Pricing & hedging asian-style options in energy

Fred Espen Benth∗ and Nils Detering†

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Abstract

We solve the problem of pricing & hedging asian-style options on energy with a quadratic risk criterion when trading in the underlying future is restricted. Liquid trading in the future is only possible up to the start of the averaging period. After the start of the averaging period, the hedge positions can not be adjusted anymore until maturity. This reflects the trading situation in the nordic energy market NordPool. We show that there is a unique solution to this combined continuous-discrete quadratic hedging problem if the future price process is a martingale. Additionally the hedge positions before the averaging period are inherited from the market specification without trading restriction. As an application we consider three models and derive their quadratic hedge positions in explicit form, a simple Black Scholes Model with time-dependent volatility, the stochastic volatility model of Barndorff-Nielsen and Shephard and an exponential additive model.

Keywords: Asian options, energy markets, trading restrictions, quadratic hedging, discrete hedging, stochastic volatility, exponential additive model

∗Fred Espen Benth, Centre of Mathematics for Applications, University of Oslo, P.O. Box 1053, Blindern, N-0316 Oslo, Norway. Email: fredb@math.uio.no
†Nils Detering, Centre for Practical Quantitative Finance, Frankfurt School of Finance & Management, Sonnemannstr. 9-11, 60314 Frankfurt am Main, Germany. Email: n.detering@fs.de