



ECB macroeconomic models for forecasting and policy analysis

SUERF WEBINAR
JUNE 4, 2024

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Discussion Agenda

- Enjoyed reading this paper! Limited scope of remarks.
- Talk about 2 issues:
 1. Things we agree upon...
 2. Modeling challenges/issues that requires further thinking:
 - a. Non-linearities in Phillips Curves
 - b. Fiscal and monetary interactions
 - c. Cross-country linkages
 - d. Merit of disaggregation: bottom-up vs. top-down approaches
 - e. Financial vs. price stability tradeoffs
 - f. V- and U-shaped recessions and role of policy
- Then wrap up with some final thoughts..,

1. Things we agree upon

Report discusses many useful issues

- Argued in OXREP (2018) article “DSGE models: Still Useful in Policy Analysis” that DSGE remain as a key policy tool for CBs in the foreseeable future.
- I also argued that large institutions like ECB and Fed Board can retain several type of models.
- Still, paper suggest important staffing challenges may lie ahead:

Table 1

Academic research and modelling at policy institutions: a continuous interaction

| Academic research | Policy modelling |
|------------------------------------------|-------------------------------------------------|
| Simple and stylised | Realistic and granular |
| Deep theoretical foundations | Robust to structural uncertainty |
| Original and strong policy prescriptions | Continuity and consistency with policy paradigm |
| Mostly mainstream and frontier | Mainstream but behind the curve |

Source: ECB.

Note: Synoptic presentation of the differences between academic research and policy modelling.

2. Challenges: Nonlinearities

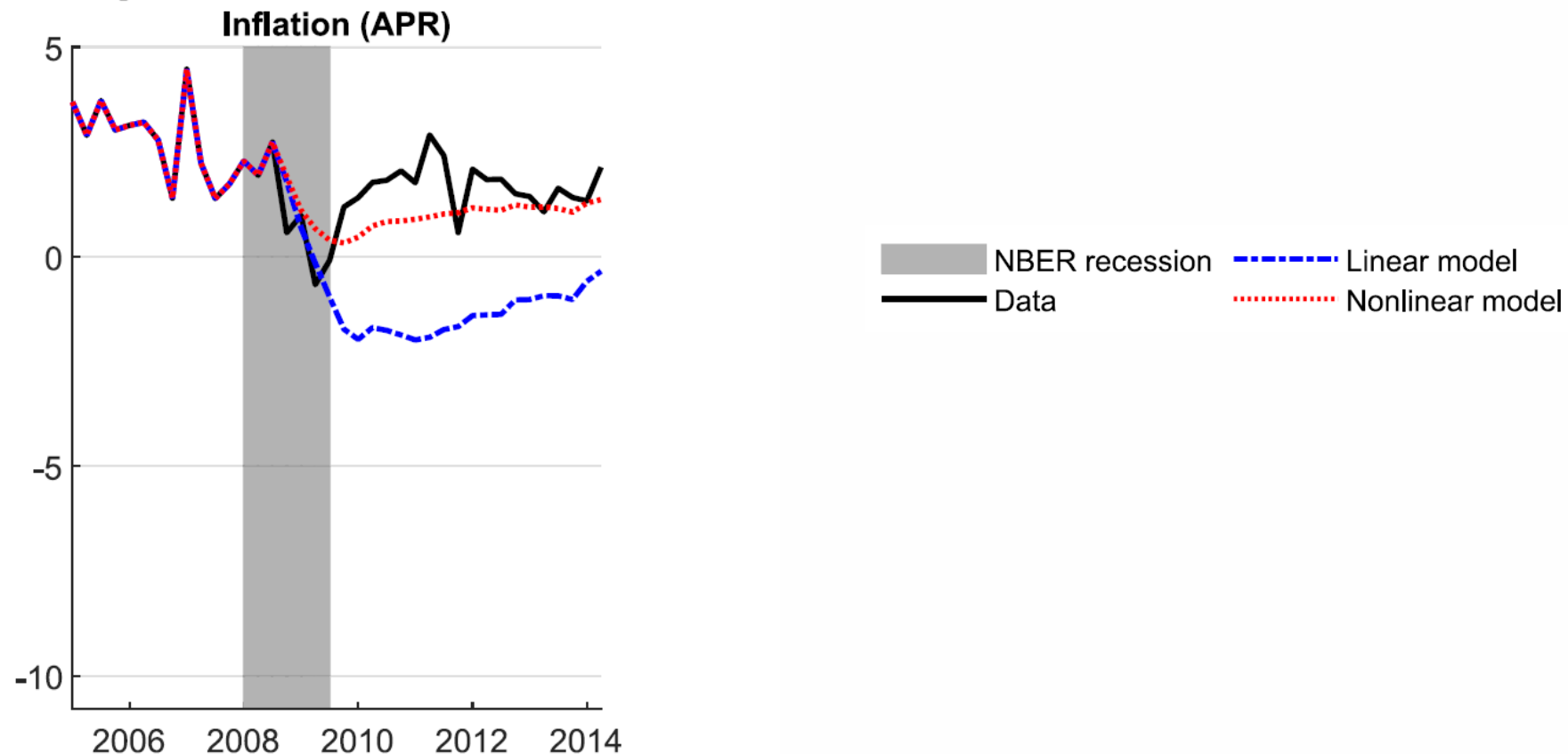
Nonlinearities in Phillips Curves

- **Phillips curves** may be considerably more **nonlinear** than previously appreciated (Harding, Lindé and Trabandt, 2022, 2023, Benigno and Eggertsson, 2023).
- Important when economy is hit with large shocks.
 - Low slope when inflation is low, higher slope then inflation rises above target.
 - Implies much larger transmission of MP-FP stimulus when inflation is elevated by a mix of adverse supply shocks and strong private demand.
- Erceg, Linde and Trabandt (2024) argues these nonlinearities may be important for policy design: **one example of limitations with linearized models.**

Nonlinearities in Phillips Curves: Harding et al (JME 2022)

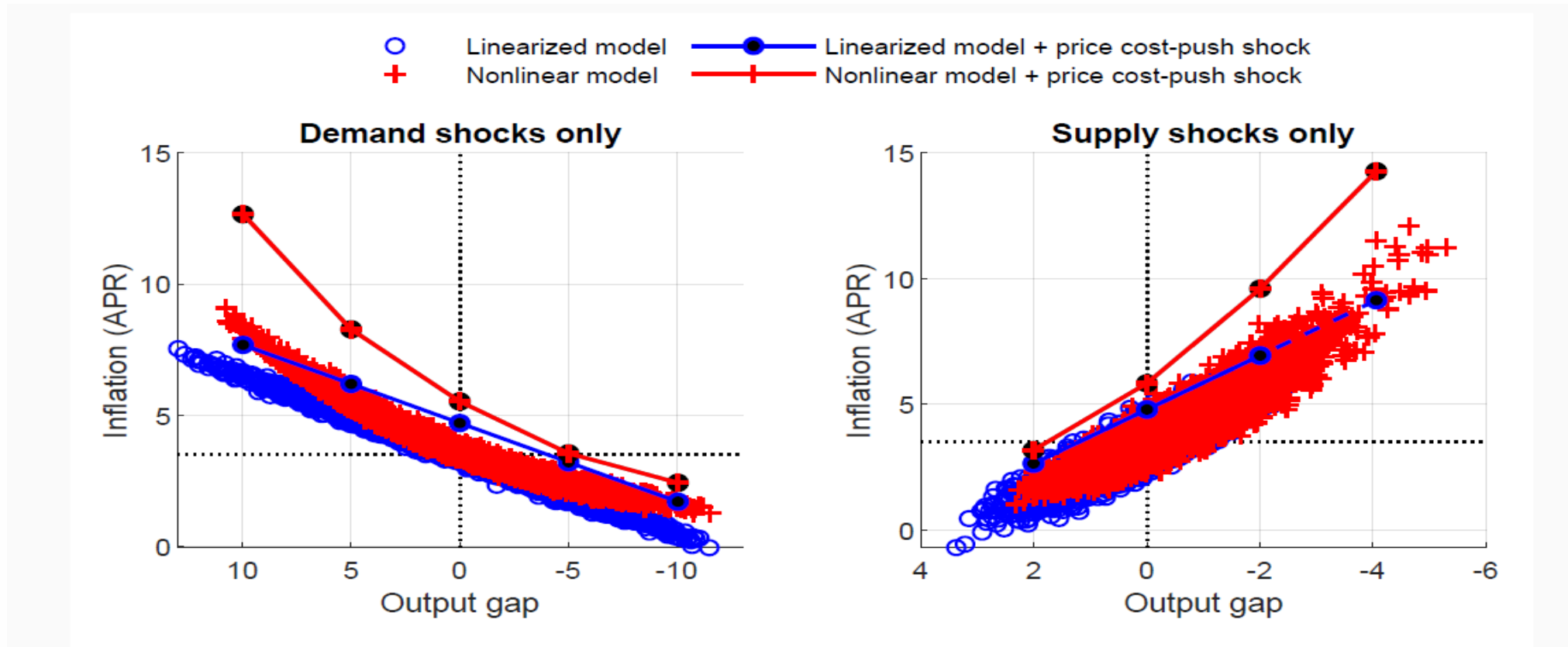
- Nonlinear formulation of SW (2007) help explain missing deflation puzzle following the GFC, linearized version relies on large positive markup shocks.

Panel B: High Demand Curvature Parameterization



Nonlinearities in Phillips Curves: Harding et al (JME 2023)

- Nonlinear formulation of SW model is also helpful to understand the Post-COVID inflation surge.
- Larger transmission of cost-push shocks (or demand) when inflation is elevated.



Estimates of Linearized Phillips Curves Support Predictions of Nonlinear Model

- Benchmark Phillips curve in SW model

$$\hat{\pi}_t - \iota_p \hat{\pi}_{t-1} = \beta (E_t \hat{\pi}_{t+1} - \iota_p \hat{\pi}_t) - \kappa_{mc} \hat{mc}_t + \hat{\varepsilon}_t^p$$

- Estimates typically highly forward looking (low ι_p) and low slope (κ_{mc})
 - ▶ Pre GFC: $\iota_p = 0.22, \kappa_{mc} = 0.008$
 - ▶ Pre COVID: $\iota_p = 0.26, \kappa_{mc} = 0.004$
 - ▶ Until 2021Q4: $\iota_p = 0.36, \kappa_{mc} = 0.007$
- Although estimates move in the expected direction when extending the sample, it is difficult to reconcile a standard forward-looking flat sloped Phillips curve with the recent surge in US core inflation.

2. Challenges: Fiscal and Monetary

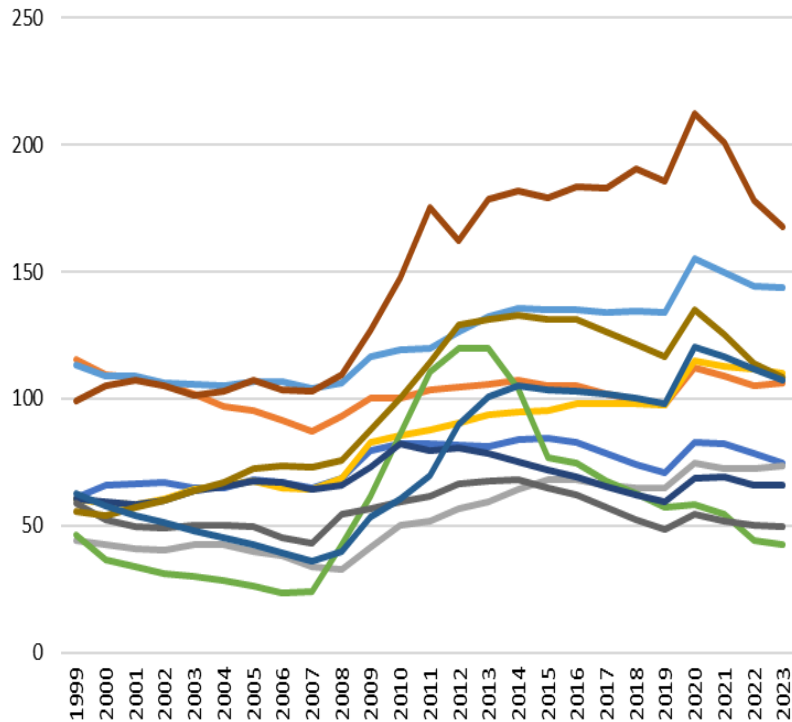
Fiscal and Monetary Interactions

- The EMU is based on active monetary (AM) by ECB coupled with passive fiscal (PF) policies in every CU nation determines price levels in each member nation.
- This view supported by standard two-country New Keynesian open economy models used by many central banks:
 - ▶ AM/PF in countries A and B => unique equilibrium as in Leeper (1991)
- However, standard NK policy models at CBs also implies that:
 - ▶ AM and AF in either country A or B => indeterminacy regardless of size of country A and B.
 - ▶ PM and AF in both countries A and B => indeterminacy even if fully symmetric calibration with complete international financial markets.
- Modelling of government debt simplistic in standard models, recent work by Leeper, Traum and Matthes (2023), and Bianchi, Faccini and Melosi (QJE) and Smets and Wouters (2024) intriguing.

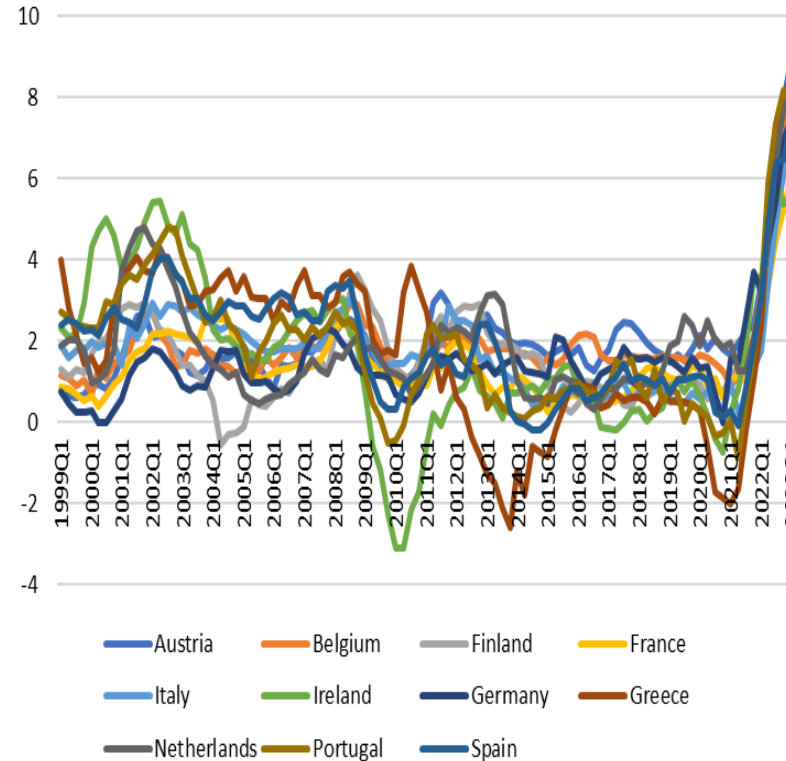
Government Debt, Inflation and Relative prices in EA Countries...

- Keynesian Greece and Ireland stories...
- ...not evident that post-COVID inflation surge driven by FTPL mechanisms.

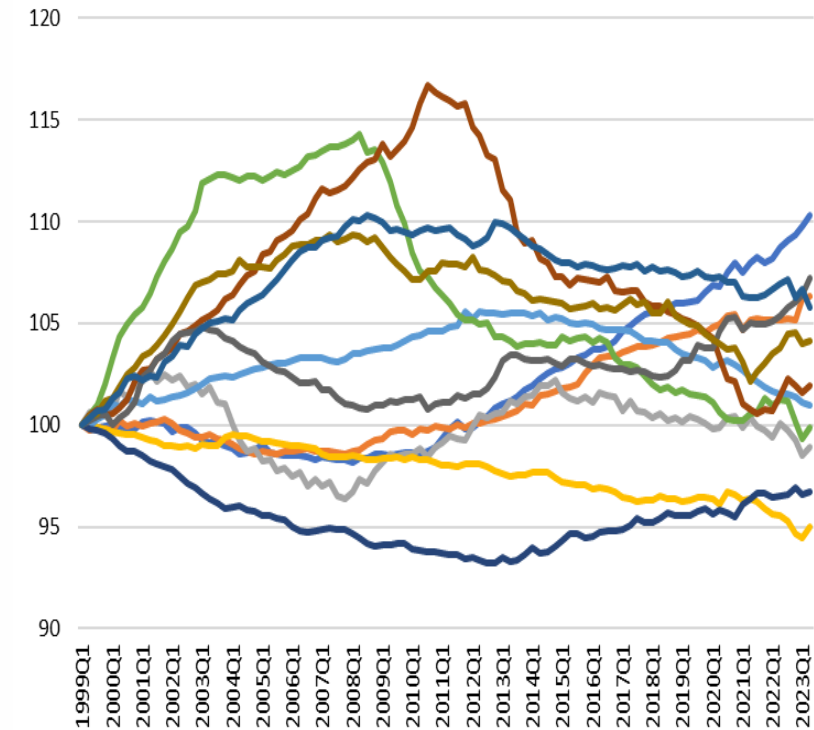
Government Debt (share of GDP)



Core Inflation (YoY)



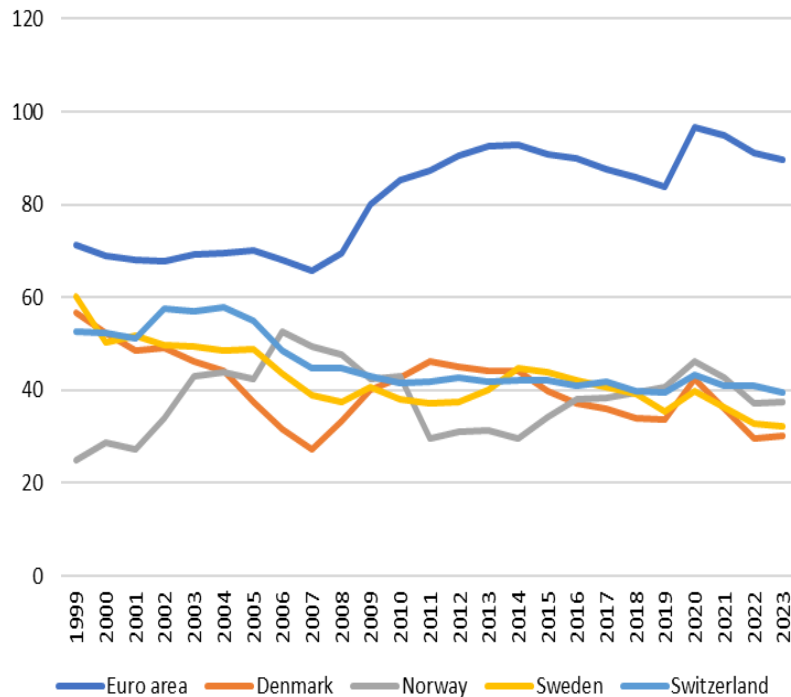
Relative Price (relative to EA aggregate)



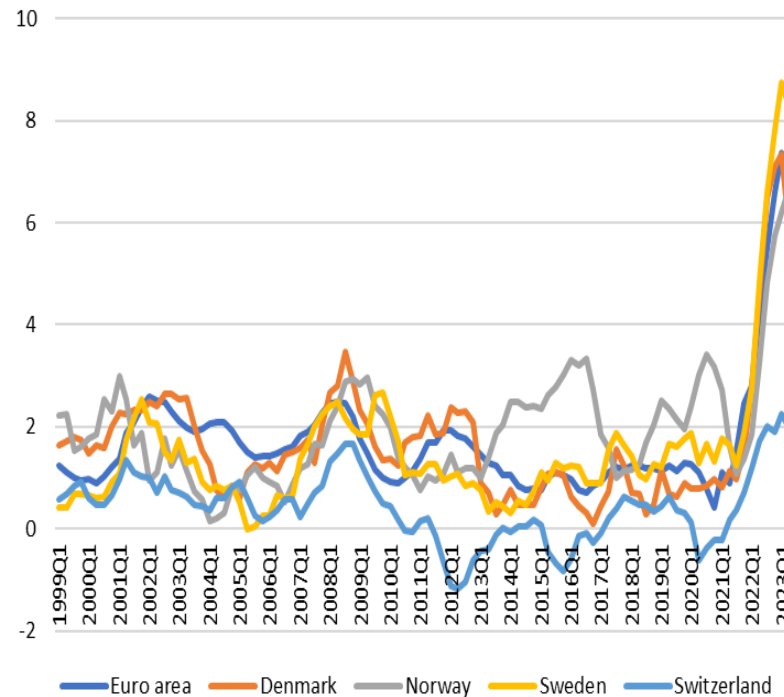
Some evidence for non-EA Countries...

- Small open advanced non-EA countries has had much more favorable (and similar) gov't debt dynamics than EA.
- Despite this, Inflation surged in 2021 in all countries except Switzerland, which has a disconnected energy market.
- Suggest that Gov't debt and FTPL is not key to understand inflation surge in 2021.

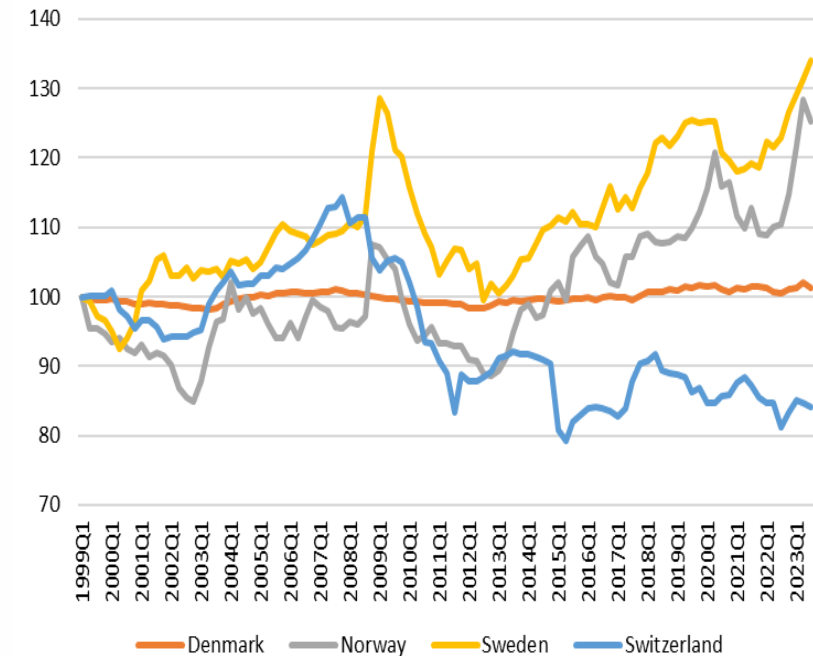
Government Debt (share of GDP)



Core Inflation (YoY)



Real Exchange Rate v.s. EA
(consumer-based: 1999Q1=100)



2. Challenges: Cross-country Linkages

Accounting for Comovement and Spillovers

- Difficult to account for strong spillovers via trade and financial linkages in DSGE models.
 - Between advanced economies (today, pressing issue is inflation spillovers).
 - From advanced to emerging markets.
- A couple of examples of how strong these spillovers are:
 - EA – Sweden: Infl (YoY) 0.44; GDP gr (YoY) 0.80; Pol Rates 0.94;
 - US – Canada: Infl (YoY) 0.61; GDP gr (YoY) 0.86 ; Pol Rates 0.94;
- In addition, impact is quantitatively large, beta of SWE on EA GDP gr rate equals 1.5. So not just correlation, but also comovement.
- Semi-structural models may be helpful.

2. Challenges: Top-down versus Bottom-up

Merits of Top-down versus Bottom-up...

- The primary objective of the European Central Bank, set out in Article 127(1) of the Treaty on the Functioning of the European Union, is to maintain price stability within the Eurozone.
 - Mandate says nothing about the distribution of inflation between member countries.
- Thus, ECB could do forecasts and policy advice based on euro area aggregates only, i.e. adopt a **Top-Down approach (NAWN II)**.
- But a **Bottom-Up approach (ECB-MC)**, merging forecasts and transmission of policy from member countries may perform better...
- A further comparison of the two approaches would be interesting, Section 3.2.
- DSGEs seem suitable for top-down, semi-structural may be better for bottom-up.
- Financial fragilities in parts of the CU may necessitate a multi-country model.

3. Final Thoughts

Final Thoughts...

- ECB staff has developed an important arsenal of tools to support policy advice.
- I have tried to point to some areas where further work may be valueable.
- Argue that many of these issues best addressed with structural models, so key role for DSGE models in the foreseeable future.

Thank you!