



ENERDAY 2013

Testing Common Myths on Fuel Prices

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Fuel Prices in Germany

- ◆ Highly emotional topic
- ◆ Central research questions
 - correlation of fuel prices and oil prices, often with daily or weekly data
 - Questions regarding market power
- ◆ Small amount of research based on recent fuel data
 - Some activity of the Federal Cartel Office (FCO) and German Automobile Club (ADAC)

Myths/Research Questions

(1) Are fuel prices higher in the morning?

Hypothesis: Specific $P_{\text{Morning}} > \text{Specific } P_{\text{Daily Average}}$

(2) Are fuel prices higher on Fridays?

Hypothesis: Specific $P_{\text{Friday}} > \text{Specific } P_{\text{Weekly Average}}$

(3) Are independent fuel stations (IFS) cheaper?

Hypothesis: Specific $P_{\text{IFS}} < \text{Specific } P_{\text{Daily Average}}$

- ◆ We have a dataset with about 13,000 data points (diesel, super gasoline) for 2011
- ◆ Source: internet price data base for Germany – fuel consumers entered data via smartphones/internet into homepages
- ◆ Collected data characteristics: fuel price, date, time, brand, postal code...

Methodology

- ◆ One-sample t-test/test for differences

$$t = \frac{\bar{z}}{\sqrt{\frac{1}{(n-1)} \sum_{i=1}^n (z_i - \bar{z})^2}} * \sqrt{n}$$

z – difference between two evaluated variables (myths)

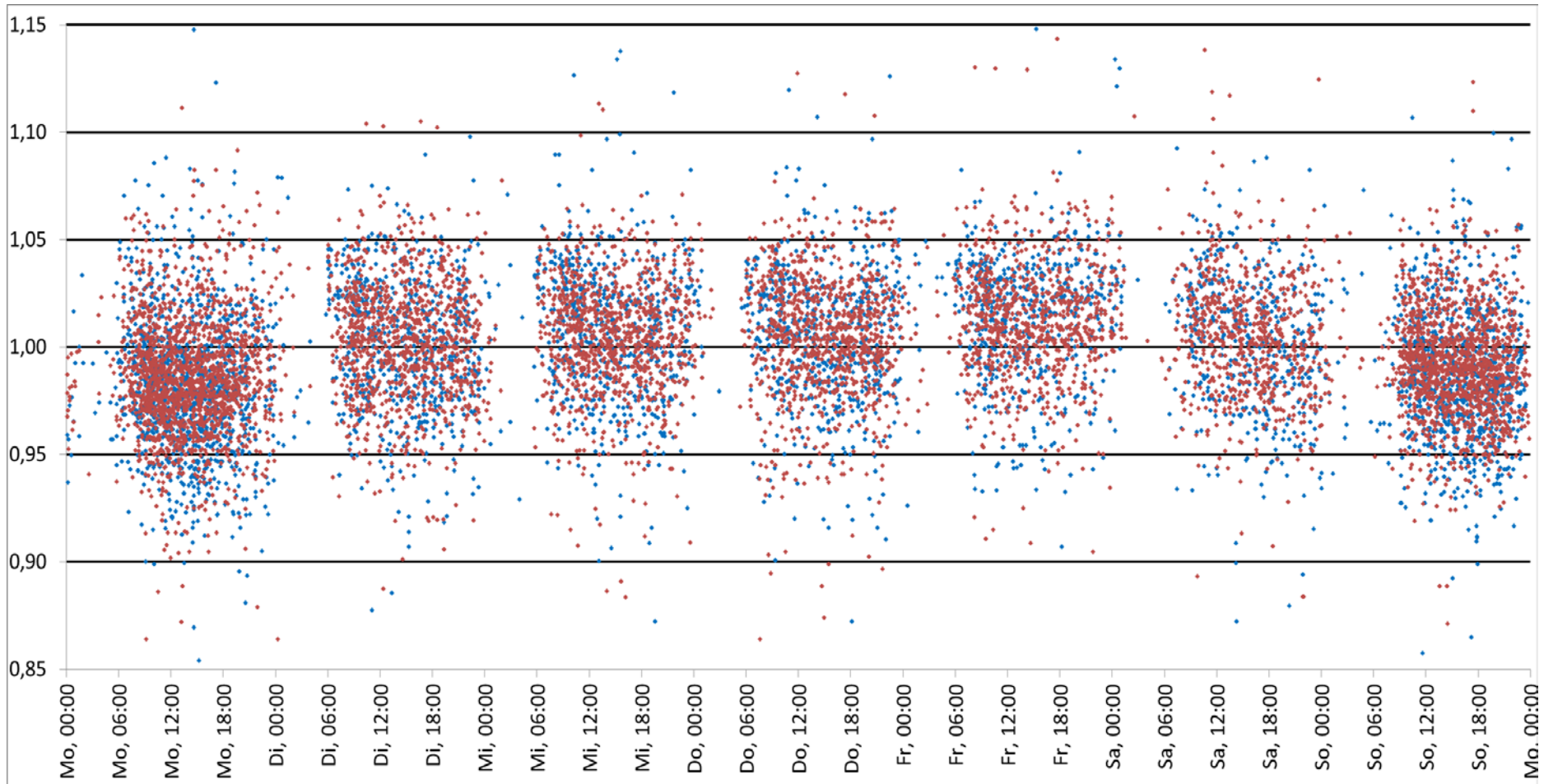
n – amount of datasets

- ◆ significance level – 0.05, one-sided
- ◆ Region of rejection for (1) and (2) $B = (1.645; \infty)$, respectively for (3) $B = (-\infty; -1.645)$
- ◆ Other tests:
 - Sign Test
 - Wilcoxon-Test

Results (I)

- ◆ We found highly significant results for the rejection of all three null hypotheses
 - Fuel prices are higher in the morning compared to the daily average price ($t = 6.33$; difference of $\approx 0.5\%$)
 - Fuel prices are higher on Fridays compared to the weekly average price ($t = 17.12$, difference of $\approx 1.2\%$)
 - the intuitive explanation that demand is higher seems not responsible (FCO, 2011)
 - Fuel prices of independent fuel stations are lower compared to the daily average price ($t = -7.99$, difference of $\approx -0.4\%$)

Results (II): Fuel prices related to the weekly average for **diesel** and **super gasoline**



- ◆ Testing for further myths
 - Other daily seasonalities
 - annual price characteristics (Are fuel prices higher at the beginning of public holidays?)
 - ...
- ◆ What effect will a changed legislation bring?
 - Institution for Market Transparency (coming in Summer 2013)

Thank You for Your attention!

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