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IWH Research Seminar in Economics

November 4, 2019, 14:15–15:45, conference room, Leipziger Straße 100

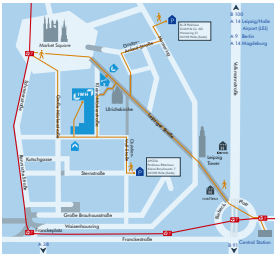
When Subadditivity Becomes a Problem: Coherent Risk Measures and Optimal Futures Hedging with Background Risk

PD Dr. Mario Brandtner, Friedrich Schiller University Jena

In this paper, we analyze standard futures hedging problems with and without background risk under law invariant coherent risk measures. While previous literature motivates the use of these risk measures by referring to their consistent axiomatic foundation, our findings raise doubts on the fit of the coherence axioms for hedging purposes. If perfect hedging is possible (i.e., the futures contract exactly matches the maturity and the underlying of the commodity to be sold), we find an all-or-nothing decision: either the hedger chooses full coverage, or there is infinite speculation if the futures market exhibits a sufficient level of normal backwardation and contango, respectively. This restrictive pattern is induced by the coherence axioms of translation invariance and positive homogeneity. We further consider an extended hedging problem in which an additional independent background risk arises. In the presence of this background risk, the speculative component in both normal backwardation and contango markets is counterintuitively increasing rather than decreasing; that is, under law invariant coherent risk measures, background risks induce risk-shifting. This problematic incentive can be directly attributed to the landmark subadditivity axiom. Likewise, we find more instead of less speculation if a basis risk arises. We also derive optimal hedge quantities for Gaussian distributions.

Scientific contact at IWH:
Andrea Strauch
Tel +49 345 7753 771, Andrea.Strauch@iwh-halle.de

Halle Institute for Economic Research (IWH) – Member of the Leibniz Association
Kleine Maerkerstrasse 8, D-06108 Halle (Saale)
Tel +49 345 7753 60, Fax +49 345 7753 820



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