

Bidding under a Price Cap

Evidence from an electricity market experiment

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Abstract

Price caps are one of the regulatory tools to achieve low and non-volatile prices but may inhibit adequate investment levels. This paper presents the results from a laboratory experiment designed to test the efficiency properties of price caps on wholesale power markets.

Several real world features of the electricity market inspire the experimental design. In our setup four identical generating subjects (playing the role of generators) interact in repeated multi-unit auctions competing on the supply side. The demand is perfectly inelastic and volatile. Subjects have to make two types of decision. Initially, they have to decide on how much capacity to make available to the market. Then they submit repeatedly multi-step supply functions, i.e. schedules of quantities and prices specifying how much they are willing to supply for a given price. They cannot offer their units above a maximum price, exogenously given in the experiment. On the other hand there is no obligation to produce at full capacity. Subjects participate in different treatments with different price caps. Moreover the participants were students but also professionals working in the electricity industry.

Our main finding is that price cap regulation has an impact not only on market prices but also on market performance. Imposing a relatively high price cap improves allocative efficiency (i.e. energy supply security) but reduces productive efficiency (costs are not minimized). Moreover we find that the price cap, for similar market conditions, is reached more often with relatively low price cap level. We conclude therefore that an increase in price cap does not fully translate into a one to one increase in market prices.