Response to Probabilistic Reconciliation via Conditioning by G. Corani, D.Azzimonti, N.Rubattu and L.Zambon

Anastasios Panagiotelis

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Initial thoughts

- A few years ago no one knew how to reconcile probabilistic forecasts.
- One strain of literature looks at using the usual projections to push probability mass onto the coherent subspace.
- The approach of Corani and coauthors is quite different in that it looks at a **conditional** distribution.
- Imagine that we condition on being on a "slice" of $\mathbb{R}^n$ where that slice is the coherent subspace.

Advantages of this approach

- In the Gaussian case, it resolves to the MinT solution.
  - Is this true in the elliptical case?
- It can be easily extended to the discrete setting, especially for the Poisson distribution.
  - How about for other distributions?

Disadvantages of the approach

- In general must be able to sample from this slice
  - Importance samplers
  - Bayesian methods
- In my view, this is not really a disadvantage but it does make extending the approach to new distributions quite challenging.
- Difficulties with sampling lead to assumptions about independence of base forecasts.

Possible avenues to deal with dependence

- Polychoric correlations
  - Assume discrete outcomes depend on a continuous latent process.
- Copulas
  - Have been used for discrete data and even mixed discrete continuous data
- Latent variable representations can easily be handled in a Bayesian setting.

More insights

- This paper also looks at the properties of reconciled forecasts.
- In the discrete case means shrunk toward zero.
- Variances after reconciliation become smaller.
- The variance becoming smaller is also seen in model averaging (which reconciliation resembles).

Thoughts

- Are these good properties?
  - If base forecasts are unbiased, should means be shrunk towards zero?
  - If base forecasts are well calibrated (or underdispersed) are smaller variances a good thing?
- This is in my view an open question for ALL probabilistic forecast reconciliation approaches.