

Hedging and Portfolio Optimization in Financial Markets with a Large Trader

Peter Bank, Dietmar Baum

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✉ Address correspondence to Peter Bank, Humboldt-Universität zu Berlin, Institut für Mathematik, Unter den Linden 6, D100999, Berlin, Germany; e-mail: pbank@mathematik.hu-berlin.de.

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Abstract

We introduce a general continuous-time model for an illiquid financial market where the trades of a single large investor can move market prices. The model is specified in terms of parameter-dependent semimartingales, and its mathematical analysis relies on the nonlinear integration theory of such semimartingale families. The Itô–Wentzell formula is used to prove absence of arbitrage for the large investor, and, using approximation results for stochastic integrals, we characterize the set of approximately attainable claims. We furthermore show how to compute superreplication prices and discuss the large investor's utility maximization problem.

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