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Competition in Swedish passenger railway: Entry in an open access market and its effect on prices

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ABSTRACT

The Swedish market for passenger railway services has been open to competition since the year 2010. Although minor entries have been made since this date, the incumbent SJ only faced substantial competition on the tracks when MTR entered the Stockholm-Gothenburg line in March 2015. Using unique Swedish ticket price data from operators' websites, this paper investigates what effects this entry has had on market prices.

The results show that the incumbent's prices decreased by 12.6 percent on average between March 2015 and June 2016. The price level of the competitor is well below the average price that was offered in the pre-entry period. Further, the largest price reduction, in percentage terms, was found on tickets booked 13 days before departure date. Finally, the observed price decrease in the paper is most likely at a short-run equilibrium, or an ongoing process, implying that prices might adjust further in the long-run.

1. Introduction

The European railway market has seen some major restructuring and liberalization reforms in the last few decades, often originating from the three railway packages with new legislation launched by the European Union. Sweden is no exception and is, together with the Czech Republic, Germany, Great Britain, and Italy, one of the countries that has gone the furthest in liberalizing its market for passenger railway services. Nash et al. (2013) discussed how competition was introduced in three of these countries, and van de Velde (2014) the role of market initiative for several European countries. Since 2010, Sweden has had open access to the market, thus abolishing the state-owned enterprise SJ's[1] monopoly. As noted by Fröidh and Nelldal (2015), the services offered by the operators established since 2010 have been limited and can be seen as complements to SJ's service. That is, these new services have not resulted in extensive competition with SJ. The exception is the Hong Kong-based operator MTR Express (below MTR), which announced its entry on the Stockholm-Gothenburg line in April 2013. Operations began in March 2015, and this paper's focus is on what effect this has had on the incumbents prices. The development in the Swedish on-track competition is described in more detail in Section 3 of the paper.

The research question posed in this paper is whether entry on the Stockholm-Gothenburg line has lowered the ticket prices paid by travelers, as would be expected from increased competition. The question might be straightforward to answer with just fundamental economic theory, but few studies concerned with the impacts of open access in Europe have empirically proven this with more than descriptive and limited "before and after" comparisons. An extensive dataset was used in this paper with price information for both the pre and post-entry periods, spanning a total of 23 months. The main contribution is to give a more formal and rigorous empirical analysis than previously performed on the pricing development following a major entry in a passenger railway market. Price competition has attracted extensive attention in the airline literature, for example in Europe (Norman and Strandenes, 1994; Schipper et al., 2002; Salvanes et al., 2003) and the US (Borenstein and Rose, 1994; Gerardi and Shapiro, 2009; Dai et al., 2014), but not in the rail literature. In addition, this paper adds to the transport literature using data collected with web crawlers. Finally, it gives more insights on railway pricing in Sweden, which for many years has been more or less unstudied due to the enterprise structure of SJ and lack of publicly available data.

Few empirical studies on entry in European railway markets have used more formal and systematic methodologies. However, this does not mean that the issue has not been explored. Two works (Tomeš et al., 2014, 2016) used descriptive statistics to study the open access competition in the Czech Republic that began in 2011 when the monopoly of

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[1] SJ is originally an acronym for Statens Järnvägar (Swedish State Railways). The company has simply been named SJ since 2001.

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the state-owned incumbent České Dráhy was contested on the Prague-Ostrava line. Tomeš et al. (2016) suggested that the open access competition lowered fares by 46 percent between September 2011 and 2014 and that service frequency and quality increased. The authors also claim that all operators are unprofitable on the line. For Germany, Séguret (2009) noted that head-on competition with the state-owned incumbent Deutsche Bahn was not easy to sustain in the long run. Rather, competing operators could only run low-cost trains between cities that were not on Deutsche Bahn's network. Finally, although open access competition is minor in Great Britain (van de Velde, 2014), Temple (2015) concludes that ridership and revenue grew on stations with competition, but that yield growth was lower, when analyzing the open access operator Grand Central Railway competing with franchises on the East Coast route.

While the previous studies were mostly descriptive, Bergantino et al. (2015) used an econometric methodology to investigate inter-modal price competition in the Italian air and high-speed railway markets, and they provided a description of the intra-modal competition in the latter market. The authors found no predatory pricing behavior by the incumbent, nor a reduced supply. Instead, claims of strategic pricing were made after correlating the incumbent Trenitalia's lagged fare $(t-1)$ and the entrant's (NTV) fare at time t. Their econometric analysis also showed that railway fares were lower with increasing inter-modal competition. Beria et al. (2016) studied the entry of a new operator (NTV) in the Italian high-speed rail market and the impact this has had on the incumbent's (Trenitalia) prices. After the entry, Trenitalia reduced prices with about 15 percent, but are not found to respond to the pricing induced by NTV. NTV, on the other hand, was found to respond to Trenitalia's pricing.

The rest of this paper is organized as follows. Section 2 provides a discussion on the competitive nature of the railway sector. Section 3 gives an overview of the competition in the Swedish railway market. Section 4 describes the data used in the empirical framework presented in Section 5. The results are given in Section 6, and a discussion follows in Section 7. Finally, Section 8 concludes the paper.

2. Competitive nature of the rail sector

This section provides a discussion on the characteristics of (open access) competition in the long-distance passenger railway market, which affect what outcomes to expect. The number of lines with competition is likely to be small, and where existent be characterized by oligopolistic competition with two, or maybe a few, actors on the line (Preston, 2008). There are several reasons for this: capacity constraints, both on the track and at terminals, limit competition (Preston, 2009), track access charges affect competition effectiveness (Johnson and Nash, 2012; Álvarez-SanJaime et al., 2016), and (as in franchises) investments in rolling-stock, labor, and maintenance might serve as entry barriers (Nash et al., 2016).

In Sweden, as in most European countries, a single incumbent is challenged when open access competition is introduced. While entry is mostly with niche services (Preston, 2009; Fröidh and Nelldal, 2015) and do not affect the incumbent to a large extent, more substantial entries on the incumbent's more profitable lines (routes) will. The incumbent can try to deter entry by increasing frequency in order to reduce the risk for competitive entry (Belleflamme and Peitz, 2010). Such a strategy might, however, be too costly for the incumbent relative to the profit loss from competition, or less successful if the entrant is committed to the entry. The industrial organization literature discusses more on such entry deterrence and accommodation, for example Tirole (1988) or Belleflamme and Peitz (2010), which some of the discussion below relies on. For the Swedish case, the entrant was committed to the entry early, having already ordered the rolling stock and received train paths in late 2013, which forced the incumbent to accommodate the entry instead.

In its entry, the entrant could act strategically in what service levels are offered. In the transport literature, two scenarios are often assumed in simulations: fringe competition[2] (running a train in each direction in the peak periods) and head-on competition (matching the incumbents schedule) (Preston et al., 1999; Preston, 2008, 2009). By simulating entry on a Swedish line with close resemblance to the Stockholm-Gothenburg line, Preston (2008) analyzed two actors' market shares (an incumbent and an entrant) following different strategic interactions in the entrant's service level and (active) price competition by both actors. The simulations showed that head-on competition with reduced fares by the entrant had the greatest potential in gaining a large market share, even if the incumbent engages in price competition. Even with fringe competition the entrant could capture up to 15 percent of the market with price competition, although this share decreased substantially if the incumbent would lower its prices as well. In short, the entrant is most successful if competing with prices in addition to frequency. In the conclusions, Preston noted that both head-on and fringe competition by the entrant would indeed be commercially feasible, the former only on the busiest lines and given lower track access charges and sufficient capacity. Rail capacity constraints might suggest the entrant would not go with a full head-on competition immediately, which is indeed the case in Sweden.

The way price competition emerges can vary, but a basic, yet important, insight is that a higher supply will cause the market equilibrium price to drop. The form and magnitude of this drop does also depend on the market structure, firm interaction, demand elasticity and more. Assuming fixed service level (frequency) by the incumbent, its prices can be affected in at least two ways following entry. First, the incumbent can act strategically and accommodate entry by adjusting its pricing scheme (similar to the simulations above), and lower prices. Examples include offering more low-price tickets or adjusting prices for certain departure or traveler groups. Second, in practice today, price competition is not a static matter due to the dynamic pricing (yield management) used by train operators. Although the mechanisms determining prices are not certainly known, it is likely prices are set at least as a function of supply (available seats). Even if the entrant only gets a small share of the market, some of the incumbent's customers might switch operator, leaving more available seats. Because the price is a negative function of supply, the result is lower prices. These two effects could both be present following an entry, and without having access to supply data on seats it is hard to quantify their relative importance. Aggressive counter measures by the incumbent to increase frequency or marketing could indicate a more active incumbent, thus also being more active in its pricing strategy. However, with a successful entrant attracting customers, the second effect (lower prices through higher supply) is probably more apparent. This gains some further support from Johnson and Nash (2012) who tested a yield management system in their simulations. They noted for head-on competition that the increased frequency indeed reduces fares with some 18 percent; a large share of the total fare decrease.

Another way to cope with price competition could be for the incumbent to increase product differentiation. For example, altering second/first-class arrangement, enhance its customer loyalty program, or using its brand recognition. A strong brand might per se even serve as an entry barrier, as could well established sales channels in which the entrant is not allowed on. Although these measures do not affect the incumbent's prices directly, they reduce the scope for price competition. The entrant might, however, have to offer even lower prices if the incumbent's product is more highly valued. Compared to the two effects discussed previously, this third effect is, however, probably less important in explaining a price decrease.

To summarize the discussion, one would expect the entrant to offer lower prices than the incumbent to gain market shares and profits. In addition, the incumbents price, which is the focus of this paper, is expected to be lowered as well following direct or indirect strategical actions taken by the incumbent, as was also demonstrated in Preston

[2] Labeled as cream-skimming in Preston et al. (1999).