

BACKING OUT EXPECTATIONS FROM HYDROPOWER RELEASE TIME SERIES

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Overview

Our goal is to study how price expectations are formed in an electricity market. In the context of a single hydropower producer in the Nordic market, we expect the forward curve to have a strong influence. The alternative we allow for is a seasonal autoregressive joint inflow and spot price model that takes dry- and wet year dynamics into account. Using observed time series of generation, reservoir trajectories and technical plant data, and a structural model of optimal releases, our initial findings indicate that forward prices have influence on price expectations. An important byproduct of the proposed procedure is estimates of marginal water values.

The paper is organised as follows: After the introduction the second section gives a brief overview about structural estimation. The third section addresses hydropower scheduling, i.e. the decision problem studied. In section four we describe the empirical structural setup. In the final section conclusions and policy implications are derived.

Methods

Structural estimation of a dynamic decision process.

Results

First, structural estimation is presented as a method to empirically measure primitives of commodity storage operations, such as the formation of price expectations for hydropower schedulers.

Second, the results of the structural estimation produces a value function that can be differentiated to give marginal water values, which are useful for estimating otherwise unobservable marginal costs, for example for market monitoring purposes.

Third, we found the loglikelihood to be highest when using a six month ahead forward contract to proxy for spot price expectations, as opposed to a more fundamental spot price model that takes dry-wet year dynamics into account.

Conclusions

Our results indicate that forward prices are an important factor in forming price expectations. Further, it seems possible to form an empirical structural model that describes the behavior of reservoir managers.

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