SELLER DENSITY AND RETAIL PRICES: EMPIRICAL EVIDENCE FROM THE SPANISH AUTOMOTIVE FUEL MARKET

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Overview

The gasoline retailing industry has been subject of intense empirical research during the last decades. Eckert (2013) provides a comprehensive review of this literature. Thus, there is a large number of papers focusing on the analysis of its industry structure (e.g. vertical integration, mergers), the impact of public policies (e.g. regulatory reforms, privatization), price dynamics (e.g. response asymmetry of gasoline prices to crude oil prices) and price formation (e.g. the determinants of retail price levels and dispersion). Such academic interest has been largely fuelled by the close scrutiny that antitrust authorities and other regulatory agencies exert on this industry. Likewise gasoline (and diesel) retail prices merit regular attention in public debates among politicians, oil industry representatives and consumer associations.

In Spain, the level of automotive fuel prices have been a matter of concern since the dismantling of the state monopoly at the beginning of the 1990s. Actually, it is part of an ongoing debate about the actual degree of competition in the automotive fuels market that results from the current market structure and the observed behaviour of major oil operators (CNE 2009, 2012).

In this paper we analyse the determinants of retail gasoline and diesel price differentials across individual stations using station level data. Firstly, we focus on how the number and type of nearby competitors influences prices. Economic models, like monopolistic competition or search consumers' models, often dramatically differ in their predictions on how the extent of competition influences equilibrium prices, hence that empirical examination is particularly valuable (Barron et al, 2004). Secondly, this paper provides further evidence on the effect of independent marketers on retail pricing behaviour, and issue barely addressed in previous empirical studies (Hastings, 2004). Finally, we analyze the impact of local market structures and independent service stations not only on gasoline prices but also on diesel prices. Unlike in the USA or in the North European countries, diesel accounts for most of the automotive fuel consumption in the main South European countries, like France, Italy or Spain. We therefore analyze whether the determinants of retail prices at the level of service stations vary depending on the automotive fuel, a question that has received scarce attention in the economic literature.

Methods

The empirical analysis uses survey data gathered from the Spanish service stations market. The sample covers 485 stations and accurately represents the Spanish network as a whole. The data set contains the retail prices set by those stations for 39 weeks in 2007. In addition, it includes a set of variables accounting for wholesale prices, regional taxes, station characteristics, location and local demographic characteristics, and the local market competition in which they operate. As far as we know, this is the first study that relies on a representative survey of the entire set of service stations in a country.

Following most relevant earlier studies (e.g. Barron et al, 2004; Hosken et al., 2008; Lewis, 2011; Chandra and Tappata, 2011) we consider the area within a 2-kilometer radius of a given station as its relevant local market. We then estimate the following model specification:

$$p_{it} = \beta_0 + \beta_1 Spot_{it} + \beta_2 Tax_i + \beta_3 Density_i + \beta_4 Density_i * Unbranded_i + \beta_5 Brandshare_i + \beta_6 Brandshare_i * Unbranded_i + \emptyset \boldsymbol{X_i} + \varepsilon_{it} \quad [1]$$

where p_{it} is the retail price of gasoline or diesel in station in station i at week t; $Spot_{it}$ is the spot price of gasoline or diesel in station i at week t; Tax_i are the regional taxes for gasoline or diesel in the region in which the station i is located in 2007; $Density_i$ measures the number of stations within a 2 kilometer radius; $Brandshare_i$ is the share of stations within a 2 km radius that carry the same brand as station i; $\boldsymbol{X_i}$ is the matrix of control variables for station and demographic characteristics associated with station i, and ε_{it} is a random error term.

The model specification in [1] allows for investigating the relationship between the expected fuel price and the number of stations in a local market, as well as for testing whether the relationship between density, brand concentration and price at unbranded stations differs from that at branded stations

Results

Here we only briefly discuss the results relative to the key variables of the analysis. Thus, we find a positive and highly significant coefficient for the variable *DENSITY*, providing consistent evidence on the positive relationship between the number of competitors and retail prices for automotive fuels, i.e. stations with a greater number of competitors within a 2-km radius show higher prices. However, our results also show that the relationship between the number of sellers and prices varies across different types of stations. Thus, we find significant negative signs for the estimated coefficients of the interaction term *Density*Unbranded*. That is, while an increase in the number of local competitors significantly increases retail automotive fuel prices at branded stations, it significantly decreases retail prices at unbranded stations.

We also find a positive and highly significant coefficient for the variable *Brandshare* across all model specifications, indicating that an increase in the share of stations that carry the same brand within a 2-km radius increases fuel retail prices. This result confirms our hypothesis stated above, suggesting that price competition among stations is mitigated when increases the concentration of the same brand in the relevant market. In contrast, the coefficient of the interaction term *Brandshare*Unbranded* is negative and highly significant in the case of diesel. Note that in the case of unbranded stations, the higher the variable *Brandshare* the higher the number of unbranded competitors in the same local market. Consequently, the effect of increasing competitors (density) on decreasing retail diesel prices charged by unbranded stations identified above, is strongly reinforced when additional competitors are also unbranded. However, in the case of gasoline, the estimate for the interaction term *Brandshare*Unbranded* is not statistically significant.

Conclusions

Our findings are fully consistent with the predictions of theoretical search models that typically divide the market into informed and uninformed buyers (e.g. Varian, 1980; Stahl, 1989; Janssen and Moraga-González, 2004). Our results also show that the relationship between the number of sellers and prices varies across different types of stations. That is, our analysis provides evidence on the existence of different competitive dynamics between branded and unbranded stations. As Lewis (2008) argues, stations with different characteristics tend to sell to different types of consumers, and thereby the effect of competitor density is likely to vary across station types. Particularly, consumers at unbranded stations have less brand loyalty and a greater propensity to search than consumers at branded stations. Thus, unbranded stations would attract a larger share of informed consumers, with lower search costs and sensitive to retail prices, whereas branded station would attract relatively more uninformed consumers with higher search costs and less sensitive to prices. Further, our results suggest that diesel consumers search more intensively than gasoline consumers as argued in the paper.

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