



Bachelor/Master Thesis

Quantitative Analysis of Base and Peak Electricity Futures in Germany

Electricity is traded on exchanges years in advance through futures contracts. Futures can serve as a risk management tool to hedge against future price volatility for both producers and consumers. The two most prominent products are baseload and peakload futures, which are typically structured as monthly, quarterly, and yearly contracts.

In Germany, the rapid expansion of solar photovoltaic (PV) and wind capacity has significantly altered the residual load curve. Specifically, PV generation has led to the formation of a duck curve, where midday hours exhibit a valley in residual load, flanked by price peaks in the morning and evening. This transformation has implications for the pricing of baseload and peakload products, as the fit of these products to the load curve has changed. For example, the significant difference in PV yield between summer and winter has caused peakload pricing to sometimes become cheaper than baseload pricing during summer months.

Alongside the effects of renewables on the residual load curve, the generation mix has shifted, with the phase-out of nuclear power and certain coal plants. Additionally, volatility in CO2 prices and especially gas prices has impacted the pricing of futures products. As a result, the liquidity and price relations of baseload and peakload futures across different time scales have undergone changes, which should be analyzed in the thesis.

Key tasks and objectives of the thesis

- Analyze the price levels, price relations (base to peak), and liquidity of German electricity futures over multiple years.
- Investigate the evolution of the residual load curve across time scales relevant for electricity futures (annual, quarterly, monthly).
- Examine fundamental drivers including CO2 prices, fuel prices, and generation capacity of futures pricing.
- Find reasoning behind the evolution of futures products in light of these fundamental changes.

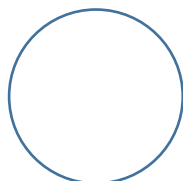
Your profile

- Student of Economics, ideally with a focus on electricity markets and quantitative skills

Literature

- Bonaldo, F., et al. (2022). The relationship between day-ahead and future prices in electricity markets: An empirical analysis on Italy, France, Germany, and Switzerland. *Energy Economics*, 102, 105-120.
- Data from EEX can be provided (<https://www.eex.com/>)

Contact



Contact

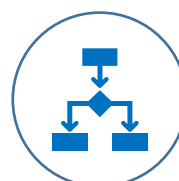
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Topics



- Electricity Futures

Methods



- Quantitative Analysis