

Price discrimination and concentration in European airline markets

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Abstract

This article deals with the relationship between price discrimination and concentration in intra-European routes. Data on ticket prices of all flights from Nice Airport (France) to European destinations is used. The objective is to analyze how price discrimination is affected by concentration. Ticket restrictions are used as proxies for price discrimination. It is shown that concentration measured by the inequality of market shares affects the sensitivity of airline prices to purchase restrictions positively, meaning that concentration and price discrimination are negatively related.

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1. Introduction

Since the liberalization of the 1990s, European airlines have been confronted with a competitive environment through a series of three “packages” of legislation¹ and the Open Sky process proposed by the US. Compared to the US, the European airline market is geographically smaller. Also, the shorter distances between major agglomerations allow stronger competition from alternative transportation, notably the high-speed train. Moreover, the shorter distances imply that for many intra-European flights, transfer via a hub is not an option. Hence, hub-and-spoke networks are not as strong as in the US. So far, the liberalization process has not led to homogeneous competition at the route level. Thus, to evaluate concentration in the European airline market, it is necessary to define each route as a specific market, which has its own market structure and concentration index.

The purpose here is to explain the phenomenon of multiple prices offered in the intra-European routes that has become pervasive since the European market liberalization. A common approach to pricing in the airline market is in line with the theory of price discrimination. Airlines offer discount fares to consu-

mers who satisfy various restrictions. These restrictions are used to sort consumers. Price discrimination is a price strategy that answers the competitive environment of carriers. Since Borenstein (1985) and Holmes (1989), the theoretical relationship between price discrimination and the degree of competition has been continuously investigated (Spulber, 1989; Champsaur and Rochet, 1989; Stole, 1995; Valletti, 2000; Rochet and Stole, 2002). These studies show that price discrimination persists and may increase as a market moves from monopoly to imperfect competition. Price discrimination behavior needs to be explored in competitive markets. Indeed, in monopoly markets, firms sort consumers on the basis of their willingness-to-pay (monopoly-type discrimination) whereas when more competition is introduced, firms must consider that consumers differ not only in regards to the utility they derive from a good, but also in regards to their preferences among different brands (competitive-type discrimination).

Specifically, dealing with airline market, Gale (1993), Gale and Holmes (1992, 1993), and Dana (1998) used advance purchase discounts as discriminatory device and concluded that there is more price discrimination and then more price dispersion in a competitive environment. This discriminatory device disperses prices and allows carriers to sort consumers in order to face airline specific constraints.²

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¹In 1987, 1990, and 1992, and by 1997 the right to “cabotage” have opened up internal markets to competition from airlines of other member states.

²Carriers face the problem of limited capacity allocation as airline service is not storable and as demand is uncertain.

Empirical analyses are consistent with theoretical results but few analyses specified the relationship between price discrimination and competition. Indeed, recent empirical analyses established that the more competitive the markets, the greater the price dispersion (Borenstein and Rose, 1994; Morrisson and Winston, 1995; Stavins, 2001). Borenstein and Rose (1994) explain that price dispersion may result from price discrimination. They show that the expected effect of market structure on price dispersion will depend on whether monopoly-type or competitive-type price discrimination dominates but they did not analyze the relationship between price discrimination and market structure empirically. In fact, only Stavins (2001) estimated the relationship of price discrimination with concentration. Her analysis is original in that she uses data on individual airline ticket prices and ticket restrictions across various routes within the United States. She finds a negative relationship between price discrimination and concentration on the American airlines market.

The study investigates the relationship between price discrimination and concentration on the European Airlines market. As with Stavins (2001), purchase restrictions are used in order to evaluate price discrimination in airline markets. Unlike previous studies of price discrimination, we have included second- and third-degree price discrimination. We have added purchase restrictions intending to foster self-selection³ to purchase restrictions intending to segment the market on the basis of exogenous passenger's characteristics. Moreover, as the European airlines market is concerned, we have taken into account the European market structure particularities by using the Herfindahl–Hirschman decomposed index.

2. Empirical framework

2.1. The data

The data contain all ticket prices of flights from Nice Airport (France)⁴ to European destinations on Wednesday, October 16, 2002. All routes are nonstop flights. Our 2592 ticket prices sample on 20 routes⁵ comes from the Amadeus system.⁶ The sample of the routes covers

nine European countries and 17 carriers.⁷ Four routes are monopolistic which represents 20% of the sample and twelve are duopoly routes, which represents 60%. This sample is representative of the European market. The routes from Nice are typical European routes: (i) hub-spoke routes (Burghouwt and Hakfoort, 2001), (ii) served by few carriers,⁸ (iii) confronted with low-cost carriers.

Ticket prices were collected 22, 14, 7, and 1 day before the departure date. This sequence allows account to be taken of the rationing device and the limited supply of the cheapest tickets. For each ticket, the price depends on flight characteristics and on purchase restrictions. We have evaluated price discrimination with the effect of ticket restriction on ticket price. If restrictions imply a greater discount on the ticket price, then the price discrimination is higher.

Before analyzing price discrimination by the mean of restrictions, some observations on price dispersion in the sample. Since dispersion is measured for only one date of departure chosen in the week, then dispersion caused by a high demand period (summer and holiday peaks) and a low demand period is excluded. Moreover, the measure of dispersion is done by route and by carrier leading to an approximate measure of discrimination here. We have chosen the coefficient of variation (standard deviation to the mean), which allows us to compare the variability of prices of the different routes. The calculation of the coefficient of variation by routes and by carrier for all carriers shows that there is large dispersion of prices around the mean. It proves spread discrimination from carriers. Table 1 shows the mean, the standard deviation and the range of the coefficient of variation (CV) for different groups of routes depending on market structure.

The mean of the coefficient of variation in relation to the market structure shows that dispersion is negatively related with the number of carriers on a route. These statistical descriptive results suggest a negative relationship between price dispersion and market structure. This relationship is consistent with Borenstein (1989) who argues that cheaper tickets are more sensitive to competition than the high-price tickets that are bought by consumers with low-price elasticity of demand. Moreover, the coefficient of variation decreases as it comes closer to the departure date whatever the market structure. Discretionary travelers tend to have a more elastic demand for air travel and a lower value in their

³These restrictions on discount airline tickets introduce a quality differentiation (see Mussa and Rosen, 1978; Chiang and Spatt, 1982).

⁴Nice airport is the second largest airport in France by passenger numbers.

⁵We do not take into account Corsica routes because they are subsidized routes. We take into account of all regular carriers on each route even if they have a code sharing partner. We have also excluded low-cost carriers because these carriers do not appear in the Amadeus system of distribution.

⁶Amadeus is a Global Distribution System.

⁷Air France (AF), Air One (AP), Alitalia (AZ), British Airways (BA), British Midland Airways (BD), Eurowings (EW), Air littoral (FU), Transavia Airlines (HV), Iberia (IB), Air Lib (IW), KLM Royal Dutch Airlines (KL), Lufthansa (LH), Crossair (LX), Portugalia (NI), Brussels Airlines (SN), TAP Air Portugal (TP), Virgin Express (TV).

⁸In 1997, 77% of all intra-European routes were serviced by one or two airlines according to the Civil Aviation Authority study CAA (1998).

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