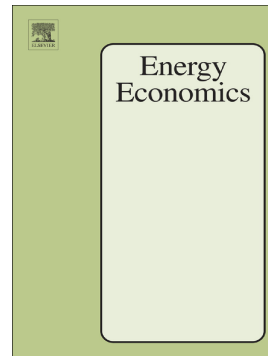


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Structural price model for coupled electricity markets

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Abstract

We propose a new structural model that can compute the electricity spot and forward prices in two coupled markets with limited interconnection and multiple fuels. We choose a structural approach in order to represent some key characteristics of electricity spot prices such as their link to fuel prices, consumption level and production fleet. With this model, explicit formulas are also available for forward prices and other derivatives. We give some illustrative results of the behaviour of spot, forward and transmission rights prices.

key words: energy markets, structural models, derivatives pricing, electricity forwards, interconnection

1 Introduction

European electricity markets are mainly organized country by country. But these national markets are also interconnected with their neighbours. The two main advantages of interconnected markets are the following:

- *Decreasing physical risk.* The interconnection between countries allows the pooling and sharing of available production capacities. And, because the electricity consumption and production outages in these countries are not perfectly correlated, the interconnection makes the system more robust. According to the French Transmission system operator¹ (TSO), this is the first mission of interconnection: "These interconnections are therefore first used to ensure the operating safety of the power transmission networks." The interconnection is then used to reduce the risk of blackouts, although one must notice that in the case of a blackout, this use increases the possible damage to the entire system.

¹*Introduction to interconnections*, http://clients.rte-france.com/lang/an/clients_traders_fournisseurs/services_clients/dispositif_global.jsp

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