DERIVATIVES AS A COMMITMENT DEVICE : on the use of swaps in electricity markets

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Overview

With the growing financialization of electricity markets electricity generating companies are increasingly taking financial positions on derivatives markets while at the same time being active on "physical" power markets. In this paper, we investigate how derivetives markets can be used as commitment device for generating companies to lock-in collusion-like strategies in the physical market.

This paper is partly motivated by actual market behavior of *Keyspan*, a major electricity producer in the New York electricity market, and its competitor, *Astoria*. During the 2006-2008 period, *Keyspan* and *Astoria* signed opposite swap contracts – based on strike prices in the physical market they were active in. In essence, both opposite swaps implemented a transfer of rents to from *Keyspan* to *Astoria.* While both firms could have been pivotal in clearing the physical market, we analyse how this agreement made its impact on bidding strategies in the physical market and ultimately made these firms comitting towards a certain (of multiple) bidding equilibria. The market at stake was clearing as a multi-unit uniform-price auction run by the electricity market operator and has already been studies by Schwenen (2015). The purpose of this paper is to analyze how the use of derivatives may affect competition in electricity uniform price auction markets, drawing from this particular case in the New York power market.

Methods

Using a game theory approach, we consider a multi-unit uniform price auction framework where two firms can sign swap agreements while being price setter and price taker, respectively. The goal is to identify conditions under which swaps can be used as a commitment device to increase market prices. We also provide a quantitative assessment of our theoretical predictions by using data from the New York electricity market.

Results

Our theoretical framework provides a rationale for using swaps as a commitment device. In uniform-price auctions, the market price is the same for all units sold, but only the *inframarginal* bidder sells all her capacity. The *marginal* bidder instead sells her residual demand, which usually is less than her capacity. This gives rise to a free-rider problem, which has been extensively studied in the literature on multi-units auctions (e.g. Fabra et al. 2006, De Frutos and Fabra 2012): each firm wants a high market price but would like other firms to take the role of price setter. Signing swaps may solve this free-rider problem. We show that swaps may have worked a commitment device towards solving this free-riding problem by transferring rents via the financial market. We illustrate the conditions under which such swaps are a viable strategy.

Conclusions

The benefits of derivative securities are well known: reduced price exposure, increased market liquidity, enhanced information transmission among other benefits. Nonetheless the effects of the spread of increasingly complex financial instruments (e.g., an increased use of different forms of derivatives) on prices and consumer welfare are heavily debated. We discuss the opportunity to favor policy interventions aimed at tightening the regulation derivatives for the electricity market.

References

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