

# An Empirical Analysis of the Bid-ask Spread in the Continuous Intraday Trading of the German Power Market

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Electricity can be traded in the short-term bilaterally or in a centralized market. The quality of a market may be measured by its liquidity: the ability to quickly buy or sell power for an amount of time. This information is crucial for a market participant in its choice to participate in the centralized market because illiquidity may be interpreted as an implicit transaction cost. In this paper, I examine the question of the liquidity of a continuous market for electricity: when is the liquidity maximum during a trading session and what are the main drivers or it?

In Germany, most of the short-term power trading (about 88% in 2015) is done the day before delivery during the day-ahead auction. The remaining volume is traded during a continuous based market – also called intraday continuous market, which occurs from after the day-ahead up to the delivery. The increase of renewable sources creates more uncertainty on the generation side which explained the increasing trend of the volume traded on the continuous market. This market is then an interesting case for a continuous market with increasing renewable generation, particularly in the context of the expansion of the continuous market in Europe thanks to the pan-European harmonization projects.

This research aims to bring the questions of the market microstructure literature to the power market literature. Both literatures are dense, but the microstructure one mainly focuses on traditional financial markets such as securities or stocks while the power market literature does not deal much with microstructure issues. This paper wants to start to fill this gap using a unique dataset.

Using the complete order book of the German continuous power market, I measure the liquidity of the market using the bid-ask spread as a proxy. The bid-ask spread is the difference in price between the best seller offer and the best buyer offer. It can be interpreted as a premium in order to be immediately executed.

In a first part, I reconstitute the order book of the market and represent the behavior of the bid-ask spread and market depths over an average trading session. I find that the bid-ask spread has a “L-shape” along the trading session: at the beginning of it, the bid-ask spread is large due to the uncertainty away from the delivery. As the trading session progresses, the bid-ask spread decreases. Most of the liquidity of the market is concentrated during the last hours of the trading session. This result is in line with the fact that 80% of the trading occurs during the last 3 hours of the trading session. On average, the local bid-ask spread is of 3.5€/MWh.

In a second part, using a reduced-form equation, I express the bid-ask spread by its four main drivers: the risk, the adjustment needs, the activity and the competition on the market. I find that an increase of the market volatility (measured by the weighted price standard deviation) increases the bid-ask spread. When there is a need for adjustment due to a load, solar or wind forecast error, the bid-ask spread gets narrow. When there is more activity (measured by the load) or competition (measured by the Herfindahl Index), the bid-ask spread decreases.

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