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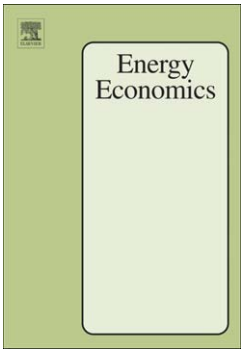

Stop-loss and Leverage in optimal Statistical Arbitrage with an application to energy market

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Stop-loss and Leverage in optimal Statistical Arbitrage with an application to energy market

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Abstract

In this paper we develop a statistical arbitrage trading strategy with two key elements in hi-frequency trading: stop-loss and leverage. We consider, as in Bertram (2009), a mean-reverting process for the security price with proportional transaction costs; we show how to introduce stop-loss and leverage in an optimal trading strategy.

We focus on repeated strategies using a self-financing portfolio. For every given stop-loss level we derive analytically the optimal investment strategy consisting of optimal leverage and market entry/exit levels.

First we show that the optimal strategy *á la* Bertram depends on the probabilities to reach entry/exit levels, on expected First-Passage-Times and on expected First-Exit-Times from an interval. Then, when the underlying log-price follows an Ornstein-Uhlenbeck process, we deduce analytical expressions for expected First-Exit-Times and we derive the long-run return of the strategy as an elementary function of the stop-loss.

Following industry practice of pairs trading we consider an example of pair in the energy futures' market, reporting in detail the analysis for a spread on Heating-Oil and Gas-Oil futures in one year sample of half-an-hour market prices.

Keywords: Mean-reversion trading, stop-loss, First-Exit-Time.

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[1]The views expressed here are those of the author and not necessarily those of the bank.

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