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The HSR new competition in Italy: a major railway reform for a “win win game”?

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1. Reform background: An institutional framework redirected in favour of rail competition
2. Motivations for the reform and pressures against
 21. A negative European macroeconomic environment and declining Italian railway demand
 22. An ambitious and very innovating Italian entrepreneurships
 23. Barriers to entry and risk of non cooperative game of the incumbent
3. Main outcomes of the reform
 31. A strong supply shock for high consumer benefits
 32. An intermodal competition deeply modified in favour of rail
 33. A “win-win game”: Positive effects for the all Italian railway system?
4. Critical factors in the reform success and main risks factors of failures
 41. Physical positive factors
 42. Institutional positive factors: the major rule of the rail regulator
 43. Main factors of failures and risks
5. Conclusions
6. References

Keywords

rail market, high speed, *Open acces*, competition, regulation, liberalization, Trenitalia, NTV, Italy, Europe.

The European Commission argues that rail renewal contributes to achieving the objective of a sustainable transport system (European Commission, 1996, 2011; Ponti and al., 2013). Competition is supposed to be the best way to reverse declining competitiveness and attractiveness of rail transport. For long-distance passenger traffic, European law advocates in favor of 'open access' competition. But, in practice, very few European countries allow on track competition and very few newcomers have decided to enter those markets. New entrants have been deterred by a lack of profitability and by advantages possessed by the largest network operator, the state-owned incumbent. This has limited open access operations to selected niche markets (Nash, 2008; Preston, 2012).

One example of a new entrant is in Italy since spring 2012, where NTV ('Nuovo Trasporto Viaggiatori') is taking on the state-owned incumbent, Trenitalia. Italy is the only European country to have opened its high speed railway (HSR) network to competition. This reform seems to have produced huge effects on mobility patterns and some "win win" results. The entry of a new operator is a major event has focused on the high speed part the rail passenger transport business, the most high-tech segment, and also the most profitable.

Our research is based on a literature review, both academic and professional, as well as on rail statistics. We complement this approach with interviews of actors, as two Italian companies as the sector regulator.

This paper analyses this major step in Italian railway reform and is structured as follows.

- (1) How did this public transport innovation come about?
- (2) What forces encouraged to this reform, but also what kind of obstacles did this reform have to overcome?
- (3) What are the main impacts and effects of this reform for the consumers and the Italian transport system?
- (4) What are the critical factors in the successes and the on-going challenges facing the reform?
- (5) Regarding the Public Transport Market Organization and Innovation issues, what are the main lessons we can draw from this case study?

1. Reform background: An institutional framework redirected in favour of rail competition

The arrival of a new competitor in the high speed in Italy is a major step in the Italian railways' reform - and even in the European Public transport context. It took place in a railway institutional framework opened mind to competition and very near the European model. This private initiative received a strong political support. This first HSR open access competition in Europe represents a significant supply shock.

Railway reform began early in Italy. At the end of the 1980s, the Government became convinced that the Italian railways needed to be restructured to increase both their efficiency and effectiveness. A reform program was embarked upon that followed the European railway reform approach. The first step was the corporatization of the rail services and infrastructure through the creation of Ferrovie dello Stato (FS) – today renamed Ferrovie dello Stato Italiane (FSI) –in 1985 as an autonomous undertaking and became in 1992 a wholly-state-owned, joint-stock company. Pressed to recover an economic and financial equilibrium, FSI succeeded by controlling costs and by raising passenger tariffs. Workforce was heavily downsized to more than 65%, from over 220,000 in 1980 to about 72,000 in 2012; which was much more drastic and tougher than in most of others European countries.

Having already complied with the European railway legislation, in 1997-1999 the Italian government (via Decree of the President 277/1998) decided to separate the competences of FS,

following a vertical scheme. Management of passenger service was given to Trenitalia, while the management of the railway lines was assigned to the infrastructure manager, i.e. Rete Ferroviaria Italiana (RFI). Trenitalia and RFI are 100% owned by FS.

The Italian railway regulation precociously has observed the European doctrine in favor of rail competition. The EU's rule requires that for freight and long-distance trains, competition among the railway undertakings is the rule and public subsidies are admitted only in specific cases. In Italy, open access to the rail network for these services has been in force since 2001 (Law 388/2000), well before it was compulsory under the EU's rule. The liberalization of freight market has resulted in a market share of the newcomers of about 30% and more on some international corridors (40% in Brenner route).

The Italian railway sector has, at least theoretically, opened its rail market, just like Germany, Great Britain and Sweden, and well ahead of the deadlines set by the European Union. Nevertheless, in practice, several obstacles remain, and for passenger traffic, the share of new entrants was negligible until the arrival of NTV (Senn and Cini, 2011).

Although the railway liberalization process in Italy was one of the earliest in Europe, paradoxically the responsibility for regulation of the railway companies was for a long time retained by the Government (Senn and Cini, 2011). From 11 August 2004 to 14 January 2014, an office of the Ministry for Transportation, called Ufficio per la Regolazione dei Servizi Ferroviari (URSF), played the role of the Italian Regulatory Body (Stanta, 2013), established following the prescription of the European legislation (Directive 14/2001). The Italian rail regulator was only made truly independent from government through the creation of ART (Transport Regulation Authority) on 17 September 2013 by the decree-law 6 December 2011 n. 201. (becoming operational on 15 January 2014). This is very recent compared with other major European countries.

2. Motivations for the reform and pressures against

On-the-track HSR competition in Italy took place in an environment of adverse European macroeconomic conditions and declining Italian railway demand. It also has face to rough and severe barriers to entry and the risk of non-cooperative behaviour of the incumbent. Facing these negative aspects, the new operator's shareholders opted for an ambitious strategy of costly investment and an innovative rail business model.

2.1. A negative European macroeconomic environment and a declining Italian railway demand

Of all the major European countries, Italy is one for which the rail passenger transport market is the least dynamic. This has been the case since the 1990s, until NTV's entry in 2012. The incumbent's railway service offer and demand have both been generally sluggish. This can be observed in the overall passenger supply and demand, expressed both in train service kilometers or passenger kilometers (FSI, 2014, 2010) (Table 1).

Table 1. European Railway companies performance

	Supply 2010 in Train-kilometer (Million) (a)	Change since 1995	Traffic 2010 in Passenger-kilometer (Billion) (b)	Change since 1995
SNCF (France)	395,9	28,6 %	84,9	53,4 %
DB (Germany)	674,9	5,4 %	77,2	27,6 %
FS (Italy)	265,9	3,8 %	43,3	-1,2 %
ATOC (UK)	507,4	36,3 %	53,3	77,7 %
RENFE (Spain)	156,5	29,2 %	21,0	37,0 %
SBB (Swiss)	136,0	50,5 %	16,9	44,0 %

Source: Our calculations, from UIC. (a) Passenger trains; Table 41. (b) Domestic and international traffic; Table 51.

The low growth of passenger rail services in Italy is due to two factors. Firstly provincial and regional authorities have not increased traffic on their territories (Stanta, 2013). Secondly the State has reduced from long distance supply, in part because bus market liberalization has increased competition for long distance travel. As for operators, the low level of subsidization of regional traffic (one of the lowest in Europe (Cesarini, 2013) leaves little room to invest in the renewal or extension of capacity of the rolling stock.

A part of this sluggish railway demand is also due to the severity of the economic crisis, whose effects are particularly disadvantageous in Italy: total passenger-kilometers fell from 50.2 billion in 2006 to 44.6 billion in 2012 (an 11.1% reduction). By comparison, in France the decrease was only - 0.8%, in Spain -2.8%, in Greece -54.1%, the most crisis-affected European country.

The economic crisis is not the only reason for this weak railway demand. The number of passenger-kilometers in Italy had increased slightly during the 1990s and remained stable from 1999 to 2006, about 49 billion per year (UIC, 2013). Historically, the attractiveness of rail in Italy is comparatively rather low. The modal share of rail passenger transport is in the lower middle of the European Union, with 6.1% of passenger-kilometers in 2012 (EC, 2014), against 7.7% on average in the EU15 (9.3% in France, 8.4% in Germany and 8.0% in the UK).

It's in this unfavorable rail context that NTV has decided to compete on the high speed rail market in Italy. The following part will try to enlighten and understand such decision.

22. An ambitious and very innovating Italian entrepreneurships

NTV was established in December 2006, by several Italian private entrepreneurs, Luca di Montezemolo, Diego Della Valle, Gianni Punzo and Giuseppe Sciarone. Later, the French national incumbent (SNCF) entered NTV's shares as "technical partner", without any involvement in the management, and now SNCF holds 20% of the shares. NTV launched its first trains in April 2012 (Baron and Ciry, 2012).

NTV's initial objectives are intended to be ambitious: to acquire 20-25% market share by 2014-2015; to break even by 2014 and to open, in a second stage, new destinations - Bologna, Padova, Venice and Torino (Sia Conseil, 2012). NTV's strategy is based on several principles: a massive investment able to bring a supply shock in the Italian railway market; a radically modern offer based on differentiated services, on comfort and on a modern image and, a rail business model that is unique in Italy.

NTV displays an ambitious and long-term choice by opting immediately for a massive investment which aims to bring a supply shock. To this end, NTV has invested over one billion Euros, including €628 million in the purchase of 25 modern AGV trains and €90 million in the maintenance site in Nola, near Napoli (Sciarone, 2014; Stanta, 2013). For its start-up, NTV has also created jobs, approximately one thousand direct jobs and almost the same amount of indirect jobs (Santa, 2013).

Italo (NTV's service brand name) offers three travel environments or classes, as in airplanes: Smart (economic), the Prima (Business) and Club (First Class). Smart offers a variant Cinema for viewing high-definition movies. The Club is equipped with individual video screens to watch live TV and meeting rooms. Italo also offers free Wi-Fi access, a food vending machine (or cold meal service in Prima and Club), displays in each car to preserve the peacefulness of travelers, and even a video surveillance security system secure luggage spaces.

The fundamental innovation provided by NTV on the Italian railway market lies in its business model (Sia Conseil, 2012). The NTV's cost structure is inspired by the 'low cost' airline. Fixed costs are minimized, with overwhelmingly digital distribution. Customers can still buy tickets directly on trains or terminals in main train stations but not at network stations. The innovative pricing system is based on yield management as in France (the expertise of its partner, SNCF). Many tasks are outsourced: maintaining costs of rolling stocks, catering, security and the call center. The objective is clearly to cut the costs in order to lower the profitability point compared with the incumbent. Furthermore, the NTV staff management introduced a new incentive-based remuneration model. The share of

individual and collective incentives in the remuneration is high, under an exception of national law. The fixed salary increases by 25% thanks to a system of individual and collective premiums. There is also a profit sharing arrangement based on the firm results.

The objective of NTV's approach is clearly to enhance services quality while increasing productivity.

23. Barriers to entry and risk of non cooperative game of the incumbent

The rail industry, due to its very specific nature, with sub-additive costs, is characterized by many barriers to entry and exit (Nash and Preston, 1992). Introducing competition is most successful where barriers to entry and exit can be reduced which, in turn, requires a reduction in sunk costs (Preston, 2012). Academic economic literature describes various entry barriers are present in the rail market, including tangible and intangible, which are serious obstacles to fair competition. The main tangible entry barrier is access to network infrastructure, but also to the rolling stock due to poorly developed second hand market. The compulsory expenditures to have access to terminals, depots, maintenance facilities and to retail outlets are also detrimental sunk costs. Ensuring fair access to retail facilities, information and ticketing systems and computer systems reservation can also be more problematic.

These tangible barriers are usually reinforced by less tangible barriers. Among them, the 'innocent barriers' relate to economies of experience, preferential access to capital and brand loyalty. These 'innocent barriers' might be reinforced strategically par reputational and size effects. Larger firms may be able to withstand competitive battles longer than smaller and can develop strategy to blockade entry, by example, by saturating the key infrastructure paths.

In the Italian HSR new competition, several authors and some newspapers underline the various practical barriers that NTV had to face and to overcome to succeed its entrance on the Italian HSR market.

Some authors have speculated that there has been discrimination against NTV regarding slots in some stations case because NTV initially didn't provide HSR services to several main railway stations unlike Trenitalia (Bergantino and al.). For example, in Milano, NTV served Milano Porta Garibaldi and Milano Rogoredo, but not Milano Centrale. This could be a deliberate strategy by NTV to avoid entering the heart of the city, where speeds are reduced, or the result of Trenitalia lobbying FSI? It's very hard to know. Similarly, the initial lack of ticket machines in railway stations, may also have been due to an entry barrier, but NTV presented it as a positive element of its commercial offer, i.e. fully digital.

Entering a railway market always takes time, even a long time. For NTV, it took one year to obtain the railway license from the Ministry for Transportation. It took even longer to obtain the authorization to operate the new trains from the Italian National Agency for the rail safety (ANSF), in March 2012, after nearly three years of assessment (Stanta, 2013).

These perceived barriers prompted NTV to go to the Antitrust Authority several times (Stanta, 2013). The Antitrust Authority issued several reports to clarify relevant matters about the access to the infrastructure and started comprehensive investigation to check if RFI and Trenitalia abused their powers to make the start-up of Italo slower and harder. The Authority found no evidence of abuse of the incumbent's dominant position.

3. The main outcomes of the railway reform

NTV's entrance produced effects both for intra-modal competition (inside the railway sector) and for inter-modal competition (with other transport means, such as air and car travel). We can also notice positive effects on the whole Italian railway system.

31. A strong supply shock for high consumer benefits

As suggested by theory, HSR competition in Italy has produced a triple competitive effect: more capacity, frequency and connections, lower prices and better services for high consumer benefits.

Firstly, the entrance of NTV produced huge positive effects for the sector as a whole, increasing the overall supply of high speed trains. Supply for HSR trains constantly increased since 2009, when the state owned operator started to run high speed services on its upgraded lines, even before on track competition. Italo provided a further huge increase in supply of HSR trains: the commercial service was quickly built up to 50 train services per day, hourly frequency between Milano and Roma, bi-hourly frequency between Roma and Venice, 6 non-stop runs between Roma and Milano, 9 cities and 12 stations served, 12 million train*km per year (Santa, 2013). Since December 2013, NTV has run operations on the Adriatic corridor, linking Ancona to Milano and Torino, competing with Trenitalia on these routes (Bergantino, 2015).

By 2012, NTV had added approximately 45% to the existing Trenitalia HSR supply on the major axis Turin-Milan-Rome-Naples (from Cascetta and Coppola, 2013). In 2012, Trenitalia provided 89 services on this axis each day, while NTV supplied 38 services. From a theoretical point of view, this strategy makes sense because it has allowed NTV to benefit of positive economies of density and network economies (Preston, 2012).

While the competitor introduced new trains on the most dense Italian HSR routes, the incumbent did not reduce its supply. Trenitalia's HSR services (the "Freccie") go on increased (ART, 2015). As consequence, the entrance of NTV in the HSR market produced an increased supply in many Italian corridors (Cascetta & Coppola, 2014), also serving new stations in Rome and secondary stations in Milan. Some authors noticed substantial supply growth on the main Italian HSR corridors: in the Milan-Rome track, by 56.5% between 2009/2010 and 2013 (considering both operators).

Secondly, the HSR competition produced a strong effect on the structure of prices and supply of onboard services (Bergantino et al., 2015; Cascetta and Coppola, 2013; Mazzola, 2014). Prices started to decrease soon after the entrance of the new competitor. A survey of prices shows that the first months of competition (June-August 2012) already had some effect. Cascetta and Coppola (2014) estimated the reduction in the price per passenger by about 30%, in average, just between 2011 and 2012. The main reason is the new pricing structure and availability of promotional offers which has also expanded the "gap" of tariffs, with a similar effect to the introduction of low-cost flights in the air market.

Thirdly, competition also had positive effects on the quality of a wide variety of services. The ancillary services were improved (as entertainment in the "Cinema" environments, Wi-Fi...). We observed that the two HS Italian operators seem to compete on the quality of services more than on travel time. The competitive advantage is based on the customer satisfaction by the various levels of services and the very high frequency.

In conclusion, the entrance of the new competitor contributed to an increase of the consumer surplus by more capacity, more frequency, lower prices and more supply from the secondary railway stations, which now have more direct connections in the main Italian transport corridors. This competition also affects intermodal competition.

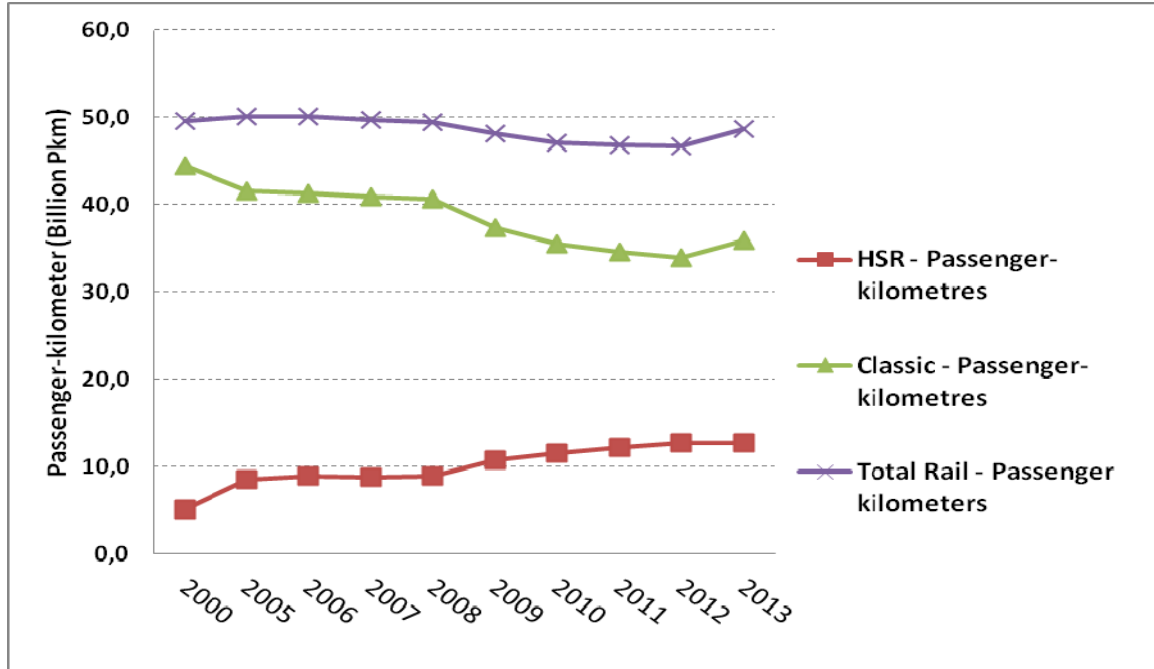
32. An intermodal competition deeply modified in favour of rail

The entrance of NTV has contributed to substantially change the intermodal competition in Italy. HSR modal share is increasing, and particularly on specific corridors, which has strong effect on the whole Italian mobility behaviors.

HSR demand in Italy is in increasing trend, with a major inflection point in 2009 - which corresponds to the completion of the network in its current configuration. The number of passenger kilometers increased from 8.9 million in 2008 to 10.8 million in 2009, and continued to increase with 12.8 million in 2012 (Figure 1). This HSR traffic growth is about 4 million passenger-kilometer and more in 4 years or an increase of about 44%. The explosion in demand for HSR, in the context of introduction of competition, shows rail's capacity to compete successfully with air and road. This fact is all the more remarkable during the economic crisis, which tends to lead to stagnation or even reduction in mobility (ART, 2015; EC, 2015).

On the same time, demand for Trenitalia's services on conventional lines dropped where it introduced HSR trains, which offset these gains, e.g. on the Milan-Rome line (Bergantino et al., 2015). However, the rise of high-speed has not (yet) in Italy, unlike other European countries, succeeded in increasing the total rail passenger traffic (Figure 1). The number of passenger kilometers in 2013 was 48.7 million, far from its last peak in 2006, with 50.2 million (EC, 2015).

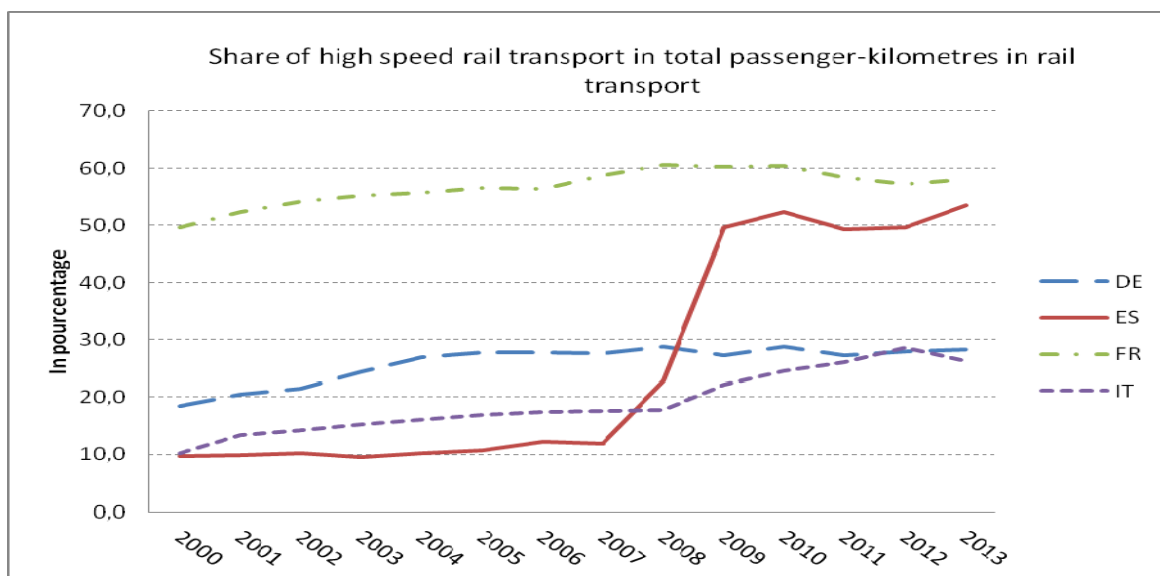
Figure 1. Italian Rail transport markets



Source: Adapted from EC (2015). EU Transport in figures 2015.

As a result of this stagnation of total rail passenger traffic in Italy and the rise of the HSR, the share of high speed has particularly increased in the total Italian railway transport. In 10 years time the high speed rail share nearly doubled, going from 14.4% to 28.7% (Figure 2), without reaching market shares of HSR in Spain or in France.

Figure 2. The high speed traffic growth in Italy



Source: Adapted from EC (2015). EU Transport in figures 2015.

Nevertheless, with a low overall progression of the rail, in a global context of reduced mobility, the modal share of rail improves slightly lately: 5.5% in 2009 and 2010, it increased to 5.7% in 2011 and 6.4% in 2012 – but down to 6.3% in 2013.

However, in some segments, with high passenger traffic, HSR was able to fundamentally change the modal split in favor of rail. Evidence from the corridor Roma-Milano shows how the modal shares of air, car and train travel can be deeply influenced by the introduction of HSR. In such route, air and rail travelling times are now very similar, and the transport modes can be considered as substitutes. The two cities are served both by HSR and by air travel, which connect the airports. From 2008 to 2014, the rail modal share significantly increased, from 36% to 65% (ART, 2015). Passenger on airplanes halved (from 50% to 24%) and travel by car was reduced from 14% to 11%. These trends began before the arrival of the competition, and the arrival of the NTV in 2012 has extended them.

HSR has induced broader changes in mobility beyond modal choice. In the long term, HSR demand is also linked to travelers' lifestyle choices (Croccolo and Violi, 2013). HSR has opened the possibility of commuting further than in the past. Higher frequency and connections between the major Italian cities centers, coupled with lower prices as a consequence of competition, can lead to higher attractiveness of HSR commuting. HSR is able to create new possibilities for work-related travel, including return journeys and the creation of 'macro residential area' as a result of increased regional integration. It's the reason why the HSR network and trains in Italy have been dubbed Italy "Italy's metro".

33. A “win-win game”: Positive effects for the all Italian railway system?

Some Italian railway actors have argued that the introduction of competition in HSR has delivered positive effects to the entire railway system (Croccolo and Violi, 2013). There are at least two observations supporting this argument, the first concerning Trenitalia and the second concerning RFI.

Trenitalia continue to obtain good commercial and financial results, even after two years of full competition on HSR. Trenitalia's HSR market share is around 80% (20% for NTV) (Table 4, below). Competition was accompanied by an increase in the total market of HSR and did not reduce the demand for the incumbent.

Trenitalia's financial statements show growth in global revenues, including HSR traffic, freight and conventional rail (Table 2). This growth is in particular due to increasing HSR passenger volumes, even though the revenue per passenger decreased because of competition. However, it is not possible to make in-depth analysis as Trenitalia's financial statement does not disaggregate its revenues and costs by market segment. Moreover, the analysis of Trenitalia income is made particularly difficult because of the detrimental impact of the economic crisis on traffic, both freight and travelers. The aggregate data shows that the company has been drastically reducing its operating costs over the last years, while its operating revenues are stable. According to A. Mazzola (Interview, 2015), the competition was very useful for Trenitalia to reform and trade unions to accept an agreement that brought more versatility, increased working time and therefore productivity gains. The company shows positive increasing operating profits for all the years considered in the analysis. This improvement has made Trenitalia one of the most profitable railways in Europe (Mazzola, 2014).

Table 2. Trenitalia: Economic and financial performances

Millions euro	2007	2009	2011	2012	2013	2014	Variation 2014/2007	Change since 2007 in %
Operating revenues	5 521	5 638	5 708	5 498	5 498	5 577	56	1,0
Operating costs	5 281	4 656	4 317	4 148	4 113	4 121	-1 160	-22,0
Operating profit (EBITDA)	240	982	1 391	1 350	1 385	1 456	1 216	506,6

Source: Trenitalia, Financial Statements.

Secondly, we observe that the on-track competition produced also some positive effects on the infrastructure manager, RFI. Bergantino et al. (2015) report a greater utilization of the network. As a result, we suggest that with the introduction of HSR, RFI benefited from an increase of HSR access charges (toll revenues). RFI's financial statement confirms this assumption, though HSR tolls and conventional lines tolls are not separately identified (Table 3).

Table 3. RFI: Revenues from sales and services (thousand of euro)

Millions euro	2009	2011	2012	2013	2014	Variation 2014/2009	Change since 2009 in %
State grants	849,3	975,4	1 110,4	1 050,4	975,6	126,3	14,9
Tolls	903,1	969,5	1 028,6	1 103,2	1 051,2	148,1	16,4
Electric traction	77,0	79,0	75,0	76,0	93,4	16,4	21,3
Ferry services	31,8	22,3	20,5	18,1	18,0	-13,8	-43,4
Total	1 861,2	2 046,2	2 234,5	2 247,7	2 138,1	276,9	14,9

Source: Adapted from RFI, Financial Statement, 2010-2014.

We observe a euro 148 million increase in total toll revenue over the period 2009-2014. In 2014, toll revenue fell slightly, probably because of Ministerial Decree n.330 (10 September 2013), which reduced by 15% the tolls due to RFI on the HSR tracks. We don't know yet the impact of the last ART decision 70/2014 which further significantly reduced HSR tolls. The evidence above suggests that higher traffic volumes on the HSR network could be able to compensate for the lower price.

More generally, as suggested by Croccolo and Violi (2013), investment in high-speed rail is also having knock-on effects for the conventional network. It frees up sections which are useful for commuting or goods traffic. The greater speed also frees up capacity on the network. Moreover, network deployment was accompanied by substantial investment in railway stations and urban hubs, an area in which Italy is a world leader, not least because of the difficulties of crossing historically and culturally important cities. If the investments in new or upgraded lines weigh heavily on Italian taxpayers, they should probably be evaluated in light of the benefits for the communities, which appear to be rather important as suggested by Bergantino et al. (2015).

4. Critical factors in the reform success and main risks factors of failures

The positive outcomes of the Italian HSR open access reform is the combined result of positive contextual factors, some physical, others institutional. Further, this newly introduced competition doesn't yet provide strong and undeniable proofs that the current gains will be sustained.

4.1. Positive physical factors

The launch of the high-speed rail NTV's offer reflects the opportunist decision to take advantage of several favorable objective factors.

First, geography and demographic characteristics offer the Italian HSR strong opportunities. Most activities in Italy are concentrated in the north. In this area, most cities are separated by distances of 150-250 km, which makes HSR competitive against air traffic and car (also, there are congestion problems to approach cities) (Cascetta and Coppola, 2013). This is consistent with Vickerman (1997), who shows that for distances between 200 and 600 kilometers, HSR has a clear advantage on air travel. The Milan-Rome corridor shares similar feature (two of Italy's most populous cities), which are separated by just over 500 km. Nash (2015) points out how serving a large population, by example in a string of large cities, is crucial for HSR success.

Secondly, successive Italian governments have invested in the national HSR network – spending around €50 billion to date. Providing and opening up this network, has made the competition possible. In all network industries, the quality and the open access of the infrastructure are among the main conditions to enduring and profitable competition.

The Italian mesh high-speed railway network was substantially completed over the 2006-2009 period (Figure 3). The first link, the “Direttissima”, was partially opened in 1977, connecting Rome and Città Della Pieve (central Italy), while the whole route between Rome and Florence (257 km) was completed in 1992. In the late 2000s, several new lines were successively put into operation: Roma-Napoli and Turin-Novara (2006), Milano-Bologna (2008) and in 2009, Novara–Milano, Florence-Bologna and Napoli-Salerno (UIC, 2014). Some other line extensions are planned or programmed, including Milano-Venice (245 km), due to open in approximately 2020. The heart of the HSR (or TAV “Treno Alta Velocità”) network will form a “T”, extending from north to south of the peninsula, connecting Turin to Salerno-Venice with the axis Milan-Rome as main corridor. Most of the Italian HSR network can now sustain a maximum speed of 300 km/h, but probably will be shortly improved up to 350 km/h.

NTV had directly benefited from a quasi-completed high-speed network of 923 kilometers. The all rail network served by large trains is even more important because high-speed trains also run on the conventional rail network, at lower speeds, to maximize the network effect and irrigation planning.

Figure 3. Italian High Speed railway network



Source: Mazzola (2014), FSI. Transforum Meeting.

Thirdly, at the end of the 2000s, the incumbent Trenitalia HSR offer is still somewhat limited. In 2011, the share of HSR in the total of rail transport, expressed in passengers-kilometer, was 26.2% in

Italy, which is relatively undeveloped compared to peers in the EU: 27.4% in Germany, 49.3% in Spain and even 58.5% in France (EC, 2014).

42. Institutional positive factors: the major rule of the rail regulator

The new rail regulator, the ART (Autorità di Regolazione dei Trasporti) seeks to promote the high speed rail competition, both by legal decision and also by everyday trade-offs.

An important decision has been the large reduction of the HSR network access charges. More precisely, the criteria to be applied by RFI to the determination of charges to be paid by HSR businesses during 2015 led to a reduction of approximately thirty per cent compared to the previous year, from € 12.8 train/km to € 8.2 train/km. Previously, estimates of access charges for HSR in Italy were around € 13.4 per train/km average against € 3.4 per train/km average for conventional trains (Arrigo and Di Foggia, 2013; Stanta, 2013).

This decision of the ART confirms the line already taken by the Ministry a year earlier, when a decree reduced HSR rates by 15% (Il Fatto Quotidiano, 5 November 2014). This measure appears as a very important signal from the Italian regulator. The reduction in tolls acts favorably on the financial balance of railroad companies, because the tolls of infrastructures represent an important proportion of the costs of the railway operators. By some estimates, this measure should allow NTV to pay only € 65 million of tolls in 2015, a saving of € 35 million - and for Trenitalia € 140 million, a decrease of € 80 million (Meillasson and Charlier, 2015). By comparison, this economy on tolls represents the all loss of NTV in 2014, which was € 37 million (Table 3).

As Arrigo and Di Foggia (2013) say, 'The level and structure of the charges are therefore crucial to establishing competition.' The high access charges level limits the scope of the profitable entry. It seems to be the case in France, where the access charge is around € 18.5 train/km. Conversely, lower track access charges helps to promote and to make head-on competition commercially feasible, as we can see in Sweden (Preston, 2012) and now in Italy. In the longer term, the effects of a change of access charges over the entire rail system concerns many stakeholders (Crozet, 2012; ECMT, 2005; Valletti and Estache, 1999), but are still very uncertain.

Some other 'secondary' measures taken by the ART (Cambini and Perrotti, 2015) could have long term positive impacts on the level of HSR competition. One of them aims to achieve a higher level of transparency in the operational coordination process and may be conducive to more open minded allocation of scarce capacity. Another one reduces the flexibility margin from 15 to 10 minutes for requested capacity within peak hours to competitors 'in the market'. This measure could bring more capacity for HSR. Some others measures concern the performance regime to make the rail service providers more responsible of the delays or train cancellations. The ART also ruled that rail service providers must have a reasonably comparable degree of access to services and facilities at stations for ticketing, advertising and providing information to customers.

By trying to find the best empirical balance between the interests of the all stakeholders, the regulator also contributes to sustaining competition and to obtaining the best possible service quality for travelers with the best cost for taxpayers (Croccolo, 2015).

43. Main factors of failures and risks

At this time, NTV has been a commercial success, but it may yet become a financial failure.

NTV has successfully entered the HSR market, even if it took six years between the establishment of NTV and its operations commencing. Moreover, NTV managed to claim a significant market share, around 20% in only two years (ART, 2014). By 2013, the announced target of market share had been reached. Nevertheless, the growth in share did not continue. NTV expected 8-9 million passengers per year by 2015; yet in 2014, there were only 6.5 million. (It would have been meaningful to present the NTV occupancy rates results to accurately assess the NTV trade situation, but these data are commercially sensitive so are not publicly available.)

Table 4. Italian HSR: NVT and Trenitalia's market shares

	2011		2012		2013		2014		2015	
	(a)	* Km (b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
	23,4 - 100%	8,6 - 100%	25,1 - 92,4%	9,1 - 91,1%	26,2 - 80,9%	9,5 - 78,3%	29,1 - 81,6%	10.4 - 79%	31,2 - 77,4%	11,09
	0,0	0,0	2,05 - 7,6%	0,89 - 8,9%	6,2 - 19,1%	2,63 - 21,7%	6,55 - 17%	2.76 - 21%	9,1 - 22,6%	

Source: ART first Annual Parliament Report (2014, p. 70); EC (2015); Trenitalia; F. Croccolo.

(a): Passengers in billion ; (b): Passengers * Km in billion

In contrast to the strong market share performance, the financial results have not met expectations (Patuelli, 2015). All successive operating results are negative, operational losses decreased in 2014 (Table 5).

Table 5. NTV financial results

Millions €	2008	2009	2010	2011	2012	2013	2014	Total
Net revenues	0,2	1,5	4,5	24,7	102,9	249,6	270,0	653,4
Operating Profit	-3,9	-11,9	-21,7	-41,4	-137,2	-77,5	-50,3	-343,9
Net Profit	-5,6	-13,2	-20,7	-39,3	-77,1	-77,6	-37,0	-270,5
Debts	89	103	104	196	755	782	761	

Source: adapted from NTV financial statements.

The deep economic crisis of 2008 could not be forecasted. Its impact had been considerable on the Italian economy and on the overall demand for transport (ART, 2015; EC, 2015). It is difficult to know what NTV financial results would have been without this crisis. There is debate in Italy about the extent to which NTV unsuccessful financial results also depended on management decisions. For example, it is not clear why NTV invested in a maintenance site so far away from the network center.

Perhaps the NTV's main mistake was to overestimate the extent of the Italian market liberalization. Ponti (2014b) argues that the lack of success of NTV is partially due to the incomplete passenger's rail competition in Italy. Trenitalia, by operating in all passenger and freight markets, enjoys large and positive economies of scale and scope which represent a substantial economic advantage in competition with newcomers (Stefanato, 2014). NTV has applied unsuccessfully for some time for access to intercity and regional passenger markets (Ponti, 2013, 2014b). It remains unclear if the Italian rail regulator will draw a new regulatory framework to open all the segments of the railway market to competition and hence provide additional opportunities to NTV.

The HSR passenger market is generally profitable in Italy, probably even with open access competition. At least in the case of Trenitalia, the concern of Preston et al. (1999) – that competition on the tracks could lead to duplication of services and to an unprofitable competitive outcome – seems not to be a major concern (the results for NTV are still ambivalent (Table 3, above)). The operational margin of Trenitalia has increased from 20% to 25% since 2009 (ART, 2015), while the share of high-speed passenger traffic is increasing sharply. Clearly it is difficult to compete with a former monopoly that is large and capitalized with public money, in an area where the product is almost identical (Stefanato, 2014). In any case, NTV does not appear to have correctly forecast the Italian rail incumbent's reactions to the market entry. NTV has probably underestimated Trenitalia's ability to bring major innovations in its services, its pricing and its operational costs to respond to competitive pressures.

For the FSI, the open access competition raises the crucial issue of public service obligations (PSOs) (Cesarini 2013). If HSR on-track competition results in “cream skimming” of the most profitable rail markets and if new competitors are not requested to contribute to PSOs, it will become very difficult to finance them with the same level of public subsidies. The incumbent will no longer be able to finance these PSOs through cross subsidization, particularly in an Italian context where PSO are already undercompensated. Cesarini (2013) suggests introducing a coherent model of contribution by all rail service providers and/or public financing for PSOs. A co-financing system for universal services should be set up, through royalties on more profitable passenger services.

There is also another debate about the modal competition equilibrium. Is the new modal share between air and rail socially more optimal? At a first level of analysis, we suggest, following Ponti and Erba (2002) that the answer depends on the balance between infrastructure costs and environmental costs. Rail infrastructure is very costly and incremental air travel is less environmental friendly. As rough order of magnitude: a kilometer of high-speed line costs around €15 million while environmental cost for a passenger-kilometer on a plane is less than €0.05. With an HSR demand less than 30 million passenger kilometers per year, the air would be, according to this calculation and assumptions, the most optimal solution. In 2012, the entire HSR Italian market was about 13 million passenger-km (EC, 2015).

5. Conclusions

This study investigated the case of the introduction of a new competitor in the HSR market in Italy, which is so far unique in Europe. This case provides some interesting results for other countries.

1. This open access competition reveals the capacity of the rail industry (including incumbents) to innovate and improve competitiveness. The successful aspects of this Italian HSR on track competition also provide strong support to the European liberalization railway policy, i.e. the forthcoming Fourth Rail Package. The Italian case supports the case for more competition in the domestic passenger market, especially in unsubsidized services. Until now, competition has only been compulsory in the EU for international passenger lines. It also provides arguments in favor of a more independent network manager. The non-discriminatory access to the rail network, to stations and other facilities appears to be a key to fair competition.

2. This new HSR competition brings significant improvements to the overall Italian mobility system, and mainly in rail mobility, in favor of consumers. The greatest advantages are for passengers: more supply and capacity, more frequency and connections, more differentiated services at lower prices and the possibility to choose between providers. Moreover, the on track competition had probably produced a ‘win win’ game between the all railway actors. If NTV is still far from breaking even, its commercial success in gaining significant market share is non-trivial. In addition, this competition seems to be commercially and financially positive for the incumbent, Trenitalia, pressed to improve its services and to cut the operational costs, and even for the infrastructure manager, RFI, which has gained increased access charge revenue.

3. The success of this new structure market is the result of several positive and specific conditions. The first success condition has been an ambitious and entrepreneurial spirit in the new entrant, who accepted an expensive and risky investment both physically and organizationally and who developed an innovative business model. The second success condition has been the very active and positive role played by the Italian Government to promote this competition. The large public financing of the new HSR dedicated network mainly contributed to make this competition technically feasible in solving the major capacity constraints, even on the busiest routes. The third success condition concerned the positive rules and decisions of the rail regulator. For example, its decision to decrease the level of access charges significantly appears to have enlarged the scope for profitable entry and to make more sustainable the investment of the new comer.

4. The specific factors of the Italian situation suggest some caution in directly applying the lessons to forecasting open access impacts and regulation patterns in others European countries.

Nevertheless, some meaningful ideas can be drawn from the analysis of the advantages and disadvantages of this new HSR open access regime. In this sense, we hope that this Italian case contribute will contribute to “better practice” for OECD member countries.

Furthermore, we are conscious that this study is based on a too short period and that the results are also impacted by the adverse consequences of the present European wide economic crisis. Further researches will be needed to bring out more mature conclusions.

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