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Assessing Market Power in the Italian Electricity Market: A synthetic supply approach

EPRG Working Paper 1930

Cambridge Working Paper in Economics 1975

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Electricity markets are complex environments where several different factors are in play. The interactions of these factors imply a constant evolution of the electricity markets where the firms must adapt quickly to remain competitive and efficient. For these reasons, experts are required to steadily investigate and face the dynamics related to the market and its challenges.

An interesting example of the evolution of the market is provided by the bidding strategies of the market participants. The bidding strategies employed in the Day-Ahead Market are a central matter of discussion in this work. The case study proposed focusses on the Italian Day-Ahead Market.

The Italian Day-Ahead Market is structured as an hourly uniform price auction where buyers and sellers respectively submit bids and offers, representing their willingness to buy and sell. Both demand and supply are matter of interest, but the strategic behaviours of generators (sellers) are more subject to market changes and therefore in constant evolution. An offer submitted by a producer is not only representative of the costs of generating that amount of electricity offered on the market but it also contains a broader set of information. The way in which a firm acts on the market depends on several aspects such as its size, its generation mix and the actual generation mix of the whole market, its start-up and marginal costs, the mark-up, the forecasting of the load produced by renewable energy sources, the market coupling, the imported/exported electricity, the behaviours of the other operators and many others. For example, the massive introduction of renewables led to a substantial change in the bidding behaviours of some market participants.

Observing and understanding the evolution of these dynamics is not an easy task. Monitoring the market and comprehending if the equilibria are the results of a competitive setting or if some operator is overexerting market power is extremely difficult.

In this paper, we analysed the Italian Day-Ahead Market equilibria using four years of data (from 2015 to 2018). We investigated, with a case study, if the bidding behaviours of large generators substantially differed from those of smaller firms. Under the assumption that large generators' offers are more strategic and may employ a greater mark-up, we created a counterfactual supply (synthetic supply, hereafter) where large generators are forced to offer as if they were smaller firms.

Results suggest that the intersection points between the synthetic supply curves and the demand curves led to equilibria with lower prices compared to the ones which occurred in the real market. Nevertheless, synthetic quantities do not seem to be affected, due to the inelastic demand. Moreover, estimates of Consumer Surplus Loss and of an alternative measure of Lerner Index are provided. Our findings suggest that the main impacts occurred during 2017 especially during those months where above average heating and cooling were required.

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Publication July 2019