

## **Comparison and empirical validation of optimizing and agent-based models of the Italian electricity market.**

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### **Extended abstract**

This paper proposes a twofold approach to modeling the Italian wholesale electricity market, by means of both a supply function equilibrium (SFE) model and an agent-based computational model. Both models are empirically validated on historical scenarios, considering a realistic market structure, i.e., the forward and day-ahead market mechanisms, the Italian high-voltage transmission network with its zonal subdivision, and the zonal loads. The aim of the paper is to compare the two modeling approaches with respect to their abilities to track the time dynamics of Italian wholesale electricity prices.

Both the agent-based and the SFE models use, as inputs, a unique dataset including detailed information on the cost parameters of Italian thermal power plants, and both share the same market-clearing procedure based on a DC-OPF procedure. The fitting performances of our models are tested on three different trading days, corresponding to different market regimes. As suggested by our findings, the agent-based model better fits the intraday profile of power prices, but both models overestimate the degree of competition among generating companies, especially on days before the macroeconomic crisis.