Short-term electricity price forecasting with recurrent regimes and structural breaks

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Abstract-

This paper develops a new approach to short-term electricity forecasting by focusing upon the dynamic specification of an appropriate calibration dataset prior to model specification. It challenges the conventional forecasting principles which argue that adaptive methods should place most emphasis upon recent data and that regime-switching should likewise model transitions from the latest regime. The approach in this paper recognises that the most relevant dataset in the episodic, recurrent nature of electricity dynamics may not be the most recent. This methodology provides a dynamic calibration dataset approach that is based on cluster analysis applied to fundamental market regime indicators, as well as structural time series breakpoint analyses. Forecasting is based upon applying a hybrid fundamental optimisation model with a neural network to the appropriate calibration data. The results outperform other benchmark models in backtesting on data from the Iberian electricity market of 2017, which presents a considerable number of market structural breaks and evolving market price drivers.

Index Terms- day-ahead electricity markets; electricity price forecasting; fundamental-econometric models; market structural breaks

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