Elicitability and Identifiability of Systemic Risk Measures and other Set-Valued Functionals

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A functional T is called elicitable if there is a loss function $L(x,y)$ such that $T(F) = \arg\min_x \mathbf{E}_F[L(x,Y)]$. Similarly, T is identifiable if it is the unique zero of an expected identification function $V(x,y)$. Elicitability and identifiability are key properties for meaningful forecast ranking and validation, but also lead to M- and Z-estimators, respectively.

This talk is concerned with set-valued functionals, e.g., quantiles, the expected region of a flood, or systemic risk measures introduced in [1]. We introduce a thorough distinction between selective forecasts, specifying single points in the set of interest, and exhaustive forecasts, describing the entire set. This induces two corresponding types of elicitability and identifiability, which turn out to be mutually exclusive [2]. We construct selective identification functions and exhaustive scoring functions for systemic risk measures studied in [1]. In a simulation study, we consider comparative backtests of Diebold-Mariano type as well as Murphy diagrams.

References

[1] Z. Feinstein, B. Rudloff, S. Weber, Measures of systemic risk, *SIAM J. Financial Math.* **8** (2017), pp. 672–708.

[2] T. Fissler, J. Hlavinová and B. Rudloff, Elicitability and Identifiability of Systemic Risk Measures and other Set-Valued Functionals, *Preprint* (2019), `http://arxiv.org/abs/1907.01306`