

OPTIMAL AND ROBUST COMBINATION OF FORECASTS VIA CONSTRAINED OPTIMIZATION AND SHRINKAGE

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ABSTRACT: We introduce various methods that combine forecasts using constrained optimization with penalty. A non-negativity constraint is imposed on the weights, and several penalties are considered, taking the form of a divergence from a reference combination scheme. In contrast with most of the existing approaches, our framework performs forecast selection and combination in one step, allowing for potentially sparse combining schemes. Moreover, by exploiting the analogy between forecasts combination and portfolio optimization, we provide the analytical expression of the optimal penalty strength when penalizing with the L2-divergence from the equally-weighted scheme. An extensive simulation study and two empirical applications allow us to investigate the impact of the divergence function, the reference scheme, and the non-negativity constraint on the predictive performance. Our results suggest that the proposed models outperform those considered in previous studies.

KEYWORDS: Combination of forecasts, optimization, shrinkage