Main advances in macro modelling for monetary policy preparation at the ECB

Seventh BIS Research Network Meeting
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* The views expressed in this presentation are those of the presenter and do not necessarily reflect those of the ECB or the Eurosystem.
A Modelling challenges in post crisis environment

B Addressing the modelling challenges

C ECB modelling portfolio for monetary policy preparation: a multi-pronged strategy
A  Modelling challenges in post crisis environment

B  Addressing the modelling challenges

C  ECB modelling portfolio for monetary policy preparation: a multi-pronged strategy
- The financial and sovereign debt crises have posed **challenges to the economic and econometric models** that had been predominantly used in the economics profession, with the ECB being no exception.

- All central banks have been affected by the near **absence of financial markets** in aggregate models of the economy and the separation between economic and financial econometric models, i.e. the **neglect of macro-financial linkages**.

- Over recent years, there have been substantial modelling efforts at the ECB to **adapt or develop models** by incorporating:
  - a variety of financial channels and frictions
  - more granularity in terms of sectors and agents
  - interactions among a number of policy tools
  - multi-country dimension
A  Modelling challenges in post crisis environment

B  Addressing the modelling challenges

C  ECB modelling portfolio for monetary policy preparation: a multi-pronged strategy
One or many models?

- No aspiration to build a model that includes everything
- Need for continuity in the assessment while keeping changing and including new channels and frictions
- Resonance or dissonance between academic research and modelling at policy institutions?

<table>
<thead>
<tr>
<th>Academic research</th>
<th>Policy modelling</th>
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<tbody>
<tr>
<td>Simple and stylised</td>
<td>Realistic and granular</td>
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<tr>
<td>Deep theoretical foundations</td>
<td>Robust to structural uncertainty</td>
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<td>Original and strong policy</td>
<td>Continuity and consistency with policy paradigm</td>
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<td>prescriptions</td>
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• **ECB approach**: develop and maintain a portfolio of **MAIN** model(s) interacting with a range of **SATELLITE** models
A Modelling challenges in post crisis environment

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C ECB modelling portfolio for monetary policy preparation: a multi-pronged strategy
ECB modelling portfolio for monetary policy preparation

**DSGE**
- NAWM I/II
- Macro-financial incl. CMR/3D/DKR
- Fiscal
- Labour market/structural
- Global economy incl. ECB-Global/EAGLE

**Semi-structural**
- NMCM
- ECB-MC
- Sectoral
- Supply-side attractors
- Stance indicators

**Time-series**
- EA/Multi-country BVARs
- Nowcasting
  - Short-term Forecasting
- Macro-financial incl. FCIs/yield curve

**MAIN models**

**SATELLITE models**
- Introduction of a long-term rate and a lending rate
  - long-term rate via expectation theory
  - lending rate as combination of short- and long-term rate

- Indirect approach to non-standard monetary (NSM) policy:
  - use of satellite models to evaluate impact of NSM on various interest rates
  - simulation of these rate changes in NAWM I

- Scenario and risk analysis at the effective lower bound on interest rates:
  - various forms of forward guidance
  - deflation and recession probabilities based on model’s predictive distributions
  - imperfect credibility and de-anchoring of inflation expectations
The NAWM II now features a rich financial intermediary sector:

- permits to study how shocks originating in the financial sector transmit to the real economy and contribute to business-cycle fluctuations
- accounts for the prominent role of bank lending rates in the transmission of monetary policy operations
- allows non-standard monetary policy measures – including large scale asset purchase programmes – to have a meaningful role in affecting the economy

The NAWM II is at the stage of completion and currently being integrated in the monetary policy preparation process.
| ECB modelling portfolio for monetary policy preparation |

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<th><strong>Semi-structural</strong></th>
<th><strong>Time-series</strong></th>
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MAIN models

SATELLITE models

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The NMCM is a multi-country model, with five country blocks (DE, ES, FR, and NL) linked via trade, common monetary policy and common exchange rate.

The institutional framework of the ECB’s forecasting process:

- bottom-up approach: *individual country forecasts*
- ECB (Mar. and Sept.) and NCB staff (Jun. and Dec)
- forecasts conditional on technical assumptions based on satellite models
- judgmental forecasts

The financial and sovereign debt crises further revealed the importance of the *country dimension* and the benefits of *flexible semi-structural models*.

In response to the crises, the existing NMCM was re-estimated and partly adapted, before a decision was taken to more fundamentally revamp the ECB’s multi-country modelling.
The main goals in developing a new version of the multi-country model:

- taking into account the **multi-country dimension**, also on the financial side
- accounting for **multiple channels** of monetary policy transmission and featuring a realistic magnitude and articulation of the transmission of shocks
- good **forecasting performance**
- adaptable **user-friendly** model & infrastructure (main forecasting model)

A semi-structural approach along the lines of FRB-US:

- **theory-based** but **less stringent** than a DSGE model
- **good empirical fit**, with empirical regularities matched in a reliable way
- **flexible framework**: more granularity in the coverage of variables; more straightforward to include multi-country dimension; easier to link with other in-house tools, new mechanism can be introduced more swiftly
ECB modelling portfolio for monetary policy preparation

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- **MAIN models**
- **SATELLITE models**
Enhance the suite of time-series models for the euro area and for the large euro area countries:

- BVARs for cross-checking the official economic projections along selected conditional dimensions
- Providing time-series benchmarks on sectoral and cross-country regularities for the semi-structural models (ECB-MC)
- Nowcasting and short-term forecasting frameworks

Enrich the suite of models by incorporating transmission channels to assess the impact of non-standard monetary policy measures NSMs:

- Refining and broadening the set of identification strategies for NSMs in (B)VAR analysis

Account for non-linearity in macroeconomic propagation as well as uncertainty in long-term attractors:

- Non-linear/TVP time-series framework for sectoral and risks analysis
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**MAIN models**

**SATELLITE models**

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Estimated/calibrated models with both demand and supply-side credit frictions, based on “first principles” in macro but major deviations from pre-crisis paradigm:

- bank capital channel, incentives for excessive credit and regulatory constraints
- sovereign-banking nexus and funding access of banks
- credit frictions for both households and firms
- default as a credible characterization of financial instability, not only for banks but also non-financial corporations and households (“3D”)
- both for euro area and multi-country settings

Those models can provide a monetary policy perspective on regulatory, supervisory and macroprudential interventions

- transitional costs of higher bank capital ratios through the euro area: Bank deleveraging process which adversely constrained the provision of credit
- long-term cost and benefits of capital regulation:
  - risk-sensitivity of bank liabilities
  - fiscal consequences of bank fragility
- strategic complementarities between MP and MaPru (capital versus asset based, untargeted versus targeted)
MAIN models:


SATELLITE models: