Project Description

Methods of Macroeconomic Forecasting

Autumn 2025

1 Concept

In small groups (2-3 people), you will work on a forecasting exercise, applying the methods studied in class. The goal is for you to design, implement, and critically assess multivariate forecasting models and to gain experience in communicating your results to both a technical and policy making audience.

Each project focuses on one particular model discussed in class. Your task will be to implement this model and forecast key macroeconomic variables (gdp growth, inflation, exchange rate) using Swiss data. In your presentation, you will need to present your results and discuss the impact of your forecasting exercise on policy making.

An important part of both academic research and forecasting within a policy making context is reproducibility and the possibility for peers to comprehend your work, but also to collaborate. Hence, we expect you to **make your code publicly available in a GitHub repository**. In particular, **we require each team member to have at least two meaningful commits pushed to your group's GitHub repository**, so that everyone has contributed to the project.

2 Forecast Specifications

Independent of the method you choose to work on, your forecasting exercise should be based on the following specifications.

- **Variables to forecast:** GDP growth, inflation, exchange rates.
- **Forecast horizon:** 1-step ahead and 1-year ahead forecasts.
- **Data:** Swiss monthly/quarterly macroeconomic data.
- **Extensions:** Choose and implement one of these extensions:
  - Scenario analysis.

- Density forecasts.
- Economic indicators.

Presentations are held on **20 - 21 November 2025**. Please send your presentation slides/upload your presentation slides until **19 November 2025**.

3 Topics

The available projects are briefly introduced in the following. Please indicate your **top three choices by 10 October 2025 in the poll**. We will allocate groups by **14 October**.

3.1 Lecture Topics

Topic 1: Bayesian VARs

Some literature to get you started:

- Lecture slides.
- Bańbura et al. (2010), Giannone et al. (2015), and Kuschnig and Vashold (2021).

Topic 2: Bayesian SEM

Your project should be based on:

- Lecture slides.
- Rathke and Sarferaz (2025).
- KOMA package by Samad and Scherer (2025).

Topic 3: Dynamic Factor Models

Some literature to get you started:

- Lecture slides.
- Kim and Nelson (1999), Stock and Watson (2002a, 2002b),Giannone et al. (2008), Stock and Watson (2011).

Topic 4: Time-Varying Parameter Models

Some literature to get you started:

- Lecture slides.
- Hamilton (1989), Kim and Nelson (1999), Cogley and Sargent (2005), Primiceri (2005).

Topic 5: Mixed-Frequency Models

Some literature to get you started:

- Lecture slides.
- MIDAS: Ghysels (2016) and Ghysels et al. (2007, 2016).
- Mixed-frequency VARs: Mariano and Murasawa (2003) and Schorfheide and Song (2015).

Topic 6: Forecast Combinations and Hierarchical Forecasting

Some literature to get you started:

- Lecture slides on forecast combinations.
- Stock and Watson (2004).
- This review and the references therein are a great starting point to a variety of forecast reconciliation methods: Athanasopoulos et al. (2024).

3.2 Machine Learning Topics

Topic 7: Forecasting with Transformers

Some literature to get you started:

- Initial paper introducing Transformers: Vaswani et al. (2017).
- Lim et al. (2021).

Topic 8: Forecasting with Random Forests

Some literature to get you started:

- Medeiros et al. (2021).
- Goulet Coulombe et al. (2022).

Topic 9: Forecasting with Gaussian Processes

Some literature to get you started:

- Rasmussen and Williams (2005).
- Hauzenberger et al. (2024).

3.3 Pick Your Own Topic

If you want to suggest your own topic, please send us an email so we can discuss this in advance.

Repository Submission Guidelines

- Save all project contributions (e.g., code, slides, etc.) in the GitHub project's *submission* folder.
- The *submission* folder has the following structure:
  - `data/`: Contains the provided monthly and quarterly datasets as well as their metadata.
  - `output/`: Save all code outputs here.
  - `renv/`: No direct edits required. Holds the `renv` infrastructure.
  - `.Rprofile`: Activates `renv` when starting an R session. In RStudio, open the project via this file.
  - `AUTHORS.yml`: List all group members here. Follow the existing structure. The email must match your Git configuration (`git config --get user.email`).
  - `main.R`: Place your main R code here. You may create additional files, but execution should start from `main.R`.
  - `renv.lock`: Captures package versions after running `renv::snapshot()`.
- Getting started:
  - One group member should **fork** the repository on GitHub. This creates a personal copy of the repository.
  - In the forked project, go to *Settings* → *Collaborators* and add your team members.
  - All group members can now **clone** the forked repository.
  - To use `renv`, ensure that your working directory is set to the `submission/` folder.

  - In your first R session, you should see the message `# Bootstrapping renv 1.1.5`, indicating that `renv` is being set up. Once installed, restore the packages recorded in `renv.lock` with `renv::restore()`.
  - Always use **relative paths** (not absolute paths) when setting file locations. This makes collaboration much easier.

- Questions:
  - We have opened a Discussions space in the GitHub repository. Feel free to ask any questions there.

- Submitting the project:
  - Before submitting, run `renv::snapshot()` to record the package versions used in your project.
  - To submit, go to your fork on GitHub and click `Contribute` → `Open pull request`. Open a pull request to merge your fork's branch into `KOF-fbp:main`.
  - Once you've created a pull request, you can continue pushing commits to your fork as usual. All new changes will automatically be added to the existing pull request. Only your final submission will be graded.
  - Remember that each group member should make at least two meaningful commits.
  - If you encounter problems with the pull request, you may instead send the files by email or another channel. The goal is to give you exposure to these tools, not to create barriers.

References

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