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Search intensity, search time and prices: evidence from retail diesel markets in France

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Abstract

We study the effect of price variations over time and across space on search intensity and search time by consumers in retail markets for diesel in France. The main contribution of the paper is that existing work in industrial organisation in this area has already studied the effect of such variability on the first measure of search but not on the second one. Using novel data from daily consultation measures and price information from a government-run website, we find that price dispersion across space increases search activity and the amount of time allocated to search. Furthermore, while contemporaneous price changes do not appear to influence the number of visits and time per visit to the website, several coefficients on past price changes are positive and statistically different from zero. Our results thus suggest that price dispersion and price variability play a role in inducing search by current and potential customers.

Keywords Search · Price dispersion · Price disclosure · Diesel

JEL classification D8 · L8

1 Introduction

Ever since Stigler (1961), a growing number of papers have analysed empirically the association between consumer information and price dispersion. Studying gasoline demand, Marvel (1976) finds that both price dispersion at a point in time and price variability over time depend on a set of proxy variables that represent the benefits and costs to consumers of acquiring information. In a review of the literature, Baye et al. (2006) conclude that

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much of the observed price dispersion in online and offline markets stems from consumers' costs of acquiring information about firms, and firms' costs of transmitting information to consumers. The question that arises is: How do consumers acquire information? The theoretical literature offers two models: clearinghouse and sequential search models. In the former, (some) consumers enter an information clearinghouse and become fully informed through, for instance, newspaper and all-or-nothing non-sequential searches. In the latter, consumers assemble information by sequentially visiting the stores in the market and stopping at some point without becoming perfectly informed. The main feature in all-or-nothing non-sequential search models is that they do not allow for searching more or less, but for a discrete decision only: consumers do not search and remain uninformed, or do search and become fully informed.

During the last decade or so, the introduction of transparency initiatives in the form of mandatory price posting and the advent of vendor websites have led to the study of the effect of information disclosure mechanisms on market outcomes such as price levels and price dispersion; see, inter alia, Hong (2014), Jang (2015), Rossi and Chintagunta (2016) and Luco (2019). At the same time, a number of authors have started to use the number of daily visits to these websites as a proxy for consumer search, with the purpose of studying the factors that guide consumers to search for better prices, reversing, to some extent, the price dispersion-consumer search link studied in (almost all) the previous research.

In this paper, we examine the effect of price changes and price dispersion on consumer search in retail diesel markets in France. We take advantage of a piece of French legislation requiring that all stations that sell more than 500 m³ of fuel per year must report all fuel price changes to the Ministry of Economy, which are then made freely available to the public through a governmental website. The motivation behind the website is to provide motorists with accurate and up to date price information to help guide their purchase decisions. From theoretical models of price dispersion, the French government website serves as an information clearinghouse that fully informs consumers who visit the site. It means sequential search models are less likely to apply to this situation.¹ We use these data to obtain an accurate measure of market-level cross-sectional price dispersion and their changes from day to day. In addition, the main feature of this research is that for measuring consumer search we use novel data on daily consultation measures from this government-run site.

While Lewis and Marvel (2011), Byrne et al. (2015), Noel (2018) and Noel and Qiang (2019) have already used retail price data from websites, i.e. *GasBuddy.com* for the US and Canada, the prices in such websites are provided by voluntary observers, and so there is the possibility of sample selection bias; see e.g. Atkinson (2008). In contrast, the fact that French legislation mandates that stations must report their prices implies that geographical coverage is maximised, while sample selection biases, data inaccuracies and report delays are minimised. In this respect, we follow closely Byrne and de Roos (2017) inasmuch as we also have a measure of search intensity given by the number of unique daily visits to the website. Unlike Byrne and de Roos (2017), the distinctive aspect of our analysis is that we use for the first time a measure of time spent per search. As in all models of search (see e.g. Varian 1980, Stahl 1989, Yang and Ye 2008, Lewis and Marvel 2011), consumers make decisions on whether to search to become informed about prices or not to search and stay uninformed. In these models, informed consumers are those that observe the prices

¹ See Baye et al. (2006) for a critical survey on information clearinghouse models and Pennerstorfer et al. (2020), who use this model in their work.