Panel Discussion:

Central Bank Forecasting During the Crisis

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The views expressed here are my own and not necessarily those of the European Central Bank.
Introduction

- About 3 years since the onset of the crisis:
  - key role of financial factors in triggering, propagating and subsequently amplifying the downturn
  - other non-financial factors such as the collapse of trade and the deterioration of confidence also very important

- How has (central bank) forecasting fared?
  - short-term forecasting tools failed to reliably inform on the current state of the economy (GDP nowcast/backcast)
  - medium-term forecasts not successful in identifying the size, persistence and propagation of ‘shocks’ (incl. adverse feedback loops)
Euro area real GDP forecasts for 2008Q4 (quarterly growth rates)

Note: Estimates and ‘news analysis’ based on the dynamic factor model of Banbura (2010).
Challenges for central bank forecasting

• The crisis has revealed short-comings of both reduced-form tools and structural models:
  – predictive failure of short-term forecasting tools:
    • estimated over stationary environments with strong mean reversion in growth dynamics
    • neglect of possible non-linearities
  – criticism of DSGE models (applicable to traditional models too):
    • limited role of financial sector and international spillovers
    • unrealistic assumptions such as rationality/linearity

• Yet tools and models remain useful, in particular regarding their interpretative (as opposed to predictive) role.
The New Area-Wide Model (NAWM) is the main aggregative tool used in the ECB staff projections:

- medium-size open-economy DSGE model of the euro area with nominal and real frictions
- closed-economy structure close to Smets-Wouters model (AER, 2007)
- euro area’s external environment modelled as (almost) exogenous 5-variable SVAR
- no explicit financial sector, but domestic and external risk premium shocks
- model estimated on time series for 18 key macro variables (cf. ECB WP 944, 2008)
The NAWM has helped to interpret economic developments as they unfolded:

- strong role of foreign shocks during downturn and subsequent recovery
- prolonged negative impact of demand shocks (reflecting a rise in risk premia)
- negative impact on potential reflected in adverse technology shocks
- price/wage rigidities hampered the recovery (markup shocks)
- monetary policy shocks contributed positively to the recovery
Enhancing structural forecasting models

• The crisis has provided strong impetus to further model developments:
  – enriching the financial sector (incl. intermediaries)
  – modelling the ZLB and non-standard policy measures
  – relaxing strong assumptions such as rationality or linearity
  – ...

• The challenge will be to expand models both meaningfully and tractably:
  – an all-encompassing model is neither feasible (data/practical limitations) nor desirable (need to understand its properties)
  – there is a case for maintaining a core ‘work horse model’ complemented by ‘satellite models’
• Potential value in the application of forecast combination techniques:
  – increasing overall forecasting performance
  – hedging against poor performance of any given model
  – using performance-based weights (difficult in crises times)

• Combination of structural models with conjunctural indicators available in real time:
  – Giannone et al. (2010) offers an elegant solution for bridging non-synchronised releases of monthly data with observed data of a quarterly structural model

• Combination of structural models with survey data
Can non-linear models be helpful?

• **Possible changes in economic relationships, in the transmission of shocks and of policies during crises:**
  
  – *financial factors*: adverse feedback loops between the financial and the real sector
    
    • lasting deterioration in balance sheets or changes in agents’ attitude towards risks
    
    • may have given rise to switches in regime
  
  – *non-financial factors*: collapse in global trade/inventories may have affected business-cycle dynamics

• Typically good fit in sample, but mixed pre-crisis evidence on out-of-sample forecasting performance.
A markov-switching BVAR for the US

Probability of high financial stress regime

Asian and Russian crisis

Effects of S&L crisis

Stock market downturn, dot-com bubble bursting

Sep 2007

Sept 2008: Lehman bankruptcy

Source: Hubrich and Tetlow (2010). In sample analysis.
• Expert judgement is an important element of central bank forecasting:
  – captures information from other sources, knowledge about unusual shocks and variables/factors not included in the forecasting models
  – received more weight in times of crisis with rapidly unfolding events that take time to appear in the data

• There is a need to discipline formation of judgement:
  – support by selected data and tools (e.g. use of ECB’s Bank Lending Survey to calibrate possible credit-supply effects)
  – comparison with historical episodes of financial crises
Uncertainty and risks

• There are intrinsic limitations on the scope for improving point forecasts, notably during crises episodes.

• A strong emphasis should be placed on quantifying forecast uncertainty and risks:
  – models should be able to provide measures of uncertainty (based on their predictive densities), along with point forecasts
  – models should be able to provide probabilistic indicators highlighting the likelihood of certain events (e.g. of ‘recession’ and ‘deflation’)

• Similarly, emphasis should be given to scenario analysis of, inter alia, low-probability high-impact events.
NAWM-based predictive densities

**Consumer price inflation**
(annual rates, in percent)

**Real GDP growth**
(annual rates, in percent)

- The risk of deflation (defined as observing 4 consecutive periods of negative inflation) is heightened, albeit temporary.
- The densities are skewed to the downside as the lower bound on the short-term nominal interest rate is occasionally binding.
A shift in long-term inflation expectations

Consumer price inflation

Real GDP growth

3-month nominal interest rate

Perceived inflation objective
Conclusion

- **Central bank forecasting during the crisis:**
  - extraordinary period with large and persistent shocks
  - difficult to forecast with models built for normal times, also when including judgement

- **Ways forward:**
  - extend existing/develop new models where appropriate (with a focus on financial factors)
  - assess uncertainty and risks around point forecasts (incl. low-probability high-impact events)
  - explore forecast and model combination techniques