From: Professor
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To: Professor Dr. Rudd H. Teunter
Editor, European Journal of Operational Research

August 30, 2021

Dear Ruud,

Please find attached the manuscript entitled "Probabilistic Forecast Reconciliation: Properties, Evaluation and Score Optimisation" by Anastasios Panagiotelis, Puwasala Gamakumara, George Athanasopoulos, and Rob Hyndman for your consideration for publication in the *European Journal of Operational Research*. This paper tackles the problem of probabilistic forecasting of hierarchical time series. As you know, the solution to this problem in the point forecasting setting known as forecast *reconciliation* has received considerable attention. This manuscript generalises reconciliation to the probabilistic setting making a number of contributions. In particular the paper:

1. provides formal definitions of probabilistic reconciliation providing a framework for reconciling probabilistic forecasts either analytically or via sampling,
2. proves that reconciliation can recover the true predictive distribution in the special case of elliptical distributions,
3. proves that the log score is improper in the setting that we consider,
4. introduces an algorithm that uses stochastic gradient descent to finds reconciliation weights that are optimal with respect to scoring rules,
5. demonstrates the proposed methodologies using simulations and data on electricity generation from different energy sources.

Finally, we note that the paper includes several appendices. In the event that the paper were accepted for publication, we would be happy to move these appendices to an online supplement if requested to do so by the editorial team or referees.

We look forward to hearing from you.

With kind regards and best wishes,

George Athanasopoulos