

# SPOT PRICE DYNAMICS IN DEREGULATED POWER MARKETS.

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ABSTRACT. Over the past decade the deregulation process in the electricity sector has led to the creation of organized power markets in many countries (United States, New Zealand, Spain, Alberta, Germany, Scandinavian countries and Great Britain, to name a few).

In this way opportunities were created both in the field of free competition to power generation, and for trading physical and financial electricity products on electricity exchanges. Additionally, the introduction of a liquid spot electricity market creates a reference index for derivatives trading.

Within this framework, modeling spot price behavior plays a key role, since this is the breeding engine for the activity in the corresponding forward and future market: developers and generators (as well as traders) need to know how electricity prices behave, as their profitability depends on them. Additionally, credit rating agencies need to monitor the exposure of different players in the market to price fluctuations and risks.

A number of papers have been already addressed to such topic [11], mainly focusing on the particular features which are exhibited by the day-ahead scandinavian power market (NordPool), among the earlier to be activated [10]: in this way it has been possible to fix some features which a good model should have to fit day-ahead prices .

Such "ideal" model should be able to consider several characteristics of power price behaviour, for instance price dependent volatility, price spikes, seasonal effect, and mean reverting effects (when existent).

Starting from this point, this work is intended to offer a comparative analysis of the features of hourly prices in the day-ahead market of several countries: to such purpose data from Alberta pool, Spanish, German and New Zealand market will be considered.

The (quite) surprising result is the persistence shown by the observed time-series in almost one of the markets considered: this is an important remark, since it proves that understanding spot price behavior in power markets is not simply a matter of best parameters estimation for a given stochastic model.

Different stochastic models will be then applied to data: brownian motion, mean reversion [4],[5],[6],[7], stochastic volatility models [3], [12], and self-similar processes [1],[2], will be employed to generate possible price paths for the different markets, and their descriptive power will be analysed.

The structure of the paper is as follows. In Section 2 we study the features of data under examination: persistence (anti-persistence) of data as well as cross correlation and usual descriptive statistics will be considered. In Section 3 we will review the different stochastic models used throughout the study. In Section 4 after a proper estimating parameters process, price paths will be generated for spot price in the various markets, for each stochastic model described in Section 3, and the results will be discussed. Section 5 will end the work drawing some conclusive remarks and outlook for future works.

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