Authors Claudia Capozza, Angela Bergantino, Mauro Capurso

Title Price discrimination in the railway market

Track General Papers

Director Mark Wardman

Abstract This paper is the first attempt to empirically explore the price discrimination carried out by rail companies in the high-speed (HS) segment and the factors influencing it. Price discrimination is a strategy often used by firms to sort consumers depending on their willingness to pay and, thus, to maximize profit. In the transport industry, it is fruitfully implemented by airline companies and, indeed, past contributions focused mainly on this sector. Instead, there is a lack of evidence on price discrimination strategies undertaken by rail companies which, though, deserve careful study, given their key role in connecting regions and enhancing mobility.

In the study of the determinants of price discrimination, we account for passengers' heterogeneity in their purpose of travel (business *vs* leisure) as well as for peak periods. Particularly, we test the role of inter-modal competition in affecting such pricing behaviour. Indeed, we focus on connections by HS services, where the inter-modal competition with airlines is effective and might induce rail companies to adopt sophisticated pricing strategies in response to airline pricing behaviour.

The dataset we use to address the research question is unique. It covers HS national connections in Italy and Spain plus some HS transnational connections where HS lines are effective. Moreover, Italy is the only case where there is competition among rail companies (Trenitalia and Nuovo Trasporto Viaggiatori) on some city-pair connections; therefore it is possible to explore both the intra-modal competition (rail *vs* rail) and the inter-modal competition (air *vs* rail). Data on fares are collected from rail and airline websites. First, we identify plausible round-trips operated in April 2014, then we retrieve data directly from the websites by simulating reservations at the 30, 20, 15, 10, 5, 3, 2, 1, and 0 booking days before departure. We collect fares for all the available ticket classes.

We assume that the price dispersion, measured by the Gini coefficient, is the result of price discrimination (see Borenstain and Rose, 1994; Gerardi e Shapiro, 2009; Gaggero e Piga, 2011). Specifically, we consider two levels of price dispersion. On the one hand, holding fixed the ticket classes, we study the inter-temporal dispersion (i.e. across booking days) of rail fares. On the other hand, we study the dispersion across ticket classes with different add-ons, holding fixed the days before departure. A given connection is observed for different departure days, hence, the structure of the data enable us to perform a panel data analysis using the Within Group (or Fixed Effect) estimator which allows to get rid of the unobserved heterogeneity and, then, to obtain consistent estimates.

Previous finding shows that competition is able to influence the price discrimination. However, both theoretical and empirical results provide very different evidences. Traditionally, market power enhances the ability of firms to price discriminate. A monopolist can set and maintain higher mark-ups (see Tirole, 1988). However, Borenstein (1985) and Holmes (1989) show that market power is not required to sustain price discrimination if consumers show heterogeneity of brand preferences, while Dana (1998) shows that price discrimination, in the form of advance-purchase discounts, does not require

market power to be implemented. Consumers with more certain demands are willing to buy in advance because the presence of consumers with less certain demand could lead to an increase in prices. Some empirical papers show that price discrimination is more likely to be undertaken in more competitive market. For instance, Borenstein and Rose (1994) and Carbonneau et al. (2004) exploring the US airline industry, provide evidence of competitive-type price discrimination: lower price dispersion arises in more concentrated markets. Differently, Gerardi and Shapiro (2009) and Gaggero and Piga (2011) they provide evidence of monopolistic-type price discrimination: few companies with a relatively large market share can easily price discriminate (i.e. higher price dispersion arises in more concentrated markets).

Preliminary findings suggest that rail companies do engage in price discrimination strategies, considering both levels of price dispersion. Price dispersion is enhanced when HS connections are in direct competition with air connections, that is, rail engages in stronger price discrimination when the inter-modal competition increases. Further, price dispersion seems to be influenced by the travel purpose.

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