

Market Power in the Nordic Power Market¹

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Overview

Electricity markets are generally considered to be vulnerable to the exploitation of market power, which is not without reasons. There are several examples of market power in electricity markets, with California in the year 2000 as the perhaps most striking one (see e.g. Borenstein, Bushnell and Wolak, 2002; Cho and Kim, 2007; Joskow and Kahn, 2002; and Puller, 2001) for studies of market power in the Californian market).

The Nordic electricity market is generally perceived as a relatively well-functioning market (see e.g. Amundsen and Bergman, 2006; Damsgaard and Green, 2005). Most studies have found little or no evidence of market power (Hjalmarsson, 2000; Johnsen, Verma and Wolfram, 1999), although the Danish competition agency has found evidence of abuse of market power in the Danish market.

Over time, the market structure has also changed due to mergers and the over capacity existing from pre-deregulation time has gradually diminished, which are both factors that could contribute to increased problems with market power in the Nordic electricity market.

In part I of this paper we study the potential for market power in the Nordic electricity market and in part II we study whether we can find evidence that market power has been exercised.

Methods

In part I of the paper we apply a SFE approach in a numerical model of the Nordic electricity market to study the potential for market power, assuming non-cooperative behaviour. The Nordic market is to a significant extent supplied by hydro power, implying that market power, in addition to holding back overall production, may be exercised by shifting production in time. The model must thus take this dynamic aspect into account and maximize profit over time.

In part II we model we use a sophisticated model for the Northern European electricity market to whether market power has been exercised on the Nordic power market. The approach is similar to the one used by Wolfram (1999), Borenstein, Bushnell and Wolak (2002) and Cho and Kim (2007). In contrast to these, the importance of hydro power in the Nordic system imply that it is necessary to explicitly take the possibility that the hydro production is used strategically into account. We study three different time periods from 2001 to 2006 with different characteristics in terms of market fundamentals (two shortage situations and one “normal” situation, due to variations in precipitation).

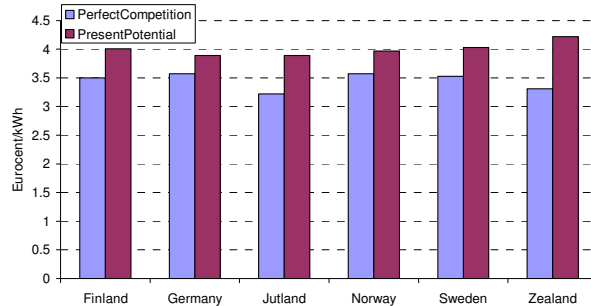
Results

In part I we found a potential for market power increasing prices by 11-27% in the different Nordic market areas. The total output is reduced by on average 2%, but with large variations between market

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areas. The assumed price elasticity is found to have a considerable effect on the potential for market power.

Figure 1 Simulated average prices with competitive pricing and with strategic behaviour of large power producers, eurocent/kWh



In part II we find strong indications of market power only in one period (shortage period in the autumn 2002/03) in one market area (Jutland). We do however find generation pattern over time that could be consistent with the exercise of market power, and a somewhat higher average actual price than the simulated price in 2006. For the latter case, it cannot be ruled out that this difference between actual prices and simulated prices are driven by differences in expectations rather than market power. For all other time periods and regions, actual prices are slightly below the simulated prices.

Conclusions

We find significant potential for market power in the Nordic power market, but mostly fail to find evidence that market power has been exercised. The modelling of the potential for market power may over estimate the practical possibilities to exercise market power, e.g. since there is no uncertainty in the model. In reality there are a number of random factors such as precipitation, temperatures/consumption and wind power generation, which make it more difficult to exercise market power. On the other hand there might be further possibilities to exercise market power in certain peak load hours which is not captured when we model the potential. Furthermore, we have not taken any coordinated behaviour or cartels into account.

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