Abstract

Natural gas and electricity are commonly traded through swing contracts that enable the buyer to exploit changes in market price or market demand by varying the quantity they receive from the producer (seller). The producer is assured of selling a minimum quantity at a fixed price, but must be able to meet the variable demand from the buyer. The flexibility of such contracts enables both parties to mitigate the risks and exploit the opportunities that arise from uncertainty in production, demand, price, etc. But how valuable are they? Traditional Net Present Value, based on expected values, cannot value this flexibility, and the traditional options-valuation techniques could not model the complexity of the terms of such contracts.

Taking gas contracts as an example, this paper seeks to (a) raise awareness of how flexibility creates value for both parties and (b) show how Least-Squares Monte Carlo Simulation can be used to quantify its value in dollar terms, from the perspective of both producer and buyer. Since the value of flexibility arises from the ability it gives to respond to fluctuations (such as in commodity prices), a useful model of swing contracts needs to reflect the nature of these fluctuations.