

Short-time electricity markets, capacity shocks and forward premia

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Overview

As increasing amounts of intermittent power are brought on-line the intra-day electricity markets, that offer an opportunity to trade power closer to the real time, become more important. The energy sector is of the utmost importance and therefore it is essential to understand the developments of electricity prices as well as the nature of the shocks that influence those prices. In this paper I study the price difference between the day-ahead and the intra-day Scandinavian electricity market – the forward premium. I explore the model used for studying forward premia on the electricity market Bessembinder and Lemmon (2002) and supplement it with an analysis of effects of contemporaneous capacity shocks.

Methods

I estimate the effects that the failures of different types of electricity generation have on the forward premium. Using econometric modeling and price data for the period 2006 – 2009 I estimate the effect of capacity shocks on premia. In order to account for differences over the day in power demand and supply I use hourly data and estimate a separate model for each hour.

Results

There exist systematic differences between the day-ahead and the intra-day price for the electricity supplied at the same hour. Moreover these differences – the premia – change sign over the day and have a clear pattern with positive premium in off-peak hours and negative in peak hours. Contemporaneous changes to market fundamentals – capacity shocks – have an important impact on these short-time premia. Over the analyzed period problems with coal-powered units were reported most often but amounted to fewer hours in total than problems with other types of power generation. The coal power plants' failures have been found to have the greatest effect on the differences between day-ahead and intra-day prices.

Conclusions

The Scandinavian intra-day electricity market is not as liquid as the “main” day-ahead market. However it is important to understand what is the price relation between these two markets. Because of specificity of the electricity market (no storage, high entry costs) price differences between these two markets might exist. It is however of interest to recognize and explain the systematically occurring patterns. The observed premia behavior can be to a large extent

explained by generators' failures and supply function shape during peak and off-peak hours. While discussing premia it is crucial to account for capacity changes.

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