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Vertical Market Structure Matters: The Case of a Horizontal Retail Merger in the German Gasoline Market

Sebastian Oschmann *

March 2025

Abstract

This article examines the price effects of gasoline stations following a retail merger in 2022. Using detailed station-level price data from 2020 to 2024, the analysis shows that fuel prices increase at both merging stations and their competitors, but with regional differences. These regional differences cannot be explained by horizontal merger effects. Instead, changes in the vertical market structure play a key role. The divestment of the station network disrupts supply chains, creating demand pressure on local refineries. The findings highlight the importance of vertical relationships in merger assessments.

JEL Classification: D22, K21, L13, L41, L81 **Keywords:** Gasoline Retail Markets, Ex-Post Merger Evaluation, Competition.

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1 Introduction

Competition authorities typically evaluate retail mergers by examining how shifts in local market concentration affect outcomes such as prices and product variety. Traditionally, the focus has been on horizontal effects, as retail mergers directly reduce the number of competitors in a given market. This assessment process involves defining relevant markets, measuring market shares, and calculating concentration measures like the Herfindahl-Hirschman Index, followed by forecasting the impact of changes in such metrics on market dynamics. While this approach is reasonable, it may overlook other critical factors—particularly vertical aspects—that might be essential for a comprehensive understanding of the way retail markets work. Toward the end of the 2010s, vertical theories of harm gained increasing importance in European Commission decisions (Bernhardt et al. 2025a). This shift reflects a growing recognition that vertical relationships between firms operating at different levels of the supply chain can strongly influence market outcomes. For example, a merged firm may strengthen its bargaining position across different levels of the supply chain, potentially influencing market conditions to its advantage. This can lead to higher prices, reduced product quality, or slower innovation. To enforce competition effectively, authorities must carefully assess when to examine vertical relationships in antitrust decisions. Overlooking these relationships in merger assessments can leave significant competitive risks undetected and ultimately harm consumers by reducing market competition.

This paper shows that a horizontal retail merger led to significant price increases in the gasoline market. However, these effects did not result from increased concentration in local markets, which is sometimes the consequence of a retail merger (e.g., Allain et al. 2017; Rickert et al. 2021). Instead, the price increase was driven by changes in the vertical industry structure. To examine this relationship, the analysis focuses on a unique case in Germany. The OMV station network was acquired by the EG Group, which operates Esso-branded stations. Before the merger, OMV's station network to shift its focus to other strategic areas, including sustainable energy production and petrochemical products¹. After the merger, OMV's former stations sourced fuel from other local refineries. This divestment led to the vertical disintegration of the merging stations. The restructuring had a notable impact on the market, as OMV operated several stations in Bavaria and Baden-Württemberg. The shift in supply chains created a demand shock at local refineries contributing to higher fuel prices. This effect is largely driven by a key structural characteristic of the industry, namely that fuel distribution is primarily regional. Refineries mainly supply nearby areas, limiting substitution between regions due to transport constraints and contractual agreements

^{1.} For more details, see the company's official website.

(Bundeskartellamt 2025). When stations no longer receive fuel from a vertically integrated refinery, demand shifts to other local refineries. Due to the industry's structure, these refineries have some pricing power. This case highlights how changes in supply dynamics, rather than increased local market concentration, can drive post-merger price effects. It is particularly relevant because the German federal competition authority (FCO) thoroughly analyzed potential consumer-harming horizontal merger effects in its decision but did not consider the impact of the vertical market structure².

This paper applies a difference-in-differences (DiD) estimator to measure the merger's causal effect by comparing price changes over time between affected and unaffected stations. The merging stations were mainly located in Bavaria and Baden-Württemberg³. The first analysis defines all stations in these two federal states as treated. Fuel prices before and after the merger are compared to those in Rhineland-Palatinate, where stations remained unaffected. The event study approach shows that prices in Bavaria and Baden-Württemberg rose immediately after the merger, with lasting effects. On average, prices increased by 1.48 cents per liter (cpl) across all post-merger periods. However, regional differences are striking. In Bavaria, prices increased by 2.62 cpl, while in Baden-Württemberg, the effect was only 0.37 cpl. These findings indicate that the merger had a stronger impact on prices in Bavaria, suggesting that regional factors played a key role in shaping post-merger price effects.

One potential explanation is that price increases result from horizontal merger effects. If the merger led to higher market concentration in certain areas, firms could raise prices due to reduced competition. However, the results suggest that horizontal merger effects do not explain the observed regional differences. When focusing on local markets where concentration increased, price changes remain similar to those in the broader regional analysis. Thus, horizontal merger effects cannot explain why prices increased more in Bavaria than in Baden-Württemberg. Additionally, differences in brand composition or brand-specific pricing strategies do not account for the variation between Bavaria and Baden-Württemberg⁴.

Instead, the findings suggest that regional differences in refinery supply played a crucial role in post-merger price developments. Most stations in Baden-Württemberg are supplied by the local

^{2.} For more details, see decision B8–77/21.

^{3.} Certain stations are not part of the analysis. For example, merging stations and highway stations are excluded. The data was adjusted to more accurately identify possible merger effects.

^{4.} For example, Fischer et al. (2023) show that stations in Germany respond differently to local market entries depending on brand affiliation. While major brands like Aral, Shell, Esso, and Total show no significant price reactions, low-price brands such as JET exhibit strong responses.

refinery, whereas stations in Bavaria rely on Bavarian refineries. The results show that the price effect is linked to the distance between stations and their respective refineries. In Bavaria, stations farther from the local refineries experienced smaller price increases, likely because they received fuel from alternative sources not located in Bavaria. In contrast, in Baden-Württemberg, the post-merger price effect increases with distance from the local refinery, likely because stations farther away received fuel from Bavarian refineries. In a small radius around the refineries, there were no differences in post-merger price effects in either region. Further analysis explores why fuel supply from Bavarian refineries led to higher price increases after the merger, while supply from the local refinery in Baden-Württemberg did not. Before the merger, most OMV stations in Bavaria were at least partially vertically integrated, receiving fuel from OMV's own refineries. After the merger, these stations switched to Bavarian refineries, leading to a demand shock in these refineries. This shift increased reliance on local refineries, potentially raising wholesale fuel costs and, in turn, retail prices. In contrast, stations in Baden-Württemberg were already supplied by the Karlsruhe refinery before the merger, meaning their supply structure remained largely unchanged. As a result, the additional demand pressure observed in Bavaria did not occur in Baden-Württemberg, contributing to the regional price differences.

The final analysis examines how the change in the supply structure influenced fuel prices. The analysis compares stations supplied by Bavarian refineries to those supplied by the local refinery in Baden-Württemberg. The findings confirm that price increases were stronger in areas where refineries faced greater demand pressure. Stations supplied by Bavarian refineries experienced stronger price increases compared to those supplied by the other refinery. In the year of the merger, prices rose particularly sharply. However, this could also be influenced by a refinery outage at OMV's Austrian refinery, which may have affected demand at Bavarian refineries. As a result, it is not possible to separate the impact of the merger from the effects of the refinery outage in the merger year. However, the combination of both events highlights how sensitive retail fuel prices react to demand-supply imbalances. Since the impact of the refinery outage was temporary, long-term price developments can be attributed to the merger. On average, fuel prices at Bavarian stations increased by 2.12 cpl in the two years following the merger. These results highlight the importance of the vertical market structure in determining fuel prices after a merger.

The main contributions of this paper are twofold. First, the analysis shows that higher market concentration in local markets is not the main reason for price increases after a horizontal retail merger. Instead, changes in the vertical market structure play a decisive role. The observed price effects are also notably strong compared to findings in the literature. For example, Fischer et al. (2023) show that market entry reduces prices by 0.5 cpl, while Assad et al. (2024) find that the

adoption of algorithmic pricing increases prices by 1.2 cpl, making the merger's impact significantly larger. Second, this study identifies a previously overlooked channel in the analysis of vertical merger effects. The post-merger rise in prices results from increased fuel demand at local refineries. Existing literature on vertical integration (or disintegration) mainly focuses on the effects of double marginalization or the theory of raising rivals' costs (e.g., Hastings 2004; Hosken and Taylor 2022).

The rest of the article is organized as follows. Section 2 presents the related literature. Section 3 discusses the industry background and the details of the retail merger between OMV and EG Group. Section 4 presents the data sources, data construction, the empirical strategy as well as summary statistics. Section 5 shows the results. Section 6 concludes and provides guidance for future research.

2 Related Literature

This study is related to three streams of the literature. First, this paper contributes to the empirical literature on how vertical market structure affects prices in the gasoline industry⁵. The second strand of literature examines the effects of horizontal retail mergers on prices⁶. Finally, the third strand focuses on price determinants in the German gasoline market.

2.1 Vertical Industry Structure and Prices in the Gasoline Market

Research on market structure in the gasoline industry often examines how ownership changes, vertical integration, and competition affect fuel prices. Studies examine the effects of mergers and acquisitions on both wholesale and retail pricing. A key focus is whether such changes lead to higher consumer prices or create competitive pressures that lower costs. Additionally, research explores the raising rivals' costs theory, which suggests that vertically integrated firms may increase costs for competitors. Hastings (2004) studies the acquisition of Thrifty Oil Company, an independent gasoline retailer in Southern California, by ARCO, a vertically integrated refiner and retailer. The study finds that gasoline prices increase significantly at stations near a former Thrifty station after its conversion to an ARCO station. Competing stations within one mile of an acquired station raise prices by an average of five cents per gallon (cpg). This price increase occurs regardless of whether the new ARCO station is company-operated or dealer-run. This suggests that the increase

^{5.} In addition to the gasoline industry, studies in other industries also examine how vertical integration affects prices. Examples include cable broadcasting (Suzuki 2009), movies (Gil 2015), soft drinks (Luco and Marshall 2020), and the cement industry (Hortaçsu and Syverson 2007).

^{6.} Ashenfelter et al. (2014) provides a survey of the older literature on (horizontal) mergers and price effects. There is also a growing body of literature on the non-price effects of mergers and acquisitions. This literature is recently summarized in detail by Haucap and Stiebale (2023).

results from the loss of an independent competitor rather than greater vertical control by refiners. Taylor et al. (2010) analyze the same market as Hastings (2004) and attempt to replicate her findings using a different data source. Applying the same DiD method, they find that gasoline prices at competing stations increase by only 0.4 cpg. Using higher-frequency data, they estimate a similar price increase of 0.5 to 0.7 cpg. However, they do not attempt to replicate Hastings' analysis of company-operated versus dealer-operated ARCO stations⁷. Hastings and Gilbert (2005) analyze how vertical and horizontal market structures affect wholesale prices for unbranded gasoline. They study Tosco's 1997 acquisition of Unocal's West Coast refining and retail assets to understand how changes in vertical integration influence upstream pricing behavior. By acquiring Unocal's refining and marketing assets, Tosco increases its retail market share and alters competition, especially in wholesale markets where Unocal previously supplies independent retailers. The study finds that stronger competition from independent retailers leads to higher wholesale prices for the integrated firm. This supports the raising rivals' costs theory. Expanding their analysis to 26 U.S. metropolitan areas during the 1990s merger wave, they provide broader evidence that wholesale prices are linked to vertical market structure. Hosken and Taylor (2022) study the price effects of vertical separation after refiners sell most of their gas stations between 2004 and 2013. Focusing on Florida and New Jersey, they compare price changes at refiner-owned stations sold to independent operators with those at stations that remain independent. They find that vertical separation leads to a 1.2 cpg price increase at stations previously owned by refiners. The study also tests whether the elimination of vertical integration affects competitors, based on the raising rivals' costs theory. If this theory holds, selling refiner-owned stations should lower prices at independent stations. The results show that in Florida, prices at unbranded stations fall by 1.4 to 1.8 cpg, supporting the raising rivals' costs hypothesis. However, in New Jersey, the results are mixed. Overall, the study estimates that vertical separation slightly lowers consumer prices in Florida, while the effect in New Jersey remains uncertain due to market differences.

2.2 Price Effects of Horizontal Retail Merger

Studies on retail mergers and market concentration analyze how ownership changes affect relevant market outcomes. A common approach in the literature on horizontal retail mergers involves estimating price effects using a DiD methodology. While specific methodological choices may vary depending on industry structure and data availability, the core idea remains consistent. Local markets where the merger is expected to have an impact, for example, due to changes in market concentration, are compared with markets that remain unaffected by the merger. This approach helps

^{7.} Hastings (2010) responds to Taylor et al. (2010) by addressing their attempt to replicate her findings. She argues that their smaller estimated price increase results from differences in data sources, sample selection, and methodological choices.

to isolate the causal effect of mergers on prices and competition. Lagos (2018) examines the impact of station divestitures in a merger between two large gasoline retailers in Chile. The study finds that divestitures help limit margin increases, but only for stations within one kilometer of the merger and in areas with low station density. Additionally, prices for one merging firm drop in areas unaffected by higher concentration, indicating possible efficiency gains. Similarly, Rickert et al. (2021) observe efficiency gains after a supermarket merger in Germany. They find price declines in regions not affected by increased concentration but likely benefiting from cost savings within the merged firm. However, their results also show that both merging firms and competitors raise prices, especially in areas where retail concentration increases significantly. Allain et al. (2017) also find increasing prices after a supermarket merger in France. However, competitors experience even larger price increases in local markets where concentration and differentiation grow due to the merger. Hosken et al. (2018) analyze supermarket mergers in the US and find that price effects depend on pre-merger market concentration. Mergers in highly concentrated markets are more likely to lead to price increases, while those in less concentrated markets more often result in price decreases. Hosken et al. (2016) examine the effects of market entry on prices and find that its impact is similar in size to merger-related price effects in the supermarket industry. This suggests that studies on market entry could provide useful insights into horizontal mergers. Unlike most studies that find price increases after retail mergers, Aguzzoni et al. (2016) show that the merger of two major U.K. book retailers does not lead to higher prices, either locally or nationally.

2.3 Price Determinants in the German Gasoline Market

The German gasoline market is the subject of extensive research on price determinants. Studies examine how various factors, such as competition, cost structures, and regulatory interventions, affect fuel prices. Haucap et al. (2017) show that station heterogeneity explains price variations. Key factors influencing price levels include refinery prices as input costs, station location on roads or highway service areas, and brand recognition. Stations offering fewer services tend to have lower fuel prices, while greater local competition also leads to lower prices. Fischer et al. (2023) examine directly the effects of increased competition on fuel prices. They find that market entries cause a lasting shift in the price distribution. Prices at the upper end remain relatively stable, while those at the lower end decrease more significantly. Consumers who have better access to price information benefit the most. Assad et al. (2024) analyze the impact of algorithmic pricing in the German gasoline market after the adoption of pricing software. On average, prices increase by 1.2 cpl following adoption. Margins rise for non-monopoly stations, while in duopoly and triopoly markets, margins increase only when all stations use algorithmic pricing. This suggests that

algorithmic pricing significantly influences competition⁸. Many studies assess the impact of the Market Transparency Unit (MTU) on fuel prices in Germany. The findings are mixed and depend on the methodology. Bernhardt et al. (2025b) examine transparency regulations in Austria, France, and Germany using a synthetic DiD approach. They find that the MTU reduces prices in Germany by two to three cpl, particularly in the long run. Horvath (2019) studies the MTU's effects using a fixed effects regression and a DiD approach, comparing Germany with 18 other European countries. His findings show a price reduction of one to two cpl. In contrast, Dewenter et al. (2017) find increasing prices. Their DiD analysis suggests that gasoline prices rise by 1.2 to 3.4 cpl, while diesel prices increase by about two cpl⁹. Several studies analyze the impact of the temporary fuel tax reduction in Germany during the summer of 2022. For example, Dovern et al. (2023) apply a synthetic DiD approach, comparing Germany to countries without a tax cut, such as Austria, Denmark, and Croatia. Their findings indicate that the tax reduction is fully passed on to consumers for gasoline. For diesel, they find at least partial pass-through, though estimates vary depending on the method. Kahl (2024) uses high-frequency price data from France and Germany for the analysis. His results show that pass-through rates vary significantly over time, across brands, and by region. On average, the pass-through is high but remains incomplete for all fuel types. Schmerer and Hansen (2023) use daily price data from all German stations and regional fuel prices from Austria in a DiD approach. They estimate pass-through rates of 105% for gasoline and 108% for diesel in early June. However, the pass-through of the withdrawal of the tax rebate is incomplete. Prices increase by less than the rise in the tax rate for gasoline. The dynamic effects for diesel could be driven by other factors and may be less reliable. Drolsbach et al. (2023) compare multiple European countries and find that pass-through rates differ by fuel type and fluctuate over time.

3 Industry Background

This section provides an overview of the German gasoline market and the merger between EG Group and OMV. Section 3.1 outlines the supply chain from crude oil extraction to fuel sales at stations in Germany. Section 3.2 explains key details of the merger.

^{8.} In its sector inquiry, the German FCO finds that gasoline stations in Germany adjust prices more frequently, making price comparisons harder for consumers. Algorithmic pricing is identified as one factor driving the higher frequency of price changes (Bundeskartellamt 2025).

^{9.} Luco (2019) studies a similar policy in Chile and finds price increases. He argues that if consumers have better access to price information, the effect could be price-reducing. Rossi and Chintagunta (2016) examine fuel price transparency in Italy and report a price drop of around one cpl.

3.1 From Oil Extraction to Retail in Germany

Before discussing the individual stages of the supply chain, it is useful to first examine the ownership structures in the market to better understand their interconnections. The industry covers various ownership structures. Fully integrated oil companies handle everything from crude oil extraction to fuel retail. Other companies focus on specific stages, with some running only refineries and others specializing in fuel sales. Some firms operate across multiple stages, such as exploration and refining, but do not sell fuel directly. Independent retailers also play a role, purchasing fuel from refiners or wholesalers and selling it under their own brand or through franchise agreements.

The supply chain of fuel starts with oil exploration, where countries grant rights to search for potential reserves. Once discovered, companies develop the fields by building infrastructure like oil platforms and pipelines, a process that takes years before production and distribution can begin. Germany is heavily dependent on crude oil imports, since only 2% of the country's crude oil demand is met by domestic oil fields (Bundeskartellamt 2025). Crude oil is mainly transported to Germany via pipelines, which account for nearly three-quarters of the total volume, while about a quarter is shipped (Bundeskartellamt 2022)¹⁰.

Germany has eleven refineries that process crude oil into different petroleum products. Crude oil refining follows a joint production process, breaking the raw material into multiple end products. These products can be broadly classified into fuels, heating oils, petrochemical feedstocks, and other refined products. Diesel and gasoline make up the largest share, accounting for 34 % and 20 % of total production, respectively. Petrochemical feedstocks follow with 13 %, while light heating oil contributes 11 %. All other products make up less than 10 % of total production¹¹. Due to the nature of joint production, as well as factors like crude oil type, facility, and refinery configuration, refineries cannot freely adjust the proportions of their end products. Refineries typically operate at high capacity, but utilization rates fluctuate due to seasonal patterns in the industry (Bundeskartellamt 2022). Besides domestic production, Germany also imports fuels to meet demand. While gasoline exports exceed imports, diesel imports remain significantly higher than exports, reflecting Germany's strong reliance on foreign supply (Bundeskartellamt 2025).

The fuels in Germany are distributed by different market players at the wholesale level. Producers refine crude oil and sell their own products. Importers buy refined fuels from foreign refineries or global traders and resell them in Germany. Wholesalers source fuels from refineries, importers,

^{10.} Alternative transportation methods, such as freight trains and tank trucks, play only a marginal role, each accounting for less than one percent.

^{11.} The values refer to May 2022.

or other wholesalers and distribute them to retailers or commercial customers (Bundeskartellamt 2025). The distribution in Germany is mostly regional rather than nationwide. Refineries primarily supply their surrounding areas, creating a localized market structure¹². Figure 1 shows all refinery locations, with symbol size reflecting annual crude oil capacity. For diesel, imports play a key role in some regions, particularly from Amsterdam, Rotterdam, and Antwerp, as well as overseas. However, the market remains regionally structured, as refineries dominate supply in their areas. Gasoline distribution is even more localized, with imports playing a minor role. Substitution between regions is limited due to transport constraints and long-term contracts. Alternative supply regions only become relevant when local price increases are extreme. This suggests that local suppliers hold some pricing power (Bundeskartellamt 2025). More than half of wholesale sales take place under long-term contracts, typically lasting one year with fixed purchase volumes. Pricing depends on product costs, transportation fees, government taxes, and market conditions such as fuel demand (Bundeskartellamt 2022).

In the final step of the supply chain, fuels are sold to motorists at stations. Vehicles are designed for either gasoline or diesel, making it difficult for motorists to switch between fuel types. As a result, diesel and gasoline function as separate markets in the short term¹³. Within each fuel type, products are highly homogeneous. Many stations in Germany are affiliated with major brands. Aral and Shell are the largest, together operating more than 25 % of all stations. However, their share of total fuel sales is even higher¹⁴. There are several other important brands. Some, like Aral, operate nationwide, while others focus on specific regions. For example, Star stations are concentrated in northern Germany. Different brands also follow distinct strategies. For example, Raiffeisen stations have a strong presence in rural areas, while Jet stations are more common in cities, especially in eastern Germany.

3.2 The Merger between EG Group and OMV

This study analyzes the merger between EG Group and OMV, in which EG Group acquired OMV's station network in Germany. EG Group is a specialized station operator and retailer, offering

^{12.} For example, the PCK refinery in Brandenburg supplies about 90–95 % of the fuel demand in Brandenburg and Berlin (For example, see here or here). This industry characteristic allows studies on the German fuel market to use the shortest distance between a refinery and a station to determine the likely supplier (Fischer et al. 2023; Assad et al. 2024).

^{13.} In 2024, around 62% of motor vehicles were powered by gasoline, while 29% used diesel as the primary fuel (See here). The remaining 9% were distributed among hybrid engines, electric engines and gas. Since these alternative drive technologies have recorded high growth rates in recent years, the market shares of gasoline and diesel were higher during the observation period. In 2020, gasoline-powered vehicles accounted for 66%, while diesel-powered vehicles made up 32% (See here).

^{14.} For example, the market shares for fuel sales in 2020 were as follows: Aral 21 %, Shell 20 % BFT 16%, Jet 10.5%, Total 9.5%, Esso 7% and others 16 %. (See here).





Notes: The map shows the locations of the eleven refineries in Germany. The size of each symbol represents the refinery's crude oil capacity in tons per year. The outer circles improve the visibility of all refineries. The quantity information comes from the sector inquiry into the refining and wholesale of fuels by the German FCO (Bundeskartellamt 2025).

fuel, convenience stores, food services, and other amenities. In Germany, it operates the Esso station network under a brand partnership with ExxonMobil. OMV's German station network was previously owned by the Austrian OMV Group, an integrated oil and gas company involved in exploration, refining, and fuel retail. The OMV stations were mainly supplied by the company's own refineries in Schwechat (Austria) and Burghausen (Germany). The Schwechat refinery produces

diesel, gasoline, petrochemical products, and heating oil, while the Burghausen refinery does not produce gasoline.

Before the merger, OMV operated 293 stations, mainly in Bavaria (226 stations) and Baden-Württemberg (61 stations), with a smaller presence in Hesse (4 stations) and Rhineland-Palatinate (2 stations). As shown in Figure 2a, these stations were located in both rural areas and major cities, with the highest concentration in Munich (11 stations). At this time, the EG Group managed 1,068 Esso stations across Germany, including 373 stations in Bavaria and Baden-Württemberg. These were evenly distributed, with 185 stations in Bavaria and 188 in Baden-Württemberg. Figure 2b illustrates this distribution, with Munich again having the highest concentration with 14 stations.

Figure 2: Station Network of the Merging Parties



Notes: The maps are based on data from Tankerkönig. The left map shows OMV station locations in Baden-Württemberg (61), Bavaria (226), Hesse (4), and Rhineland-Palatinate (2). The right map shows Esso station locations in Baden-Württemberg (188) and Bavaria (185).

The number of stations corresponds to market shares of 7.9 % for Esso and 6.0 % for OMV across both federal states. These market shares made Esso the fourth-largest and OMV the sixth-largest operator in these regions. The three largest competitors with more stations were Aral, Shell, and Avia. Table 1 shows the market shares, measured by the number of stations, for the merging parties and their three largest competitors. If Esso and OMV's station counts were combined, the merged entity would hold the second-largest market share across both federal states, just behind Aral. In Bavaria, the merged entity would become the largest station operator. In Baden-Württemberg, OMV had a relatively small market share of 3.0 %, but the EG Group had a stronger presence. After the merger, the entity would become the second-largest station operator in Baden-Württemberg, ranking just behind Aral. When assessing retail mergers, changes in market concerntration at the local level are particularly important (e.g., Rickert et al. 2021). This is especially relevant in the gasoline market, where competition between stations is highly localized (Fischer et al. 2023). At the local level, Esso and OMV stations had some overlap. Overall, 32.8 % of OMV stations were in cities where the EG Group also operated stations. However, defining markets at the city level can be too broad. A more precise analysis examines the overlap at the postal code level¹⁵. At this level, one-quarter of OMV stations were still in postal code areas where the EG Group also operated Esso stations.

Brand	Combined	Bavaria	B-W
EG Group (Esso)	7.9 %	6.9 %	9.2 %
OMV	6.0 %	8.4 %	3.0 %
Aral	14.0 %	13.1 %	15.3 %
Shell	10.5 %	9.4 %	12.0 %
Avia	9.5 %	9.5 %	9.6 %

 Table 1: Market shares of the Merging Parties and Three Largest Competitors

Notes: Based on data from Tankerkönig. The table shows the market shares of the merging parties and the three main competitors in Bavaria and Baden-Württemberg. Market shares are calculated using the number of stations in 2020.

The merger was proposed in mid-2021 and reviewed by the German FCO. The decision did not consider potential vertical effects from separating the station network from a fully integrated company. Instead, the merger analysis concentrated on horizontal concerns¹⁶. For this analysis, local markets were defined based on the catchment areas of the merging stations. The FCO concluded that the planned acquisition did not raise significant competitive concerns in most affected markets. However, a full takeover of the stations would have led to a noticeable increase in market concentration in seven regions, including Munich and Stuttgart¹⁷. The main competition concern was coordinated effects, meaning that higher market concentration could make it easier for competitors to align prices and reduce competitive pressure. In early 2022, the merger was approved under the condition that 24 Esso stations and 24 OMV stations in the affected regions be sold to third-party companies

^{15.} German postal codes consist of five digits and follow a structured system. The first two digits indicate the region or federal state, while the remaining three specify a more detailed area, such as a city, district, or neighborhood. The system facilitates mail sorting and delivery while reflecting administrative boundaries. As a result, postal code areas vary in size, covering entire cities and surrounding villages or representing specific districts within larger cities. For example, Munich has 76 distinct postal code areas.

^{16.} For details, see decision B8-77/21.

^{17.} The other regions with competition concerns included Rosenheim, Bad Herrenalb, Weil am Rhein, Lindau, and Passau.

(Figure A1). After these divestitures, 21.3 % of OMV stations remained in postal codes where the EG Group also operated. All remedy stations were acquired by AVIA, the third-largest provider in Bavaria and Baden-Württemberg, with 453 stations and a 9.5 % market share. Before the acquisition, AVIA had little presence in Munich (0 stations) and Stuttgart (2 stations), both part of the remedy markets. However, three of the 48 remedy stations were in postal codes where AVIA was already active. AVIA quickly renovated and rebranded the acquired stations. In contrast, the EG Group initially made no immediate changes and planned station renovations and rebranding efforts for 2024.

4 Data and Empirical Strategy

This study analyzes the impact of the gasoline retail merger on fuel prices and explores the sources driving potential effects. Section 4.1 describes the data sources and outlines the process of constructing the sample. Section 4.2 explains the identification strategy, focusing on how treated and control groups are selected to estimate the effects of the merger. Section 4.3 presents the empirical model used to estimate the price effects of the merger. Finally, Section 4.4 provides descriptive statistics, summarizing key trends in fuel prices before and after the merger. These statistics offer initial insights into price developments and set the stage for the econometric analysis.

4.1 Data Source and Sample Construction

This study analyzes the effects of the merger between OMV and EG Group in 2022. The sample period covers January 2020 to December 2024. The dataset comes from Tankerkönig¹⁸. The dataset includes all price changes for E5, E10, and diesel at approximately 15,000 stations across Germany. It provides details on prices, brand affiliation, addresses, geographic coordinates, and the date each station was established. Several studies, including Fischer et al. (2023), Assad et al. (2024), and Montag et al. (2023), have used this data source. The analysis in this paper includes weekday station-level gross retail prices for E5 gasoline and diesel. Following Fischer et al. (2023) and Montag et al. (2023), prices at 5 pm are used, as this is when most consumers refuel their cars. Highway stations are excluded, because they serve a different group of consumers (Fischer et al. 2023). Stations that entered or exited the market during the sample period are removed to avoid potential biases from other competitive effects. Because distance between competitors plays a key role in horizontal merger analysis, exact location data is used to calculate distances between stations as crow flights.

^{18.} Tankerkönig is a German platform that provides real-time fuel price data for stations in Germany. It sources information from the German MTU for Fuels, which is managed by the FCO. Since 2013, stations have been required to report price changes in real time to enhance price transparency and competition.

4.2 Identification Strategy

Mergers often raise concerns about reduced competition, particularly in local markets where concentration increases. In such cases, firms may gain more market power, potentially leading to higher prices. Regions with changes in market concentration include areas where at least one merging station and one station from the acquiring brand operate. A simple before-and-after price comparison at these stations does not accurately measure the merger's causal effects, as price changes may also result from shifts in demand or costs. To address this issue, price changes at affected stations are compared to a counterfactual scenario using stations unaffected by the merger. A DiD estimator identifies the merger's effect by comparing price developments over time between treated and control stations. This approach separates the merger's impact from broader trends or external factors, such as national cost shocks, that affect all stations. If price changes at treated stations differ significantly from those at control stations, the difference is attributed to the merger, assuming both groups followed similar price trends before the merger. This assumption, known as the parallel trends assumption, suggests that, without the merger, prices at treated and control stations would have developed similarly.

The identification strategy builds on the idea that stations follow regional pricing patterns, ensuring that price changes across different markets remain independent after accounting for various fixed effects. The interaction of fuel-retailer-time fixed effects controls for price changes affecting entire retailers, such as rising costs or shifts in pricing strategies (e.g., the widespread adoption of algorithmic pricing)¹⁹. The interaction with fuel type fixed effects allows for different pricing trends between diesel and gasoline within brands. The inclusion of these fixed effects also ensures that the treatment effects is only identified for retailers present in both treated and control regions. The effect of increased market concentration is most clearly identified when no other factors interfere. To ensure this, merging stations with ownership changes are excluded from the analysis. The focus is on insider stations, which already belonged to the retailer before the merger. Additionally, the analysis considers outsider stations, which are competing stations not affected by ownership changes, to observe how increased market power influences pricing. The treatment effect captures the local price change that cannot be explained by adjustments in retailer-level pricing or general trends in Germany.

The merger can influence small local markets as well as broader regional market. In both federal states, approximately 6.0 % of all stations changed ownership due to the merger, resulting in increased market concentration on a large regional scale. This shift may not only affect competition

^{19.} The sample includes only stations that remain in the dataset for the entire period. Thus, the results cannot be driven by stations entering or exiting the market due to the merger. However, the regression also includes station-level fixed effects.

at individual locations but could also impact fuel prices across the entire region. One possible reason is the disappearance of a major competitor, not just locally but across both federal states. This could facilitate coordinated pricing effects on a larger scale, shaping the overall market dynamics. To account for these potential market-wide effects, the analysis takes a broad approach when defining the treatment group. Hence, in a first step, all stations in the sample located in Bavaria and Baden-Württemberg are defined as treated. Stations in Rhineland-Palatinate serve as control group²⁰. In particular, stations in the southern part of Rhineland-Palatinate receive fuel from the same refinery as stations in Baden-Württemberg. This ensures that the development of the main input cost remains comparable. This similarity of input cost is stronger for gasoline than for diesel (Bundeskartellamt 2025). Additionally, refineries in Karlsruhe and Bavaria are supplied with crude oil through the same Transalpine Pipeline, leading to similar cost developments across regions. Furthermore, the geographical proximity of Rhineland-Palatinate makes the regions broadly comparable in terms of their economic environment.

A broad definition of the treatment group, covering entire federal states, presents certain challenges. For example, efficiency gains from improved logistics at the merging parties could lower prices in some areas where local market concentration remains unchanged, while prices may rise in markets where concentration increases due to the merger (e.g., Rickert et al. 2021). Analyzing the effects at an aggregate level could mix these opposing influences, making it difficult to isolate specific channels that affect prices. To address this, the treatment and control groups are refined in the next step. First, the focus shifts to local markets where the merger leads to increased concentration on a smaller regional scale. The treatment group includes stations near both an OMV and an Esso station in Bavaria and Baden-Württemberg, while the control group consists of stations in Rhineland-Palatinate located near an Esso station. This approach builds on Rickert et al. (2021), who examined concentration effects after a supermarket merger. However, the competition in both markets differs, requiring different distance thresholds. To reflect the localized nature of gasoline demand, a 2-kilometer radius is applied, following Fischer et al. (2023). Second, potential efficiency gains are most visible in local markets where only one of the merging firms operated before the merger, as cost savings could result in lower prices in these areas. To identify these effects, the analysis focuses on EG Group, the acquiring retailer²¹. Various definitions exist for measuring efficiency gains after a retail merger. Rickert et al. (2021) apply a definition in the context of a supermarket merger in Germany, while Lagos (2018) uses a similar approach for the gasoline market in Chile²². Both approaches compare price changes in markets where only one

^{20.} Before the merger, OMV operated two stations in Rhineland-Palatinate. These stations, as well as all other stations in the same postal code area, are excluded from the analysis.

^{21.} The analysis also considers AVIA an insider because AVIA took over the remedy stations.

^{22.} Rickert et al. (2021) propose an approach to identify efficiency gains after a supermarket merger in Germany.

merging firm was previously active with those in markets completely unaffected by the merger. If efficiency gains occur, they should be reflected in price reductions in markets where concentration remains unchanged. In this study, the treatment group consists of Esso stations in Bavaria and Baden-Württemberg that are at least 10 kilometers (measured as "crow flights") from the nearest OMV station. The control group includes Esso stations in Rhineland-Palatinate, which are, by definition, farther from OMV stations and outside the takeover area. This comparison within the Esso network helps isolate local efficiency gains, which may arise if the merger improves supply structures and reduces transportation costs. However, this approach captures only local effects and does not account for potential national efficiency gains. In the context of a gasoline retail merger, such nationwide effects are likely to be less significant.

4.3 Empirical Implementation

The baseline specification estimates the following equation:

$$y_{cit} = \beta PostMerger_{it} + \alpha_i + \gamma_{crt} + \epsilon_{cit}$$
(1)

where y_{cit} is the fuel price (measured in cpl) for fuel type *c* at station *i* at date *t*. α_i are station fixed effects and γ_{crt} denotes fuel type-retailer-time fixed effects which control for nationwide changes across retailers. The treatment indicator is *PostMerger_{it}*, which takes on the value of one if the station is treated and after the merger and zero otherwise. Finally, ϵ_{cit} is an error term. Note, equation (1) does not include treatment group and post treatment indicators as separate variables due to the inclusion of station fixed effects and (interacted) time fixed effects. The coefficient β measures the impact of the merger on prices in an affected station relative to the prices when the station is unaffected. A positive (negative) and significant β suggests that the merger exerts a price-increasing (price-decreasing) effect. For all specifications, the regression equation accounts for correlation in the residuals of the regression by clustering standard errors at the county level.

The baseline specification is extended to display the main results as event study. The key

Their approach defines the treatment group as markets where only one of the merging firms operated before the merger, but not both. The control group consists of markets without either merging firm. If the merger leads to efficiency gains, these benefits should appear in markets where market concentration remains unchanged. Price changes in the treatment group are compared to those in control markets using only outsider firms. Efficiency gains are identified through price adjustments of competitors responding to competitive pressure from merging firms. This approach identifies cost savings at the national level. However, efficiency gains can only be measured if outsider firms adjust their pricing strategies. A similar approach for the Chilean retail gasoline market was developed independently byLagos (2018) alongside Rickert et al. (2021). Lagos (2018) examines prices at stations unaffected by increased market concentration. The analysis compares price margins at merging firms' stations not impacted by concentration changes with those of non-merging firms' stations in unaffected areas. The underlying idea is the same as in Rickert et al. (2021). Stations that do not experience increased market concentration should not raise prices. However, if these stations benefit from efficiency gains related to the merger, prices could decrease.

advantage of using this approach is the opportunity to show results for each individual time period before and after the merger separately which gives the dynamic nature of the treatment effects. Moreover, this study design facilitates checking the identifying assumption of parallel trends graphically. The adjusted version of equation (1) interacts the treatment with each year in the sample²³. The period before the merger is dropped to avoid perfect multicollinearity and serves as reference period (Sun and Abraham (2021)). The event study takes the following form:

$$y_{cit} = \sum_{\tau=-q}^{-2} \delta_{\tau} PostMerger_{it} + \sum_{\tau=0}^{m} \delta_{\tau} PostMerger_{it} + \alpha_{i} + \gamma_{crt} + \epsilon_{cit}$$
(2)

where q is the number of anticipatory effects (leads) and m is the number of post-treatment effects (lags). If the pre-trends of the event studies are flat ($\delta_{\tau} = 0$ for $\tau < 1$), this will be indicative of treated stations and control stations are following parallel trends. This observation helps alleviate concerns regarding potential reverse causality bias, as diverging pre-trends would be evident in cases of reverse causality. Finally, equation (1) is expanded to consider heterogeneous effects, which are briefly discussed in the corresponding subsections.

4.4 Summary Statistics

Table 2 presents the average gasoline prices from 2020 to 2024²⁴. The table shows descriptive statistics, including the mean, median, standard deviation, and the 10th and 90th percentiles²⁵. The table shows three notable findings. First, the mean and median gasoline prices increased significantly from 2020 to 2022 and then declined slightly in 2023 and 2024 but remained above the initial level. It is important to note that the overall increase in gasoline prices over time is largely driven by external factors. One major reason is the rising cost of crude oil, which has been affected by global supply disruptions. In particular, the embargo on Russian crude oil has contributed to price increases in European fuel markets. The drop in 2023 and 2024 suggests some normalization but at a higher level than before 2022. Second, the standard deviation increased sharply in 2022, suggesting high price fluctuations. In contrast, 2023 shows a lower standard deviation, indicating a period of more stable prices after the peak in 2022. Third, the 10th and 90th percentiles follow a similar pattern, indicating that price increases affected both lower and upper price ranges.

Table 3 presents average gasoline prices for stations in Baden-Württemberg and Bavaria and

^{23.} The year of the merger (2022) is split into two periods, before the merger (January to May) and after the merger (June to December).

^{24.} In June, July, and August of 2022, a temporary discount on gasoline and diesel was introduced. The energy tax rates were reduced by 29.55 cpl for gasoline and 14.04 cpl for diesel.

^{25.} Table A1 shows the results for diesel. The conclusions are essentially the same. The main differences are higher volatility and a sharper peak in 2022 for diesel.

	2020	2021	2022	2023	2024
Mean	1.245	1.544	1.882	1.817	1.764
Median	1.239	1.549	1.879	1.819	1.769
Sd	0.079	0.108	0.146	0.064	0.084
p10	1.149	1.389	1.699	1.738	1.659
p90	1.359	1.689	2.079	1.899	1.859

 Table 2: Summary Statistics of Gasoline Prices

Source: Based on data from Tankerkönig. The table shows the summary statistics of average gasoline prices from 2020 to 2024. The data includes stations in Baden-Württemberg, Bavaria, and Rhineland-Palatinate.

stations in Rhineland-Palatinate before and after the merger²⁶. It shows how prices changed over time in both regions. Before the merger, average gasoline prices were similar in both regions. Stations in Baden-Württemberg and Bavaria had an average price of 1.546, while stations in Rhineland-Palatinate had a price of 1.532. After the merger, prices increased in both regions. The average price rose to 1.822 in Baden-Württemberg and Bavaria and to 1.789 in Rhineland-Palatinate. This corresponds to an absolute price increase of 0.276 in Baden-Württemberg and Bavaria and 0.257 in Rhineland-Palatinate. The difference in price changes between the two groups is 0.020. This suggests that, beyond the general price increase in Rhineland-Palatinate, prices in Baden-Württemberg and Bavaria rose slightly more. However, this simple comparison does not prove that the merger caused this difference. The table presents average prices, which may hide fluctuations over time. Additionally, the two groups may not be fully comparable if they contain different retailers. If some retailers follow different pricing strategies, this could affect the results. While this initial analysis indicates a higher price increase in Baden-Württemberg and Bavaria, a more detailed econometric analysis is needed to confirm causality.

	Pre-merger year	Post-merger year	Δ
Baden-Württemberg & Bavaria Rhineland-Palatinate	1.546 1.532	1.822 1.789	0.276 0.257
Δ	0.013	0.033	0.020

Table 3: Mean Gasoline Prices before and after the Merger

Source: Based on data from Tankerkönig. The table presents the mean gasoline prices for the pre-merger year (2021) and the post-merger year (2023), separately for stations in Baden-Württemberg & Bavaria and stations in Rhineland-Palatinate.

26. Table A2 shows the results for diesel. The conclusions are the same.

5 Results

This section presents the empirical results. The first section provides the baseline results by comparing station prices in Bavaria and Baden-Württemberg to those in Rhineland-Palatinate. The findings show that prices increased after the merger. However, this effect was not uniform across regions. In Bavaria, prices rose significantly and stayed high, whereas the effects in Baden-Württemberg were marginal. Section 5.2 explores whether these differences can be explained by horizontal merger effects. The results suggest that changes in local market concentration did not account for the regional differences. Section 5.3 shows that the regional differences can instead be attributed to the different refinery supply in Bavaria and Baden-Württemberg. Section 5.4 examines why differences in refinery supply cause stronger reactions in Bavaria than in Baden-Württemberg. Finally, the last section discusses how shifts in fuel supply have contributed to price increases, showing that the vertical market structure played a key role.

5.1 Baseline results

This section analyzes the impact of the merger on fuel prices using an event study approach. Figure 3a presents the event study graph, comparing treated stations in Bavaria and Baden-Württemberg with control stations in Rhineland-Palatinate. Separate treatment effects are estimated for each year, with 2022 divided into two periods: before the merger (January to May) and after the merger (June to December). The period immediately before the merger serves as the baseline. The graph shows no significant differences in price trends between treated and control stations before the merger. After the merger, treated stations immediately raised their prices compared to control stations. The estimated effects remain statistically significant in all post-merger periods, indicating a lasting impact. On average, prices increased by 1.48 cpl across all post-entry periods. This effect is not only economically meaningful but also quite strong compared to other studies on fuel prices in Germany. For instance, Fischer et al. (2023) show that market entry in close proximity lowers prices by 0.5 cpl at nearby stations. Similarly, Assad et al. (2024) find that the adoption of algorithmic pricing increases prices by 1.2 cpl. In comparison, the estimated price increase after the merger exceeds these effects, highlighting its substantial impact. Figure 3b restricts the treated group to Bavarian stations. The graph also shows no evidence of diverging pre-trends. The effect in Bavaria is significantly stronger than the baseline, suggesting that the overall results are largely driven by these stations. On average, prices increased by 2.62 cpl in Bavaria. Figure 3c supports this conclusion by using the stations in Baden-Württemberg as the treated group. Similar to the previous graph, it shows no evidence of diverging pre-trends. Unlike in Bavaria, stations in Baden-Württemberg increased prices on average by only 0.37 cpl. Prices rose slightly in 2023, but this increase was small and not consistently observed in other post-merger periods. These results suggest that the

merger's impact on fuel prices differed across regions.



Figure 3: Event-Study Results

Notes: These figures show the event study graphs for DiD estimates of stations in Bavaria and Baden-Württemberg. Point estimates and 95% confidence intervals are shown. The outcome variable is fuel prices (E5 and diesel), measured in cpl. The treatment period begins after May 2022, when the EG Group took over the OMV station network. The reference period covers January to May 2022. Stations in Rhineland-Palatinate serve as the control group.

5.2 Horizontal Merger Effects and Post-Merger Price Changes

The previous section shows that the merger affected station prices differently in Bavaria and Baden-Württemberg. A possible explanation is that price-increasing horizontal merger effects develop differently in the two regions. The strength of these effects may depend on the scale of the merger, particularly the number of affected stations. In areas where many stations change ownership, competitive pressure weakens in multiple markets, making price increases more visible on average. If fewer stations are involved, most markets remain more competitive, limiting the merger's impact on average prices. Differences in the number of affected stations between Bavaria and Baden-Württemberg could therefore explain why the price effect is stronger in one region than in the other.

To test this hypothesis, the treatment and control groups are refined. Instead of analyzing all stations in each federal state, the focus shifts to those in local markets where concentration changed after the merger. If the stronger price effects in Bavaria result from a greater number of directly affected stations, similar results in both federal states should be observed when restricting the analysis to local markets where concentration increased after the merger. Table 4, column (1), shows that the price effect for these stations in Bavaria is nearly identical to the effect for all stations in Bavaria. Hence, the average effect in Bavaria is not driven by these stations. Similarly, column (2) indicates that the effect in Baden-Württemberg remains unchanged compared to the average effect in Baden-Württemberg. Consequently, the difference between Bavaria and Baden-Württemberg remains. A similar explanation for different price effects in both regions could be the uneven spread of local efficiency gains from the merger. These gains could result from streamlined supply chains, leading to more efficient logistics. To analyze this, the treatment and control groups are redefined, focusing only on Esso stations. The treated group includes stations in both federal states at least 10 km from any OMV station. The control group consists of all Esso stations in Rhineland-Palatinate. This approach isolates potential efficiency-driven price effects by excluding stations directly impacted by changes in market concentration. Table 4, columns (3) and (4), show no evidence of efficiency gains. The price effect for Esso stations in Bavaria and Baden-Württemberg remains the same as the average effect for all stations in these federal states. In summary, the analysis finds no evidence that horizontal merger effects caused the different price reactions in Bavaria and Baden-Württemberg. The results also show no notable differences across local markets affected in different ways. Consequently, horizontal merger effects likely had only a limited impact on competition between retailers.

Differences in price reactions between Bavaria and Baden-Württemberg could also result from variations in brand composition or regional differences in brand pricing strategies. Fischer et al. (2023) show that stations in Germany respond differently to local market entries depending on

	$\Delta \text{ Concer}$ (1)	ntration (2)	Local effi	ciency gains (4)
PostMerger	2.53***	0.59	2.31***	0.33
	(0.30)	(0.36)	(0.59)	(0.29)
Station FEs	Y	Y	Y	Y
Brand-fuel-date FEs	Y	Y	Y	Y
Region	bavaria	b-w	bavaria	b-w
Treated stations	327	76	14	36
N	1,302,371	662,221	177,468	234,052
R^2	0.99	0.99	0.99	0.99

 Table 4: Merger Effects by Market Concentration Change

Notes: The dependent variables are fuel prices at the station level. Post-Merger is a dummy variable taking the value 1 post-merger for stations located in Baden-Württemberg and Bavaria. Standard errors are clustered at the regional level and shown in parentheses. Symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

their brand affiliation. While major brands like Aral, Shell, Esso, and Total show no significant price reactions, low-price brands such as JET react more strongly. However, Table 1 already shows that the main competitors are the same in both federal states. Additionally, the inclusion of brand-fuel-date fixed effects ensures that the treatment effect is identified within brands, requiring the brand to be present in both Rhineland-Palatinate and the analyzed region. Nevertheless, Table 5 shows that the post-merger price responses do not differ between major brands (Aral, Shell, and Total), low-price stations (JET), independent stations (BFT), and other stations. Insider stations (Esso and Avia) also do not behave differently from the remaining stations (Table A4). Hence, the post-merger pricing reaction does not differ between brands in the same region. The results also remain unchanged when considering only brands active in all three federal states (Table A5). Summarized, brand-specific pricing strategies or the composition of brands do not explain the different price reactions in Bavaria and Baden-Württemberg.

5.3 Refinery Supply and Post-Merger Price Changes

The former analysis does not explain the different price effects in Bavaria and Baden-Württemberg. To explore other explanations, the focus shifts to the vertical structure of the supply chain. One key factor in this context is the difference in fuel supply between the two regions. Most stations in Baden-Württemberg receive fuel from the refinery in Karlsruhe, while stations in Bavaria rely on one of the Bavarian refineries in Neustadt/Vohburg, Ingolstadt, or Burghausen. These supply chain differences may play a crucial role in the observed post-merger price reactions.

	(1)	(2)	(3)	(4)	(5)	(6)
PostMerger	2.68***	0.32	2.63***	0.36	2.64***	0.37*
	(0.27)	(0.32)	(0.19)	(0.22)	(0.19)	(0.22)
PostMerger \times Top 3	-0.09	0.11				
	(0.27)	(0.31)				
PostMerger imes Jet			-0.01	0.10		
			(0.24)	(0.24)		
PostMerger \times BFT					-0.27	0.04
					(0.27)	(0.31)
Station FEs	Y	Y	Y	Y	Y	Y
Brand-fuel-date FEs	Y	Y	Y	Y	Y	Y
Region	bavaria	b-w	bavaria	b-w	bavaria	b-w
Treated stations	1.719	1.360	2.094	1.680	2.094	1.680
Size of heterogeneous group	579	577	112	93	77	104
Ν	5,876,564	4,992,925	6,997,808	5,979,235	6,997,808	5,979,235
R^2	0.99	0.99	0.99	0.99	0.99	0.99

 Table 5: Merger Effects by Market Participants

Notes: The dependent variables are fuel prices at the station level. PostMerger is a dummy variable taking the value 1 post-merger for stations located in Baden-Württemberg and Bavaria. Standard errors are clustered at the regional level and shown in parentheses. Top 3 is a dummy variable taking the value 1 for the brands Aral, Shell and Total. Jet is a dummy variable taking the value 1 for the brand Jet. BFT is a dummy variable taking the value 1 for the brand SFT. Symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

To examine whether price effects depend on the refinery supply, the analysis considers the distance between refineries and stations. In doing so, the post-merger indicator is interacted with the distance between each station and the refinery in its respective state. For stations in Baden-Württemberg, the distance is measured in kilometers to the refinery in Karlsruhe. For stations in Bavaria, the distance is measured to the refinery in Ingolstadt²⁷. The interaction term is included as an additional variable in equation (1). If post-merger price effects depend on the refinery, the interaction effect should be negative in Bavaria. Stations farther from the refinery in Ingolstadt are more likely supplied by the refinery in Karlsruhe or another refinery that does not increase prices after the merger. In Baden-Württemberg, the opposite pattern should be observed.

The first column of Table 6 shows that in Bavaria, every additional kilometer between a station and the refinery reduces the price effect by 0.011 cpl. In contrast, column (2) indicates that in Baden-Württemberg, the price effect increases by 0.017 cpl for every additional kilometer. These findings suggest that the impact of the merger on prices depends on the refinery supplying the station. Table A6 shows that this effect appears only at greater distances. Within a 50-km or 75-km radius, the interaction term shows no statistically significant effects, likely because stations close to the refinery are almost always supplied directly by it. The last two columns of table 6 test this hypothesis differently. In Bavaria, the analysis includes only stations closer to the refinery in Karlsruhe than to the refinery in Ingolstadt, such as those in Würzburg. The same approach is applied to Baden-Württemberg stations closer to the refinery in Ingolstadt than to the refinery in Karlsruhe. Figure A3 illustrates the selected stations. The results confirm previous findings, showing a larger point estimate for stations in Baden-Württemberg than for stations in Bavaria. Additionally, Table A7 presents post-merger price effects for stations near the Bavaria-Baden-Württemberg border. Column (1) focuses on postal code area 89, located between Ingolstadt and Karlsruhe, spanning both federal states (Figure A4a). Columns (2) to (4) include stations with a neighboring-state station within 2, 5, or 10 km (Figure A4b to Figure A4d). The results show no significant difference in post-merger price reactions between stations near the border in Bavaria and Baden-Württemberg. This further rules out regulatory differences between the two federal states as a potential driver of the observed price effects. Summarized, these findings suggest that differences in refinery supply explain the varying price effects in Bavaria and Baden-Württemberg. The observed price patterns align with the regional fuel distribution, indicating that refinery access played a key role in post-merger price adjustments.

^{27.} The bayernoil refineries in Vohburg (16 kilometers) and Neustadt (30 kilometers) are located east of Ingolstadt, making Ingolstadt the geographically closest Bavarian refinery to Karlsruhe.

	Own refinery		Other re	efinery
	(1)	(2)	(3)	(4)
PostMerger	3.38***	-0.53*	1.20***	1.59***
PostMerger × Distance	(0.27) -0.011** (0.004)	(0.29) 0.017*** (0.006)	(0.19)	(0.26)
Station FEs	Y	Y	Y	Y
Brand-fuel-date FEs	Y	Y	Y	Y
Region Treated stations N R^2	bavaria 2.094 6,997,808 0.99	b-w 1.680 5,979,235 0.99	bavaria 158 2,072,508 0.98	b-w 163 2,091,682 0.98

Table 6: Merger Effects depending on Refinery Distances

Notes: The dependent variables are fuel prices at the station level. PostMerger is a dummy variable taking the value 1 post-merger for stations located in Baden-Württemberg and Bavaria. Distance is a continuous variable that measures the distance between the station and the refinery in kilometers. Standard errors are clustered at the regional level and shown in parentheses. Symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

5.4 Impact of the Merger on the Supply Structure

The analysis shows that price effects depend on the supplier, suggesting that the vertical industry structure influences regional price differences. This outcome raises the question of why fuel from Bavarian refineries leads to higher post-merger prices, while supply from the Karlsruhe refinery does not. To understand this pattern, it is important to examine where merging stations sourced their fuel before and after the merger.

According to the German FCO's sector inquiry into the refining and wholesale of fuels, fuel supply is mainly regional. This charcteristic is well illustrated by the self-sufficiency rate, which shows the share of locally sold fuel that originates from local refineries. Hence, it shows how much of a region's fuel demand is met by its own refineries without relying on external deliveries. Instead of using federal states as regional markets, the analysis of the FCO follows the industry-standard Argus regions. The "Southwest" region primarily covers Baden-Württemberg and Saarland, while the "South" region largely corresponds to Bavaria (Bundeskartellamt 2025). Table 7 presents the self-sufficiency rates for both regions in 2023, the first year after the merger. The results show that in the Southwest region, which includes the Karlsruhe refinery, self-sufficiency rates are very high for both gasoline and diesel. Diesel has a slightly lower rate due to deliveries from the ARA region and the Cologne Bay area via the Rhine. Similarly, in the South region, which includes the Bavarian refineries, self-sufficiency rates are also very high for both products. However, this

region receives notable diesel deliveries from the North region, where key import ports are located. Smaller quantities of both diesel and gasoline also come from the Southwest region. As a result, a large share of local demand is met by local refineries. Fuel deliveries from the Karlsruhe refinery to stations in Bavaria are minimal, and transports in the opposite direction are negligible. Overall, since the merger, refinery fuel supply in the analyzed regions is largely regional, with minimal exchange between them.

	Southwest Share of		South Share of gasoline diesel		
Southwest	[80-100] %	[60-70] %	[80-90] %	[60-70] %	
South	[0-5] %	[0-5] %	[5-10] %	[5-10] %	
Cologne Bay ARA North	[0-5] % [0-5] %	[10-15] % [10-15] %	[0-5] % [0-5] % [0-5] %	[0-5] % [0-5] % [10-15] %	
Rhne-Main	[0-5] %	[0-5] %	[0-5] %	[5-10] %	
Southeast	[0-5] %	[0-5] %	[0-5] %	[0-5] %	
West	[0-5] %	[0-5] %	[0-5] %	[0-5] %	
Seefeld/East	[0-5] %	[0-5] %	-	-	
Emsland	-	-	[0-5] %	[0-5] %	
Schwedt/East	-	-	[0-5] %	[0-5] %	

 Table 7: Self Sufficiency Rates

Source: Bundeskartellamt (2025).

Understanding the different impact of the merger on the refineries requires knowing their size and identifying how many merging stations each refinery supplies. The refinery in Karlsruhe is as large as all refineries in Bavaria combined. Each has an annual crude oil capacity of 15 million tons²⁸. The exact amounts of diesel and gasoline produced depend on various refinery characteristics (Bundeskartellamt 2025). To estimate how many merging stations each refinery supplies, a simple approach considers the shortest distance between each station and the nearest refinery. The refinery in Ingolstadt is used as the Bavarian supplier because it is the closest Bavarian refinery to Karlsruhe. Figure 4 shows that 213 merging stations are supplied by Bavarian refineries, while only 67 stations receive fuel from the Karlsruhe refinery. This suggests that most merging stations depend on Bavarian refineries for supply after the merger.

It is essential to examine whether the supply structure before the merger was the same as after or

^{28.} The refinery in Burghausen is not included because it is owned by OMV and does not produce gasoline.



Figure 4: Distances of the Merging Stations to next Refinery

Next Refinery Ingolstadt + Karlsruhe

Notes: The map is based on data from Tankerkönig. The map shows the locations of the merging stations. The symbol indicates whether a station is closer to the refinery in Karlsruhe or Ingolstadt. In total, 213 merging stations are closer to the refinery in Ingolstadt, while 67 stations are closer to the refinery in Karlsruhe. The larger black circles mark the locations of the two refineries.

if significant changes occurred. Understanding the pre-merger supply chain helps determine whether former OMV stations were already reliant on local refineries or if their supply sources shifted due to the merger. The following analysis explores various indicators to assess the pre-merger level of vertical integration. First, Figure 5a shows the volume of fuel produced by OMV and sold across its own retail network. The volume decreases substantially after 2021. OMV attributes this decline, among other factors, to the sale of its German station network (OMV AG 2022). Second, OMV was among the leading gasoline importers in 2021, one year before the merger. By the merger year, OMV's role as a gasoline importer had already declined. This decline reflects the fact that OMV stations in Germany only required supply until mid-year. For diesel, OMV does not appear as a major importer, likely because it was primarily sourced from its Burghausen refinery in Germany (Bundeskartellamt 2025). Third, the analysis compares the degree of vertical integration for stations in Bavaria and Baden-Württemberg. To assess this, petroleum and coke imports from Austria to each region are examined separately²⁹. Since the OMV refinery in Schwechat is Austria's only refinery, petroleum imports from Austria can be directly linked to this facility. Figure 5b shows that imports from Austria to Bavaria were high. After the merger in 2022, these imports dropped sharply, indicating that former OMV stations in Bavaria were at least partially vertically integrated. In contrast, Figure 5b shows that pre-merger imports from Austria to Baden-Württemberg were much lower than those to Bavaria. Furthermore, Austrian imports to Baden-Württemberg did not decline after the merger. This pattern can be explained by geographic factors. While Bavaria shares a border with Austria, stations in Baden-Württemberg are located much farther from the OMV refinery in Schwechat. As a result, transportation costs from Schwechat to Baden-Württemberg are significantly higher. This finding indicates that, for gasoline, stations in Baden-Württemberg were not vertically integrated. Overall, although it goes against the trend of local fuel supply, abundant evidence shows that OMV stations in Bavaria were at least partially vertically integrated.

Table 8 summarizes the findings. Before the merger, OMV stations in Bavaria received gasoline from the Schwechat refinery in Austria and diesel from the Burghausen refinery in Germany. In Baden-Württemberg, OMV's refineries played a smaller role, especially in gasoline supply. After the merger, the supply structure changed. Most former OMV stations are now supplied by Bavarian refineries due to the vertical disintegration. Since stations in Baden-Württemberg were likely already supplied by the local refinery before the merger, their supply structure remained largely unchanged. In contrast, Bavarian refineries had to absorb the additional demand previously covered by OMV's refineries. This shift likely caused a demand shock for gasoline and diesel in Bavaria, as local

^{29.} There are no public import data from destatis at the federal state level that include only petroleum product imports or imports at a more granular level. Therefore, the chosen classification combines imports of coke and petroleum products.





Notes: The left graph is based on OMV's Factbooks from 2023, 2022, and 2021 and provides statistics on the OMV retail network. The left y-axis (black line) represents retail sales in million tons of OMV-produced fuels. The right y-axis (grey line) shows the number of OMV stations in Europe. The right graph is sourced from Destatis (Code 51000-0037) and displays data on imports of coke and petroleum products from Austria. The black line represents imports to Bavaria, while the grey line represents imports to Baden-Württemberg.

refineries had to compensate for the lost supply from Austria and OMV's internal network. As a result, local demand became an even more crucial factor in fuel pricing. When demand rises, prices tend to increase as supply becomes more constrained. The additional demand placed on Bavarian refineries after the merger likely contributed to price increases in the region, as fuel station prices largely follow wholesale prices (Bundeskartellamt 2022). However, despite changing market conditions, stations rarely switch suppliers. High transportation costs and long-term supply contracts make it difficult to change fuel providers, even when price differences emerge (Bundeskartellamt 2025).

Table 8: Support	pply Structure	before and	after the	Merger
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	Pre-merger	Post-merger
Baden-Württemberg	local	local
Bavaria	local / OMV network	local

Notes: Based on Author's Elaboration.

5.5 Impact of Supply Structure Changes on Fuel Prices

The following analysis compares price trends between stations in the two regions with different supply structure developments. The Bavarian refineries experienced increased demand, making the stations they supply the treated group. In contrast, stations supplied by the Karlsruhe refinery

serve as a control group since their demand remained largely unchanged after the merger. Again, as approximation, the shortest distance to a refinery determines the assignment to the treated and control groups³⁰. Comparing both groups helps to isolate price effects caused by the vertical market structure. This distinction is crucial for understanding how the increase in station demand from local refineries affects retail fuel prices.

Figure 6 presents the results of estimating equation (2) with the adjusted treated and control groups. The graph shows no evidence of diverging pre-trends between the groups. Immediately after the merger, prices rose by approximately 5.1 cpl. Over time, the effect gradually declined to around 2.8 cpl in 2023 and 1.5 cpl in 2024. However, the impact remains persistent and, most importantly, economically significant. The figure highlights that the price effect is particularly strong in the merger year. Alongside the merger, another event occurred during the same period that could have temporarily influenced fuel prices in Bavaria. In June 2022, an incident at the OMV refinery in Schwechat severely damaged the distillation unit, reducing production capacity to just 20 %. Production only began to recover gradually at the end of September, with full refinery operations resuming in early October 2022. During the four-month repair period, OMV established a temporary supply system to meet demand in the affected markets. This system relied on sourcing additional fuel from partner refineries in Germany, Slovenia, Slovakia, Italy, and the Czech Republic³¹. The increased demand from Austria may have put additional pressure on fuel prices in Bavaria during this time. While it is not possible to fully separate the temporary refinery outage effect from the merger effect in 2022, both factors highlight the strong link between fuel prices and supply-demand imbalances. However, the refinery issue was a temporary event, limited to 2022. As a result, it does not affect the long-term price trend observed in 2023 and 2024 at Bavarian stations. This distinction is important because it confirms that the persistent price differences in later years are driven by structural changes in supply and demand rather than short-term disruptions. If the merger year is excluded from the analysis, the average price effect decreases from 2.79 cpl to 2.12 cpl.

Although previous results suggest minor horizontal effects, the definition of treated and control stations based on refinery distance includes locations that may be affected by horizontal effects. Table 9 examines markets where local concentration stayed the same or changed after the merger. This approach isolates the effect of increased fuel demand at refineries from possible horizontal merger effects, allowing for a clearer assessment of vertical market dynamics. The results show that the point estimate is slightly larger in markets where concentration remained unchanged. However, the magni-

^{30.} Stations where the distance to both refineries differs by less than 50 kilometers are excluded from the analysis. In summary, the price effects become stronger when excluding stations with similar distances to both refineries (Table A8). Hence, the results do not qualitatively depend on the exclusion of these stations.

^{31.} See here.





Notes: This figure shows the event study graph for DiD estimates of gasoline stations next to the refinery in Ingolstadt (Bavaria). Point estimates and 95% confidence intervals are shown. The outcome variable is fuel prices (E5 and diesel), measured in cpl. The treatment period begins after May 2022, when the EG Group took over the OMV station network. The reference period covers January to May 2022. The control group includes stations in Bavaria and Baden-Württemberg that are closer to the refinery in Karlsruhe than to the refinery in Ingolstadt. Stations where the distance to both refineries differs by less than 50 kilometers are excluded.

tude of the effects is relatively similar across both cases and aligns with the result displayed in figure 6.

6 Conclusion

This paper examines the impact of a retail merger in the German gasoline market. The findings show that fuel prices increased after the merger, but the strength of the effect varied significantly across regions. These regional differences cannot be explained by horizontal merger effects. Further analysis indicates that they are closely linked to differences in fuel supply. The merger led to the disintegration of mainly Bavarian stations from OMV's supply network, cutting off deliveries from OMV refineries. As a result, Bavarian refineries faced increased fuel demand after the merger, putting upward pressure on prices. This effect did not occur in Baden-Württemberg, where most OMV stations were already supplied by the Karlsruhe refinery before the merger. On average, fuel prices increased by 2.12 cpl at the affected stations in the two years following the merger year. These results highlight the critical role of vertical supply structures in shaping market outcomes. The findings are particularly notable for both their economic impact and regional scope. Compared to other competitive effects in the German fuel market, the impact of this merger is particularly strong. The average price increase in Bavaria exceeded 2 cpl. In contrast, the competitive effect of a market entry on nearby prices is only about a quarter as strong (Fischer et al. 2023). Furthermore, unlike typical horizontal retail mergers, which mainly impact local markets, this merger affected pricing on

	Δ concentration (1)	No Δ concentration (2)
PostMerger	2.55*** (0.38)	2.99*** (0.34)
Station FEs Brand-fuel-date FEs	Y Y	Y Y
Treated stations N R^2	235 754,608 0.99	281 1,093,789 0.99

Table 9: Merger effects depending on Vertical Structure and Market Concentration

Notes: The dependent variables are fuel prices at the station level. PostMerger is a dummy variable taking the value 1 post-merger for stations located in Baden-Württemberg and Bavaria. Standard errors are clustered at the regional level and shown in parentheses. Symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

a much larger regional scale.

These findings are particularly relevant for policymakers and competition authorities. The results suggest that merger assessments in markets with a strong vertical structure should not focus solely on horizontal competition but also consider supply chain effects. In this merger, the vertical structure was not considered in the FCO's merger control decision. This paper shows that merger effects related to vertical structures can be significant and should not be overlooked in competition assessments. Unfortunately, it is not possible to analyze the role and the development of vertical theories of harm in the FCO's decisions, because there is no publicly available database for Germany. However, in merger control decisions by the European Commission, vertical theories of harm have become increasingly important (Bernhardt et al. 2025a).

The findings of this study highlight several promising directions for future research. First, while the results suggest that differences in refinery supply explain regional variations in post-merger price effects, further research could explore the mechanisms through which refinery capacity constraints and supply chain rigidity influence price adjustments. Second, future research could analyze how these capacity shifts have influenced the pricing and production of petroleum-based products manufactured at OMV's refinery in Austria. Such research could provide clearer insights into the broader economic and competitive effects of these changes in refinery operations. Finally, this study focuses on a single merger in the retail gasoline sector, but the findings may have implications for broader merger policy. Comparative analyses of mergers in different industries and regions could help determine whether the observed effects are specific to fuel markets or reflect a more general pattern. Further work could also assess the effectiveness of competition policy measures in preventing adverse price effects in markets with complex supply chains.

Appendix

A Additional Tables and Figures

	2020	2021	2022	2023	2024
Mean	1.080	1.363	1.930	1.696	1.623
Median	1.049	1.339	1.959	1.709	1.619
Sd	0.091	0.114	0.183	0.098	0.086
p10	0.989	1.229	1.619	1.549	1.519
p90	1.229	1.539	2.139	1.809	1.719

Table A1: Summary Statistics of Diesel Prices

Source: Based on data from Tankerkönig. The table shows the summary statistics of average diesel prices from 2020 to 2024. The data includes stations in Baden-Württemberg, Bavaria, and Rhineland-Palatinate.

	Pre-merger year	Post-merger year	Δ
Baden-Württemberg & Bavaria Rhineland-Palatinate	1.366 1.345	1.703 1.654	0.337 0.309
Δ	0.021	0.049	0.028

Source: Based on data from Tankerkönig. The table presents the mean diesel prices for the premerger year (2021) and the post-merger year (2023), separately for stations in Baden-Württemberg & Bavaria and stations in Rhineland-Palatinate.

	(1)	(2)	(3)
PostMerger	1.48***	2.62***	0.37*
	(0.22)	(0.19)	(0.21)
Station FEs	Y	Y	Y
Brand-fuel-date FEs	Y	Y	Y
Region	all	bavaria	b-w
Treated stations	3,774	2,094	1,680
N	11,301,771	6,997,808	5,979,235
R^2	0.99	0.99	0.99

 Table A3: Baseline Results

Notes: The dependent variables are fuel prices at the station level. PostMerger is a dummy variable taking the value 1 post-merger for stations located in Baden-Württemberg and Bavaria. Standard errors are clustered at the regional level and shown in parentheses. Symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
PostMerger	2.63***	0.38*	2.64***	0.39*	2.62***	0.36*
	(0.20)	(0.23)	(0.19)	(0.23)	(0.19)	(0.22)
PostMerger \times Insider	-0.03	-0.11				
<u> </u>	(0.20)	(0.22)				
PostMerger × Esso			-0.10	-0.20		
			(0.20)	(0.22)		
PostMerger × Avia					0.26	0.35
					(0.32)	(0.33)
Station FEs	Y	Y	Y	Y	Y	Y
Brand-fuel-date FEs	Y	Y	Y	Y	Y	Y
Region	bavaria	b-w	bavaria	b-w	bavaria	b-w
Treated stations	2.094	1.680	2.094	1.680	2.094	1.680
Size of heterogeneous group	375	320	139	163	236	157
N	6,997,808	5,979,235	6,997,808	5,979,235	6,997,808	5,979,235
R^2	0.99	0.99	0.99	0.99	0.99	0.99

Table A4: Merger Effects by Insider

Notes: The dependent variables are fuel prices at the station level. PostMerger is a dummy variable taking the value 1 post-merger for stations located in Baden-Württemberg and Bavaria. Standard errors are clustered at the regional level and shown in parentheses. Insider is a dummy variable taking the value 1 for the brands Esso and Avia. Esso is a dummy variable taking the value 1 for the brand Esso. Avia is a dummy variable taking the value 1 for the brand Avia. Symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)
PostMerger	2.62*** (0.18)	0.36* (0.21)
Station FEs	Y	Y
Brand-fuel-date FEs	Y	Y
Region	bavaria	b-w
Treated stations	1,623	1,422
N	5,464,638	4,965,141
R^2	0.99	0.99

Table A5: Merger Effects without Different Brand Compositions

Notes: The dependent variables are fuel prices at the station level. PostMerger is a dummy variable taking the value 1 post-merger for stations located in Baden-Württemberg and Bavaria. Standard errors are clustered at the regional level and shown in parentheses. Symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

(1)(6)(2)(3) (4)(5) 2.59*** PostMerger 2.68*** 2.95*** -0.15 -0.14 -0.40 (0.33)(0.31)(0.30)(0.26)(0.30)(0.30)PostMerger × distance 0.005 0.006 0.007 0.014*** 0.006 -0.001 (0.006)(0.005)(0.007)(0.006)(0.008)(0.007)Station FEs Y Y Y Y Y Y Brand-fuel-date FEs Y Y Y Y Y Y 50 75 100 50 75 100 Radius Region bavaria bavaria bavaria b-w b-w b-w Treated stations 827 1.416 1,836 783 1,250 1,570 Ν 3,774,548 5,275,954 6,342,460 3,684,986 4,879,030 5,699,106 R^2 0.99 0.99 0.99 0.99 0.99 0.99

Table A6: Merger Effects depending on Refinery Distances within Different Radii

Notes: The dependent variables are fuel prices at the station level. PostMerger is a dummy variable taking the value 1 post-merger for stations located in Baden-Württemberg and Bavaria. Distance is a continuous variable that measures the distance between the station and the refinery in kilometers. Standard errors are clustered at the regional level and shown in parentheses. Symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)	(3)	(4)
PostMerger	1.23***	1.42***	1.81***	1.53***
	(0.18)	(0.13)	(0.29)	(0.26)
PostMerger × Bavaria	0.53	-0.49	-0.36	0.12
	(0.34)	(0.44)	(0.38)	(0.29)
Station FEs	Y	Y	Y	Y
Brand-fuel-date FEs	Y	Y	Y	Y
Distance	-	2 km	5 km	10 km
Region	all	all	all	all
Treated stations	128	34	106	291
Ν	2,000,551	1,761,427	1,942,690	2,413,152
R^2	0.98	0.98	0.98	0.98

 Table A7: Merger Effects next to the Federal State Boundary

Notes: The dependent variables are fuel prices at the station level. PostMerger is a dummy variable taking the value 1 post-merger for stations located in Baden-Württemberg and Bavaria. Standard errors are clustered at the regional level and shown in parentheses. Symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
PostMerger	2.28***	2.54***	2.79***	2.96***	2.77***
	(0.17)	(0.16)	(0.16)	(0.20)	(0.21)
Station FEs	Y	Y	Y	Y	Y
Brand-fuel-date FEs	Y	Y	Y	Y	Y
Exclusion threshold	0	< 25 km	< 50 km	< 75 km	< 100 lm
Treated stations	2.099	1.834	1.596	1.322	958
N	9,626,499	8,255,130	7,049,068	5,190,480	3,563,010
R^2	0.99	0.99	0.99	0.99	0.99

 Table A8: Merger Effects depending on the Vertical Structure

Notes: The dependent variables are fuel prices at the station level. PostMerger is a dummy variable taking the value 1 post-merger for stations located in Baden-Württemberg and Bavaria. Standard errors are clustered at the regional level and shown in parentheses. Symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Figure A1: Geographical Distribution of the Remedy Stations



Former Owner • esso ▲ omv

Notes: The map is based on data from Tankerkönig. It shows the locations of all remedy stations in Bavaria and Baden-Württemberg including former OMV and Esso stations.

Figure A2: Selected Stations for Regional Analysis Depending on Refinery Supply



Notes: The maps are based on data from Tankerkönig. The left map shows station locations in Bavaria that are closer to the refinery in Karlsruhe than to the one in Ingolstadt. The right map shows station locations in Baden-Württemberg that are closer to the refinery in Ingolstadt than to the one in Karlsruhe.



Figure A3: Selected Stations for Further Regional Analysis

Notes: The maps are based on data from Tankerkönig. The left map shows station locations in Bavaria that are closer to the refinery in Karlsruhe than to the one in Ingolstadt. The right map shows station locations in Baden-Württemberg that are closer to the refinery in Ingolstadt than to the one in Karlsruhe.



Figure A4: Selected Stations Near the Bavaria–Baden-Württemberg Border

Notes: Based on data from Tankerkönig, which includes addresses of all stations in Germany. The top left map includes all station locations in the postal code area 89. The top right map includes all station locations with a station within 2 kilometers in the other federal state. The bottom left map includes all station locations with a station within 5 kilometers in the other federal state. The top left map includes all station locations with a station within 10 kilometers in the other federal state.

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