

# Fuel Prices and Station Heterogeneity on Retail Gasoline Markets

*Justus Haucap*<sup>\*</sup>, *Ulrich Heimeshoff*<sup>†</sup>, and *Manuel Siekmann*<sup>‡</sup>

## Executive summary

Competition and pricing on retail gasoline and diesel markets have already long been highly debated topics among consumers, media as well as regulatory and antitrust authorities in many countries around the globe. Gasoline and diesel markets, and their retail segments in particular, have also been a field of intensive empirical research. Specifically, studies focusing on dynamic pricing behavior and characteristics of price cycles as well as studies analyzing (station-level) price dispersion and determinants of price levels have received substantial attention. In addition, numerous competition authorities have conducted in-depth inquiries into the sector. Comprehensive pricing data sets for empirical investigations, however, are difficult to obtain as gasoline and diesel are sold through numerous locally distributed, stationary sales outlets.

While gasoline markets around the world are a field of extensive empirical research, pricing studies of the German market are rare. To the best of our knowledge, we are the first to use a novel panel data set for the German market representing a census of price quotes from virtually all gasoline stations, centrally collected by the German Federal Cartel Office. By combining price data with various station-specific characteristics (e.g., amenities such as shop offerings or car wash facilities) and measures for spatial competition, we are able to identify key factors determining station-level prices at different times of the day (e.g., day- and nighttime), in different segments (e.g., road and highway stations), and on different product markets.

Our empirical investigation specifically looks at how and why average or point-in-time price levels as well as the number of price changes differ across stations in Germany. We show that 80-90% of the price distribution can be associated to observable station characteristics and wholesale price shocks with ex-refinery prices being a good predictor of input cost changes. Stations located at highway service areas or associated to premium brands charge significantly higher prices (on average, +5.7 Eurocents/ liter or +2.5 Eurocents/ liter, respectively), albeit the exact price difference of individual brands varies (e.g., from 4 Eurocents/ liter surcharge at Aral and Shell stations to a non-significant difference observed at Jet stations vis-à-vis independent brands). In addition, certain brands seem to have distinctly different day- and nighttime pricing strategies as a reaction to local competition intensity. Moreover, additional service offerings positively affect price levels (up to 3 Eurocents/ liter), while heterogeneity among local competitors appears to imply lower prices. Finally, stations offering gasoline as a by-product (e.g., supermarket-owned stations) have distinctly lower prices, albeit opening hours are structurally different.

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<sup>\*</sup> Corresponding author. Heinrich-Heine University Düsseldorf, Düsseldorf Institute for Competition Economics (DICE) Send correspondence to Düsseldorf Institute for Competition Economics (DICE), Universitätsstr. 1, 40225 Düsseldorf, Germany. E-mail: [haucap@dice.hhu.de](mailto:haucap@dice.hhu.de).

<sup>†</sup> Heinrich-Heine University Düsseldorf, Düsseldorf Institute for Competition Economics (DICE).

<sup>‡</sup> Heinrich-Heine University Düsseldorf, Düsseldorf Institute for Competition Economics (DICE).

Our findings are also relevant for the policy debate. In our paper, we have managed to identify a number of factors that affect price levels as well as the frequency of price changes. Parts of the price differences among stations can be explained by factors of product differentiation between stations. Furthermore, competition among stations plays a role, as prices tend to decrease with the number of competitors in the vicinity. Input costs as measured by ex-refinery prices and distance to refineries are also important, so are demand-side factors. Hence, we are able to draw a quite complex picture of the factors driving retail gasoline price levels and price changes. Most important from a policy perspective, however, is the finding that competitive forces are, at least to a measurable degree, working, in contrast to suspicions sometimes voiced in policy circles.

Further research in the area of gasoline pricing in Germany may investigate specific aspects associated with intraday pricing patterns (e.g., Edgeworth cycles). Furthermore, the impact of opening hours and other competition-related variables as well as the pass-through of prices from refineries to retail gasoline stations could be interesting aspects for research.

**Keywords** Gasoline Pricing, Station Heterogeneity, Fuel Prices, Gasoline Stations, Germany.