

## **Advanced Econometrics: Forecasting (Part I)**

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### **Aims, objectives and intended learning outcomes**

#### **Course aims**

This course focuses on practical forecasting through the lens of the M4 forecasting competition. This high-visibility competition drew entrants using very different methodologies. We will focus on exponential smoothing and combination methods. This course is focused on learning techniques and applying them, not on their theoretical underpinnings.

#### **Intended learning outcomes**

Students should become familiar with:

- Alternative methods to forecast using exponential smoothing;
- Methods to improve predictions by combining forecasts; and
- Modeling seasonality.

#### **Lectures**

Part I Lectures are provided by Kevin Sheppard (Lectures 1 (week 1) and 3 (week 2)). Lecturers are held Mondays from 9:00 to 12:15.

#### **Assessment**

Part I of the course is assessed using a group project. This project contributes 40% to the total score.

## Readings

Most of the readings are short articles from a special issue of the *International Journal of Forecasting* covering the M4 competition. The other key readings are an open text book, *Forecasting: principles and practice, 2nd edition*, and “Exponential smoothing: The state of the art—Part II” (Gardner 2006).

## Reading List

- Atiya, Amir F. (2020). “Why does forecast combination work so well?” In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 197–200.
- Darin, Sarah Goodrich and Eric Stellwagen (2020). “Forecasting the M4 competition weekly data: Forecast Pro’s winning approach”. In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 135–141.
- Doornik, Jurgen A., Jennifer L. Castle, and David F. Hendry (2020). “Card forecasts for M4”. In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 129–134.
- Fildes, Robert (2020). “Learning from forecasting competitions”. In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 186–188.
- Fry, Chris and Michael Brundage (2020). “The M4 forecasting competition – A practitioner’s view”. In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 156–160.
- Gardner, Everette S. (2006). “Exponential smoothing: The state of the art—Part II”. In: *International Journal of Forecasting* 22.4, pp. 637–666.
- Gilliland, Michael (2020). “The value added by machine learning approaches in forecasting”. In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 161–166.
- Hyndman, Rob J. and George Athanasopoulos (Jan. 1, 2018). *Forecasting: principles and practice, 2nd edition, OTexts*. Melbourne, Australia. URL: <https://OTexts.com/fpp2>.
- Ingel, Anti et al. (2020). “Correlated daily time series and forecasting in the M4 competition”. In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 121–128.
- Jaganathan, Srihari and P.K.S. Prakash (2020). “A combination-based forecasting method for the M4-competition”. In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 98–104.
- Lichtendahl, Kenneth C. and Robert L. Winkler (2020). “Why do some combinations perform better than others?” In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 142–149.
- Makridakis, Spyros, Evangelos Spiliotis, and Vassilios Assimakopoulos (2020). “The M4 Competition: 100,000 time series and 61 forecasting methods”. In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 54–74.
- Montero-Manso, Pablo et al. (2020). “FFORMA: Feature-based forecast model averaging”. In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 86–92.
- Pawlikowski, Maciej and Agata Chorowska (2020). “Weighted ensemble of statistical models”. In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 93–97.
- Petropoulos, Fotios and Spyros Makridakis (2020). “The M4 competition: Bigger. Stronger. Better”. In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 3–6.

Petropoulos, Fotios and Ivan Svetunkov (2020). "A simple combination of univariate models". In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 110–115.

Shaub, David (2020). "Fast and accurate yearly time series forecasting with forecast combinations". In: *International Journal of Forecasting* 36.1. M4 Competition, pp. 116–120.