

The Nowcasting Lab: GDP Forecasting and True Out-of-Sample Model Testing in Real Time

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Nowcasting Lab project group @ KOF, ETHZ

- Senior researchers, postdocs and Ph.D. students at KOF
- ▶ Academic research on macroeconomic now-/forecasting methods
- ▶ Use of now-/forecasting models also in policy-related work

Motivation

Experience 1:

- Policy makers, financial sector, media, e.g., demand near real-time assessments of the current and future state of the economy.
- Research institutes, central banks, international organizations, banks, e.g., use models internally (with few exceptions).
- Projections enter – or “disappear” in – a broader forecast process, which is usually published at a low frequency (monthly, quarterly or half-yearly).

Motivation (continued)

Experience 2:

- Short-term projection models as input for quarterly macroeconomic forecasting process
- But: Actual relevance of the nowcasts/short-term forecasts sometimes depends on discretionary decisions during the process.

Experience 3:

- Nowcasting models often work nicely in the empirical applications of published academic papers.
- However, they might work less well when applied to new and unknown data.
- True out-of-sample testing of forecasting models is lengthy, costly and thus, very rare.

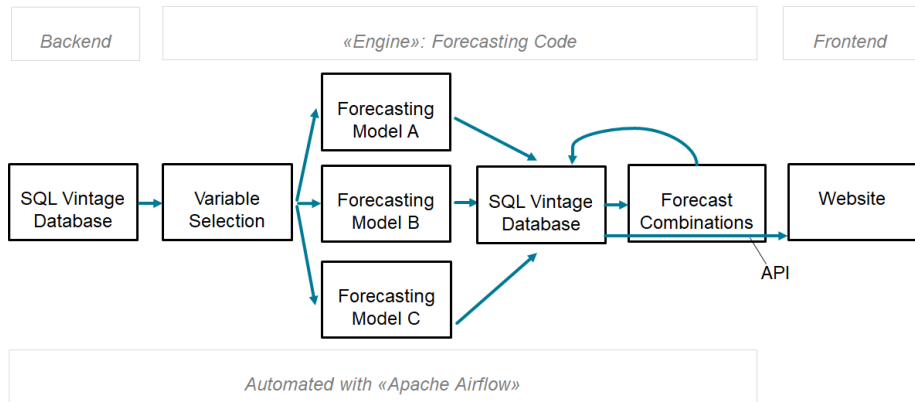
Automated code-database-website environment

- Nowcasts and one-quarter ahead forecasts for quarterly GDP growth
 - ▶ Extension to other variables as an option for the future
- Several European economies
 - ▶ Currently: Euro Area, Germany, France, Italy, Spain, United Kingdom, Netherlands, Switzerland, Austria, Poland, Sweden, Belgium, Portugal
- Several widely accepted nowcasting models
- Large dataset
 - ▶ Around 250 daily and monthly macroeconomic and financial predictor time series per country
- Daily (overnight) update
 - ▶ Intra-day update possible

Transparency

- Transparency on models and methods
- Transparency on data
- Now-/forecasts always up to date, i.e. as close to real time as possible
- Transparency on now-/forecasts (e.g., drivers of forecast updates)
- No judgement
- No ex-post adaptations

Technical structure



Models

Bridge

- Single-predictor Bridge equations model as described in Schumacher (2016)

MIDAS

- Autoregressive single-predictor mixed data sampling (MIDAS) model following, e.g., Ghysels et al. (2007) or Clements and Galvão (2008)

UMIDAS

- Autoregressive single-predictor unrestricted MIDAS model as described in Forni et al. (2015)

MF-DFM

- Mixed-frequency dynamic factor model as described in Bok et al. (2018) which elaborates on Bańbura et al. (2011).

Transformations and variable selection

- Input time series are transformed in multiple ways as optimal transformation is a priori unknown.
- Upstream of all models: Elastic net variable selection along the lines of Zou and Hastie (2005).
 - ▶ MIDAS, UMIDAS and DFM: Mixed-frequency version as in Siliverstovs (2017).
 - ▶ MF-DFM: Restriction to a maximum of 20 variables

Forecast combinations

- Bridge, MIDAS and UMIDAS: unweighted averaging of (pre-selected) single-predictor forecasts
 - ▶ Once real-time forecast history is long enough: Weighted averaging forecast combinations procedure as described in, e.g., Kuzin et al. (2013) or Timmermann (2006)
- Pooled projection over the projections from the four model classes (Bridge, MIDAS, UMIDAS, MF-DFM) with equal weights

The Nowcasting Lab website

<https://www.nowcastinglab.org>

Two ways of seeing the Nowcasting Lab

For practitioners:

- A website that supports daily forecasting work in, e.g., research institutes, central banks, ministries, international organizations

For researchers:

- A real-time testing platform for short-term forecasting models in academic research

Support for daily forecasting work

Macroeconomic forecasters in public institutions:

- Model skills and data knowledge exist
- But: Often no time and resources to implement and maintain forecasting models for all covered countries
- ▶ Can use the Nowcasting Lab as an extended arm for their own forecasting work and for benchmarking

Support for academic research

Macroeconomic forecasters in academia:

- Model skills and data knowledge exist
- But: Models often designed for specific academic applications and not practical for general use
- ▶ Can use the Nowcasting Lab as a testing platform for their own forecasting models under true out-of-sample conditions.

Related projects

Up-to-date macroeconomic short-term projections on a website:

- Atlanta Fed GDPNow model (Higgins, 2014)
- New York Fed Nowcasting Report (Bok et al., 2018)
- Now-Casting.com
- High-frequency business cycle indices during COVID-19:
 - ▶ USA: Lewis et al. (2020)
 - ▶ Germany: Eraslan and Götz (2020)
 - ▶ Switzerland: Wegmüller et al. (2021) and Eckert et al. (2020)
 - ▶ Austria: Fenz and Stix (2021)
 - ▶ Czech Republic: Adam et al. (2021)
 - ▶ OECD countries: Woloszko (2020)

Contribution

- Daily updated forecasts
- Model plurality
- Daily-vintage real-time database for several countries
- True out-of-sample environment

Other aspects:

- Automatization: Completely machine-driven process
- Accessibility: Address different target groups
- Transparency: Openly communicate methods
- Reproducibility: Store model specifications and results
- Timeliness: Publish results timely on website

Further developments of the lab

- Integration of additional countries (USA, Bulgaria, Romania, Hungary)
- Integration of additional forecasting models
- Inclusion of a true out-of-sample forecast evaluation tool
- Cooperation with other researchers and institutes as partners

Goals

- Become a reliable platform for GDP now- and short-term forecasting
- Provide a daily vintage real-time database for several countries
- Establish a true out-of-sample testing platform for forecasting precision
- Invite researchers to jointly extend the Nowcasting Lab



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