Acceptability Pricing of Contingent Claims Under Model Ambiguity Using Stochastic Optimization

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Optimal bid and ask prices for contingent claims can be found by mathematical optimization. To do so, a model for the market dynamics is needed. While the traditional replication or superreplication strategies find the optimal prices under the constraint that all risks are shifted to the counterparty, we weaken this assumption by introducing risk (resp. acceptability) functionals in the stochastic optimization framework. Moreover, we consider the associated ambiguity problem, where we replace the single probability model by a non-parametric set of models. We show that weakening the acceptability constraint leads to a shrinking bid-ask spread while considering model ambiguity makes the bid-ask spread even larger. We discuss algorithmic solution methods and present some illustrative examples.