

Abstract

With the deregulation of natural gas industry in the USA, the structure of the industry has changed and resulted in competitive wholesale gas market. As gas prices become highly volatile in the open markets, participants in the spot markets face substantial price risks. This has led to the beginning and development of the financial gas markets. In this environment, it is inevitable to price natural gas contracts with due consideration to the financial risk. Contracts in natural gas markets are usually designed to provide flexibility of delivery with respect to both the timing and the amount of natural gas. These contracts are called as Swing contracts. Swings permit the option holder to repeatedly exercise the right to receive greater or smaller amounts of energy subject to daily as well as periodic constraints and the contracts are also usually of multi-period type with a make-up provision.

I proposed to price swing contract with above-mentioned characteristics in this study. The approach proposed in this study is called as binomial forest approach (a multiple layer tree extension of the binomial tree approach). There are three steps in pricing these contracts. The first step consists of empirical estimation of parameters of the stochastic process that is assumed to be followed by the spot price of natural gas from the market data. The second step consists of writing an algorithm to determine price of swing contract by taking in estimated parameters of assumed stochastic process and various other parameters, which characterizes the contract as inputs. The third step consists of validation of model by collapsing it to simple American option by changing the parameters that characterize the contract.