

German Institute for Economic Research

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# The need for and benefits of intra-day auctions - evidence from Germany

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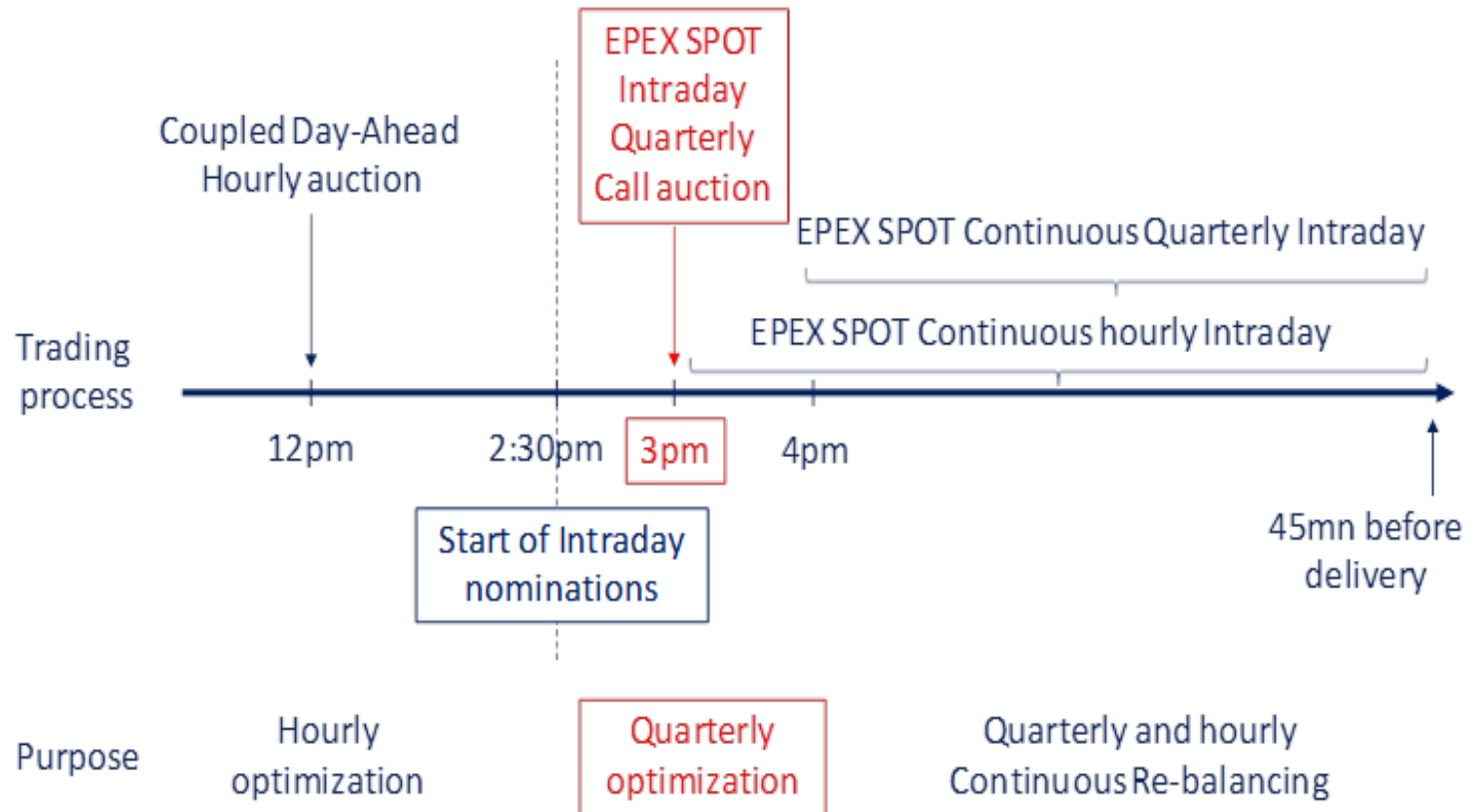
EPEX Spot SE

Electricity Policy Research Group Cambridge, 13.05.2016

# The need for and benefits of intra-day auctions - evidence from Germany

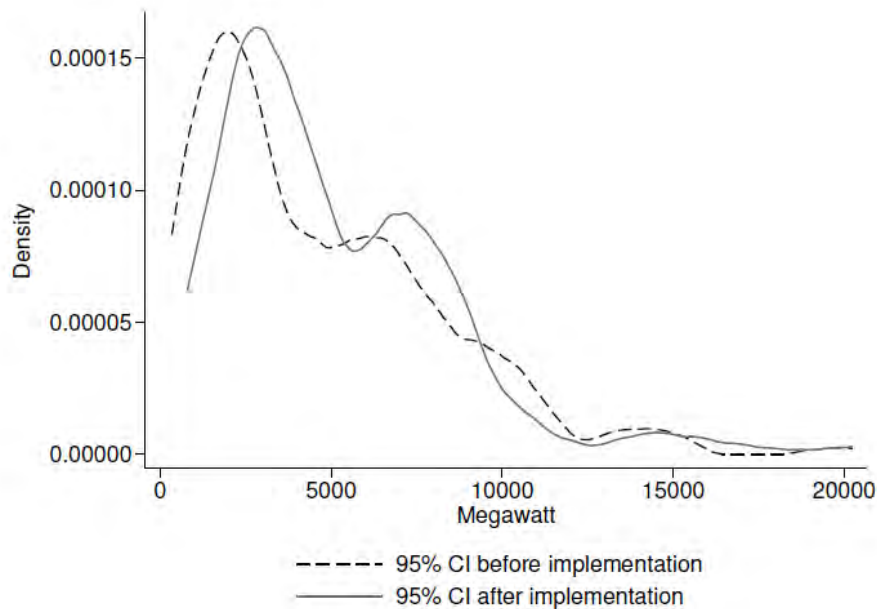
- 1 Short-term electricity trading in CWE
- 2 Impact of intraday auctions on liquidity of markets
- 3 Impact of intraday auctions on depth of market
- 4 Impact on reference price for derivative products
- 5 Impact on flexibility brought to market
- 6 Impact on security of system operation
- 7 Allocation & pricing of cross-zonal transmission capacity

# Timeline of trade at EPEX

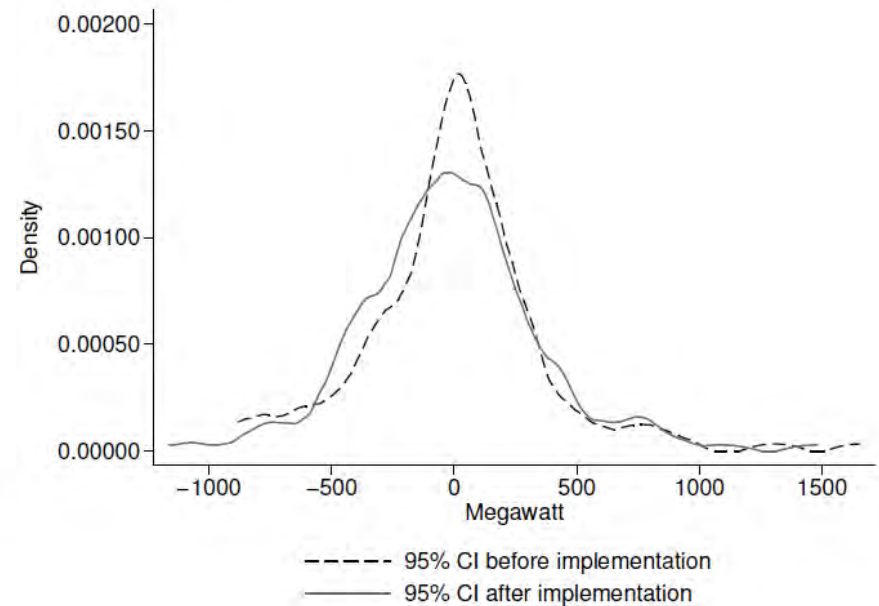


- 2014, EPEX introduced a uniform price auction for 15 min. products
- Otherwise, the market structure remained identical
- Identification of causal effects of the newly implemented auction:
  - Compare observations within 90 days before and after the implementation

## Similarity of variables by matching stage

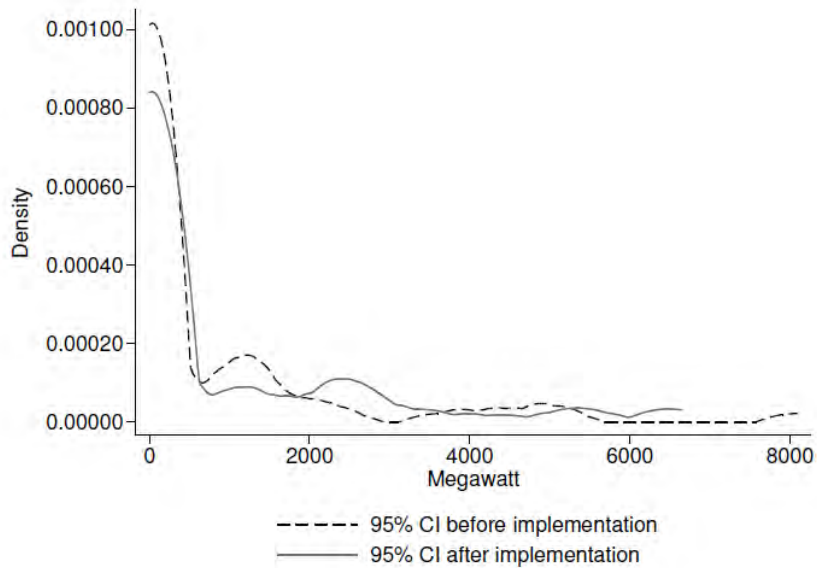


(a) Wind generation

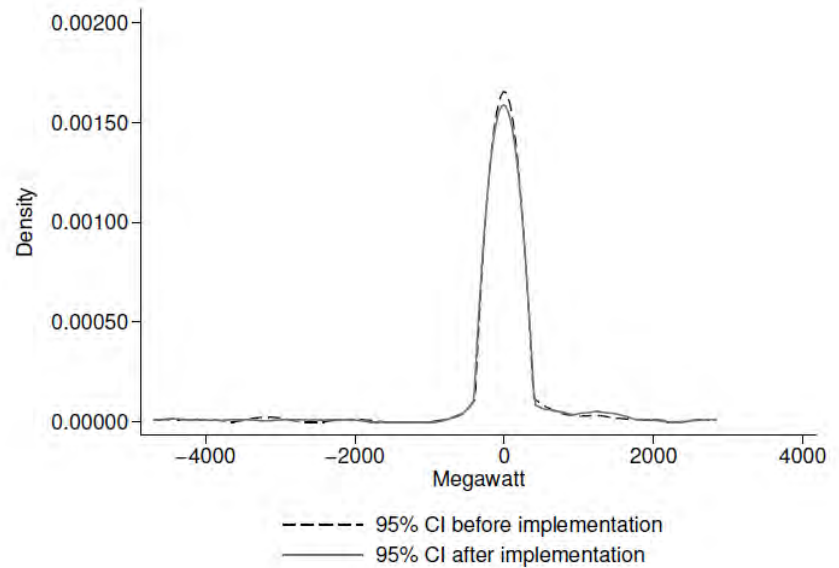


(b) Change in wind generation

## Similarity of variables by matching stage

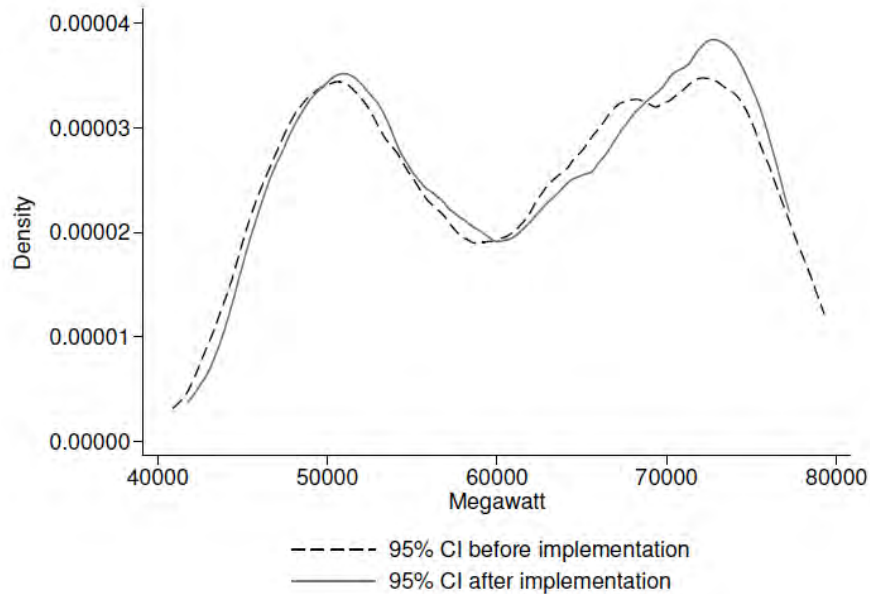


(a) Solar generation

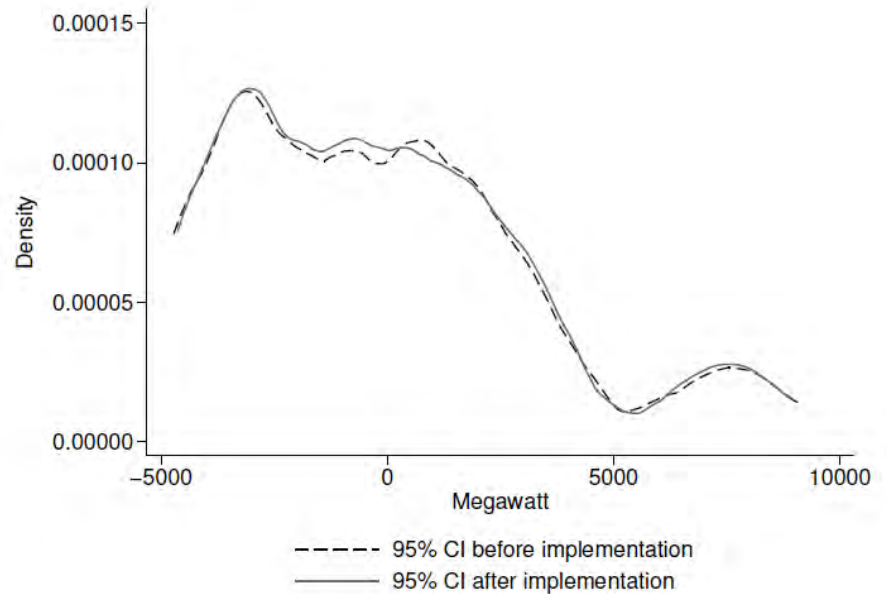


(b) Change in solar generation

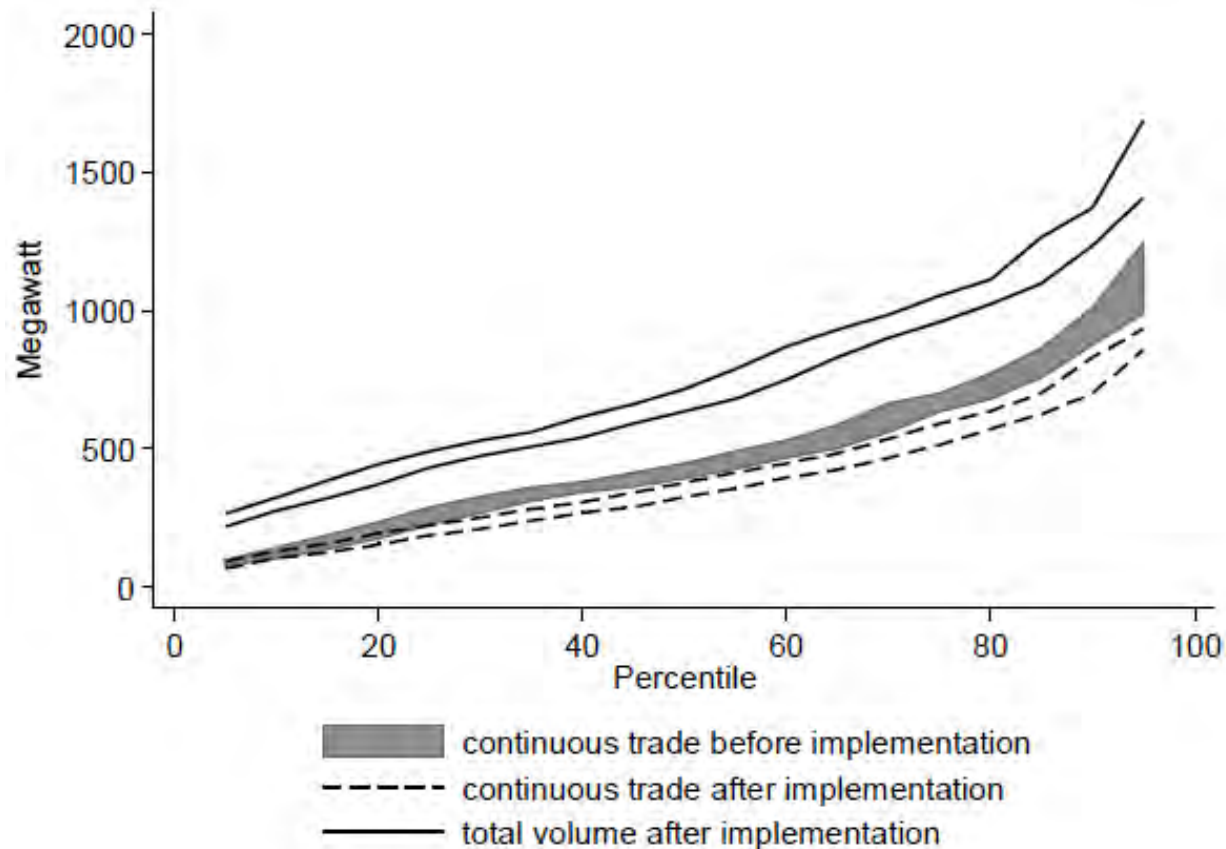
## Similarity of variables by matching stage



(a) Total load



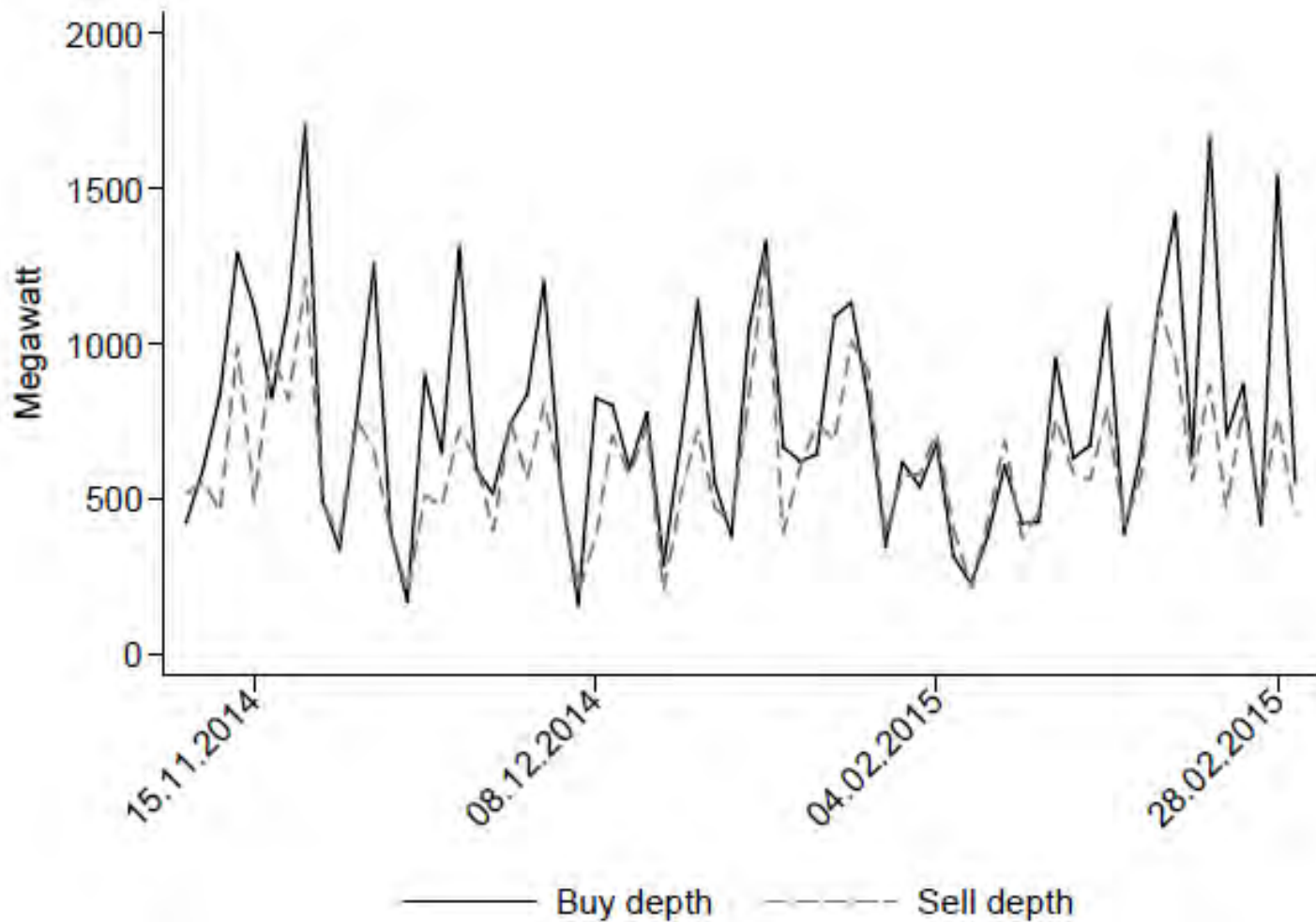
(b) Change in total load

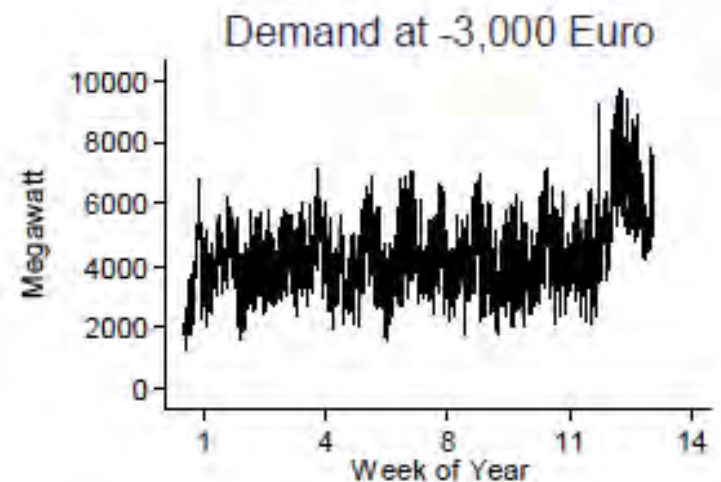
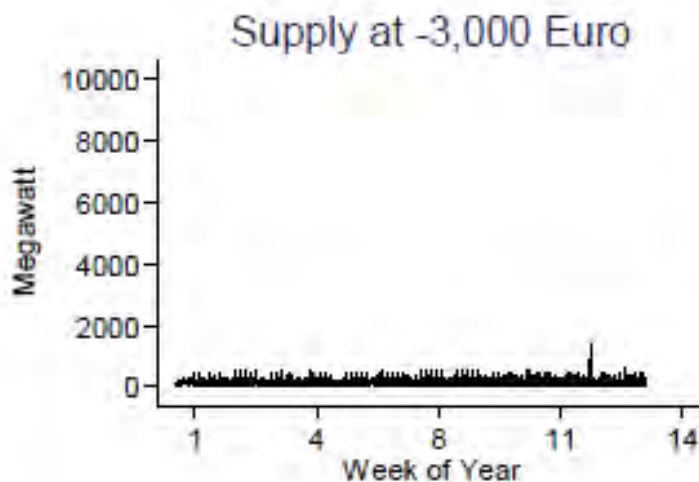
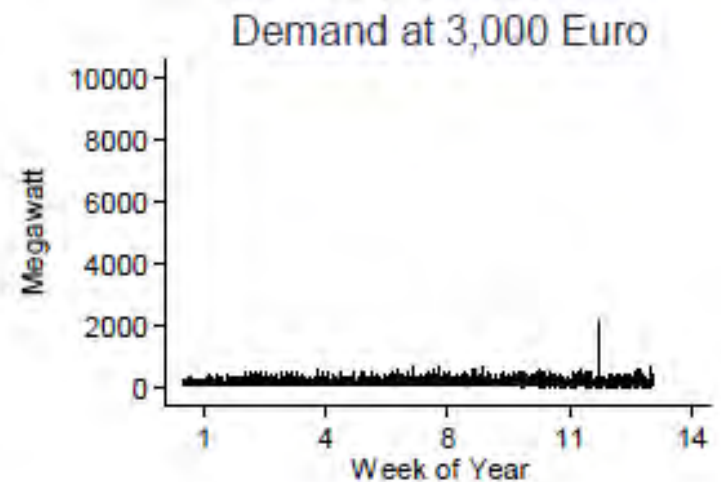
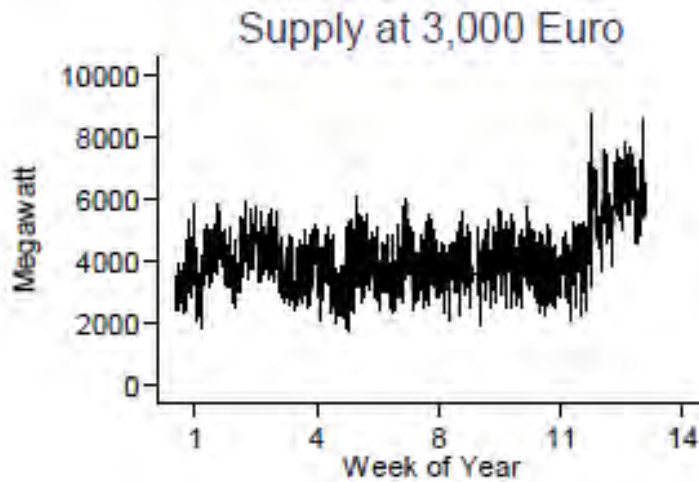




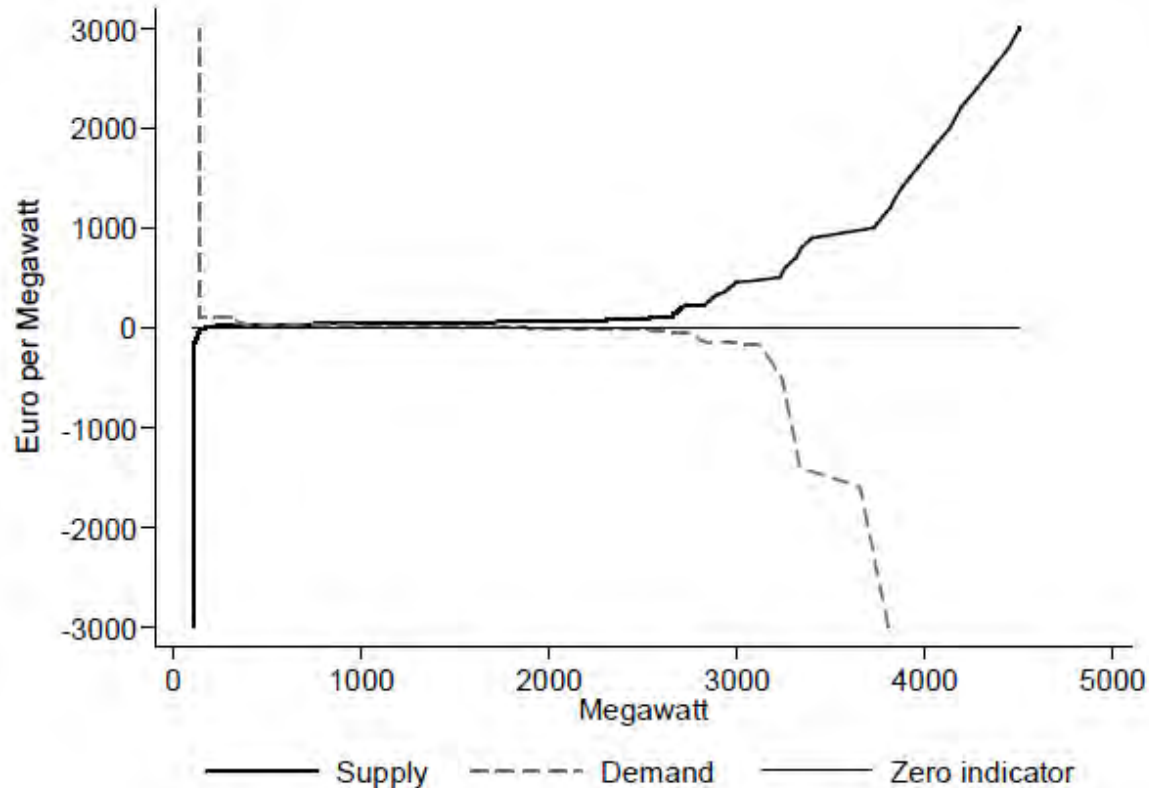
- 3pm auction reduced trade of 15 min. products in the continuous market
- However, the trade volume at the auction overcompensates the reduction in continuous trading
- Thus, the auction increases total trade volume
  
- In case that trading is more beneficial compared to producing, rational market participants chose to trade.
- All else equal, increases in the trading volume indicate increases in market efficiency.

# 3 Order book depth on the 15min continuous intraday market





# Bid-offer curve of the 15mn auction

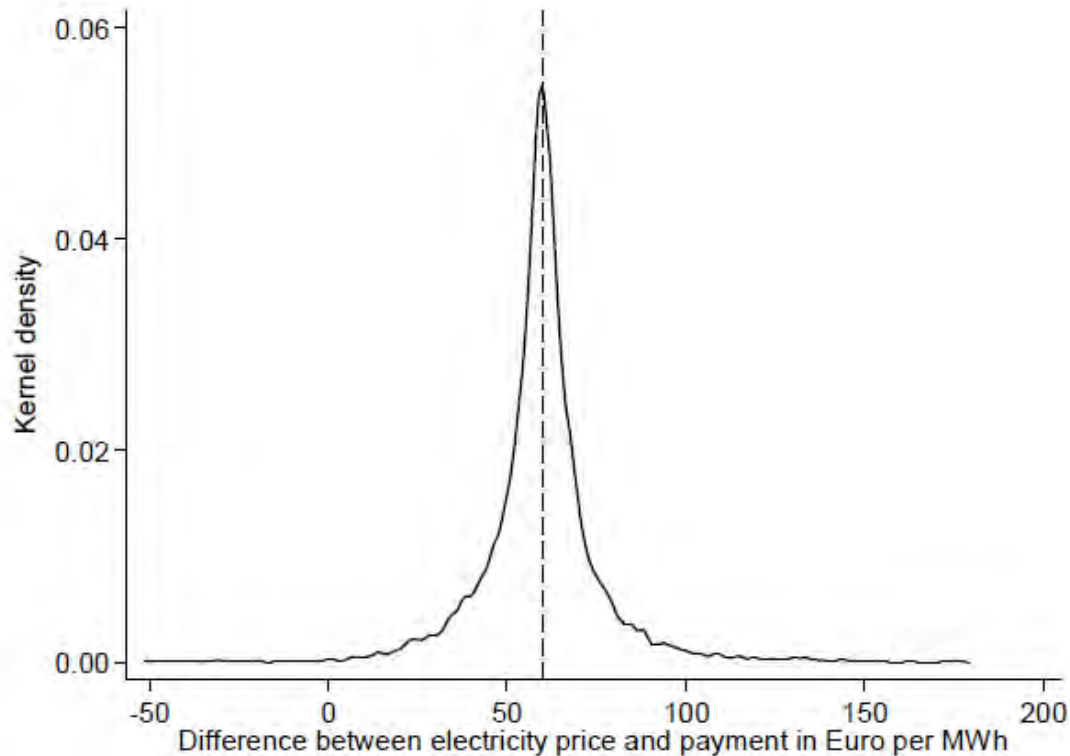


Auction March 15, 2015: 1200 to 1215 CET

## 4

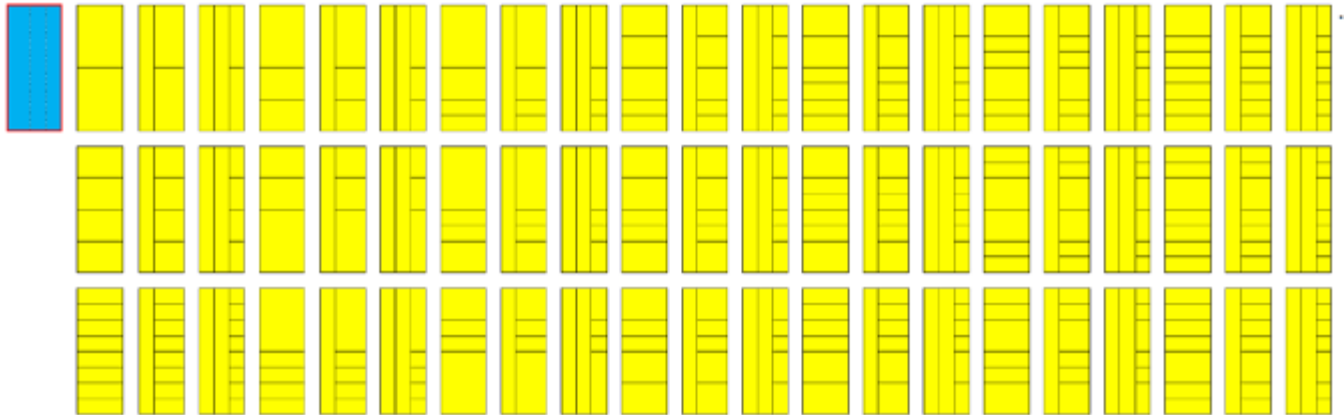
## Delta electricity prices and payments from cap future

Volume weighted price index for the cap futures Jan 2014 – April 2015 (2,5 Mio. Trades)



- In 5% of the transactions the basis risk is more than 86 €/MWh.
- Referenced to an index based on continuous trading, it is not possible to fully hedge one's positions.

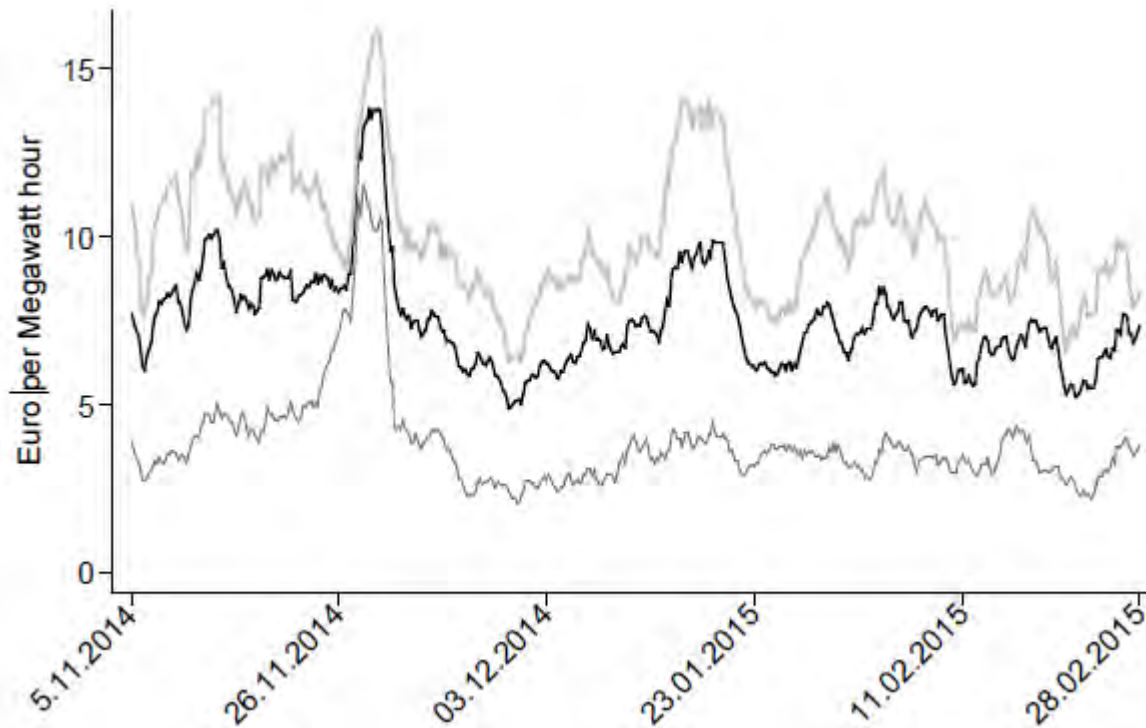
Matching a simple 3MW hourly order with hourly, half-hourly or quarterly order combinations.



- Penetration of algorithmic trading in intraday exchanges
  - > higher trading speeds, turnover rates, order-to-trade ratios
- More than 100,000 intra-day orders per day in Germany
- Risk of backlogs and ultimately secure operation

Number of automated trading applications almost doubled

*Moving average of Bid/Ask-Spreads using 15 observations*



**-> automated traders do not improve the bid/ask spread**



# 7 Allocation & pricing of cross-zonal transmission capacity

## **Pricing of T capacity in continuous trading difficult**

- ex-ante set price inhibits efficient trades / can violate T
- ex-post set price – trading risk limits arbitrage

## **Allocating T capacity on first come first serve (for free)**

- gives scarcity value to traders not consumers
- inefficient use of scarce resource in flow based approach

**-> Politics changed as robots captured margins from traders**

## The need for and benefits of intra-day auctions - evidence from Germany

- 1 Intraday auctions enhance liquidity of markets
- 2 Intraday auctions enhance depth of market
- 3 Intraday auctions provide reference price for derivatives
- 4 Intraday auctions enhance secure system operation
- 5 Intraday auctions allow efficient use and pricing of T
  - > Agree on multi-part bids for full flexibility
  - > This allows for standing orders and attractive frequency