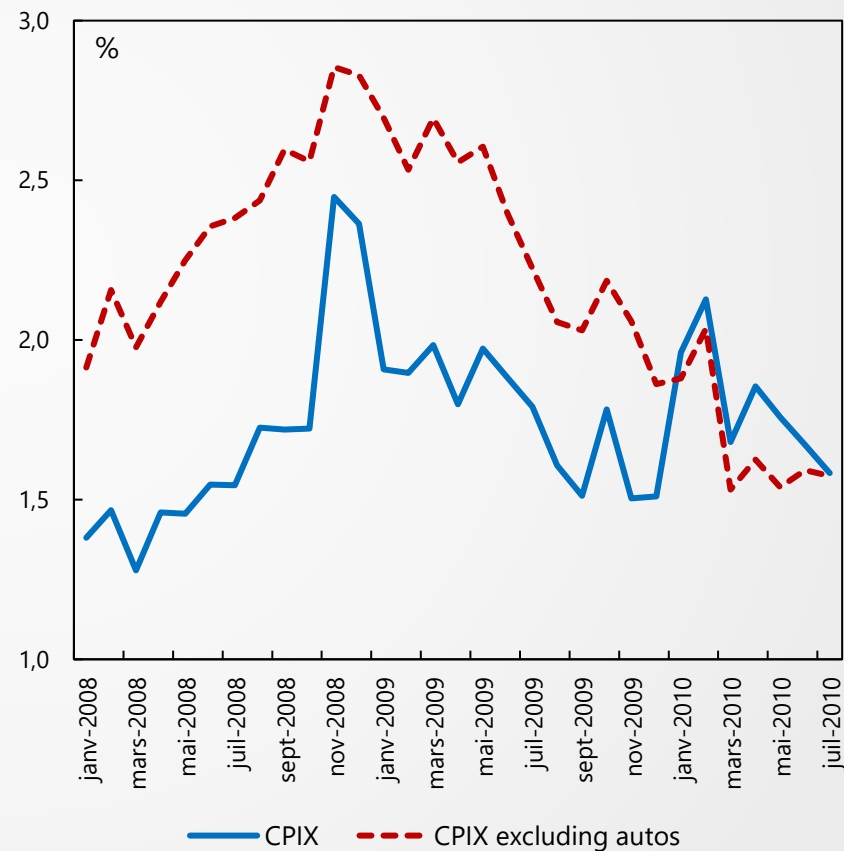
*The Bank of England, Swiss National Bank, Reserve Bank of New Zealand and Sveriges Riksbank do offer projections of total inflation despite not projecting core. Others largely follow the same practice for total inflation as they do for core inflation.

Idiosyncratic shocks frequently challenged traditional exclusion measures...

2002-2003



2008 Recession



...making them underperform in the Bank's empirical assessments

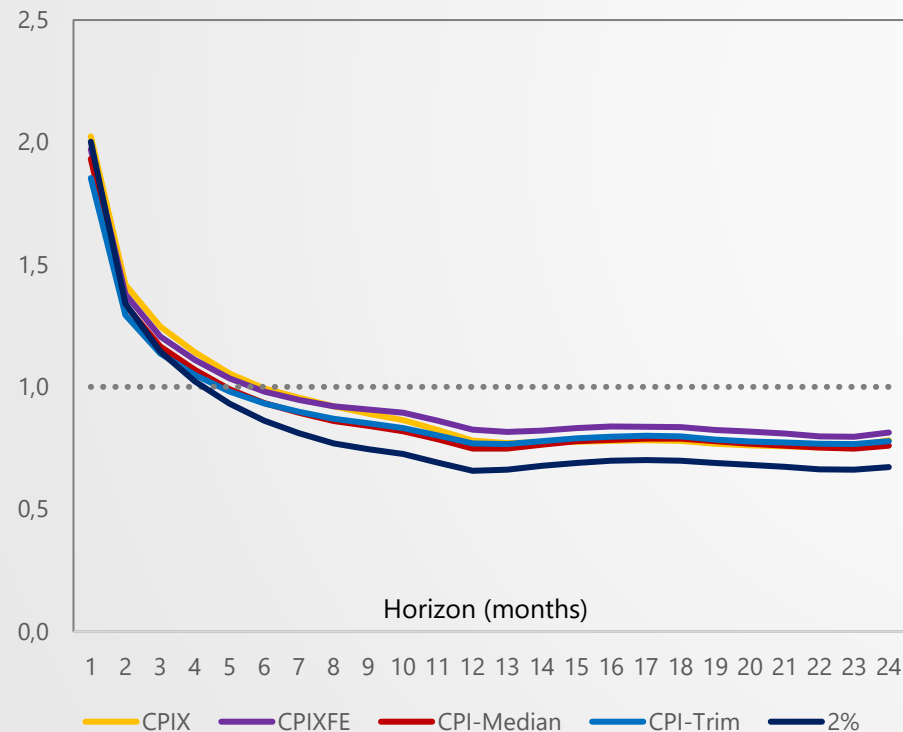
Summary of 2016 evaluation of different core inflation measures

	CPIX	CPIXFET	CPIW	Trimmed mean	Weighted median	Common component
Unbiased?	✓	✗	✓	✓	✓	✓
Persistent?	✗	✓	✗	✓	✓	✓
Moves with output gap?	✗	✗	✗	✓	✓	✓
Looks through sector-specific shocks?	✗	✗	✗	✓	✓	✓

Forecasting headline inflation

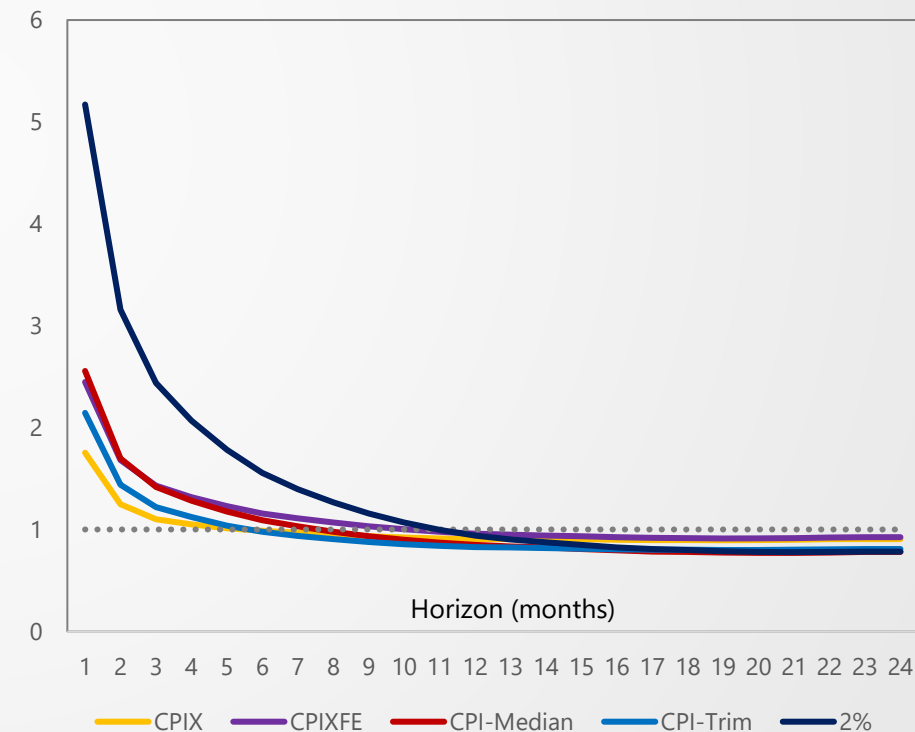
Pre-COVID: core beats total but 2% beats all

Forecasting inflation: relative RMSEs
1 = RMSE using total inflation only



COVID: all beat 2% but core doesn't beat total

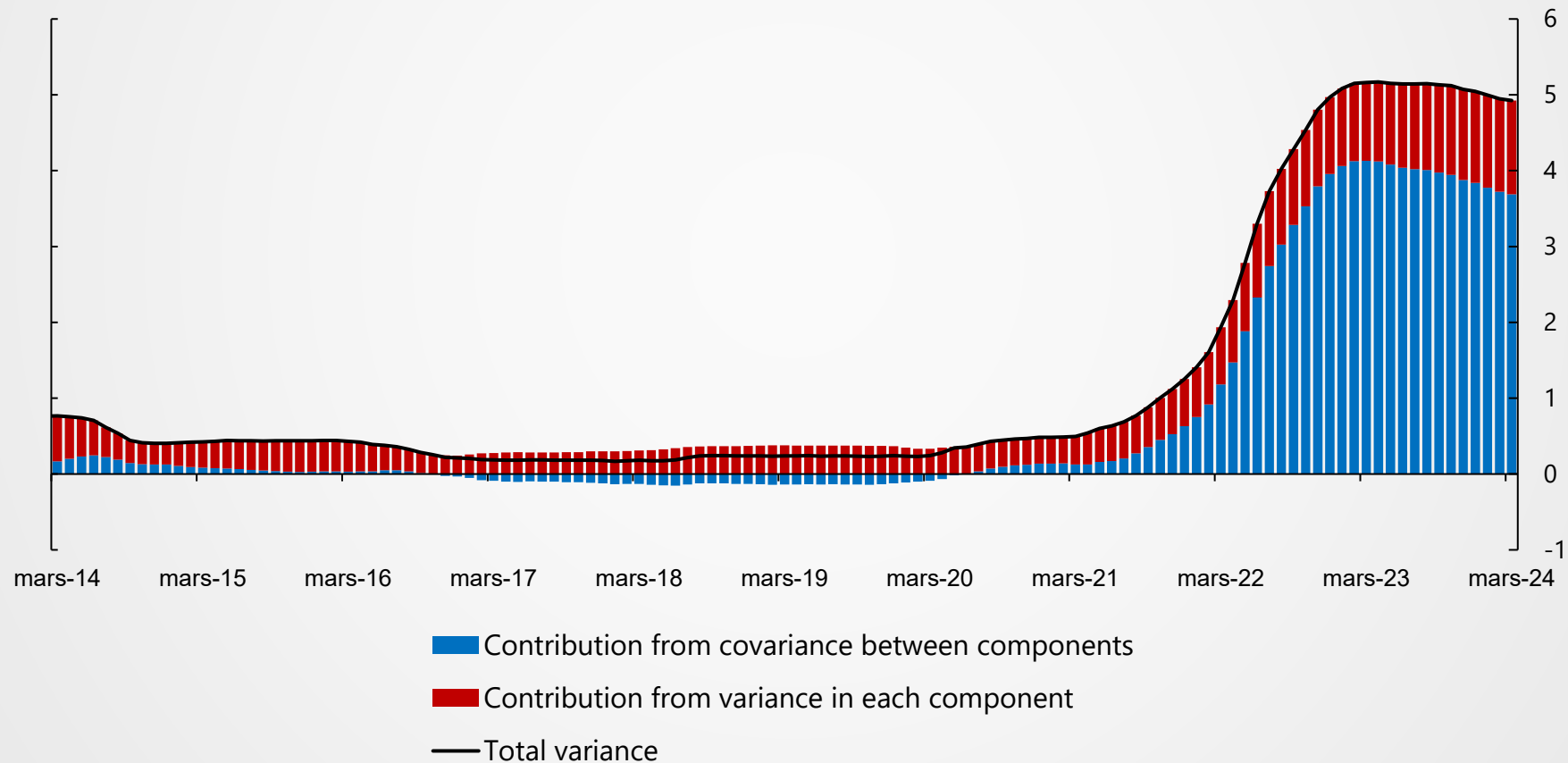
Forecasting inflation: relative RMSEs
1 = RMSE using total inflation only



There is no signal extraction problem when many prices are moving together

Variance of CPI inflation

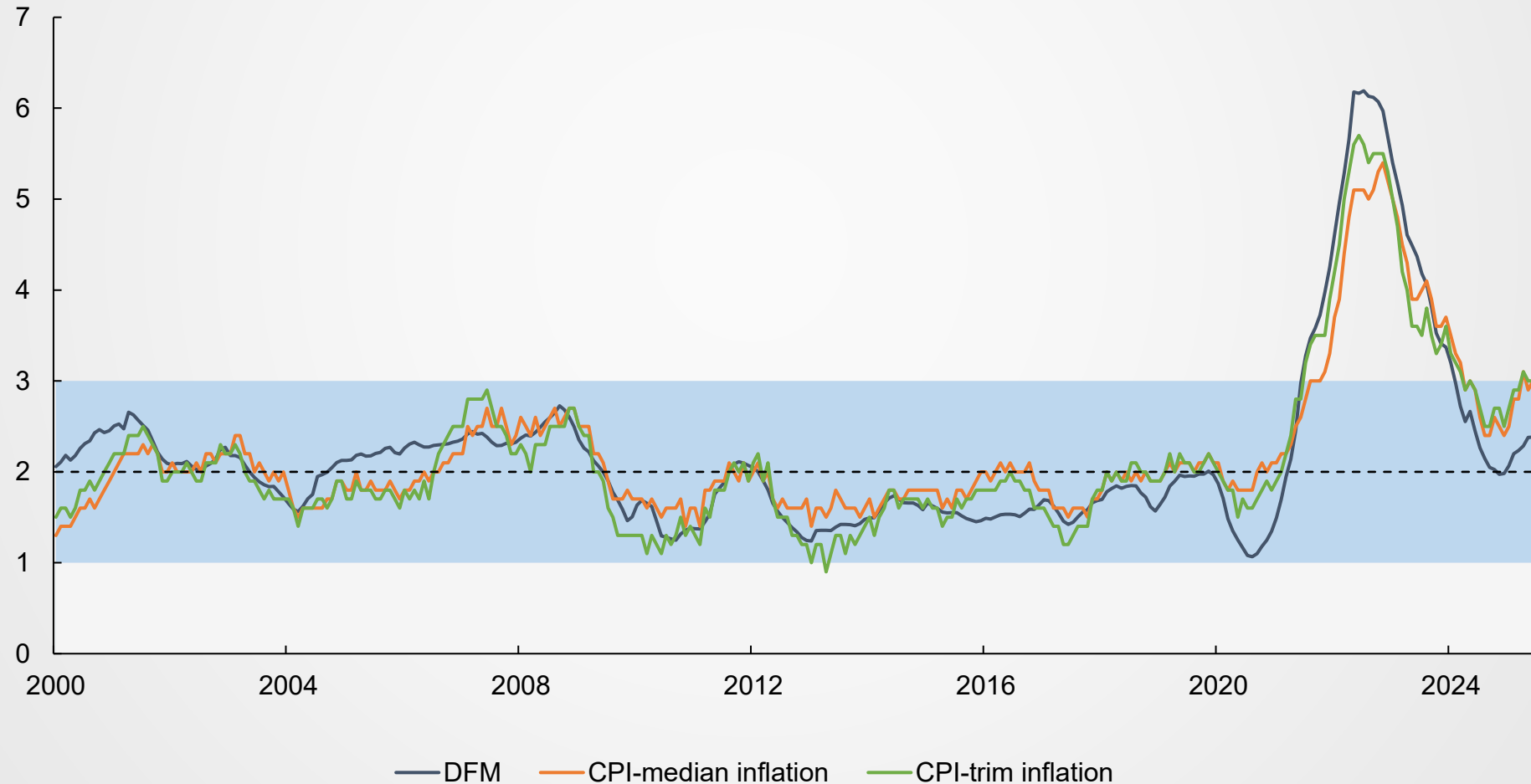
5-year rolling window



Last observation: March 2024

Model provides a complementary view on underlying inflation...

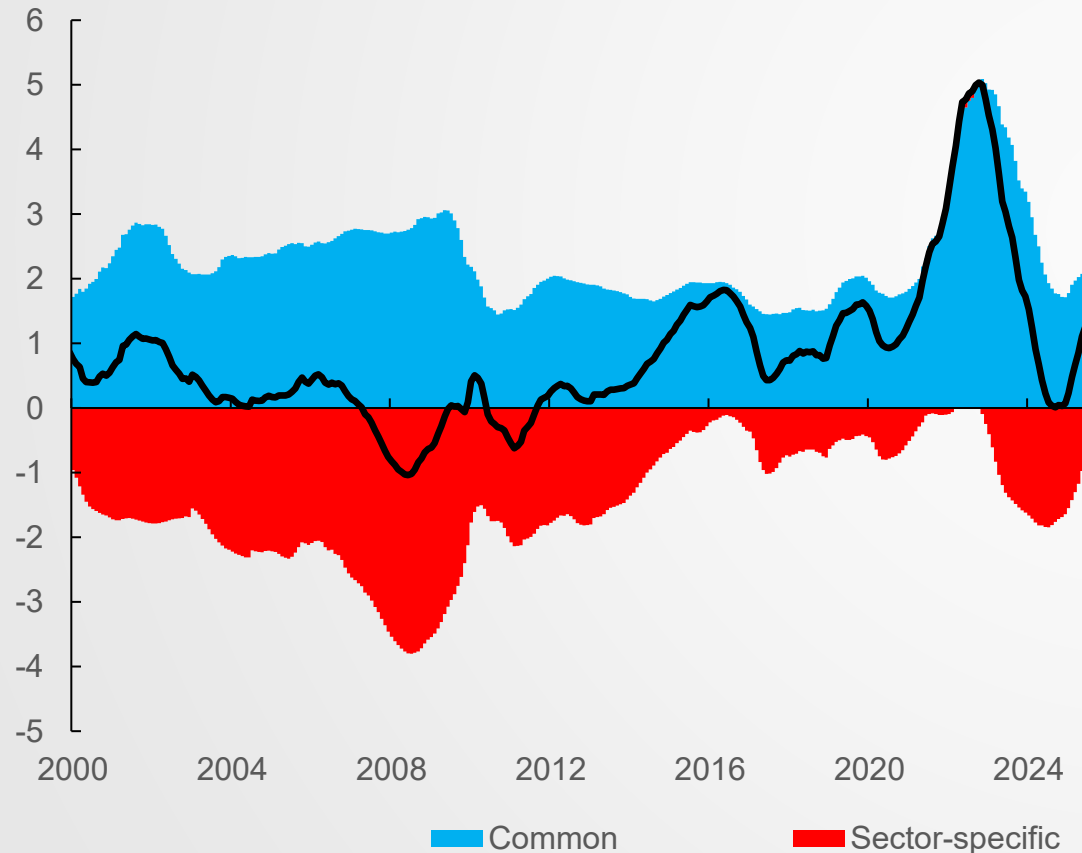
DFM and official core measures of inflation
(year-over-year, percentage points)



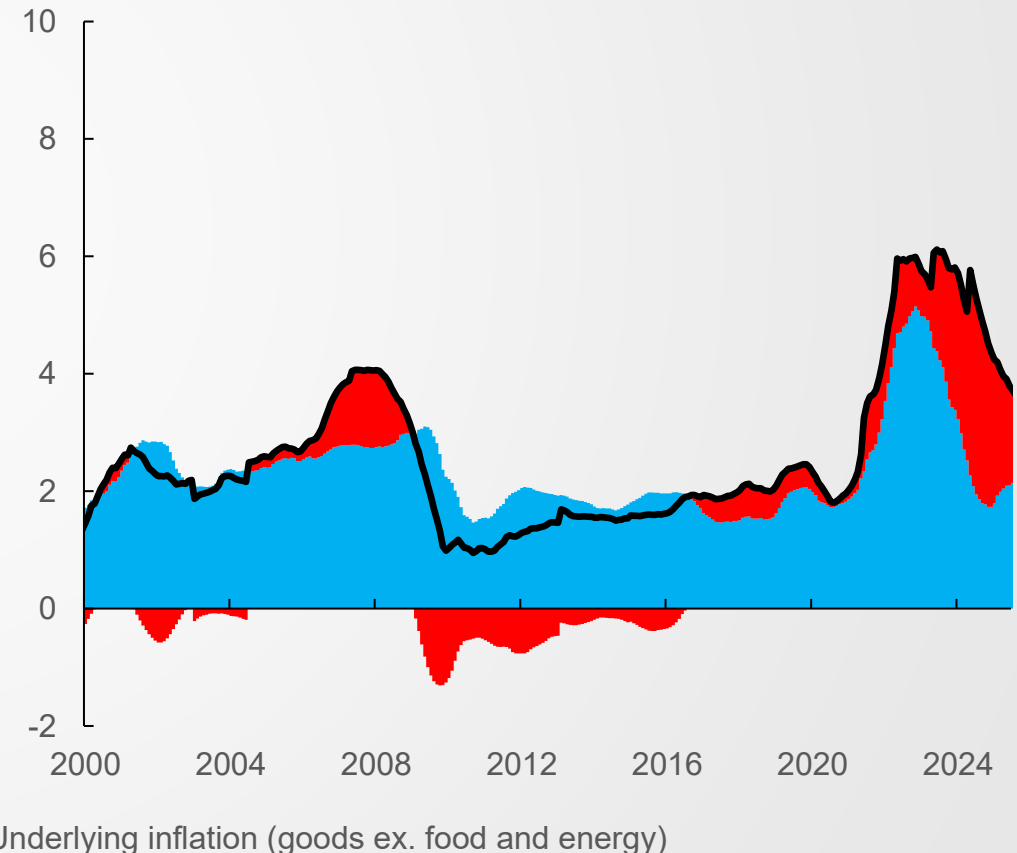
...together with a rich narrative (2)

Decomposition of underlying inflation into a common and a sector-specific component
(year-over-year, percentage points)

a. Underlying goods ex. food and energy inflation



b. Underlying shelter inflation



Note: Underlying captures common-across-sector and sector-specific sources of persistence.

2. Mortgage interest cost

