Forecasting day-ahead electricity prices: utilizing hourly prices
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- Addressed issue: Do hourly electricity prices contain useful predictive information for the daily average price? Two related questions:
  - ▷ Loss when only modeling aggregated data at a daily level?
  - ▷ Interdependencies between hourly prices?

- Time release of day-ahead prices: the prices of all hours are determined *simultaneously* by an auction mechanism the day before the delivery.
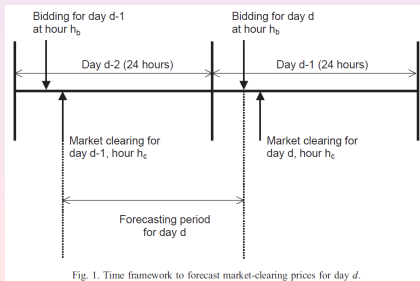

Fig. 1. Time framework to forecast market-clearing prices for day d.

Brief summary

- 2 competitive methods to forecast the daily average price
  - ▷ 1-step method: Univariate models for the daily average price
  - ▷ 2-step method: 1) Multivariate models for the 24 hourly prices, 2) Average of the forecasted hourly prices

- Multivariate models: diagonal VAR, Bayesian VAR, factor models, reduced rank regression

- Results of the out-of-sample evaluation on Nord Pool data
  - ▷ Multivariate models allowing for cross-sectional effects lead to more accurate forecasts
  - ▷ Among the multivariate models, superior performance of the BVAR models
  - ▷ Pooling results provide more reliable forecasts

Contribution to the literature

An intermediate approach between the modeling strategies often adopted in the existing literature:

- Treatment of the hourly prices as a single time series. See e.g. Nogales and Contreras (2002), Conejo et at. (2005), Liu and Shi (2013)

- Separate treatment of the hourly prices. See e.g. Cuaresma et al. (2004), Weron and Misiorek (2008), Karakatsani and Bunn (2008), Bordignon et al. (2013)

- + Direct modeling of the daily average price. See e.g. Koopman, Ooms and Carnero (2007), Schlueter (2010), Escribano, Pena, Villaplana (2011)

Some related papers: Huisman, Huurman and Mahieu (2007), Panagiotelis and Smith (2008), Maciejowska and Weron (2013)

Questions

- Treatment of spikes? Is it possible to extend this analysis with regime switching models?

- Only past prices are considered as explanatory variables. What about fundamental variables such as forecast demand or temperature, capacity margin, gas price,...?

- Cross-sectional dependence between the individual hours is found more important in recent years. Do you have any idea why?

- Focus on the price level. Similar results for the conditional volatility?

- It could be interesting to treat separately peak or off-peak hours. Indeed, disaggregated prices are correlated especially in two blocks: peak and off-peak hours.

- Isn't it possible to exploit the intra-day information with a MIDAS approach?