Abstract

The thesis evaluates and quantifies the residual shape risk on the Czech natural gas market. The risk stems from insufficient liquidity of forward market, when energy supplier has to hedge his short shaped sales by standard baseload products available at wholesale market. Hence, energy supplier is always left with residual position, which has to be closed at spot market. We model the residual shape risk as a difference between spot and forward prices weighted by residual position, which is derived from the shape of innogy Energie, s.r.o. household portfolio. In order to do so we develop model for a spot price dynamics based on the daily index OTE. We price forward contracts as expected spot price at delivery. The spot price dynamics is modelled as a mean-reverting Ornstein-Uhlenbeck process, while assuming two different driving stochastic processes for innovations. First, we model them as a mixed jump diffusion process. Second, we estimate control model assuming innovations to come from the normal inverse Gaussian distribution. The residual shape risk is then evaluated by Monte Carlo simulation of spot price paths, which we use for hedging the portfolio shape. Five percent Value-at-Risk and the Expected Shortfall measures for the jump mixed diffusion process yield costs of 0.013 and 0.016 EUR/MWh, respectively. The second assumed process yields costs of 0.011 and 0.013 EUR/MWh, respectively. Even though, the risk is relatively low it worths mentioning at highly competitive market, something what the retail energy supply business is. Further, we found the OTE index to be of lower volatility relatively to the NBP day ahead index. To our knowledge no one analysed Czech natural gas prices by this method before. Moreover, an advantage of this approach is that it can be directly used for other flow commodities like electricity.