Hedging and Portfolio Optimization in Financial Markets with a Large Trader

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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.

REFERENCES ∨

Back, K. (1992): Insider Trading in Continuous Time, *Rev. Financial Stud.* **5**, 387–409.

| **Web of Science®** ↗ | **Google Scholar** ↗ |

Bierbaum, J. (1997): Über die Rückwirkung von Handelsstrategien ausgewählter Investoren auf Wertpapierpreisprozesse, Diploma thesis, Humboldt University Berlin .

Google Scholar ↗

Çetin, U., R. A. Jarrow, and P. Protter (2002): Liquidity Risk and Arbitrage Pricing Theory, Working paper, Cornell University .

Google Scholar ↗

Çetin, U., R. A. Jarrow, P. Protter, and M. Warachka (2002): Option Pricing with Liquidity Risk, Working paper, Cornell University .

Google Scholar ↗

Cuoco, D., and J. Cvitanic (1998): Optimal Consumption Choices for a 'Large' Investor, *J. Econ. Dynam. Control* **22**, 401–436.

Web of Science® ↗   Google Scholar ↗

Cvitanic, J., and J. Ma (1996): Hedging Options for a Large Investor and Forward–Backward SDE's, *Ann. Appl. Prob.* **6**, 370–398.

Web of Science® ↗   Google Scholar ↗

Delbaen, F., and W. Schachermayer (1998): The Fundamental Theorem of Asset Pricing for Unbounded Stochastic Processes, *Math. Annalen* **312**, 215–250.

Web of Science® ↗   Google Scholar ↗

Dellacherie, C., and P. Meyer (1975): *Probabilités et Potentiel*, Chapitres I–IV. Paris : Hermann.

Google Scholar ↗

Jarrow, R. (1992): Market Manipulation, Bubbles, Corners and Short Squeezes, *J. Financial Quant. Analysis* **27**, 311–336.

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Jarrow, R. (1994): Derivative Securities Markets, Market Manipulation and Option Pricing Theory, *J. Financial Quant. Analysis* **29**, 241–261.

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Kramkov, D. (1996): Optional Decomposition of Supermartingales and Hedging Contingent Claims in Incomplete Security Markets, *Prob. Theory & Rel. Fields* **105**, 459–479.

[Web of Science®](#) [Google Scholar](#)

Kunita, H. (1990): *Stochastic Flows and Stochastic Differential Equations*. Cambridge , UK : Cambridge University Press.

[Google Scholar](#)

Kyle, A. (1985): Continuous Auctions and Insider Trading, *Econometrica* **53**, 1315–1335.

[Web of Science®](#) [Google Scholar](#)

Levental, S., and A. V. Skorohod (1997): On the Possibility of Hedging Options in the Presence of Transaction Costs, *Ann. Appl. Prob.* **7**(2), 410–443.

[Google Scholar](#)

Papanicolaou, G., and R. Sircar (1998): General Black-Scholes Models Accounting for Increased Market Volatility from Hedging Strategies, *Appl. Math. Finance* **5**, 45–82.

[Google Scholar](#)

Schönbucher, P. J., and P. Wilmott (2000): The Feedback Effect of Hedging in Illiquid Markets, *SIAM J. Appl. Math.* **61**(1), 232–272(electronic).

Web of Science® ↗ | Google Scholar ↗

Soner, H. M., S. E. Shreve, and J. Cvitanić (1995): There Is No Nontrivial Hedging Portfolio for Option Pricing with Transaction Costs, *Ann. Appl. Prob.* **5**(2), 327–355.

Web of Science® ↗ | Google Scholar ↗

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