The Natural Rate of Interest in the Euro Area: Evidence from Inflation-Indexed Bonds

by

Jens H. E. Christensen and Sarah Mouabbi

A Discussion

Daniel P. Monteiro[1]

[1]European Commission.

The opinions expressed in this presentation are exclusively the author's own and do not necessarily reflect those of the institution to which he is affiliated.

6 February 2025

Introduction

The natural rate of interest (r*): the real rate of interest that prevails when inflation is stable and output is at its potential level.

r* is a variable whose economic relevance is only matched by the considerable difficulty in measuring it accurately.

Different methods and estimates tend to agree qualitatively on the broad trends of **r***, but can differ significantly in quantitative terms and for specific periods.

The authors take an affine term structure model (ATSM) to price data from (euro area HICP) inflation-linked bonds (OAT€) issued by the French government and tease out a financial market-based measure of **r***.

Achievements

- The authors cleverly exploit a relatively small dataset of 19 French bonds issued between 2001 and 2022.[1]
- Their preferred ATSM specification is carefully selected via empirical tests of alternative specifications.
- The inclusion of a bond-specific risk factor credibly controls for idiosyncrasies at bond level and provides interesting information in itself.

$\Rightarrow$ In general, ATSMs can be quite sensitive to estimation and specification choices. The battery of checks[2] included by the authors provides reassurance.

[1] For comparison, the EU, a latecomer to large-scale issuance, has placed close to 100 bonds and bills in the market since October 2020.

[2] E.g., different data frequencies, specifications, cut-off points and r* definitions, as well as real-time estimation and comparisons with results from the literature.

A comparative reading

What are the **commonalities** and **points of divergence** when compared with a **different ATSM** estimated on **different financial data**?

The Commission has recently developed a 6-factor ATSM observing:

1. **The yield curve**: based on a large selection of "nominal" (i.e., non-inflation-linked) securities smoothing out individual idiosyncrasies.
2. **The inflation swap curve**: captures euro area HICP inflation expectations.

The model is composed of 3 factors (level, slope and curvature) split into real (R) and inflation (Π) variants:

$$
\begin{aligned}
r_t &= \delta_0 + \delta_1' X_t = \delta_0 + r_t^R + \pi_t \\
r_t^R &= \delta_0^R + L_t^R + S_t^R \\
\pi_t &= \delta_0^\Pi + L_t^\Pi + S_t^\Pi \\
\delta_0 &= \delta_0^R + \delta_0^\Pi
\end{aligned}
\qquad
X_t = \begin{bmatrix} L_t^R \\ S_t^R \\ C_t^R \\ L_t^\Pi \\ S_t^\Pi \\ C_t^\Pi \end{bmatrix}
\qquad
\delta_1 = \begin{bmatrix} 1 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \end{bmatrix}
$$

Illustrative model results

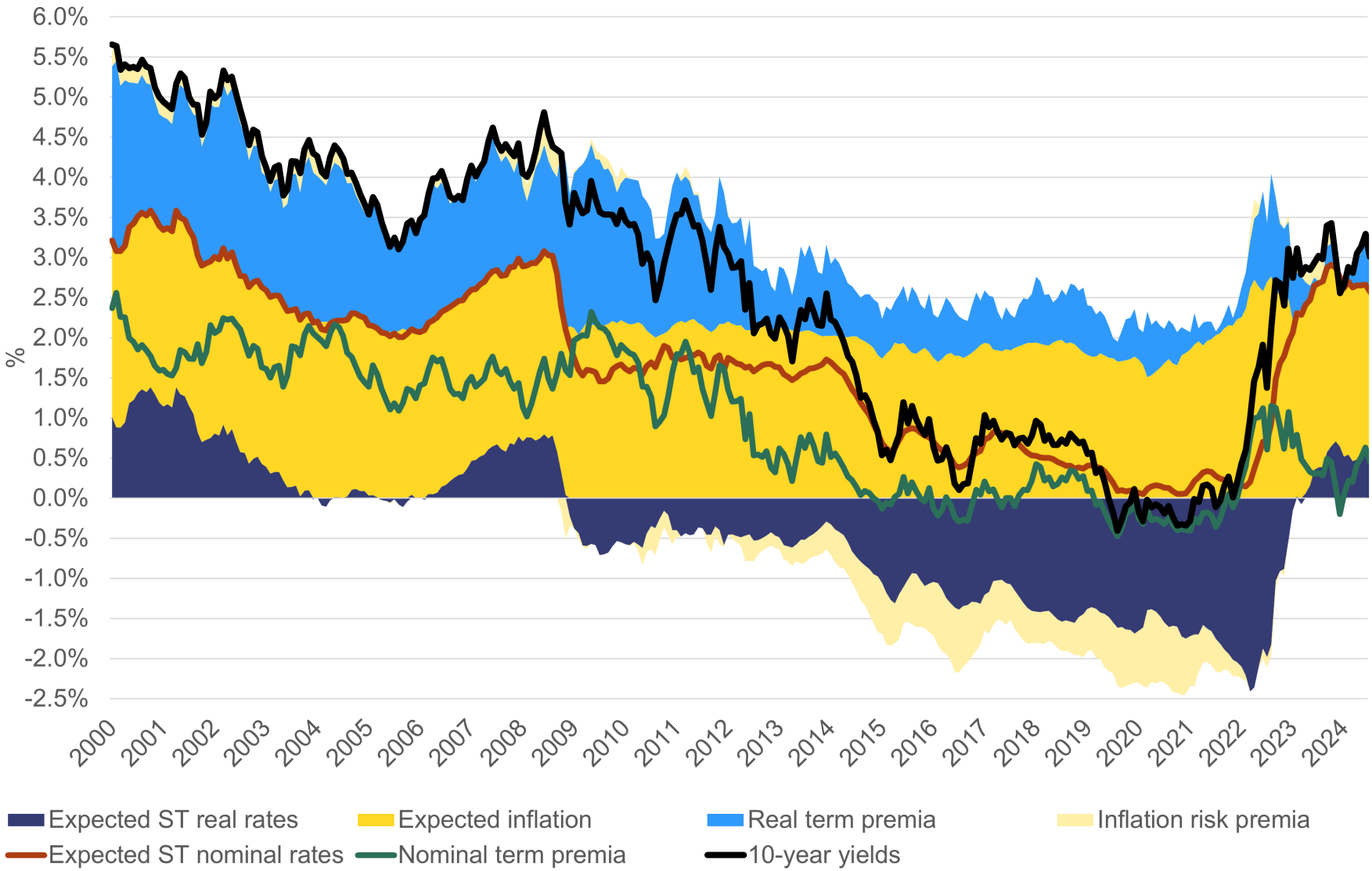

Figure: Decomposition of 10-year French sovereign bond yields (6-factor COM model)

A comparative reading of r*

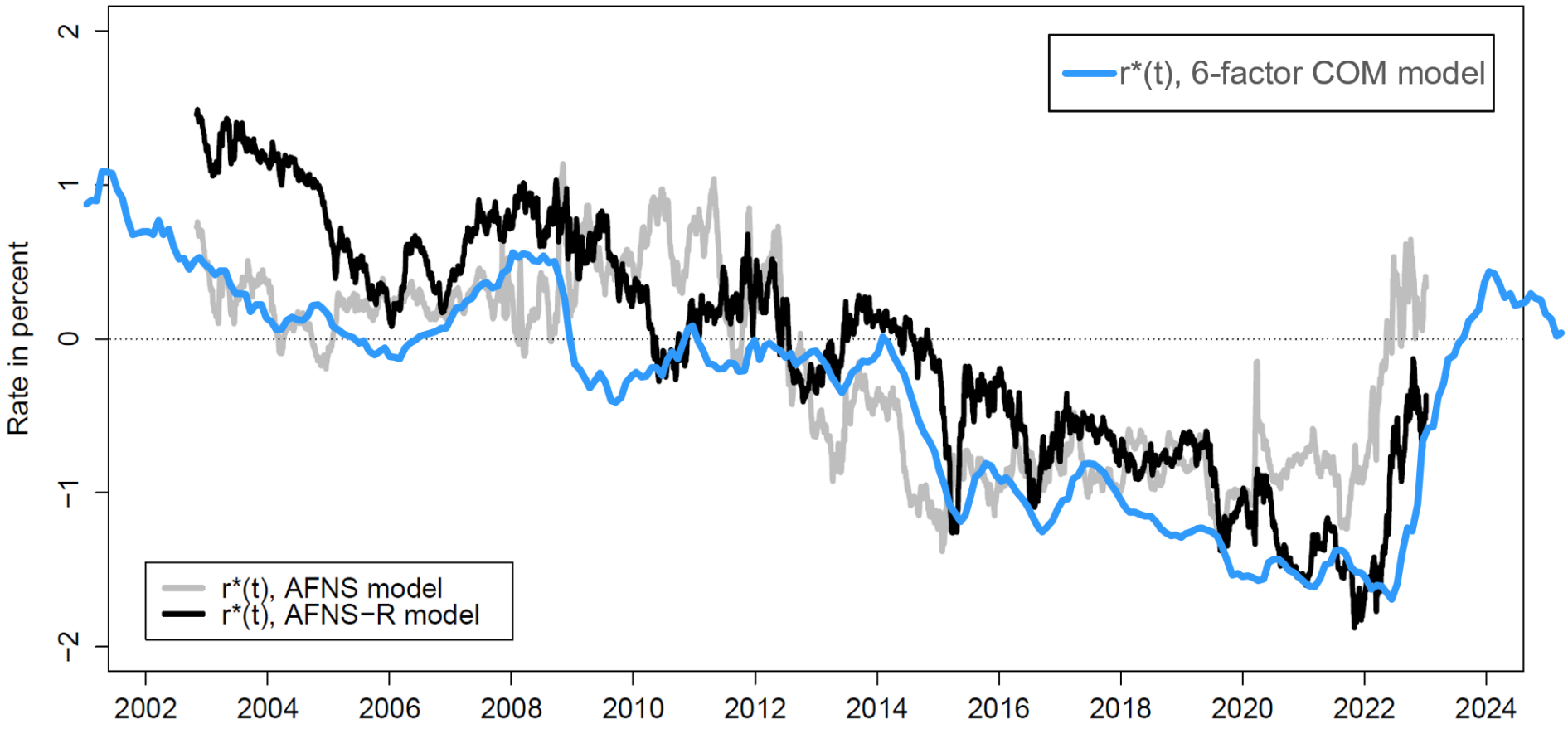

Figure: Results from 3 ATSMs

$\Rightarrow$ High correlation and agreement on the broad trends. Some disagreement on the specifics.

Does credit risk matter?

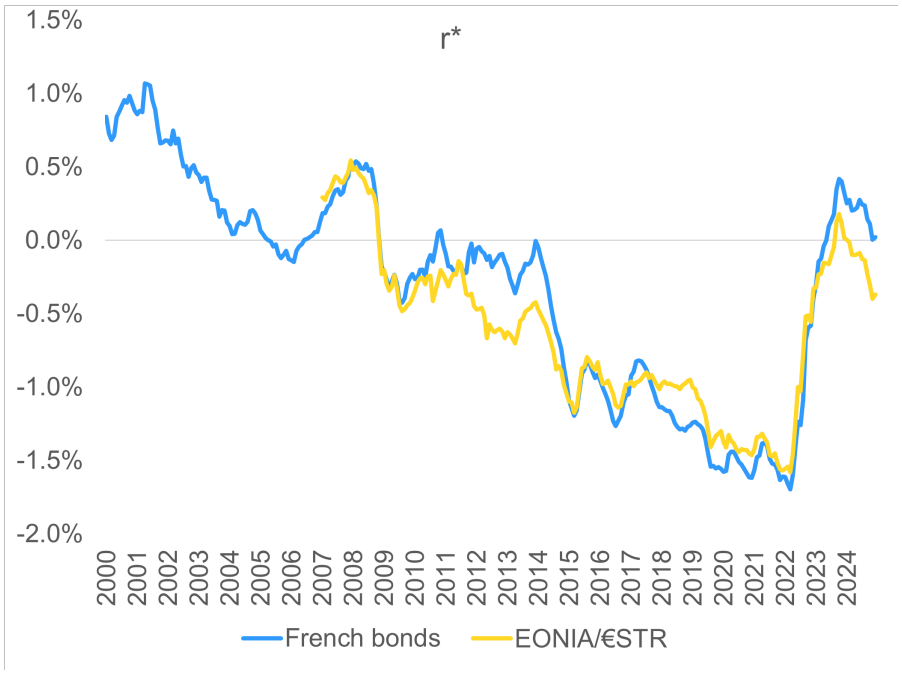

Figure: French bond vs risk-free rate-based measures of r* (6-factor COM model)

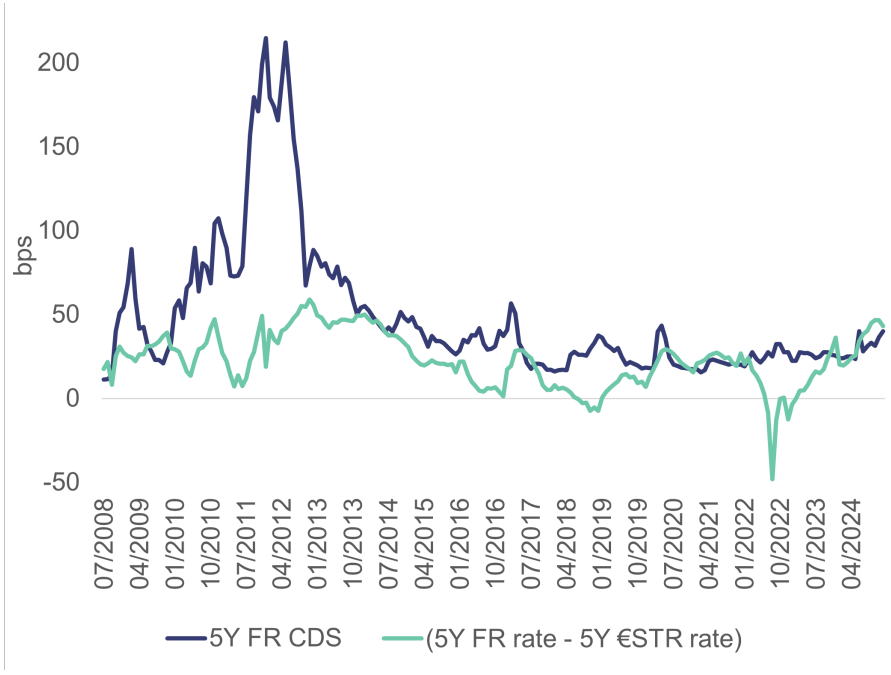

Figure: 5Y FR-€STR real rate differentials and French credit risk

⇒ Quantitative conclusions may differ significantly between the two measures of r* in some periods (e.g., December 2024).

⇒ 44% correlation between 5Y FR-€STR differential and French 5Y CDS spreads. Orders of magnitude roughly comparable (in non-crisis periods).

Implications for the assessment of the monetary policy stance

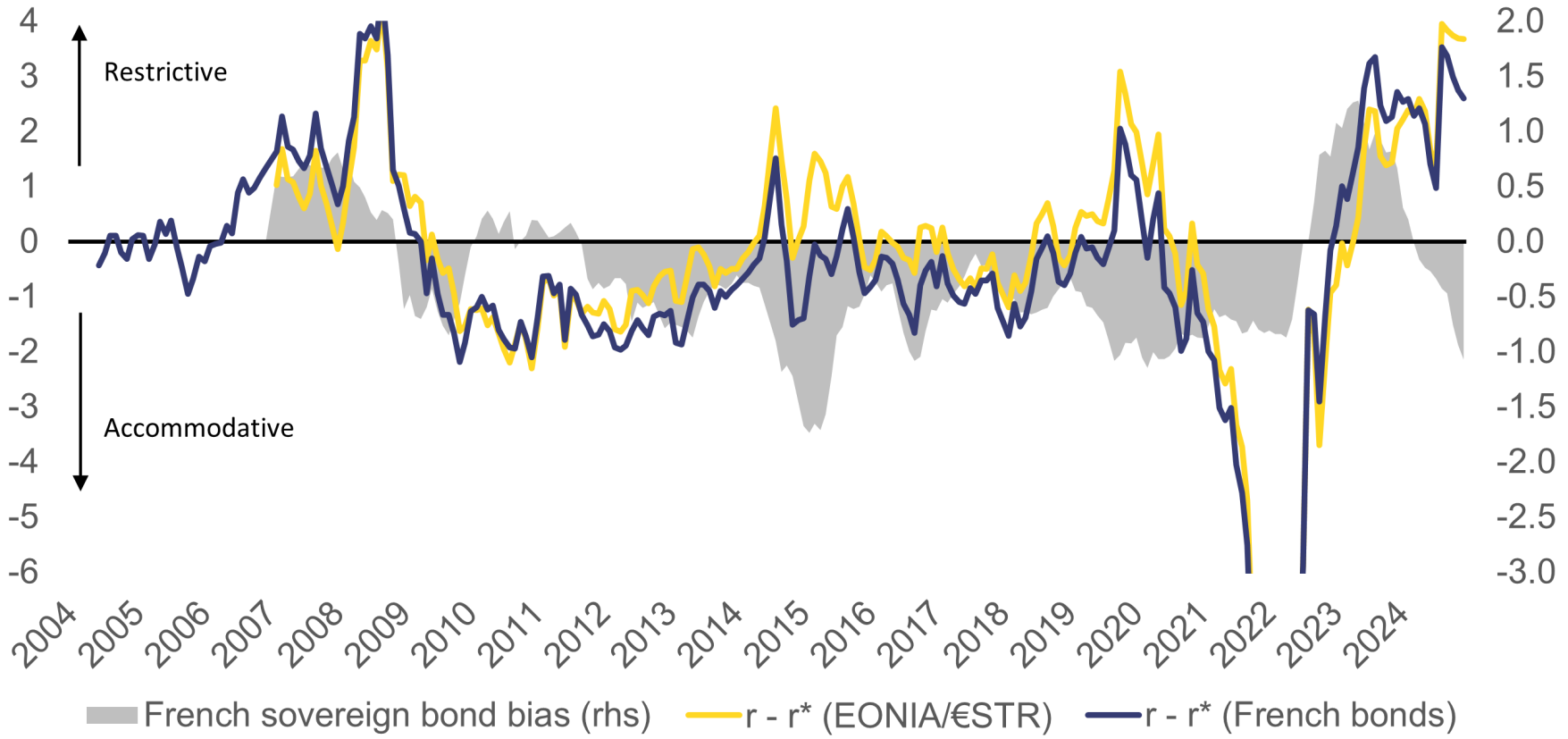

Figure: Monetary policy stance (r - r*) (6-factor COM model)

⇒ *r* constructed as the 1M EONIA/€STR minus the model-implied 1M inflation rate.
⇒ MP stance more easily assessed as "loose" when r* is based on FR sovereign yields.
⇒ MP stance is more than (r - r*) due to UMP. Temporary inflation bursts can strongly affect (r - r*).

Comparing MP stance assessments

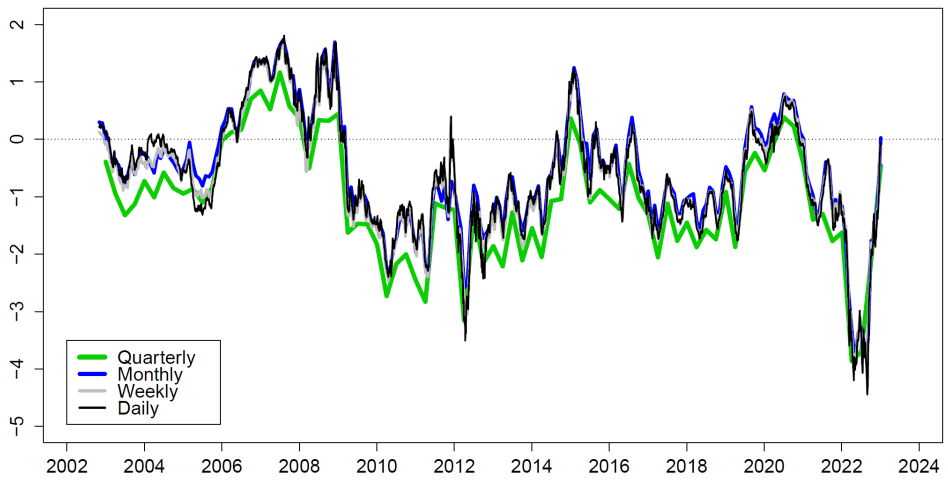

Figure: Monetary policy stance (Christensen and Mouabbi (2025))

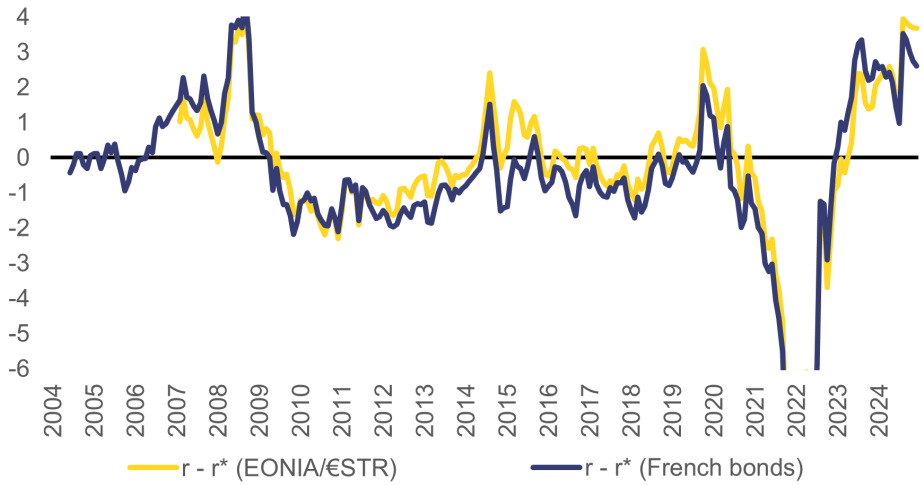

Figure: Monetary policy stance (6-factor COM model)

Qualitative cross-model agreement:

- MP was tight going into the GFC in 2007 and remained above neutral into 2009, before reaching an accommodative level.
- At the peak of the pandemic in spring 2020, MP reached a tightening stance and did not become accommodative until early 2021.
- MP remained very accommodative at the beginning of the 2021-2023 inflationary episode and did not reach a tightening posture until the very end of 2022.

Some quantitative disagreement: According to the 6-factor COM model, the risk-free rate was not very accommodative during the low inflation period of 2015-2020 because of the ELB (rather, accommodation came from unconventional MP).

The bond-specific risk factor

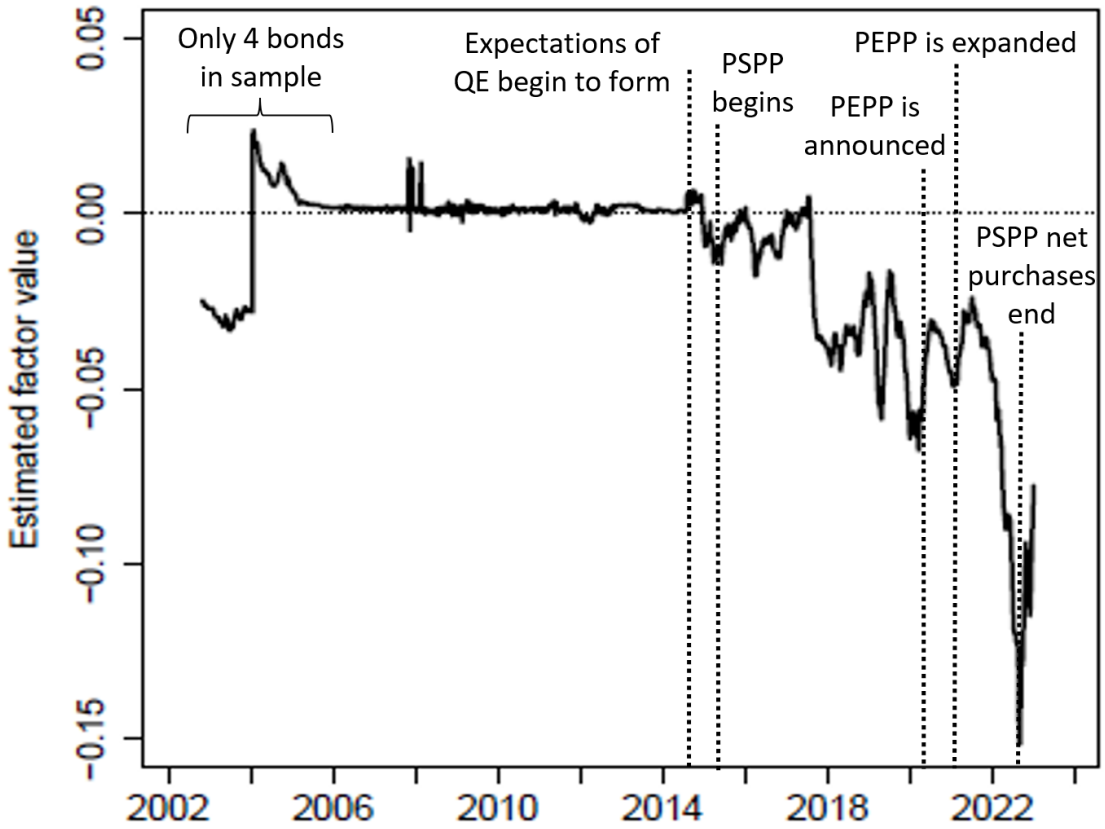

Figure: Bond-specific risk factor timeline

The bond-specific risk factor captures price idiosyncrasies linked to a bonds' maturity and age. It is thought to capture mainly liquidity and convenience yield premia.

However, quantitative easing is implemented asymmetrically as a function of a bond's maturity.

⇒ **Is the bond-specific risk factor capturing QE?**

Conclusions and questions

Impressive ATSM analysis of an interesting and informative asset class.

Once more, we find "*qualitative agreement on the broad trends, some quantitative disagreement on the specifics.*"

Two general questions:

- Can we really abstract from French sovereign credit risk when deriving r* from OAT€?
- Is the bond-specific risk factor (partly) capturing the asymmetric effect of ECB asset purchases?

Two nerdy questions:

- Your 3-factor (AFNS) model is arbitrage-free. But can the same really be said of your 4-factor (AFNS-R) model?
- Is the 5Y5Y real rate capturing r* today or in 5- to 10-years time?

  $\Rightarrow$ This question matters because r* is time variant! If it is capturing r* in 5- to 10-years time, then how accurately can we assess the monetary policy stance today?

Thank you for your attention

The monetary and fiscal policy mix in a changing world