

Do Gas Stations Pass Through Cost Changes? Big Data Evidence from Germany

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Introduction

- There are contradictory results regarding the degree of competition in the gas price market.
 - ▶ IEA (2012) finds the german gas price market competitive.
 - ▶ Bundeskartellamt (2011) found oligopolistic structures.
Afterwards, there was some discussion about regularization of gas prices changes.
- We look at brand-specific cost pass-through.

Cost pass-through

- Walters et al. 2014, p.1,4: “ ”Cost pass-through” describes what happens when a business changes the price of the products or services it sells following a change in the cost of producing them.[...] Cost pass-through arises when a business changes the prices of the products or services it supplies following a change in its costs.”

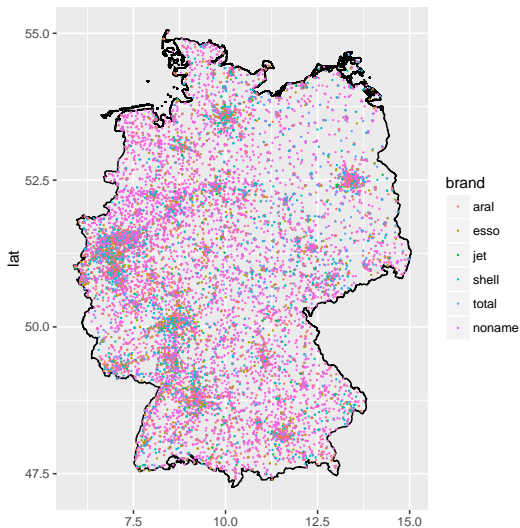
Cost pass through

- The value of pass-through depends on the structure of the market: Pass through equals 1 if the market is perfectly competitive and marginal costs are constant (Yde and Vita 1996).
- Under competition, cost-pass-through only increases if cost changes are industry wide (Ten Kate and Niels 2005). This is the case for gas prices.
- We test whether cost-pass through is statistically different from 1, for every brand.

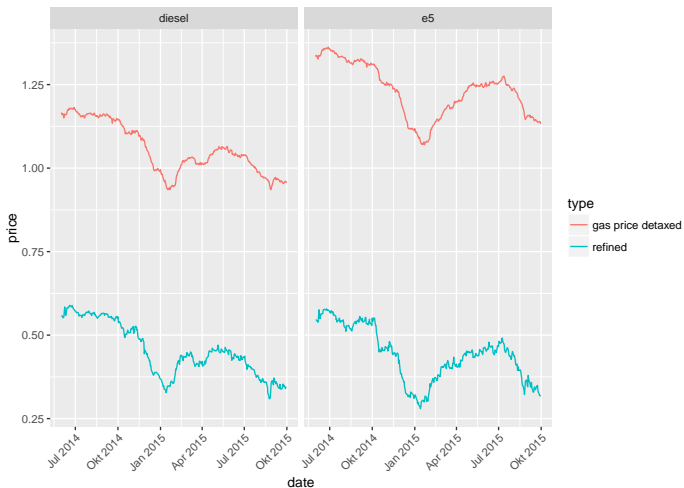
Data

- Large panel data set (6.6 million observations) for [2014-06-01,2015-09-30].
- Contained are daily price averages for e5 gas and diesel, data on the gas stations and refinery prices.
- Brands are shell, total, aral, esso, jet all other are categorized as noname.

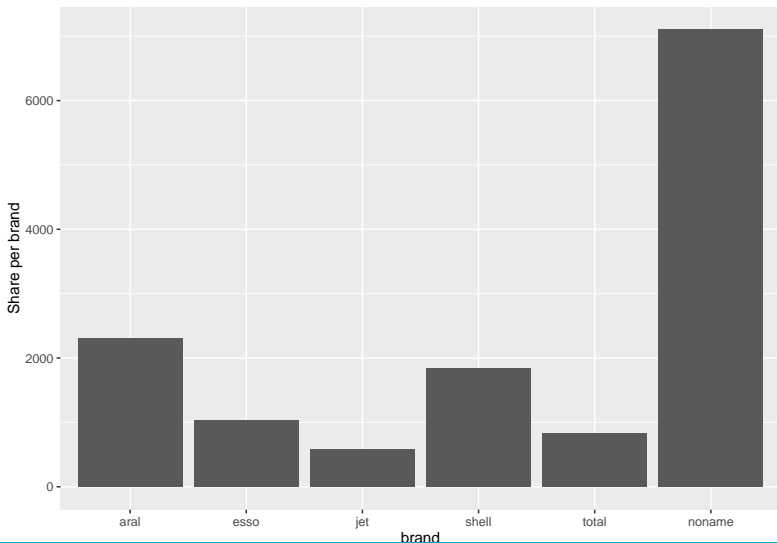
Gas stations in panel



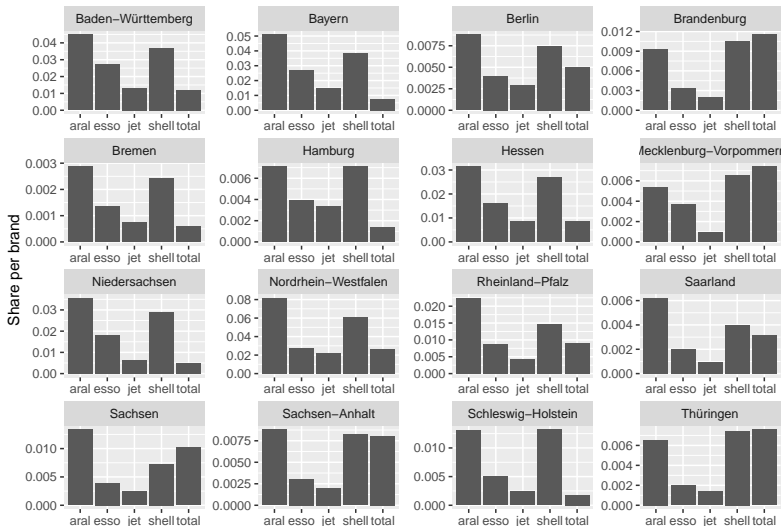
Prices for e5 and diesel + refinery prices



Brand counts



Brand shares per county



Econometric model

- Of interest is the change in price given a *marketwide long run* change in cost. We use an infinite distributed lag model with estimating equation:

$$\text{price}_{i,j,t} = \alpha_{i,j} + \gamma_{0,j} \text{refinery price}_t + \gamma_{1,j} \text{refinery price}_t + \rho_j \text{price}_{i,t-1} + v_{i,j,t},$$

where

i = gas station

j = brand

t = time.

Econometric model

- Cost pass-through is given by the long run propensity:

$$LRP_j = (\gamma_{0,j} + \gamma_{1,j}) / (1 - \rho_j),$$

for every brand.

- Variance estimation obtained via delta method.

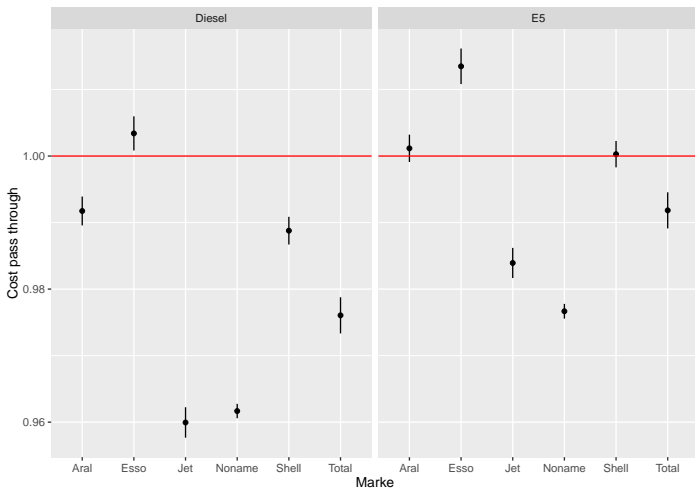
Fixed effects

- Inclusion of fixed effects to control for time-invariant characteristics.
 - ▶ This covers important indicators for competition, e.g. number of gas stations in neighbourhood.
 - ▶ Includes characteristics of the location of the gas station.
 - ▶ Controls for time-invariant transportation cost.

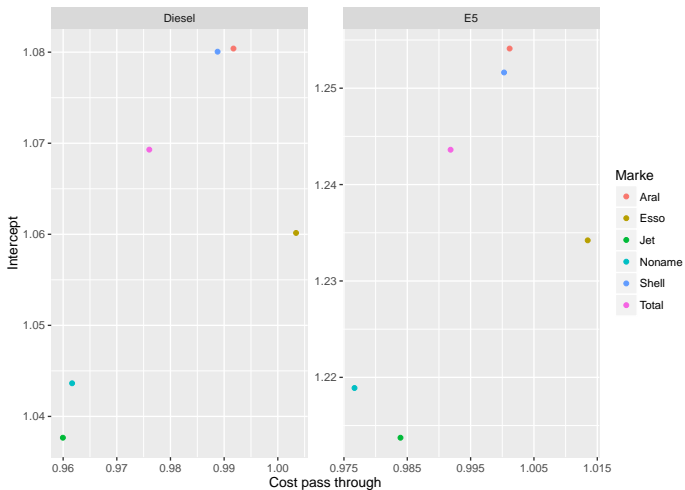
SURE model

- We observe e5 and diesel prices for every gas stations. It is expected that random shocks to these two price series are correlated.
- To exploit this information, we estimate a seemingly unrelated regression model for e5 gas and diesel.

Results: Long run propensity



Cost pass-through and average price



Results

- We find some heterogeneity in cost pass-through.
- While the cost pass-through of all brands is close to 1, we find a significant difference of cost pass-through from 1 for all brands of diesel and 4 out of 6 for e5.
- Several explanations for a pass-through < 1 :
 - ▶ Demand is downward sloping and marginal costs increase linearly,
 - ▶ marginal costs are constant, supply is upward sloping (Fabra and Reguant 2013).

Thank you for your attention [◀ Return](#)

Reference

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-  Fabra, Natalia and Mar Reguant (2013). *Pass-through of emissions costs in electricity markets.* [Tech. rep. National Bureau of Economic Research.](#)
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-  Ten Kate, Adriaan and Gunnar Niels (2005). “To what extent are cost savings passed on to consumers? An oligopoly approach”. [In: *European Journal of Law and Economics* 20.3, pp. 323–337.](#)
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