Manipulation of day-ahead electricity prices through virtual bidding

Chiara Lo Prete September 2013

Abstract

In the past two years, enforcement actions addressing episodes of manipulation in organized wholesale electricity markets have attracted national attention in the U.S. The Federal Energy Regulatory Commission accused several market participants (like Constellation Energy Commodities Group, Deutsche Bank Energy Trading and Barclays Bank) of placing virtual bids and/or physical schedules that were unprofitable on a stand-alone basis, but were intended to move prices in a direction that would enhance the value of sufficiently leveraged financial positions (like swaps or financial transmission right--FTR--positions). Since the size of the related financial positions was larger than the one of the unprofitable energy positions, the manipulator would net an overall profit from the scheme. This research focuses on one particular instance of loss-based manipulation: we consider the case of a purely financial trader who places uneconomic virtual energy bids with the intent of affecting day-ahead electricity prices—thus creating a divergence between day-ahead and real-time prices—in order to benefit his related FTR positions.

In a well-functioning electricity market, day-ahead and real-time prices should not systematically diverge over sufficiently long timeframes. If day-ahead prices are predictably lower or higher than expected real-time prices, arbitrage opportunities exist. Persistent price differences should encourage entry and competition for arbitrage rents, in turn leading to greater price convergence and making manipulation of day-ahead prices hard to sustain. Under conditions like complete information, risk neutrality and absence of restrictions to entry, financial traders would not be able to successfully manipulate day-ahead prices.

The paper addresses the question of how a purely financial market participant could have and maintain a material impact on the day-ahead electricity price for a sustained period of time. Since the virtual trader does not own generating capacity or serve load, he cannot successfully manipulate real-time electricity prices. If manipulation of day-ahead prices through virtual bidding is possible, it should necessarily exploit market features that limit the ability of other participants to profit from the resulting arbitrage opportunities. The manipulator could exploit the risk aversion of other participants, the role of information and/or restrictions to entry, due for example to liquidity constraints or asymmetric charges allocated to virtual positions. These features prevent the full integration of day-ahead and real-time electricity markets, resulting in systematic price differences between the two and potential opportunities for day-ahead price manipulation. Previous work on market manipulation in electricity and related financial markets has not explicitly addressed this research question.