Nowcasting Czech GDP in Real Time

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* The views expressed are those of the author and do not necessarily reflect those of the ECB.

Now-casting

The paper contributes to the literature on short-term forecasting/now-casting:
$\Rightarrow$ *forecasting with very low, possibly negative, forecast horizon*

Relevant in economics: key variables released at low frequency and with long publication delays

- GDP: first estimate released a few weeks after the end of the reference quarter; US: 4 weeks; EA: 6 weeks;
- Possibly other variables of interest: employment, GDP expenditure components, fiscal variables; released even later; also CPI/HICP;

Beyond the short-term - important to have a good starting point for longer-horizon forecasts.

Many now-casters

- Market participants
  - Closely monitor macroeconomic data to get a view on current and future fundamentals
  - Form expectations: for the headlines of the macroeconomic reports these are collected up to the day before the actual release of the indicator and distributed by data providers (e.g. Bloomberg)
  - When realizations are different than these expectations, that is when the news are sizeable, the view of the market changes and this leads to changes in asset prices (see Boyd, Hu, and Jagannathan, 2005; Flannery and Protopapadakis, 2002).
- Central banks and other policy institutions (Fed, ECB, IMF, OECD, ...)
  - Now-casts are part of conjuntural assessment - what do data releases tell us about the state of the economy
  - Now-casts can be used as starting points for longer-term forecasts

Now-casting, some features

KEY: Exploitation of early releases throughout the quarter (real time data-flow)

Particular to now-casting - features of information set:

- it contains mixed frequency series
  possibly daily, weekly, monthly, quarterly, ..., stocks and flows
- it has a “ragged” or “jagged edge”
  publication lags differing across series
- it could be large

Now-casting literature ...

... has grown considerably over the last 10 years.

Variety of models:

1. Partial models
   - **Bridge equations**
   - MIDAS
   - Factor MIDAS
2. Joint models
   - **Dynamic factor models**
   - Vector auto regressions

See e.g. Bańbura, Giannone and Reichlin (2011) and Bańbura, Giannone, Modugno and Reichlin (2013) for a review of the literature.

Such models have been implemented in many central banks around the world.

General conclusions from the literature

Now-casting makes sense:

- Short-term forecasting is important
  Forecastability and starting conditions
- Timely information matters
  Accuracy improves as more info arrives. Soft data are important due to timeliness.
- Possible to obtain “mechanical” forecasts that are no worse than judgmental
  Also during a crisis?
- Model based now-casts offer advantages
  Speed, costs, uncertainty measures, systematic interpretation of *news*
- Methodology works for different data sets; not necessarily large data sets

Now-casting Czech GDP in real time

Interesting elements:

- Small open economy

  Data selection is country specific; no satisfactory automatic data selection techniques exist (timeliness vs information content)

  Here: **importance of the external sector; surveys less relevant**

- Real-time forecast evaluation exercise

  Most of the applications in the literature based on pseudo real-time evaluations

  But revisions during the crisis could be large and cross-correlated

- Comparison with institutional forecast

  Truly real-time evaluation, as here, is needed.

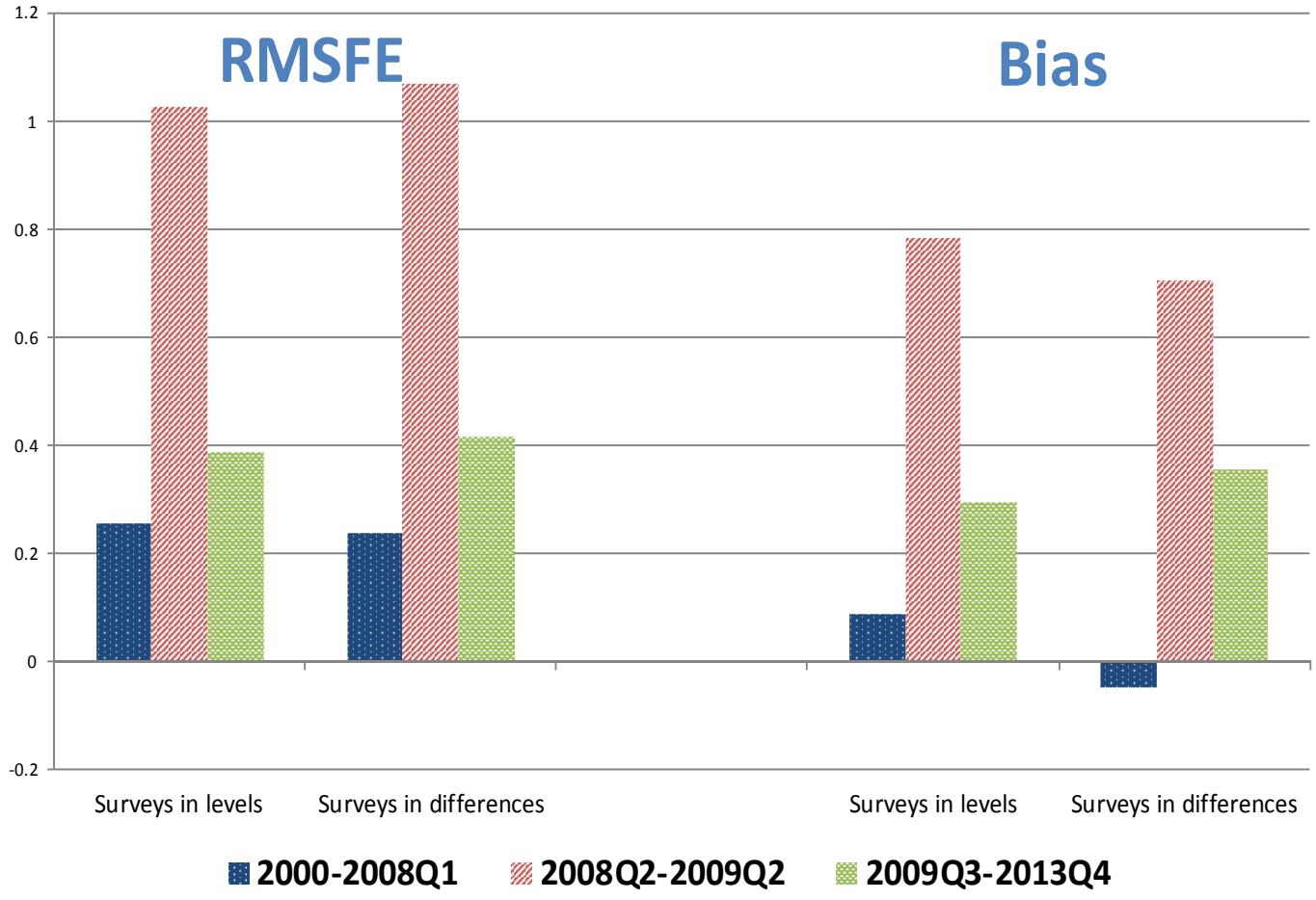
Well executed and written paper.

Now-casting after the crisis

- The performance of the models deteriorated
- Need to account for potential structural breaks
- Need to account for uncertainty

Forecact accuracy of a DFM for the euro area

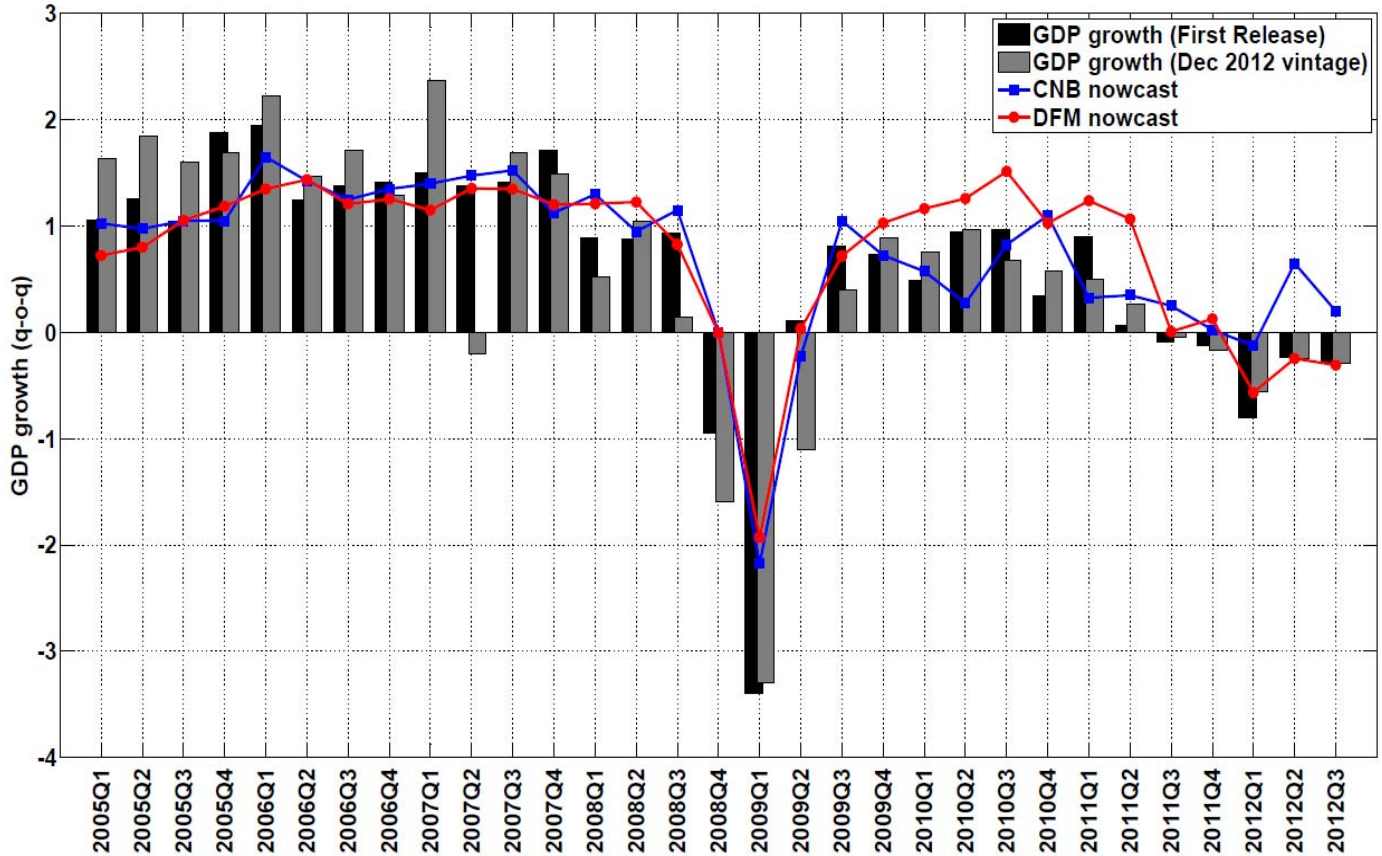
Model of Bańbura and Rünstler (2011)



Now-cast for Czech GDP

From the paper

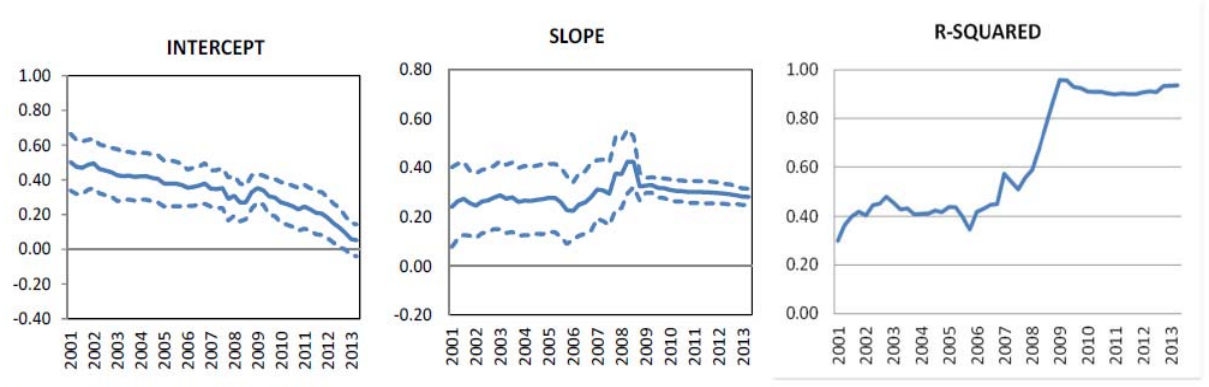
Figure 4: Quarterly GDP Growth and its Nowcasts as of Q(0)M3 end



Investigating the now-cast bias in the euro area

The relationship between euro area real GDP growth and economic indicators has changed since the crisis.

Coefficients and R2 in the bridge equation of GDP on industrial production



Sources: Eurostat and author's calculations.

Based on joint work with L. Saiz

Possible sources of the structural break

Possible factor behind downward trend in the intercept – different patterns in sectoral VA developments.

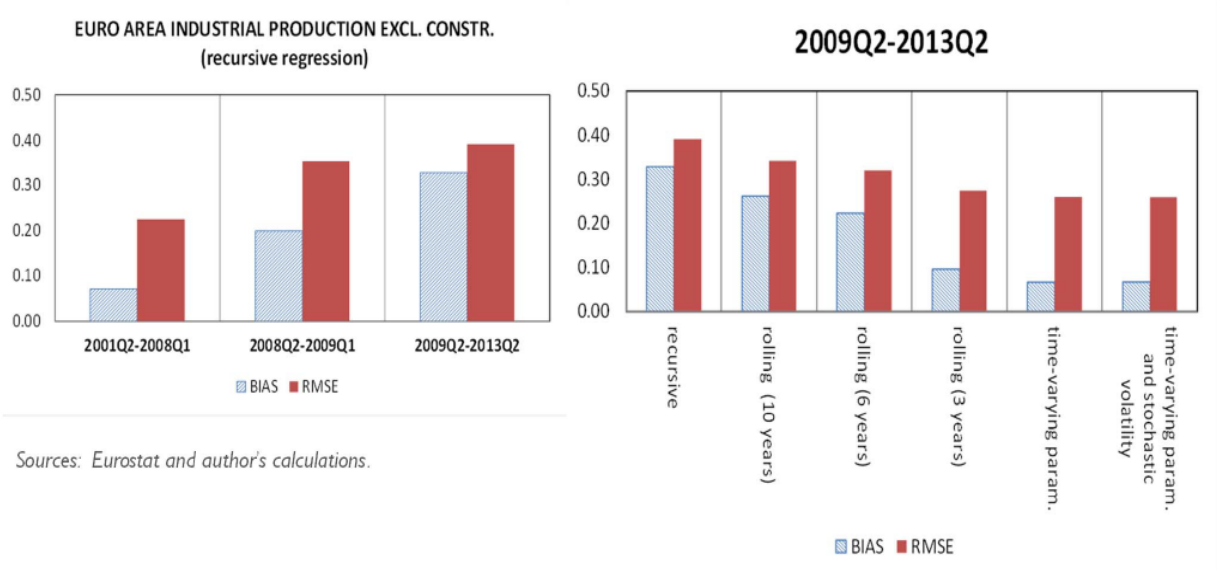
	Share in total value added		Total value added, growth rate	Contributions		Intercept in GDP-IP eq.
	Industry excl. constr.	Remainder		Industry excl. constr.	Remainder	
2000Q1-2008Q1	20.4	79.6	0.5	**0.1**	**0.4**	0.4
2009Q2-2013Q2	19.3	80.7	0.2	**0.1**	**0.1**	0.0

Sources: Eurostat and author's calculations.

- **Share of non-industrial sector has been growing over time**
- ***But* very different patterns in *growth rates*:**
  - **Industry: sharp drop during the crisis and stronger recovery**
  - **Remainder: weaker drop and weaker recovery**
- **Has consequences when one looks at the growth rates:**
  - **Lower relative contribution of the 'remainder' to the total value added growth rate since 2009**
- **As the 'remainder' is the intercept (plus error) in the GDP-IP regression → structural break in the intercept**

Potential solutions

Structural breaks are typical cause of deterioration in the forecast performance.



Sources: Eurostat and author's calculations.

- **They seem to be causing the upward bias and deterioration of the forecast accuracy when forecasting (1-quarter ahead) euro area GDP growth over the period 2009Q2-2013Q2....**
- **... as shortening the estimation samples or including time varying parameters help to reduce the upward bias and improve forecast accuracy.**

Some recent problems and contributions

- How to use new sources of information

  e.g. Google search volumes, Schmidt and Vosen (2011); payments data, Esteves, (2009); daily data, Andreou et al (2013), Bańbura et al (2013)
- Density nowcasts

  Aastveit et al (2011), Mitchell, Mazzi and Montana (2010)
- Bayesian estimation and stochastic volatility

  Marcellino, Porqueddu and Venditti (2012), Carriero, Clark and Marcellino (2012)
- Time-varying and non-linear models

  Guerin and Marcellino (2013), Carriero, Clark and Marcellino (2012)
- Nowcasting with mixed-frequency Bayesian VARs

  Song and Schorfheide (2013)
- Bridge now-cast and DSGE models

  Giannone, Modugno, Monti and Reichlin (2012)