

Panel Discussion:

Central Bank Forecasting During the Crisis

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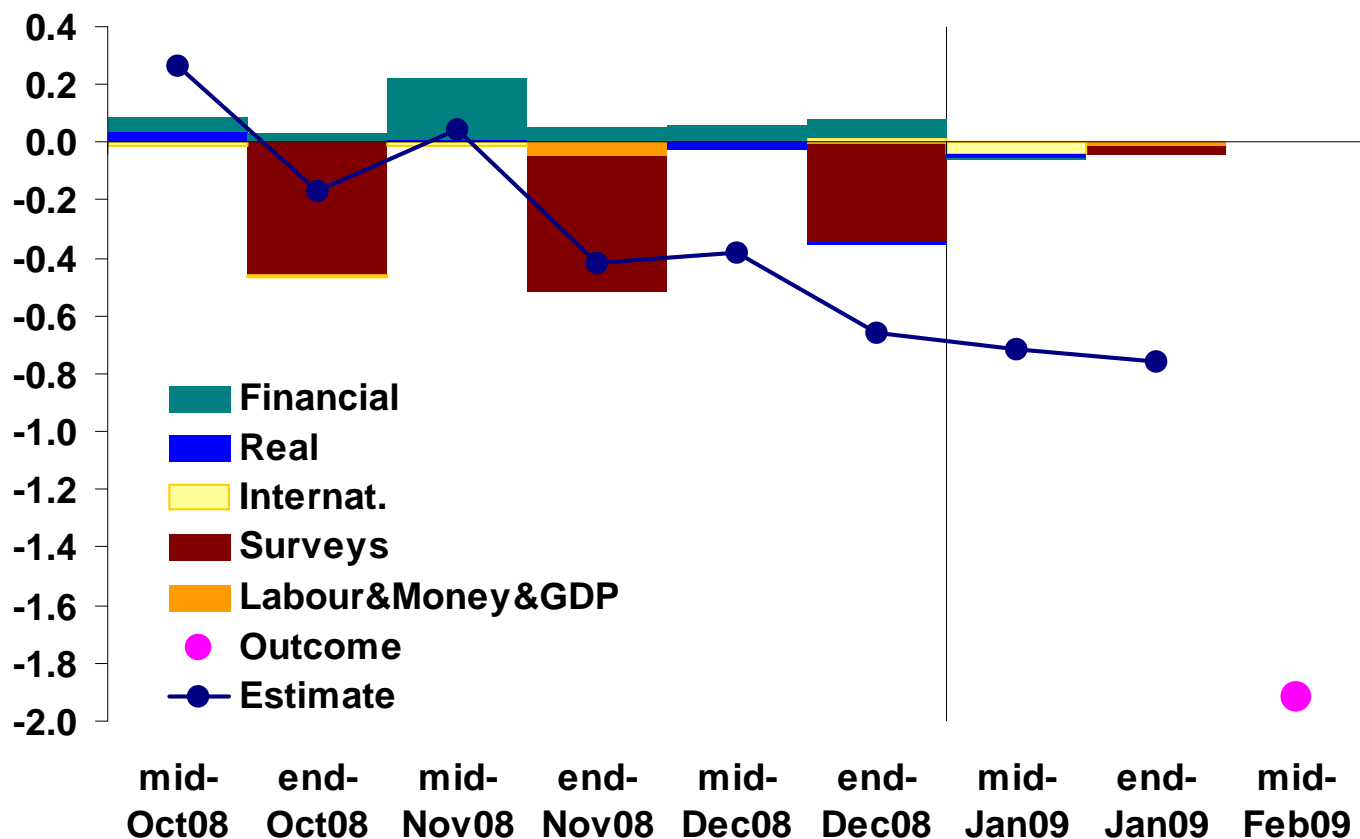
The views expressed here are my own and not necessarily those of the European Central Bank.

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)

Substantial short-term forecast errors

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

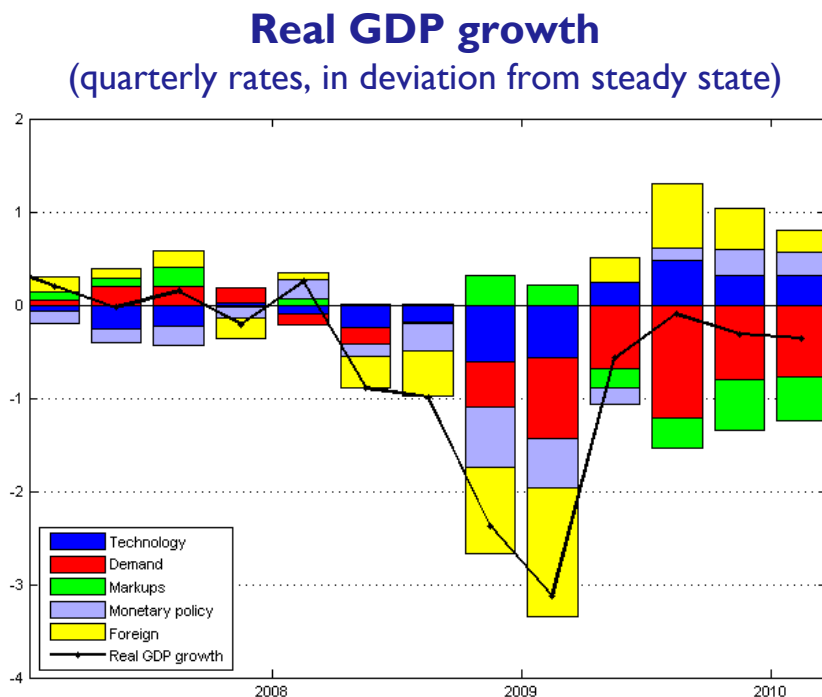
- **The crisis has revealed short-comings of both reduced-form tools and structural models:**
 - **predictive failure of short-term forecasting tools:**
 - estimated over stationary environments with strong mean reversion in growth dynamics
 - neglect of possible non-linearities
 - **criticism of DSGE 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 ECB's New Area-Wide Model

- **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)**

Structural interpretation of crisis period

- **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’

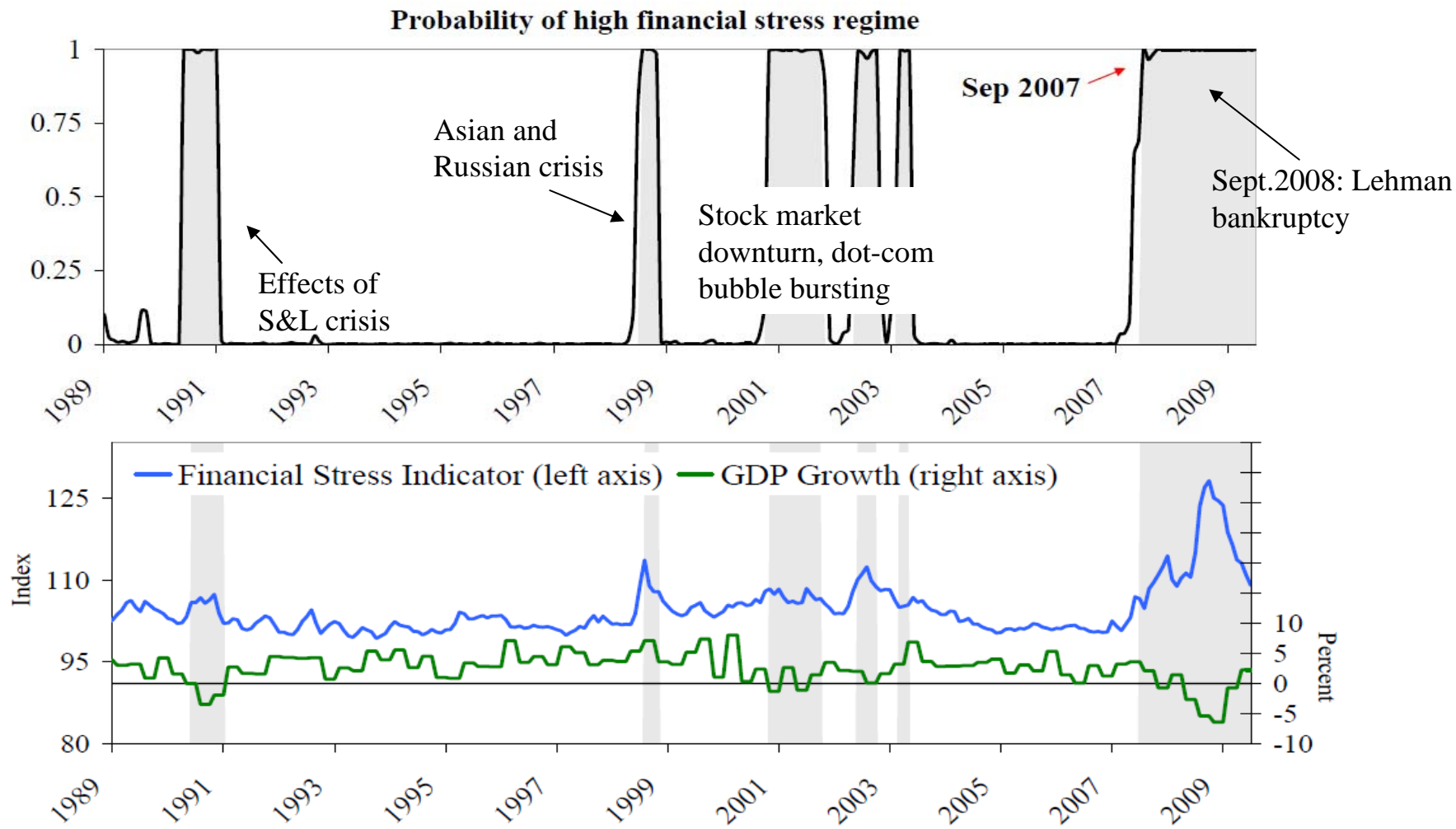
Forecast and model combination

- **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



Source: *Hubrich and Tetlow (2010). In sample analysis.*

Which role for judgement?

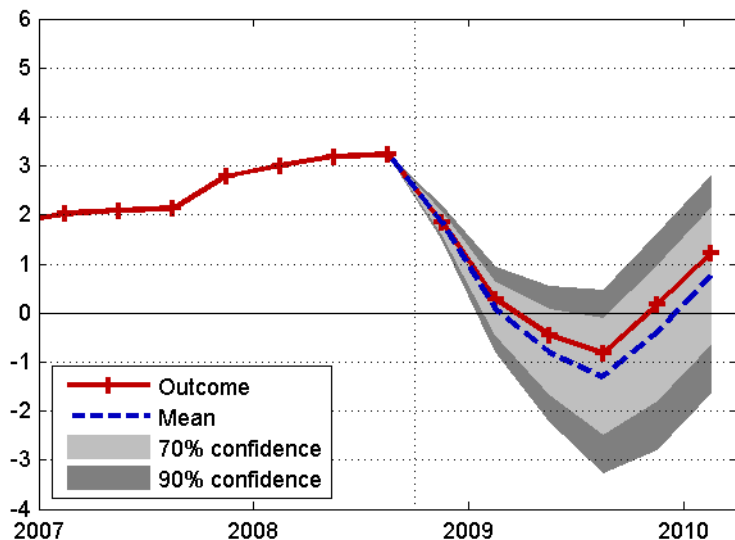
- **Expert judgement is an important element of central bank forecasting:**
 - captures information from other sources, knowledge about unusual shocks and variables/factors not included in the forecasting models
 - received more weight in times of crisis with rapidly unfolding events that take time to 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

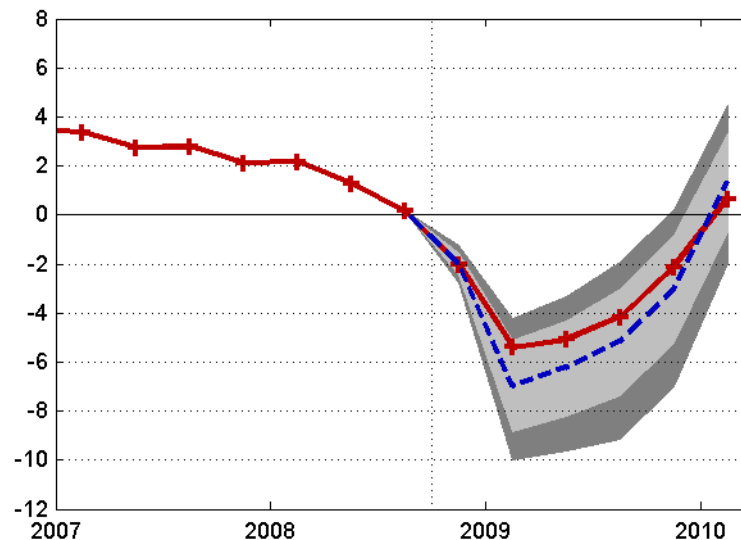
- **There are intrinsic limitations on the scope for improving point forecasts, notably during crises episodes.**
- **A strong emphasis should be placed on quantifying forecast uncertainty and risks:**
 - **models should be able to provide *measures of uncertainty* (based on their predictive densities), 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)



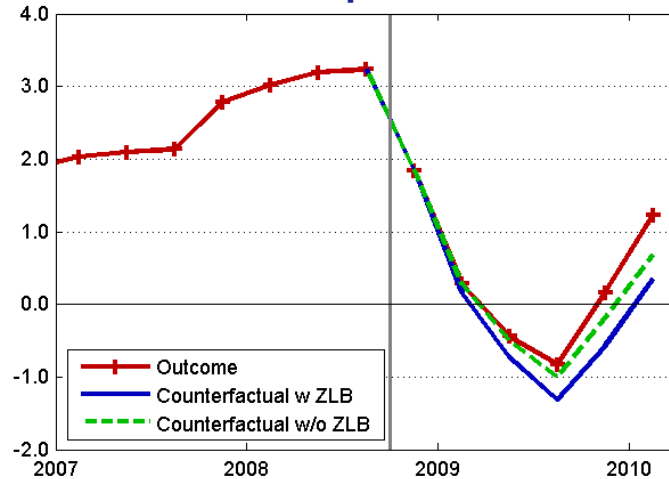
Real GDP growth
(annual rates, in percent)



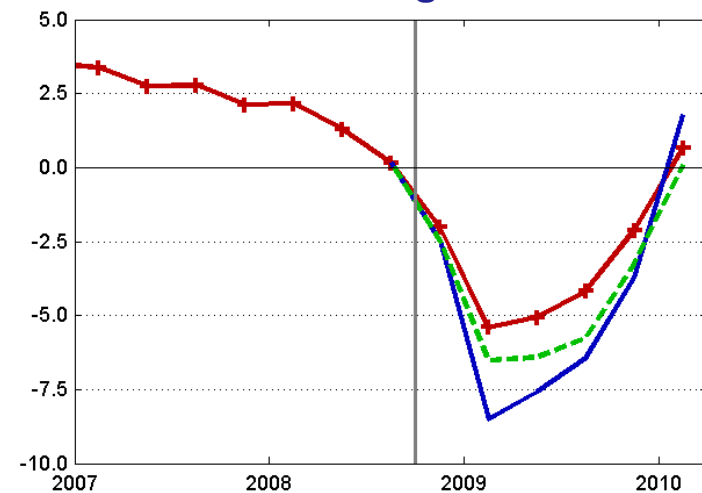
- **The risk of deflation (defined as observing 4 consecutive periods of negative inflation) is heightened, albeit temporary.**
- **The densities are skewed to the downside as the lower bound on the short-term nominal interest rate is occasionally binding.**

A shift in long-term inflation expectations

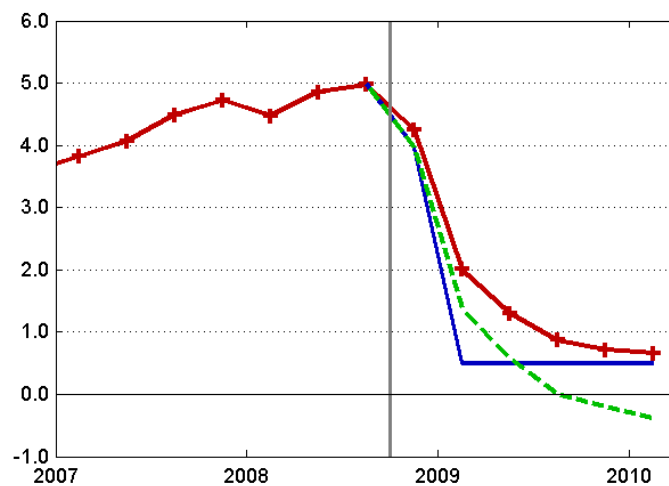
Consumer price inflation



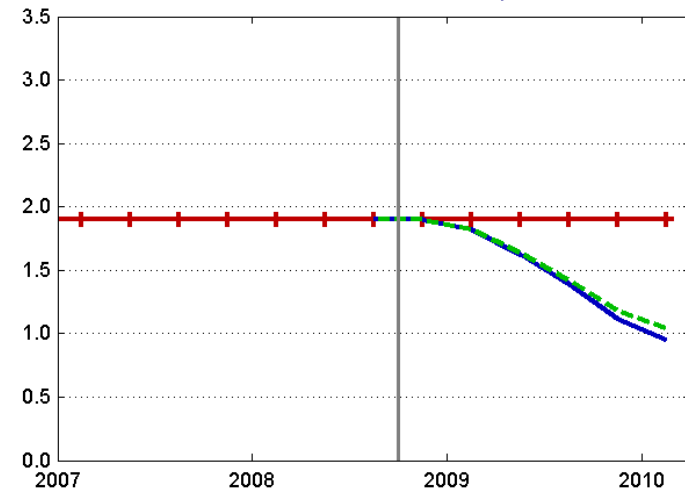
Real GDP growth



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