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COMPETITION AND PRICING OF ESSENTIAL INPUTS: THE CASE OF ACCESS CHARGES FOR THE USE OF THE ITALIAN RAIL INFRASTRUCTURE

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Abstract:
This paper explores the access charge for the use of the Italian rail infrastructure. Access problems arise when the provision of a complete service to end users requires the combination of two or more inputs, one of which is non-competitive (OECD, 2004). It is a well-known fact that excessive access charges mean higher prices for rail passengers and rail freight companies when using the infrastructure. We conclude that the structure of the access charge has changed significantly with the recent introduction of the HS/HC (high-speed and high-capacity) network; specifically, the fixed component has lost importance, whilst the variable component reaches 94%. The results of this paper provide evidence of the access charge for HS/HC being above 13 €/km.

Keywords: railway, competition, access charge, Italy, regulation, high-speed.

Jel Classification: L13, L52, L92

INTRODUCTION

One major advance in regulatory policy during the last decades has been the realisation that government objectives for the utility industries can often be better achieved by facilitating competition. Such competition usually requires action by the regulator to ensure that entrants have non-discriminatory access to any essential inputs (OECD 2005). In today's fast-paced economic environment, rail infrastructure governance has become a popular topic across European countries and Worldwide, among the common procedures in practice, two are common in railways restructuring: the provision of access to the infrastructure by independent train operating companies, and assurances of non-discriminatory access terms for such companies (Pittman 2004).

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Railway reforms in Europe, initiated by Directive 91/440, are aimed at achieving opening of the rail transport market (Holvad 2009). The European legislation is based on a distinction between infrastructure managers who run the network and the railway companies that use it for transporting passengers or goods. According to the European Commission (2013), different organisational entities must be set up for transport operations on the one hand and infrastructure management on the other. Thompson (1997) offers a number of reasons for separating rail infrastructure from operations: to reduce unit costs, to create intrarail competition, to better focus on the services to be provided, to clarify public policy, and to strike a better balance between the roles of the public and private sectors. However, such policies also pose particularly thorny challenges related to the domestic legislation in use in many of the European countries. Harmonisation of rail systems access charge (and governance) to the infrastructure shall help to break down barriers to a more competitive rail sector, along with better connections between EU and neighbouring markets. In fact The EU railway market suffers in particular from three major problems (i) A low level of competition due to market access conditions and still biased in favour of the incumbents, (ii) Poor regulatory supervision by national authorities, often with insufficient independence, competences and powers and (iii) Low levels of public and private investment as the quality of infrastructure is declining. In this paper we generate the Average charge/Km using an interactive tool provided by the infrastructure manager. We develop this ideas in detail throughout a comprehensive simulation aimed at extrapolate Average charge/Km.

Consistent with EU concern data suggest that excessive access charges mean higher prices for rail passengers and rail freight companies when using the Infrastructure: this generates access barriers for competitors and as table. 2 shows that comparing the demand of five European countries, the average increase is +38.5%, exception made for Italy (-3%) with respect to the base year i.e 1990. The remainder of this paper is organised as follows: in the first section we provide a review of some related works, as well as some insights on the network and demand. We then discuss the regulatory framework and the Calculation process of charge for the use of Italian rail infrastructure. This is followed by the simulation and conclusion.

1. BACKGROUND OF THE STUDY AND LITERATURE REVIEW

Italy, with 5.5 kilometres of railway network per 100 square kilometres of area, lies in an intermediate position compared with other European countries. If the high speed (HS) development of the network is taken into consideration, the position improves, with Italy ranked fourth behind Spain, France and Germany. The Italian HS/high capacity railway system (HS/HC – high-speed and high-capacity) has recently came into force to complement the existing *direttissima* Florence–Rome, which was built in the 1970s. The HS/HC Italian network is oriented to both passengers and freight.

Table 1. Italian rail network

RAILWAY LINES	16.741 km
CLASSIFICATION	6.444 km
- Main lines	9.359 km
- Secondary lines	938 km
- Nodes	
NO. OF TRACKS	7.536 km
- Double track lines	9.205 km
- Single track lines	
ELECTRIFICATION	11.931 km
- Electrified lines	7.459 km
double track	4.472 km
single track	4.801 km
- Not electrified lines	24.227 km
OVERALL LENGTH OF TRACKS	22.935 km
- Conventional network	1.305 km
- HS lines	
RAILWAY INSTALLATIONS	2.260
- Stations (including halts) (1)	6
- Ferry ports	

Source: RFI

When comparing the demand of five European countries, at least two considerations arise: (i) the average increase (+38.5%) and (ii) the Italian peculiarity (-3%) with respect to the base year, i.e. 1990.

Table 2. Evolution of demand in five countries (base year: 1990)

	1990	1995	2000	2005	2010	2011
Germany	100	116,3	123,6	122,8	136,1	139,3
Spain	100	107,1	130,2	139,7	144,6	147,3
France	100	87,2	109,6	119,6	134,8	139,6
Italy	100	104,3	110,9	112,9	105,8	96,9
United Kingdom	100	90,6	115,0	133,0	167,2	169,5

Source: European Transport in Figures EU Transport in figures (2013)

Nowadays infrastructures are increasingly positioned as commercial economic sectors, accordingly competition is introduced and the liberalisation defines fundamental change in the governance of infrastructure with consequences for the operations and performance (Finger and Kunneke 2011). An important component of policies to promote effective competition is a regulatory environment guaranteeing that competitors have access to services of potential bottleneck facilities Valletti and Estache (1999), as a part of restructuring, potential competitors often require access to essential (bottleneck) network facilities (Kessides 2004). Szekely (2009) sheds a light on the transformation schemes in Europe so that it would be possible for countries to set up better policies to manage their efforts. According to the author, it can be claimed that the ability of governments to leverage lean strategies is the key. In addition, it is essential to impose regulatory measures to be able to control the efficiency of major service providers.

The work of Holvad (2006) aims to provide an overview of railway reforms in Europe which at EU level was initiated by Directive 91/440, he also focuses on the background to the reform process, the legislative initiatives as set out in EC Directives and the implementation of the EC Directives in the EU Member States (Holvad 2009). By the same token Beria et al. (2012) provide an analysis of the relationship between the State and the rail companies, network access conditions by operators, slot allocating and pricing schemes and how public service obligations are defined, financed and regulated. Nash (2010) underscores that whilst the emphasis of European Union rail legislation to date has been on freight, measures such as separation of infrastructure from operations, infrastructure charging regimes and regulation have major implications for the passenger sector. Sánchez-Borràs et al. (2010) examine rail access charges for high speed trains on new high speed lines in Europe and the impact these have on the market position of high speed rail. They examine the latest evidence on the marginal infrastructure and external costs of high speed rail. What and Smith (2008) apply econometric methods to estimate marginal track maintenance cost in Britain, they also discuss the potential biases introduced into elasticity and marginal cost estimates when dealing with a railway that may be out of steady state, and how to adjust for these. Andersson and Ogren (2007) state that in order to achieve a competitive transport sector, infrastructure charges in the European Union should be based on short-run marginal costs. Calvo and De Ona (2012) study a series of national charging systems to compare track usage costs and the charges that seek to recover those costs. They also examine the pricing levels applied to railway services to study the coherence between national charging systems and the charging principle on which they are based. EU rules require track access charges to be set on the basis of direct/marginal costs – the cost directly incurred as a result of operating a train service. As an exception for specific investment projects only, higher charges can be set on the basis of the long-term costs of such projects (European Commission 2013). Adler, Pels, and Nash (2010) analyze a high-speed rail system in order to investigate the implications of changes to the network on social welfare. This type of analysis attempts to explore the effects of infrastructure provision and charging on the best response function of all competitors in the relevant market. Access charges for the use of railway infrastructure have also been analyzed by Freebairn (1998), the author assesses marginal cost, average cost, Ramsey prices and multipart tariff rules for access fees and propose an independent regulator and the use of price ceilings on the infrastructure supplier. Excessive access charges mean higher prices for rail companies when using the infrastructure.

The paths in Figure 1 (own elaboration) delineate a simplified case. IM stands for infrastructure manager, RC1, 2... railway companies, Mc = cf the marginal cost of offering the service, D demand, P price and Ci average cost. It is clear that access charge impacts on the service prices of both companies (this in turn negatively impacts on final demand). As infrastructure charges account for a significant part of the cost of a railway operator, the level of the charge is crucial for establishing competition on the rail network. If IM coincides with RC1, the access charge RC1 corresponds to IM revenue, thus favouring RC1 over RC2.

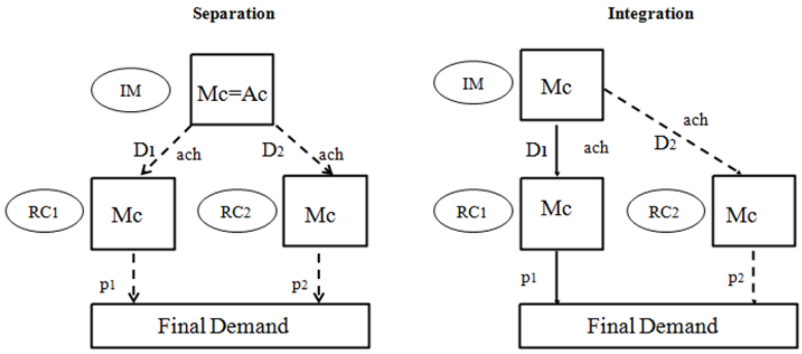

Figure 1. Railway companies and infrastructure managers

IM stands for infrastructure manager, RC1, 2... railway companies, Mc = Cf marginal cost of offering the service, D demand, P price and Ci average cost.

2. REGULATORY FRAMEWORK

The European Union launched its railway liberalisation process in the first half of the 1990s through a series of measures: Directive 1991/440 (liberalisation of freight transport); Regulation 1893/1991 (provision of subsidies); Directive 18/1995 (requirements for railway undertakings to obtain a licence); and Directive 19/1995 (allocation of infrastructure capacity and levying a network access charge). Most of these rules were modified by the first railway package (Directives 12/2001, 13/2001 and 14/2001) followed by the second package (Regulation 881/2004 and Directives 49/2004, 50/2004 and 51/2004) and third package (Directives 58/2007 and 59/2007 and Regulation 1371/2007). These aimed at (i) the implementation of competition within the rail market and (ii) the guarantee of the parity of access to services and infrastructure as well as safeness.

The first railway package enabled rail operators to access the trans-European network on a non-discriminatory basis. The second package was aimed at revitalising the railways through the rapid construction of an integrated European railway area. In 2004, the third rail package contained measures to revitalise railways in Europe. At the time of writing, the fourth package is being defined. EU legislation requires the independence of the regulator from railway operators and infrastructure managers. It therefore calls for the separation of accountability and management systems of railway undertakings from those of the infrastructure manager. However, in the absence of common rules on cost allocation, member states have determined their access charges independently. All railway undertakings holding a license and compliant with the safety requirements must be ensured the right of access to the network without discrimination.

The Italian liberalisation process began with Decree of the President 277/1998, which established the separation between the infrastructure manager and railway undertakings. It also introduced a charge for the use of rail infrastructure, establishing that in its determination it should not take into account the long-term costs but rather identify the univocally short-term costs. With Legislative decree 188/2003, the three directives of the first railway package were transposed into national law. The Decree redefined important aspects of the discipline of rail transport: licensing of railway undertakings, charges for the use of infrastructure and expansion of access to the rail network. It further laid down the characteristics and tasks of the infrastructure manager and named the Ministry of Infrastructure and Transport as the regulatory authority.

Table 3. European packages and transposition into the Italian system

	2001	**2003**	**2007**
EU	First package: Directive 2001/12/EC Directive 2001/13/EC Directive 2001/14/EC	Second package: Directive 2004/49/EC Directive 2004/50/EC Directive 2004/51/EC Regulation (EC) 881/2004	Third package: Directive 2007/58/EC Directive 2007/59/EC Regulation (EC) 1370/2007 Regulation (EC) 1371/2007 Regulation (EC) 1372/2007
IT	Transposition Legislative decree 188/2003 Legislative decree 268/2004	Transposition Legislative decree 162/2007 Legislative decree 163/2007	Transposition Legislative decree 15/2010 Legislative decree 191/2010 Legislative decree 247/2010

3. CHARGE FOR THE USE OF RAIL INFRASTRUCTURE

Access problems arise when the provision of a complete service to end users requires the combination of two or more inputs, one of which is non-competitive, i.e., a monopoly (OECD 2004). The context for the reassessment of the infrastructure access charge is very different from one member state to another. Railway access charge systems in European countries have been slowly but surely reformed since the 1990s (Vidaud and de Tilière 2010). The access charge rate was defined by D.M. 43/T/2000 (and subsequent amendments); prior to the decree, there was no access charge. With mandatory access, rail infrastructure owners offer an additional service for competitors to access the infrastructure. The above-mentioned decree contained the following regulatory framework: i) the rail network is the part of the infrastructure used by railway undertakings; ii) "*omotachica* speed" is the speed corresponding to the optimal commercial exploitation of infrastructure; iii) implantation is the structure aim at ensuring the arrival and departure of trains, their composition and decomposition and other services such as parking; iv) node is an area with a high concentration of railway lines and installations; v) main station is a traffic-intensive station located within a node; vi) the time slot is a time span of network utilisation; and vii) parking is the parking time on the rails. In addition, the decree divided the Italian network rail into three categories:

- Main network, characterised by high traffic density and high quality infrastructure. This is divided into 78 commercial tracks.
- Complementary network, characterised by lower traffic than the main network, connects the main routes and consists of the secondary network (191 tracks), low network traffic (42 tracks in low demand) and shuttle lines.

– Nodes (eight). Nodes are the sets of lines and installations serving metropolitan areas and ensuring the link between fundamental and complementary lines. Nodes exist in the following metropolitan areas: Turin, Milan, Venice, Genoa, Bologna, Florence, Rome and Naples.

The calculation of charges for the use of rail infrastructure relies on a two-component system (plus a third):

– A fixed component for track and nodes for accessing each track/node. Nonetheless, this component does not apply to HS/HC tracks.
– A variable component depending on the distance and minutes of node' usage.
– In addition, there is a further component relating to energy consumption.

The Ministerial Decree 43/T/2000 clarifies the procedure to obtain the access charge throughout some annexes that define (i) the fixed component, (ii) the variable component and (iii) energy consumption. Considering the fixed component, the above-mentioned decree defines the unit costs of the 78 tracks of the main network, which are divided into four levels (current values are reported in Table 4.

Table 4. Unit cost of tracks on the main network

Level	Euro	Number of tracks
1	50,592	14
2	55,924	52
3	58,584	10
4	66,576	2

Source: Ministerial Decree 43/T/2000

Similarly, the decree establishes (i) the unit costs of access to complementary network lines (secondary: 47.93 €, low traffic: none, shuttle: 23.96 €; HS/HC lines that were introduced successively: none) as well as (ii) the access charges to the eight nodes. Subsequently, two inflation updates occurred so that the current value is 53.26 €. The second component is variable; indeed, it is correlated with distance and use of nodes. Unit prices per km are thus summarised as follows: 13.11 € for HS/HC and 1.03 € otherwise, including the use of nodes (measured in minutes). A further amount (measured in km) is incurred for the electric traction: 0.35 €/km. Base unit prices are shown in Figure 1 (own elaboration based on D.M. 43/T/2000 and amendments).

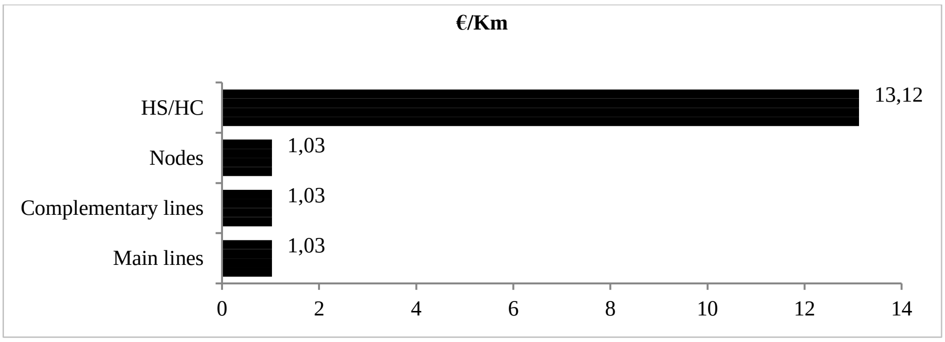

Figure 1. Base unit prices for the calculation of charges for the use of rail infrastructure

3.1. Theoretical framework as stated in D.M. 43/T/2000

The access charge for each of the tracks is generated from the following three parts A, B and C. First comes A, namely the access charge for tracks and nodes, formalized in eq. (1), then comes B that is to say the cost of infrastructure use as a function of the kilometres of each track and usage at every node, generated by the sum of the following two imports: the first stems from eq. (2) i.e. main and (3) complementary network, whilst the second comes from eq. (4); the last component, C presented in eq. (5) depicts the cost of energy consumption.

$$\sum_{j=1}^{n} val_j{}^F + \max(val_k^c) + \sum_{r=1}^{t} val_t{}^N ; \qquad k_{1,2,3} = q \qquad (1)$$

$$\text{PbaseKm}^F * \sum_{j=1}^{n} \sum_{w=1}^{s} \text{Km}^F{}_{jw} * (\alpha_1 * \text{Pvel} + \alpha_2 * \text{Pdens} + \alpha_3 * \text{Pwear}); \qquad \alpha_{1,2,3} = 1 \qquad (2)$$

$$PbaseKm^C * Km^C \qquad (3)$$

$$Pbasem^n + \sum_{r=1}^{t} \sum_{p=1}^{h} \text{minutes}_{rp} * \varphi_p * \psi \qquad (4)$$

$$(\sum_{j=1}^{n} \text{km}^{fe} \text{j} + \text{km}^{ce} + \sum_{r=1}^{t} km^{ne} \text{ r}) * Pbas \qquad (5)$$

Where:

J	Track indicative (main line)
N	Number of tracks (main line)
val_j^F	unit cost of access to *j*,
K	Complementary network indicative
Q	Complementary network lines (number)
max (valc k)	Access charge to the complementary network calculated as the maximum value between unit base values *valc k*.
R, T	Node indicative *R* and number *T*
val_r^N	Unit base cost to access the node *r*
$PbaseKm^F$	Unit base cost per Km within the Main network
W, S	Time indicative *W* and number *S* slots
S	Number of time slots
Km_{jw}^F	Km (usage) of track *j* within time slot *w*
Pvel, dens, wear	Parameters: velocity, density, wear
$PbaseKm^C$	Basic unit price per Km of line, within the complementary network
Km^C	Km (usage) of the complementary network
P	time slot indicative of the permanence in the node
H	Number of time slots (stay) of nodes
$minutes_{rp}$	Number of minutes of stay within the node *r* in the slop *p*
φ_p	coefficient of utilization of the node within the time slot *p*
ψ_r	coefficient: using node's main station
$km^{fe} j$	Km on the track j (Main network) with electric traction
km^{ce}	Km on the track j (complementary network) with electric traction
$km^{ne} r$	Km of node r usage with electric traction
$Pbasekm^e$	Cost per Km of electric traction

4. DISCUSSION

The estimation and comparison of charges for the use of rail infrastructure across Europe is convoluted. The ECMT study (2008) mentions useful reference models for the simulation of the access charge, while RailNetEurope, the association of European infrastructure managers, proposes the European Infrastructure Charging Information System (EICIS). Even infrastructure managers make interactive tools available. IBM (2007) provides insights in that sense. The Community of European Railways (CER) has calculated average rates using questionnaire responses. More estimates are reported in two ECMT studies (2005, 2008).

Table 5. Average cost for the use of the network in Italy (comparison between different sources)

	Passengers			Freight
Italy	Reg./Sub.	Intercity	HS	(960 t)
EICIS/Pedaggio/DB	6–2,38	3-2,255	13,4	2,38
IBM Liberalisation Index	5,57	2,38	n.d.	2,38
Media CER	n.d.	2,56	n.d.	2,41
ECMT (2008)	2,49	2,90	13,32	2,41

Source: ECMT (2008) with additions

In this paper, we generated Italian access charges according to three simulated routes, times and network categories:

- Florence–Bologna: 91.5 km, using two nodes;
- Florence–Bologna–Milan: 306.2 km, using three nodes;
- Florence–Bologna–Milan–Turin: 454.6 km, using four nodes.

For each of these three routes, the access charge was calculated for the three time slots for the HS/HC and the ST (other then high-speed) lines. As a result, we obtained 18 different cases (three routes, three time slots, two categories of network). Hypothetical trains have a weight of 500 tons (compatible with intercity and HS). Tables 6 and 7 (own elaboration based on Pedaggio 2004) provide the results respectively for the HS/HC and ST lines.

Table 6. Access charge for HS/HC according to different routes with 2, 3 and 4 nodes and different time slots

		Nodes					
	Variables	2		3		4	
		Value	% tot.	Value	% tot.	Value	% tot
slot 6-9 am	Total Km	91,5		306,2		454,6	
	Average charge/Km	**13,6**		**13,5**		**13,3**	
	Km nodes	11,8	12,9	25,5	8,3	47,3	10,4
	Overall cost Track/Node	106,5	8,6	159,8	3,9	213,0	3,5
	Overall cost Km/Minute	1102,0	88,8	3851,4	93,5	5658,1	93,8
	Total cost before energy	1208,5	97,4	4011,2	97,3	5871,1	97,3
	Energy Consumption	32,7	2,6	109,3	2,7	162,3	2,7
	Total cost	1241,2		4120,6		6033,4	

Table 6. (*continued*)

	Variables	**Nodes** **2** Value	% tot.	**3** Value	% tot.	**4** Value	% tot
slot 9 am - 10 pm	Total Km	91,5		306,2		454,6	
	Average charge/Km	**13,5**		**13,4**		**13,2**	
	Km nodes	11,8	12,9	25,5	8,3	47,3	10,4
	Overall cost track/Node	106,5	8,6	159,8	3,9	213,0	3,6
	Overall cost Km/Minute	1094,0	88,7	3829,5	93,4	5610,1	93,7
	Total cost before energy	1200,5	97,3	3989,3	97,3	5823,1	97,3
	Energy Consumption	32,7	2,7	109,3	2,7	162,3	2,7
	Total cost	1233,2		4098,6		5985,4	
slot 10 pm -6 am	Total Km	91,5		306,2		454,6	
	Average charge/Km	**13,4**		**13,3**		**13,1**	
	Km nodes	11,8	12,9	25,5	8,3	47,3	10,4
	Overall cost Track/Node	106,5	8,7	159,8	3,9	213,0	3,6
	Overall cost Km/Minute	1088,6	88,7	3814,8	93,4	5578,1	93,7
	Total cost before energy	1195,1	97,3	3974,6	97,3	5791,2	97,3
	Energy Consumption	32,7	2,7	109,3	2,7	162,3	2,7
	Total cost	1227,8		4083,9		5953,5	

Table 7. Access charge for ST according to different routes with 2, 3 and 4 nodes and different time slots

	Variables	**Nodes** **2** Value	% tot.	**3** Value	% tot.	**4** Value	% tot.
slot 6-9 am	Total Km	96,9		315,4		467,5	
	Average charge/Km	**3,4**		**2,7**		**3,0**	
	Km nodes	11,8	12,2	30,9	9,8	65,4	14,0
	Overall cost Track/Node	165,1	50,3	330,2	38,5	492,6	35,4
	Overall cost Km/Minute	128,5	39,1	413,9	48,3	730,8	52,6
	Overall cost before energy	293,6	89,5	744,1	86,9	1223,4	88,0
	Energy Consumption	34,6	10,5	112,6	13,1	166,9	12,0
	Total cost	328,2		856,7		1390,3	
slot 9 am - 10 pm	Total Km	96,9		315,4		467,5	
	Average charge/Km	**4,2**		**3,4**		**3,3**	
	Km nodes	11,8	12,2	30,9	9,8	65,4	14,0
	Overall cost Track/Node	165,1	41,1	276,9	25,9	386,1	25,0
	Overall cost Km/Minute	202,4	50,3	677,9	63,5	991,8	64,2
	Overall cost before energy	367,5	91,4	954,8	89,5	1377,9	89,2
	Energy Consumption	34,6	8,6	112,6	10,5	166,9	10,8
	Total cost	402,1		1067,4		1544,8	
slot 10 pm -6 am	Total Km	96,9		315,4		467,5	
	Average charge/Km	**3,3**		**2,6**		**2,6**	
	Km nodes	11,8	12,2	30,9	9,8	65,4	14,0
	Overall cost Track/Node	165,1	51,0	276,9	34,3	386,1	32,4
	Overall cost Km/Minute	123,9	38,3	417,7	51,7	639,0	53,6
	Overall cost before energy	289,0	89,3	694,7	86,1	1025,1	86,0
	Energy Consumption	34,6	10,7	112,6	13,9	166,9	14,0
	Total cost	323,6		807,3		1192,0	

The cost per km seems to be constant in the hypotheses considered in Table 6: from a minimum of 13.1 € to 13.6 €. The average cost is 13.4 €/km. The average costs per km in the case of the ST network are much lower. They vary from a minimum of 2.6 € to 4.2 € (mean: 3.4 €/km). The Average charge/Km tends to decrease if distance and number of nodes increase. Prior research shows that the share of fixed costs in the definition of the access charge in the railway sector tends to be higher than that in two other sectors often discussed as candidates for vertical separation, namely electricity and telecommunications (Pittman 2003); however, Italian evidence unveils a different approach.

The fixed cost component counts for slightly less than 40% of total cost before energy consumption, which is consistent with Marzioli (2004); the remaining 60% is the variable one. In the HS/HC case, the variable component reaches 94% of total cost before energy consumption. The data thus highlight a different structure between these two systems. Broadly speaking, since the introduction of the HS/HC access charge system, the fixed component has lost significance; hence, the variable one has become predominant.

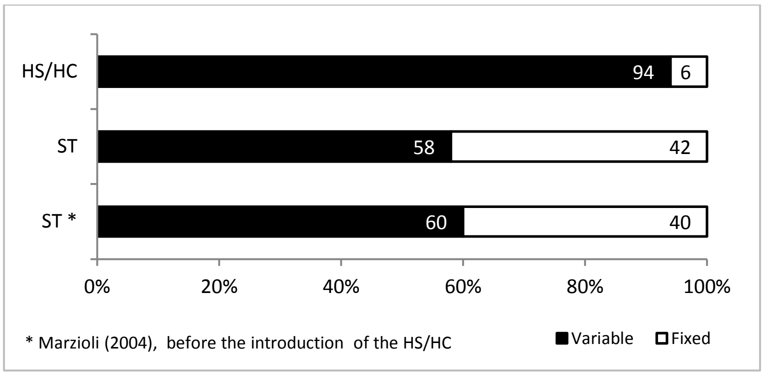

Figure 2. Access charge calculation before and after the introduction of the HS/HC network[2]

It should be noted that the Average charge/Km (3.4 €) estimated for trains on the ST network cannot be considered to be representative of the average cost of using the entire non-HS/HC network, especially because of the weight of nodes on the simulated routes. The longest of the three considered routes, for example, requires the crossing of four of the eight existing nodes, while much longer routes may involve the usage of only one, two or four nodes. Thus, the Average charge/Km for the use of the network can go down as well.

[2] own elaboration based on RFI and Marzioli (2004).

CONCLUSION

In this paper we have presented the elements and procedure of access charge's calculation for the use of rail infrastructure in Italy. The findings reported herein provide support for our contention that access charges for the use of rail infrastructure is an important aspect of fair competition; in fact, infrastructure charges account for a significant proportion of the costs of a railway operator. The level and structure of the charges are therefore crucial to establishing competition. According to the European Commission (2013), excessive infrastructure access charges mean higher prices for rail passengers and rail freight companies. They also discourage new railway operators from entering the market. The results of this paper are consistent with the European Commission statement and provide evidence of the access charge for HS/HC being above 13 €/km, which is a remarkable rate. We think that our findings might be useful for decision makers as reported data facilitate cross-country comparisons. Future research needs to examine the social, environmental and economic consequences of the choice of charge level, the impact on demand and modernisation in infrastructure governance.

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