

## Strategic withholding through production failures – executive summary

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A competitive and well-functioning market is one of the goals of modern, liberalized electricity markets. However, a commonly voiced concern has been that firms strategically reduce their generating capacity in order to increase the electricity price. Strategic withholding of electricity was for example observed during the electricity crisis in 2000-2001 in California and has been determined to be one of the reasons why the crisis became so severe. Theoretical studies have also shown how firms benefit from this behavior. On the other hand, studies of market power investigating the Nordic electricity market Nord Pool have so far been inconclusive.

There are some pre-conditions that are thought to ease unilateral withholding of capacity; when demand is high and capacity utilization (including marginal capacity) is tight, generators possess considerable market power to increase prices. In such a situation even a small company may be able to exercise market power, in particular so if further electricity imports to the price area are prevented by transmission constraints – that is why even in a large market as Nord Pool potential for exercising market power exists.

In this paper we look at a previously under-researched method that electricity producers can use to withhold capacity in order to increase prices on the Nordic electricity market. We consider instances when generators shut down part of their production due to a failure, and we verify whether the decision to stop production and provide information about his failure depends on economic incentives rather than being the result of a technical problem. Market participants on Nord Pool are obliged to publicly provide information about changes to consumption, generation or transmission that exceed 100MW and last longer than 60 minutes in so-called Urgent Market Messages (UMMs). We investigate whether spot prices on Nord Pool influence the probability of production failures being reported in UMMs. Production failures should not directly depend on prices, as failures should be irregular and difficult to foresee. Detection of a significant relationship between prices and market messages therefore indicates that market participants do not only base their decisions concerning failure reporting on technical problems but also on economics incentives.

We use text-scraping methods to create a unique dataset containing information about UMMs released by market participants with information about unplanned reductions of production, i.e., production failures. Our dataset permits us to examine how prices affect market participants' decisions about issuing failure messages and how these decisions vary by generator type. We use econometric techniques to control for the possible relationship between generators' strategies and market price, substituting the actual prices with temperature and precipitation levels (which generators cannot control).

The results indicate that there is a significant relationship between day-ahead electricity prices and the number of reported failures. The size of the effect depends on the type of fuel used for generation. There are positive and significant results for gas and oil, where a 1 euro increase in price increases the number of reported failures by 5.2 percent in the case of gas fuelled generation and by 6.3 percent in the case of oil. Thus, if price would increase by 15 euros the number of oil failure messages would increase almost by 100%. This positive effect of an increase in price on the number of reported failures in the case of marginal technologies is consistent with the hypothesis that it is more profitable to withhold capacity from generators with a high marginal cost.