



The impact of open access on intra- and inter-modal rail competition. A national level analysis in Italy



Angela S. Bergantino ^{a,*}, Claudia Capozza ^a, Mauro Capurso ^{a,b}

^a University of Bari Aldo Moro, Italy

^b University of Leeds, UK

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ABSTRACT

During 2012 the Italian passenger market has experienced the entry of a new operator, *Nuovo Trasporto Viaggiatori* (NTV) on the high speed rail (HSR) market segment, in competition with the incumbent *Trenitalia*. The Italian market is the first and most extensive case in Europe where two railway companies compete for HSR services on open access basis. In this paper we empirically explore the competitive effects of the newcomer's entry in the passenger market tackling two issues. First, we study price and capacity effects of the stemming *intra-modal competition*. Second, we measure the impact of *inter-modal competition* by HSR on airline pricing behaviour. The results show that the two railway companies engage in strategic pricing, although to a different degree on different routes and that capacity and frequency are strategic variables. We also find that airlines significantly reduce fares when flights are in direct competition with HSR services.

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1. Introduction

In recent decades the competition between rail and air transport in the short- and medium-haul passenger market has steadily increased. Before the introduction of high-speed rail (HSR) services in the second half of the 20th century, rail transport did not compete with air transport, given the huge difference in travelling time. The provision of HSR services notably reduced the gap in the city-centre to city-centre travelling time. The *Union Internationale des Chemins de fer* (2010) classifies HSR services as those lines running at a minimum of 250 km/h (155 mph). Actually, [Gonzalez-Savignat \(2004\)](#) argues that HSR services can even be seen as a new form of railway transport.¹

By improving the quality of services over the conventional ones, HSR transport generates a significant competitive pressure on airline companies over specific travelling distances. According to the *Union*

Internationale des Chemins de fer (2010) the “HSR services being less rapid than air still can hold the majority of market shares when the travelling time ranges between 2 h and 3 h 30.”

In many European countries there is evidence of a significant substitution effect between HSR and airline services. In twenty years, the demand for HSR services increased sevenfold, from 15.23 thousand million pax/km in 1990, to 110.35 thousand million pax/km in 2011. Likewise, the share of HSR services has increased from 15.9% in 1991, to 27.1% in 2011, more than one percentage point per year.^{2,3} The supply of a new quality service has led not only to an increase in the demand for rail transport but also to traffic reallocation.⁴

The arrival of HSR services has mainly stimulated the research on the inter-modal competition effects. However, the liberalisation of the rail market has attracted new operators and has fostered the intra-modal (on-track) competition that deserves to be studied.

In this work, we explore the Italian passenger market, a suitable case for analysing the impact of HSR on the transport sector.

* Corresponding author.

E-mail addresses: angelastefania.bergantino@uniba.it (A.S. Bergantino), claudia.capozza@uniba.it (C. Capozza), mauro.capurso@uniba.it (M. Capurso).

¹ The Paris–Brussels line is about 320 km long, corresponding to 1 h15 of travelling time. After the introduction of HSR transport, there has been a reallocation of traffic. The demand changed from 25% to 50% for rail services, from 61% to 43% for car services and from 7% to 2% for air services. The impact has been even more relevant on the Madrid–Seville line, almost 500 km long, corresponding to 2 h15 of travelling time. Before the introduction of HSR services, trains held about one third of total demand. Thereafter, trains account for over 84% of the demand ([Union Internationale des Chemins de Fer, 2010](#)).

² Statistical pocketbook, [Directorate-General for Mobility and Transport \(2013\)](#).

³ An ample body of literature explains the effects on transport demand by the introduction of new services. See, among others, [Gutiérrez et al. \(1996\)](#), [Gutiérrez \(2001\)](#), [Willigers and van Wee \(2011\)](#) and [Cao et al. \(2013\)](#).

⁴ If we look at the rail sector as a whole (including conventional services), the increase in demand from 1990 to 2011 was rather small (from 400.7 to 407.1 thousand million pax/km). In the 1990s there was a sharp demand fall. If we consider only the period 2000–2011, we actually see a more significant increase in demand, equal to 9.8% (from 370.7 to 407.1 thousand million pax/km).

Indeed, it is the first and most extensive case in Europe⁵ where two railway companies compete on an open access basis for HSR services on the domestic market,⁶ allowing us to study two complementary issues.

First, we explore price and capacity effects of *intra-modal competition* among HSR companies. Basically, we verify whether there is a strategic interaction in fare and capacity decisions between *Trenitalia* and *NTV* on all the competing routes. The market penetration of *Nuovo Trasporto Viaggiatori (NTV)* has been very fast. In April 2012, *NTV* started the HSR services on the Rome–Milan line in competition with the incumbent *Trenitalia*. Since then, *NTV* entered other city-pair markets, namely the Rome–Venice and the Rome–Turin routes and after that, the Salerno–Napoli–Rome and the Milano–Ancona routes. In 2012, *NTV* moved more than 2 million passengers, against the 25 million of *Trenitalia* (Longobardi, 2013; *Trenitalia*, 2012) while, in 2013, *NTV* conquered 25% of the market share, moving about 7 million passengers (*Nuovo Trasporto Viaggiatori*, 2013).

Second, we measure the effect of *inter-modal competition* on airline pricing behaviour and focus on the Rome–Milan market. On this line, HSR transport is a substitute for air transport as the total journey time is below three hours, and we can observe intra- and inter-modal competition thanks to the open access regulation. Indeed, *NTV* entry has fostered competition with the former incumbent *Trenitalia* but also with the airlines. HSR services started to be supplied in 2008 on the Rome–Milan line. The rail market share was 36% whilst the airline market share was 51%.⁷ In 2012, with the entry of *NTV* and the reaction of *Trenitalia*, the rail market share reached 68%, whilst the airline market share decreased to 26% (Ministero delle Infrastrutture e dei Trasporti (MIT), 2013 and *Nuovo Trasporto Viaggiatori*, 2013).

The *Autorità Garante per la Concorrenza ed il Mercato* (2013) notes that when *Trenitalia* started the non-stop service between Rome and Milan, the number of rail passengers increased along with the average revenue per passenger. The revenue increment could be due to the substitution of *Intercity* and *Eurostar* trains with HSR services, usually more expensive. At the same time, *Alitalia* experienced a small drop in the number of passengers and a reduction in the average revenue per passenger. The AGCM estimates a range of daily passengers from 3000 to 6000 in 2009. The estimated range reduces to 2000–4000 (10–20%) in 2011. The number of passengers using HSR non-stop *Trenitalia* services increased from 3000 to 6000 in December 2009, to 5000–10,000 in December 2010 (10–30%). The increment is also due to the elimination of a large number of conventional services (e.g. *intercity*).

Besides diverting a substantial share of passengers from air transport to rail transport,⁸ the inter-modal competition might exert a significant downward pressure on airfares. Past empirical studies on competition in the transport sector analyse the effect of airline competition on fares⁹ with regard to the role of low cost

carriers (LCCs).¹⁰ A number of studies explore the air–rail competition to analyse the actual or the potential modal shift between air and rail due to the entry of HSR operators.

The database we use to carry out the empirical analyses is unique. Data on one-way fares are retrieved from railways' and airlines' websites by simulating reservations. Fares are recorded every day starting at sixty booking days before departure. The intra-modal competition analysis applies to all the Italian domestic routes on which *Trenitalia* and *NTV* compete, whereas the inter-modal competition analysis focuses on the Rome–Milan line because air and rail travelling times are very similar and, thus, the transport modes can be considered substitutes.

The results show that the on-track competition leads to an overall increase in the supply of services and, thus, to a greater utilisation of the network. The arrival of *NTV* has not induced *Trenitalia* to cut down its supply. The analysis of the daily frequencies highlights that *Trenitalia* has increased the capacity by more than 30% from the year previous to *NTV* entry, and the overall capacity on the Rome–Milan line has increased by 56%. Moreover, the railway companies are found to engage in strategic pricing, although to a different degree on different routes. The incumbent's tariffs are 29.92% to 34.67% higher than the newcomer's, thus there is no evidence of predatory or aggressive pricing behaviour by *Trenitalia*.

Our results have relevant implications for antitrust policy as *NTV* reported to the Italian Competition Authority (*Autorità Garante della Concorrenza e del Mercato*, AGCM) a number of cases of alleged discriminatory behaviour by: *Trenitalia*, the infrastructure manager *Rete Ferroviaria Italiana* (RFI) and the mother company *Ferrovie dello Stato Italiane* SpA (FSI).¹¹ On May 28, 2013, the AGCM started an investigation into *Trenitalia's* pricing strategies on the Rome Termini–Milan Centrale route, as *NTV* accused the incumbent of dumping and cross subsidisation. *NTV's* claim is that *Trenitalia* sets fares for HSR services that do not cover the operating costs, and compensates the losses with the subsidies received from the regions and the local authorities under the public service obligations (PSO) contracts. On March 12, 2014, the AGCM closed the investigation for abuse of dominant position declaring FSI to be not guilty, although it was required to guarantee a fairer behaviour towards competitors.

Finally, the empirical analysis on the inter-modal competition shows a positive spillover effect for consumer welfare. The air–rail competition induces airlines to decrease fares. In fact, airlines are found to reduce fares up to 13.26 Euros when they compete with HSR operators. This can be seen as an indirect benefit of the HSR transport that should be considered in the cost-benefit analysis by policymakers in the evaluation of HSR infrastructure investments.

The paper is organised as follows. In *Section 2* we survey the literature. In *Section 3* we analyse the liberalisation process in the European Union, with a focus on the appearance of intra-modal competition in the Italian rail sector. In *Section 4* we describe the data and the collection procedure. In *Section 5* we illustrate the analysis of the intra-modal competition and, then, we show the results. In *Section 6* we carry out the empirical analysis on the

⁵ This was shown in Bergantino (2015), providing a comparison across European countries on the process of opening up to competition in the railway market.

⁶ There are a few cases of open access competition throughout Europe. On the international route linking Brussels and Köln, the French, the Belgium and Dutch railway companies – allied in the consortium Thalys – compete with the German incumbent Deutsche Bahn. On conventional services, the domestic open access competition appeared in Germany (on the Hamburg–Köln route), Austria (on the Vienna–Litz route), Czech Republic (on the Praga–Ostrava route) and in the UK (on some parts of the railway line connecting London to Scotland). However, there is a debate on whether the competing services that operate on the East Coast Main Line should be considered HSR or conventional.

⁷ The road transport held 13% of the market share.

⁸ According to *Nuovo Trasporto Viaggiatori* (2013), more than 2 million passengers on the Rome–Milan route only, were diverted from airlines between 2009 and 2012.

⁹ See, among the others, Gaggero and Piga (2010, 2011) and Bergantino and Capozza (2015).

¹⁰ Consumers benefit from the increased supply of services on point-to-point connections, but also from fares' reduction due to the competitive pressures exerted by LCCs on legacy carriers (see, for instance, Bergantino, 2006; Bergantino and Ponti, 2006; Fageda et al., 2011).

¹¹ The liberalisation process was not so straightforward. In March 2011, *NTV* complained that RFI was hindering its entry by making last-minute changes to the network statements. The holding FSI and some of its controlled companies were also accused of abuse of their dominant position, with reference to the slots' concession to *NTV* on the Rome–Milan line. *Trenitalia*, in turn, when *NTV* received the authorisation to operate, accused the newcomer of cream-skimming and cherry picking (for a review of the cream-skimming practices in the railway industry, see Alderighi and Bergantino (2011, 2013)).

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