Forecast Adjustment Under Shocks: A Unification

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Abstract

This work systematizes and unifies the rich landscape of model adjustment and model correction methods, with a special focus on forecast adjustment under the presence of shocks.

1 Introduction

With many prediction tasks, the salient challenge is not predicting when the event will occur but what it's direction/sign, magnitude, duration, and/or after-effects will be. This is not to say that predicting when the event will occur is easy. In some cases, it may be difficult or impossible. Our claim is instead that the more statistically rich task is the event's consequences.

Forecasting amid anticipated shocks raises unavoidable questions: should the forecast model be abandoned in favor of a discretionary or ad-hoc or one-off adjustment? Does the does the discretion of a forecaster rule out a quantitative method for making the adjustment? What is the ultimate purpose of the adjustment, and how it is to be used? For how long is the adjustment necessary or reliable?

This work aims to systemaize and unify a range of conceptual approaches and tools that have developed across the broad ecosystem of the econometric and forecasting literatures.

difference between discretionary and automated

Setting the model back on track

what we are talking about here is not forecast combination, but there may be, nevertheless, a role for forecast combination: combining the forecasts generated by small differences in covariate and/or donor choice

The role and meaning of similarity

How important is a shared DGP?

The forecast horizon — does it matter? If so, how so? Lin and Eck [2021] has a one-period horizon. Clements and Hendry [1998]p. 203 discuss how long to keep the forecast adjustment in place. For a corrected "slope parameter", the effect of h is not so clear.

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1.1 Literature Review

Three Clements and Hendry books

- 1994
- 1998
- 1999

Quinton-Guerrera and Zhong

1.2 Model Adjustment Using Similarity-Based Parameter Correction: A Global Overview

1. a random object to forecast that depends on a linear specification
2. a parametric model family shared by donors
3. a correction term for the model family shared by donors
4. a parametric specification for the correction term
5. a reliable estimation procedure for the shared model
   (a) This should be straightforward
6. a reliable estimation procedure for the correction term
   (a) This might not be straightforward. Some models like GARCH, for example, might deliver very noisy estimates for indicator variables that occur just once.
7. a correction function that aggregates (i.e. maps) donor correction terms based on some notion of similarity

2 Setting

3 Model-Specific Considerations

3.1 ARIMA

3.2 GARCH

3.3 HAR

3.4 VAR

4 Real Data Examples

5 Discussion

- Binary Outcome Forecasts
- Density Forecasts
- Quantile Forecasts

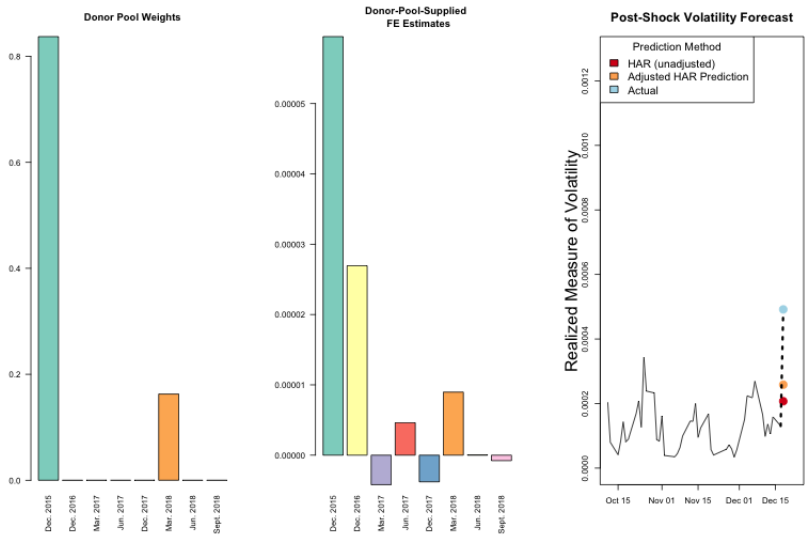

Figure 1: Volatility series of six i.i.d. GARCH processes, each of which experiences a volatility shock, indicated with a red vertical line, at a uniformly distributed point in the set $\{756, ..., 2520\}$ of trading days, corresponding to between 3 and 10 years of daily trading data.

References

Michael Clements and David F Hendry. *Forecasting economic time series*. Cambridge University Press, 1998.

Jilei Lin and Daniel J Eck. Minimizing post-shock forecasting error through aggregation of outside information. *International Journal of Forecasting*, 2021.