# Ex-Post evaluation of competition policy enforcement in energy markets: The E.ON abuse of dominance case

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# Introduction – Ex-post Evaluation of Competition Policy

- Large consensus on the welfare-enhancing properties of **competition**
  - Achievement of allocative, productive & dynamic efficiency → increases productivity & growth
- More limited evidence on whether **competition policy** is socially beneficial
  - Broad policy with many different tools affecting all markets simultaneously
- Increasing policy and academic interest
  - Ex-post (retrospective) policy evaluations are becoming integral part of competition policy enforcement (US FTC, EU DG COMP, UK CMA, OECD…)
- Today: Study for DG Competition on the ex-post evaluation of competition policy enforcement in energy markets
  - Broad econometric analysis: cross-country approach, firm level data
  - Case study I: **Abuse of dominance in the Germany wholesale electricity market**
  - Case study II: GDF-Suez merger – focus on the Belgian gas market
- A similar study on the ex-post evaluation of competition policy enforcement in telecoms markets concluded this month (will be published in December)

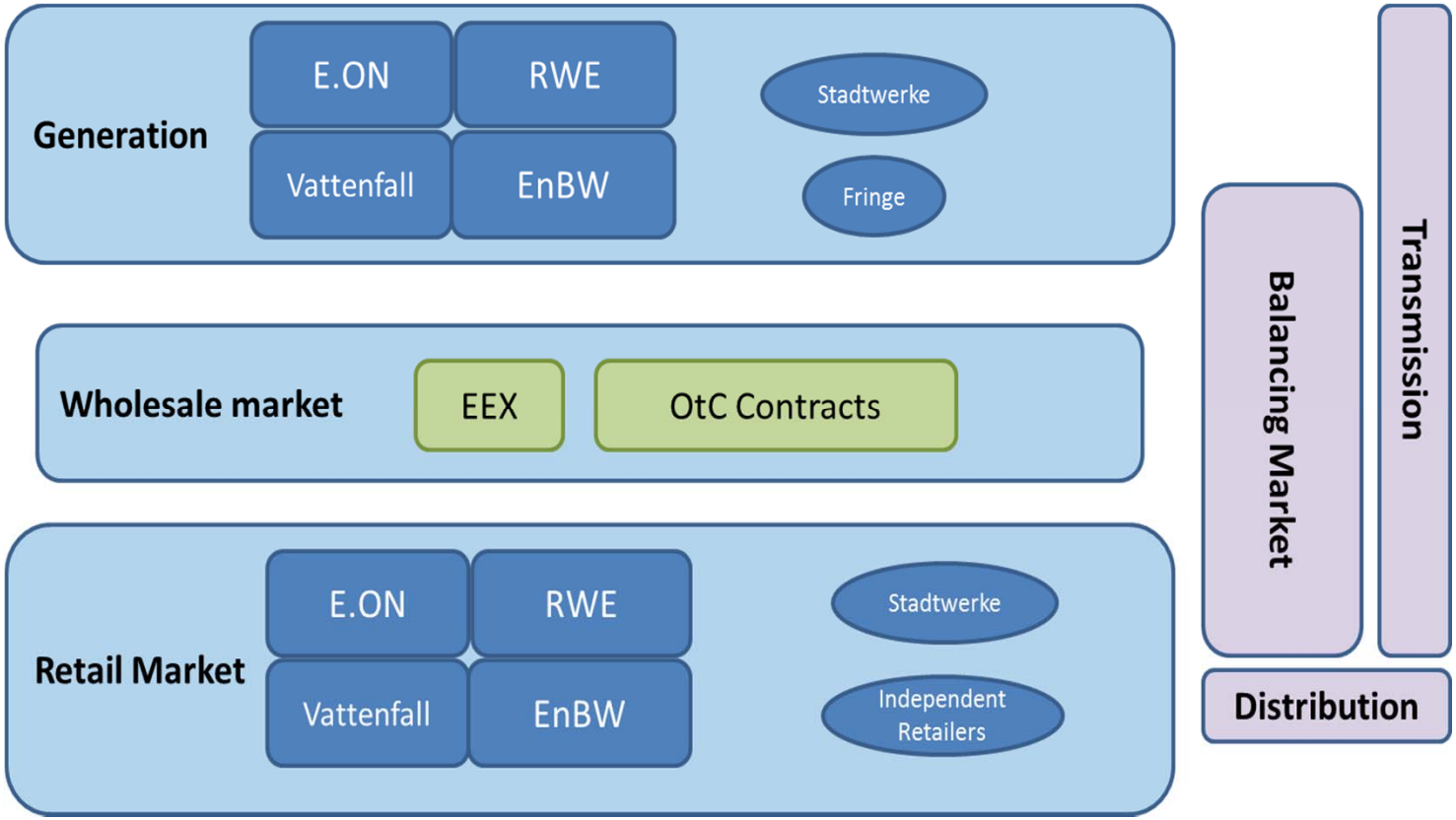
# Introduction: E.ON (Alleged) Abuse of Dominance Case

- In 2008, the EU Commission alleged that E.ON **withheld electricity production capacities** with the aim to increasing wholesale prices → price increases and harm for consumers (exploitative abuse)
  - Case concerns the German electricity wholesale market in the 2002-2007 period
  - Individual abuse of joint dominant position (E.ON, RWE, EnBW, Vattenfall, ~70% market share)
  - E.ON committed to divest **5,000 MW** of capacity to resolve concerns
- The Commission alleged that E.ON favoured its production affiliate for providing **balancing services**
  - E.ON committed to **divest its extra-high voltage network** in early 2010
- The case was settled during the investigation: It never really came to a decision and the abuse was never proved
- We cannot cleanly distinguish the effect of the two decisions but we believe the former to have a first order impact while the latter a second order effect

# Introduction: Why this case?

- Focus on energy markets
  - Crucial sector of the economy, high priority for the EU Commission
- Focus on an abuse case
  - Many ex-post evaluations of merger cases but no existing ex-post evaluation of an abuse case
- Focus on upstream Market
  - Generally ex-post evaluations focus on downstream/retail markets: how to deal with other markets?
- Focus on the analysis of the effect of remedies
  - Several remedies applied at different point in time
  - High-frequency of the data potentially allows identification
- Possibly better data, more expertise on the market

# Introduction: The German Electricity Market

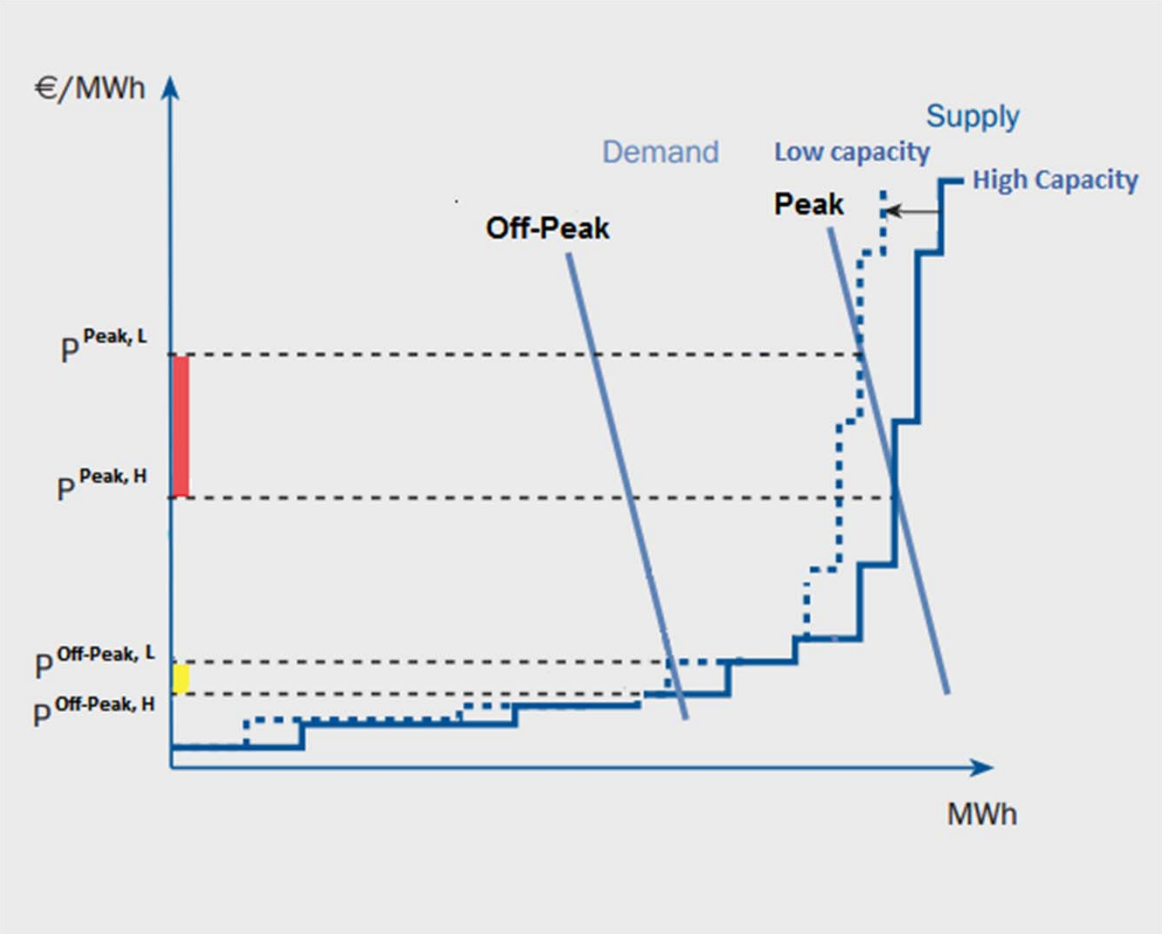


# Introduction: The German Electricity Market

- Big four **vertically integrated firms** (**E.ON**, **RWE**, **EnBW** & **Vattenfall**) are dominant at all layers (wholesale over 75% MS, transmission/distribution, retail over 50% MS)
  - Most of energy trade (ca. 80%) done by means of long-term bilateral contracts between wholesaler and retailers but EEX is a benchmark for wholesale prices
  - Other players: 1) municipal firms 2) small independent entrants (especially in retail)
- Analysis of both upstream **wholesale market** and downstream **retail market**
  - Both analyses based on a **difference-in-difference** estimation strategy
  - Different identification strategies, different data
  - Key ingredients: definition of the '**counterfactual**', definition of the '**before-and-after**' periods
- For this presentation focus on the **wholesale market** analysis

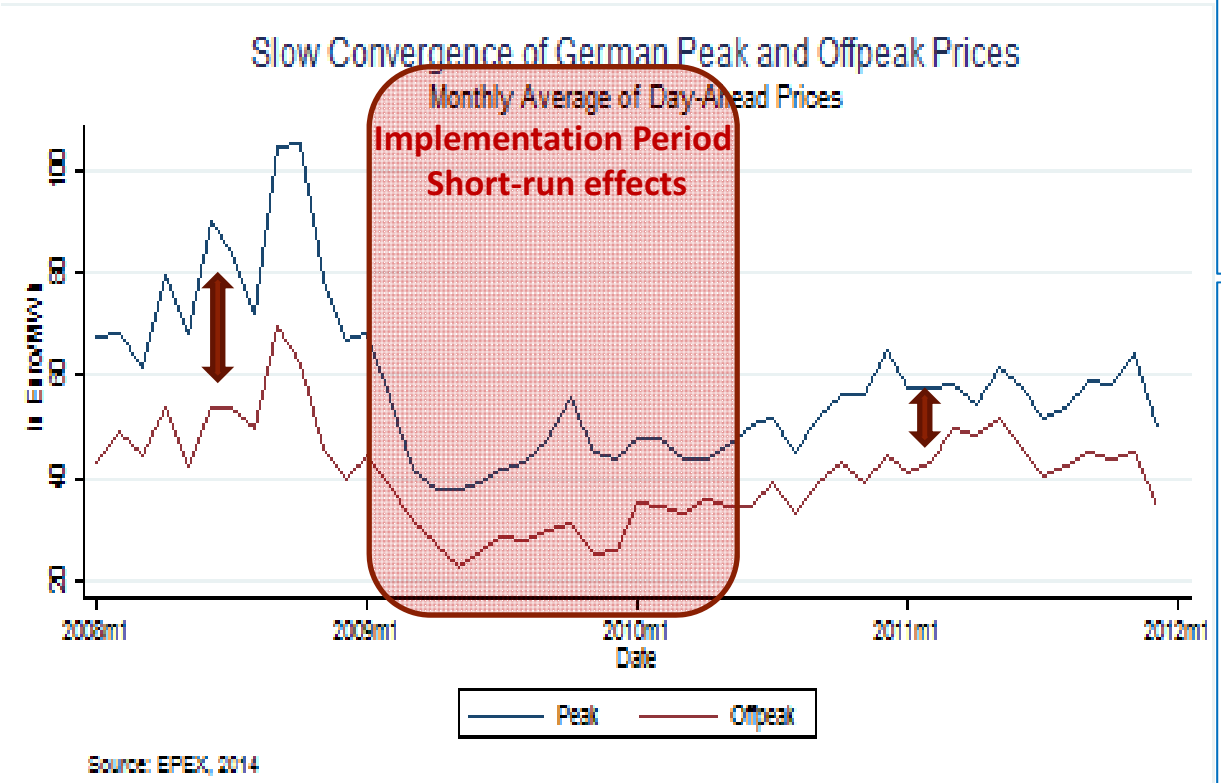
# Wholesale Market: Identification I

- Under which circumstances do firms have market power and can abuse it?



# Wholesale Market: Identification II

Difference-in-Difference approach




## Treatment

Market Power is larger closer to the capacity limit, i.e. during peak times (8am-6pm) → peak prices should be more affected by the abuse

## Before-and-after

**Long term scenarios**: after 2009 or after 2010 (excluding 2009) → diff-in-diff

**Short term scenarios**: one week after the implementation of each remedy → 'event study'

# Wholesale Market: Empirical Framework

- Basic model for wholesale prices (Böckers and Heimeshoff, EnJ 2014):

$$p_{it} = \sum_{y=2008}^{2012} \theta_y Y_{y,t} + \sum_{m=1}^{11} \vartheta_m M_{m,t} + \sum_{d=1}^{6} \mu_d D_{d,t} + \rho_1 \, temp_{it} + \tau_1 holiday_t + \omega_1 uranium_t$$
$$+ \omega_2 coal_t + \omega_3 gas_t + \omega_4 oil_t + \omega_t emission_t + \alpha_1 wind_{it} + \alpha_2 sun_{it}$$
$$+ \alpha_3 cross - border\ flows_t + \beta peak_i + \gamma post + \boldsymbol{\delta peak_i \times post} + \epsilon_{it}.$$

  - $p_{it}$ is the daily EEX power price
  - Demand-side drivers (day, month, year, holiday, and temperature)
  - Supply-side drivers (prices of uranium, coal, gas, oil, and price for emission certificates)
  - Electricity production from renewable sources (wind, sun)
  - Integration of European electricity markets (cross-border electricity flows and a dummy for the market-coupling period)
  - Account for autocorrelation in the errors terms (Newey-West standard errors - 7 days)

- Key variable is the interaction between *post* and *treat*
  - Coefficient ($\delta$) measures the peak price change relative to the off-peak price change

# Wholesale Market: Data

- The data come from different sources.
  - The power exchange prices are taken from the respective (national) power exchanges and come from the Platts database
  - Coal price is a combined price series of two sources (Platts and Argus McCloskey)
  - Oil price index is chosen from ICE Brent Europe (in $/tonne),
  - Gas price reference is that of ENDEX/TTF,
  - Emission certificates price is the weighted emission certificate price from the EEX.,
  - Electricity consumption is retrieved from the ENTSO-E country reports,
  - Several other sources for the other control variables (Deutscher Wetterdienst, website of the network operators, Solarwirtschaft.de, …)

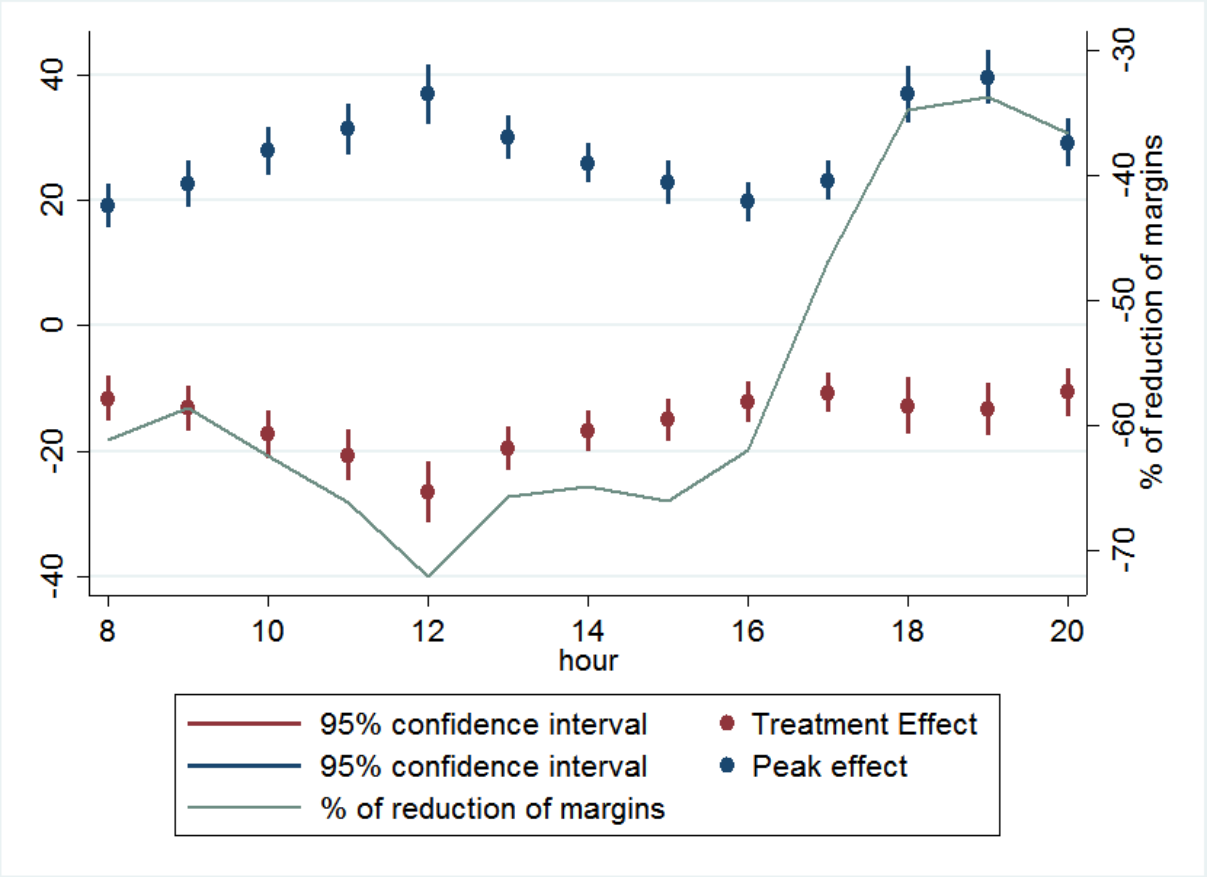
# Wholesale Market: Main Results

| | Post 2010 | Post 2009 | Short-Run | Single Div. |
|---|---|---|---|---|
| Peak | 30.84*** | 31.03*** | 19.68*** | 19.83*** |
| | (1.89) | (1.79) | (1.00) | (1.03) |
| Peak × Post | -15.37*** | -14.58*** | -3.22** | |
| | (1.65) | (1.66) | (1.54) | |
| Peak × Div. 1 | | | | -2.48 |
| | | | | (2.65) |
| Peak × Div. 2 | | | | -4.47*** |
| | | | | (1.62) |
| Peak × Div. 3 | | | | 0.18 |
| | | | | (2.28) |
| Peak × Div. 4 | | | | 3.57 |
| | | | | (3.25) |
| Peak × Div. 5 | | | | -2.40** |
| | | | | (1.19) |
| Peak × Div. 6 | | | | -9.55*** |
| | | | | (2.16) |
| Peak × Div. 7 | | | | -4.37*** |
| | | | | (1.31) |
| Peak × Div. 8 | | | | -6.54*** |
| | | | | (2.27) |
| Constant | 40.32*** | 38.38*** | 46.66*** | 47.89*** |
| | (7.46) | (6.33) | (7.92) | (8.24) |
| Cumulative post effect | -7.09*** | -11.85*** | -20.06*** | -20.84*** |
| | (2.74) | (4.30) | (4.97) | (5.62) |
| N | 2190 | 2916 | 2890 | 2916 |
| Adj. $R^2$ | 0.7800 | 0.7900 | 0.7626 | 0.7625 |

The dependent variable is the daily average peak or off-peak price at the EEX power exchange. We control for input prices (gas, oil, coal, uranium, and emission), day, month, and year dummies, solar and wind energy production, temperature, cross-border capacities, market coupling, as well as holydays. Newey-West standard errors with maximum lag order of autocorrelation equal to seven days are reported in parentheses. The symbols ***, **, * represent significance at the 15, %%, 10% levels respectively.

# Wholesale Market: Additional results – Non-monotonic effect

- Using different peak Hours: Non-monotonic effect



# Wholesale Market: Additional Results – Placebo analysis

- To support our identification strategy, we run our regressions on 'placebo' countries
  - I. Spanish wholesale electricity market was not integrated to Germany and should not be impacted by the E.ON abuse
    - Small significant convergence (3 EUR MWh) between peak and off-peak prices after 2009 or 2010
    - No significant convergence in both short-term specifications
  - II. French wholesale electricity market more closely integrated to Germany and could be impacted by the E.ON abuse
    - Significant convergence (15 EUR MWh) between peak and off-peak prices after 2009 but it disappear in 2010 → 2009 very special year for France
    - No significant convergence in both short-term specifications. But few significant effects around some divestitures

# Wholesale Market: Robustness checks for Inferences

- Autocorrelation in the residuals is one of the main econometric issues for inferences
  - We use a Newey-West estimator with 7 periods (days) lags
- We run robustness checks
  - Lower order autocorrelation: Newey-West estimator with lower order autocorrelation lag (two days) → no difference
  - Bootstrapped standard errors (1000 iterations) → results minimally affected, loose some significance
  - Weekly data: We use weekly averages for the peak and off-peak prices → qualitative and quantitative results are the same

# Wholesale Market: Conclusions

- Our findings are consistent with the view that Commission's decision, by affecting competition in the wholesale market had the effect of reducing prices
  - Strong and statistically significant convergence between peak and off-peak prices in the short-run as well as in the long-run
  - The size of the effects is economically relevant varying between 3 to 15 EUR MWh
  - The effect is non-linear and larger the higher the market power (the higher the peak price)
  - Placebo regressions based on Spanish and French data support our identification strategy
  - We run several checks to test the robustness of our inference
- CAVEATS
  1. We cannot separately identify the extent of the alleged abuse *and* the effect of the decision
  2. We cannot (cleanly) identify the effect of the different remedies – though we have some evidence
  3. We cannot exclude that other relevant events which affected the functioning of markets might also be driver of the observed results
     - Evidence of no type II error but we cannot say much on type I errors