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Contents

EXECUTIVE SUMMARY

Rail transport is a strategic sector because of its horizontal importance to the development of other industries and services, to territorial connectivity and to achieving sustainable mobility. The strategic relevance of rail transport and its nature as a network industry explains why the State has traditionally had a strong presence in the sector.

In recent years, the European Union has promoted the gradual opening of this sector to competition. The liberalisation process has been implemented through the so-called "railway packages". The Fourth Railway Package, adopted in 2016, completes this process by opening the market of commercial passenger transport services by rail in the year 2020.

In Spain, the transposition of European Directives into national laws promotes a model of vertical separation in which the infrastructure management operations, entrusted to ADIF and ADIF Alta Velocidad (ADIF High Speed) are unbundled from the provision of transport services, provided by the incumbent operator RENFE. All of these companies remain state-owned, and they are operated under the Spanish Ministry of Public Works.

The objective of this study is to analyse the market for commercial passenger transport services by rail in Spain, and to assess the main challenges and obstacles for the introduction of competition in this market, in order to formulate recommendations to the competent authorities to ensure its effective liberalisation.

This study draws on the liberalisation experiences of the markets for domestic commercial passenger services by rail in several European countries, which have drawn positive results in terms of increasing the number of passengers, distance travelled, train frequencies, quality of service and lower prices.

The railway sector exhibits certain features that can favour liberalisation. In particular, the Spanish railway infrastructure presents excess capacity and low levels of congestion, which makes it easier for new operators to access the infrastructure. In addition, the small overlap between commercial services and those subject to Public Service Obligations (PSO) facilitates entry into the market.

Nevertheless, there remain a number of challenges and obstacles to achieving effective competition in the market for commercial passenger services.

Firstly, Spain has adopted a model of vertical separation of infrastructure management and transport operations, which entails the structural separation of ADIF and RENFE. However, the subordination of ADIF, ADIF Alta Velocidad and RENFE to the Spanish Ministry of Public Works calls into question their autonomy

from this entity, as well as the neutrality of the Ministry with respect to their activity in the market.

Secondly, certain technical characteristics of the railway infrastructure, and specifically the coexistence of Iberian-gauge and international-gauge rail tracks, hamper the interoperability of passenger transport services, which conditions the dynamics of competition between market operators.

Thirdly, some aspects of the capacity allocation and the setting of infrastructure access charges can pose a significant barrier to entry for new operators. In particular, framework capacity agreements, which guarantee an operator's long-term access to the infrastructure, are necessary for new operators to be able to commit to the substantial investments needed to enter the market. At the same time, they reduce available capacity for other operators during the length of the agreement. Moreover, the current system for setting infrastructure access charges should be revised, as it does not provide ADIF with the flexibility required for the optimal management of the infrastructure. In addition, new operators should be granted access to spaces in passenger stations on a transparent and non-discriminatory basis, under the same conditions as the incumbent operator.

Fourthly, there exist potential problems in accessing rented rolling stock and maintenance facilities. These problems stem from the advantageous position of RENFE in these markets as the incumbent operator, and from the large investments and time necessary for new operators to obtain their own rolling stock and maintenance facilities. This situation should be solved so that it does not become a significant barrier to entry for new operators. Moreover, the access by new operators to engine drivers may be impeded by the power exerted by the incumbent operator in the market for recruiting and training of engine drivers.

Lastly, new operators have to commit to large investments and face significant asymmetries with respect to the incumbent operator, which has advantages inherited from its former monopolistic position in terms of information on the market and end users, and by virtue of being a provider of PSO services, which are subject to public subsidies. If the regulatory and institutional framework does not provide sufficient guarantees, it will be difficult for a railway company to undertake the costs and risks involved with entering the rail market.

The analysis carried out in this study, which incorporates the expertise accrued by the CNMC in the application of sector regulations and in ensuring competition in the railway sector, makes it possible to lay out the following recommendations, aimed at maximizing the positive effects of liberalisation and reducing the restrictions on competition that have been identified.

In the first place, the independence of the infrastructure manager from the incumbent operator of transport services has been of great importance, both in the mentioned international experiences and in the liberalisation of freight service in Spain, and has contributed to reducing the uncertainty of new entrants regarding infrastructure access conditions. We therefore recommend:

- Maintaining the structural separation of ADIF and ADIF Alta Velocidad from RENFE.

Secondly, it is essential that both RENFE and ADIF act independently in the market. The autonomy of the incumbent operator is necessary to give certainty to new entrants and guarantee competition between operators under equal conditions. We therefore recommend:

- Ensuring the full autonomy of ADIF, ADIF Alta Velocidad and RENFE.

Third, the entry of new operators is contingent upon obtaining capacity in the railway infrastructure. Accordingly, the infrastructure must be properly managed in order to maximise available capacity and allocate it to operators based on a previously established, non-discriminatory procedure. In turn, the procedure for obtaining framework capacity must balance the entrant's need for certainty regarding long-term access to the infrastructure against the need to safeguard the plurality of rail services, offered by new and different operators. That is, those who do not belong to the same business group and whose partners do not hold controlling stakes or exercise decisive influence over other operators with framework capacity.

We therefore recommend:

- Guaranteeing adequate and sufficient access to capacity in the railway infrastructure and service facilities.

Fourth, the current framework for setting infrastructure access charges, which considers them as taxes, does not provide operators with the necessary certainty regarding the future evolution of one of their main operating costs. Moreover, the amount of the charges must be determined in such a way that it does not pose a significant access barrier for operators, while guaranteeing the financial sustainability of ADIF. An allowance and mark-up structure should be designed to encourage the entry of new operators and to recover the costs associated with building the infrastructure. Consequently:

- We recommend improving the system for setting infrastructure access charges.

Fifth, the access to and maintenance of rolling stock is a considerable barrier to entry for new operators due to the high cost, the technical characteristics specific

to the Spanish network and the absence of rolling stock leasing companies and maintenance companies independent from RENFE. Therefore:

- We recommend facilitating the opening of new maintenance facilities and guaranteeing that new entrants have access to the heavy maintenance services of Renfe Fabricacion y Mantenimiento (Renfe Manufacturing and Maintenance), as well as to the rolling stock that RENFE does not need to provide its services and PSO, on a transparent, objective and non-discriminatory basis.
- We recommend promoting the structural independence between Renfe Alquiler (Renfe Leasing) and Renfe Fabricacion y Mantenimiento from Renfe-Operadora (Renfe Operator), by means of creating separate companies for leasing and maintaining rolling stock that are completely independent from Renfe-Operadora.

Sixth, the driving staff is a fundamental asset for the provision of passenger transport services. New operators must be assured access to these personnel. The deficiencies identified in the market for training and hiring of engine drivers after the liberalisation of freight transport led the CNMC to impose a series of measures on RENFE to ensure the correct functioning of this market. However, any new needs that arise once competition in commercial services is introduced may require the adoption of additional measures. We therefore recommend:

- Guaranteeing effective competition in the markets for training and hiring of engine drivers.

Lastly, in the new competitive framework, it will be essential to prevent RENFE from using the subsidies it receives to operate PSO services to compete more aggressively in the liberalised market. We therefore recommend:

- Not extending the contract directly awarded to RENFE for PSO services.
- Guaranteeing the effective separation of commercial services and PSO by separating the accounting, operational and legal aspects of the two activities.

I. INTRODUCTION

Rail transport is a strategic sector because of its horizontal importance to the development of other industries and services, and an essential instrument for achieving territorial connectivity and sustainable mobility. Despite operating Europe's longest high-speed network, and owning a conventional network of extensive coverage, the modal share of railway transport in Spain is below that of other means of land passenger transport, accounting for 6.6% of all passenger-kilometres in 2016, according to Eurostat.

The State has maintained a traditionally strong presence in the rail transport sector, due to its strategic importance and network industry features. In recent years, the European Union has promoted, among other aspects, the gradual opening of this sector to competition with the aim of establishing a single railway market. This process has been carried out through the approval of so-called "railway packages", sets of directives and regulations designed to restructure and revitalise the sector, defining an appropriate framework for railway liberalisation.

The transposition of European Directives into Spanish national law was carried through Railway Sector Act 39/2003 on the Railway Sector and its successive modifications. It configured the sector according to a model of vertical separation in which the infrastructure management operations, entrusted to ADIF and ADIF Alta Velocidad, are unbundled from the provision of transport services, provided by RENFE. Recent developments in the liberalisation process have increased the competitive pressure on RENFE, which currently faces competition in the freight transport segment, and in the segments of international passenger transport and passenger transport with primarily touristic purposes.

The adoption of the Fourth Railway Package in 2016 constitutes the latest stage of the rail liberalisation process, opening commercial services to competition from 14 December 2020.

Given the relevance of the current stage of the liberalisation process, this study offers an overview of the market for commercial passenger transport services by rail[1] and an assessment of the main challenges and obstacles for the introduction of competition in this market. The objective of this study is to propose recommendations to the competent authorities to ensure an effective liberalisation of the market, safeguard competition between operators and foster an efficient provision of services to the benefit of consumers. With this, the CNMC seeks to contribute to the design of an appropriate economic and legal framework

[1] Passenger transport services by rail subject to public service obligations (PSO) are outside the scope of this study.

that addresses the challenges posed by the impending liberalisation. The study is based on the knowledge obtained from previous liberalisation experiences in other European countries and on previous recommendations issued by the CNMC while exercising its competences in application of sector regulation and enforcement of competition in the railway sector[2].

The study consists of six sections, aside from the introduction, which are structured as follows: section 2 contains a list of previous proceedings initiated by the CNMC in relation to the railway sector. Section 3 studies the domestic market for commercial passenger services, analysing the sector from a legal and economic perspective. Section 4 examines previous liberalisation experiences of passenger transport by rail in Europe, identifying the main risks and restrictions to competition encountered by new entrants. Section 5 assesses the Spanish case from the competition perspective, analysing the main challenges and obstacles to liberalisation. Section 6 presents the main conclusions drawn from the previous analysis. Finally, section 7 states the recommendations which, in the opinion of the CNMC, must be adopted to overcome the challenges and obstacles and achieve an effective liberalisation of commercial passenger services in Spain.

[2] CNMC (2014): PRO/DTSP/0001/14; CNMC (2018a): INF/DTSP/117/18; CNMC (2018b): INF/DTSP/173/18; CNMC (2018c): INF/DTSP/041/18; CNMC (2018d): STP/DTSP/119/18; CNMC (2018e): IPN/CNMC/014/18; CNMC (2019a): STP/DTSP/118/18.

II. BACKGROUND

The railway sector and its gradual liberalisation has been analysed by the CNMC on numerous occasions through studies, reports on draft legislation, cases and decisions, issued in the exercise of the CNMC's powers as a competition authority and sector regulator.

It is firstly worth mentioning the report prepared by the former *Comisión Nacional de la Competencia* (National Competition Commission - CNC) in 2012[3] on competition in the freight rail transport, which analysed the main obstacles for effective competition in this market. This report concluded that the dominant position of RENFE in the related markets for the rental and maintenance of rolling stock, among others, could explain its high share in the rail freight transport market. Moreover, the uniqueness of the Spanish rail network, with three different track gauges, creates problems of interoperability with Central European countries, hindering the entry of new operators.

In 2014, the CNMC published a think piece[4] on the process of liberalising rail passenger transport at a time when the Ministry of Public Works was considering bringing forward the liberalisation of commercial passenger services prior to the approval of the Fourth Railway Package. Specifically, the Cabinet Agreement dated 13 June 2014 determined that the process of introducing competition would begin with the East Coast corridor (Levante) through awarding an operating permit to operate in this corridor in addition to that assigned to RENFE-Operadora. For this purpose, the Ministry of Public Works would award operating permits would be carried out by means of the corresponding tender procedure[5].

Despite the aforementioned agreement, the Ministry of Public Works finally abandoned this plan to open up gradually rail passenger transport to competition in 2016, postponing the liberalisation to the date established in the Fourth Package, which is 14 December 2020.

However, some recommendations in this think piece are still valid and included throughout this study.

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3 CNC (2012): "Report on competition in rail freight transport in Spain".

4 CNMC (2014): "Documento de reflexión sobre el proceso de liberalización del transporte de viajeros por ferrocarril" (Think piece on the process for the liberalisation of rail passenger transport) (PRO/DTSP/0001/14).

5 Section 5 of the third temporary provision of Railway Sector Act 39/2003, in the wording given by Royal Decree-Law 4/2013.

With regard to restrictive practices, the CNMC has sanctioned the main operator for agreements and concerted practices as well as for abusing its dominant position in different segments of the freight transport market[6].

In order to try to resolve problems related to the dominant position of RENFE, the CNMC has also acted through imposing regulations, specifically in the engine driver training and recruitment markets. In 2017, the CNMC imposed a series of measures on RENFE because of a Decision[7], aiming to ensure access by operators to driving staff. However, as analysed in this study, new actions by the CNMC could be necessary to ensure the proper functioning of the engine driver training and recruitment markets as the commercial services market is opened up to competition.

Finally, in the agreement dated 25 July 2018[8], containing a report on the draft bill amending the Railway Sector Act 38/2015, the CNMC made recommendations about the system for setting rail fees, access to rolling stock and maintenance facilities and the integrated ticket information and sales system. These have been taken into account in this study due to their relevance for the liberalisation of rail passenger transport.

6 Decision of the CNMC dated 28 February 2017 (2017a): S/DC/0511/14.

7 CNMC (2017b): STP/DTSP/053/17.

8 CNMC (2018e): IPN/CNMC/014/18.

III. STUDY OF THE MARKET FOR COMMERCIAL RAILWAY PASSENGER TRANSPORT SERVICES

Rail transport is characterised, from a technological viewpoint, by being a network industry[9] and, as such, it relies on an infrastructure or network whose construction costs are high and which cannot be used for any purpose other than that for which it was built[10]. The high cost of the infrastructure[11] and the existence of economies to scale mean that it is inefficient to build more than one network to carry out the transport activity, so this network is a natural monopoly.

Thus, in the railway sector, the construction and operation of the infrastructure are also generally activities with natural monopoly characteristics. In contrast, the operation of the transport service may be provided competitively.

However, due to the existence of high barriers to entry for new operators and the incumbent possibly retaining advantages that are difficult for its competitors to replicate, successful liberalisation of network industries requires public intervention. This takes place through regulations to prevent any abuse resulting from a single company operating the infrastructure, meaning that it could charge operators excessive prices to access the infrastructure. It is also necessary to ensure that operators entering the market do not face disproportionate barriers to entry and can compete under the same conditions as the incumbent.

To ensure access to the infrastructure under transparent and non-discriminatory conditions, one of the most common options is the vertical separation of activities. This involves retaining the activities with characteristics of a natural monopoly, such as the operation of the rail network, in the hands of a company subject to regulation and introducing competition in the provision of the transport service.

Despite it being a network industry, two types of competition can exist in rail transport[12]:

- Competition *in* the market: this can occur in activities that are not intrinsically a natural monopoly. In this way, with adequate levels of coordination, the same infrastructure may be shared by two or more operators, that compete providing transport services on the same routes[13].

[9] Other network industries are the transport and distribution of electricity and telecommunications.

[10] The construction costs of the infrastructure are, therefore, sunk costs.

[11] This high cost requires high public subsidies, which is why the rail network is usually public.

[12] De Rus (2006).

[13] The coordination needs depend on technical factors whose complexity increases with the density of the routes and the number of participants.

- Competition *for* the market: different companies compete for the right to operate a route under conditions regulated through concessions for a limited time. To be effective, this competition must generate ex-ante rivalry and a threat of ex-post competition, which maintains competitive intensity, because the winning firm knows that its right is temporary and it will need to compete again if it wishes to continue the activity.[14]

Below is a description of the rail liberalisation process in Europe and in Spain, as well as the current position of rail passenger transport and, in particular, commercial services in Spain.

III.1. The rail transport liberalisation process

The process of rail transport liberalisation, promoted by the European Union, began in 2001 and since then there has been a gradual opening up to competition, the aim being to increase the modal share of the railway sector and integrate the domestic markets to achieve a single European rail market.

The European railway sector, before the liberalisation, was characterised by public companies that both owned the infrastructure and operated the service. Therefore, in order to integrate the domestic markets, the European Union mainly opted for a model of railway restructuring and vertical separation of activities[15]. In this model, rail operators are unbundled from infrastructure managers through the creation of independent companies and access of operators to the rail network is guaranteed[16].

The European legislator has promoted a model of vertical separation, entrusting the administration of rail infrastructure to a single manager who provides access to the infrastructure under conditions that are objective, transparent, non-discriminatory and subject to regulation. Moreover, measures aimed at integrating the domestic markets and introducing competition among rail operators have been adopted in the different railway packages.

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[14] In addition to these two types of competition, there is intermodal competition, which is between rail transport and other modes of transport (road or air, for example).

[15] The vertical separation of activities has been common in other markets such as the energy market, which separates transport and distribution (in the hands of a single company due to being a natural monopoly) from marketing and generation, activities provided competitively.

[16] Vertical separation facilitates the integration of domestic markets, allowing the same company to operate traffic between different countries.

The regulation contained in the different railway packages, approved by the European Union, intends to increase the contestability[17] of the market, especially at an infrastructure level, ensuring access to the market to all companies (established and entrants) under similar conditions, thus promoting competition.

The First Railway Package (2001)[18] ensured independence in the management of the infrastructure manager and liberalised international freight transport services, guaranteeing rights of access to the trans-European network to all authorised rail operators in a transparent and non-discriminatory manner[19].

The Second Railway Package (2004)[20] focused on measures relating to safety, interoperability and the creation of the European Union Agency for Railways (ERA)[21], which is responsible for managing railway safety and interoperability. This package established the full opening of the rail freight markets on 1 January 2007.

The Third Railway Package (2007)[22] aimed at the liberalisation of international passenger transport, establishing 1 January 2010 as the deadline for the opening of this market. This Third Package sought to promote the creation of an internal market for rail services through a strict framework of regulations on safety and the protection of passenger rights.

Finally, the Fourth Railway Package (2016) was designed to revitalise national rail passenger transport and make it more competitive with other modes of transport. It consists of two pillars: the technical pillar[23] and the market pillar[24].

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17 Baumol, Panzar and Willig (1982) established that, in order for a market to be contestable, three conditions must be met: (1) There should be no barriers to entry or exit, (2) There should be no sunk costs (not recoverable if companies exit the market) and (3) Potential entrants should have access to the same resources as the companies already established.

18 Directive 2001/12/EC; Directive 2001/13/EC; Directive 2001/16/EC; Directive 2001/24/EC.

19 Directive 2012/34/EU, establishing a single European railway area, simplified and clarified the community regulatory framework for rail transport, combining the directives making up the first railway package into a single text.

20 Directive 2004/49/EC; Directive 2004/50/EC; Directive 2004/51/EC; (EC) Regulation 881/2004.

21 ERA (*European Union Agency for Railways*) was created by approval of (EC) Regulation 881/2004 of the European Parliament and of the Council.

22 Directive 2007/58/EC; Directive 2007/59/EC; Regulation 2007/2370/EC; Regulation 2007/1371/EC.

23 Directive 2016/797/EU Interoperability; Directive 2016/798/EU Safety; (EU) Regulation 2016/796 ERA.

24 Directive 2016/2370/EU; (EU) Regulation 2016/2337; (EU) Regulation 2016/2338.

The market pillar completes the gradual process of opening up the markets, which started with the First Railway Package. This included the opening up of the rail passenger transport market and rail companies having the right to access the rail infrastructures of all Member States in 2020[25]. This pillar also establishes rules to improve impartiality in the governance of rail infrastructures, avoid discriminatory behaviour, and introduce the compulsory tendering of railway Public Service Obligations (PSO) contracts from 2023. The measures contained in the market pillar are aimed at increasing consumer choice and improving the quality of rail passenger transport services.

Table 1. Summary of European rail regulations

Package	Regulation	Main measures
First Railway Package	Directive 2001/12/EC Directive 2001/13/EC Directive 2001/14/EC Directive 2001/16/EC	- Management independence of the infrastructure manager. - Liberalisation of international freight transport. - Extension of national licences at European level. - Capacity allocation, access charges and security. - Interoperability of rail transportation.
Second Railway Package	Directive 2004/49/EC Directive 2004/50/EC Directive 2004/51/EC Regulation (EC) 881/2004	- Safety measures, interoperability and creation of the ERA. - Opening of freight transportation: - International: 1/1/2006. - National: 1/1/2007.
Third Railway Package	Directive 2007/58/EC Directive 2007/59/EC Regulation 2007/1370/EC Regulation 2007/1371/EC	- Liberalisation of international passenger transport: 1/1/2010. - Engine driver certification. - Rights and obligations of passengers.
Fourth Railway Package	Directive 2016/797/EU Directive 2016/798/EU Regulation (EU) 2016/796 Directive 2016/2370/EU Regulation (EU) 2016/2337 Regulation (EU) 2016/2338	- Liberalisation of national passenger transport: 14/12/2020. - Mandatory tendering of PSO services: starting 2023. - Impartiality in the governance of rail infrastructures.

Source. Compiled by author.

[25] Directive 2016/2370/EU determines that this right will become effective on 1 January 2019, in time for the working timetable on 14 December 2020.

In Spain, the liberalisation process began with the approval of the Railway Sector Act 39/2003 of 17 November (known as LSF for its Spanish name)[26], which entered into force on 1 January 2005 and liberalised rail freight transport[27].

The LSF also created the Railway Regulation Committee (known as CRF for its Spanish name), a collegiate body forming part of the Ministry of Public Works, responsible for the supervision and resolution of conflicts between the rail infrastructure manager and the rail market operators, or among different operators, and for ensuring the overall proper functioning of the rail system. Act 3/2013 of 4 June 2013 creating the National Markets and Competition Commission was an important step in the independence of the railway sector supervisor by abolishing the Committee and assigning its functions to the new regulatory body, the CNMC.

Railway Sector Act 38/2015 of 29 September incorporated, albeit partially[28], Directive 2012/34/EU[29], establishing the single European railway area, into the Spanish legal system.

Finally, Royal Decree-Law 23/2018 modified Act 38/2015 to progress in the transposition of the aforementioned Directive 2012/34/EU and incorporate (EU) Directive 2016/2370. The latter Directive implements the single European area and focuses on two main aspects: on the one hand, the opening of the passenger transport market and, on the other, the strengthening of the independence and impartiality of the infrastructure managers through additional precautions that guarantee their organisational separation from any rail operator.

[26] This Act incorporated the community regulations in the First Railway Package into Spanish legislation

[27] In Spain, the liberalisation of freight transport took place two years prior to the date of 1 January 2007 established in the Second Railway Package.

[28] The European Commission opened two infringement cases relating to the transposition of Directive 2012/34/EU, one of which is in the reasoned opinion stage, communicated to the Kingdom of Spain on 15 June 2017, and another through a formal notice on 18 May 2018.

[29] This Directive simplifies and clarifies the community regulatory framework for rail transport and means bringing together the First Railway Package and the modifications made at a later date.

Table 2. Summary of Spanish rail regulations

Regulation	Package/Directive	Main measures
Railway Sector Act 39/2003	Transposition of First Railway Package Transposition of Directive 2007/58/EC	- Separation of the management of infrastructure (ADIF) from the transport operation (Renfe-Operadora). - Liberalisation of freight transport (2005). - Liberalisation of international passenger transport (2010).
Railway Sector Act 38/2015 (LSF)	Transposition of Directive 2012/34/EU	- Single rail space. - Transparency and sustainability of the financing of infrastructures. - Reinforcement of the regulators. - New rules on infrastructure access charges.
Royal Decree-Law 23/2018	Transposition of Directive 2012/34/EU Directive (EU) 2016/2370	- Liberalisation of national passenger transport (2010). - Reinforcement of the independence and impartiality of infrastructure managers with regard to rail operators.

Source. Compiled by author.

III.2. Structure of the railway sector in Spain

The LSF configured the rail model in Spain based on the vertical separation of activities: the management of the infrastructure, which continues to be a public monopoly, separated from the provision of the service, which gradually opens up to competition.

Hence, the public company with the monopoly in rail transport in Spain since 1941, RENFE, was split into two different public companies in 2005[30]: Administrador de Infraestructuras Ferroviarias (ADIF), a body responsible for the management and construction of the Public Railway Network (known by its acronym in Spanish, RFIG), and RENFE-Operadora, the company responsible for providing the transport service.

RFIG consists of the rail infrastructures[31], which are essential for ensuring a common rail transport system in Spain. The Minister of Development is

[30] Following the entry into force of Railway Sector Act 39/2003 as of 1 January 2005.

[31] Article 3 of Act 38/2015 refers to rail infrastructure as passenger transport stations, freight transport terminals and all elements forming part of the main and service lines and private branch lines, with the exception of the tracks situated inside rolling stock repair workshops and stabling or garages for traction machines.

responsible for adding new infrastructures to this network, justified by overriding reasons relating to the public interest[32]. While the Ministry of Public Works is responsible for the planning of RFIG infrastructures the approval of projects and construction of infrastructures corresponds to the rail infrastructure managers.

The RFIG infrastructures include different line gauges. Although Iberian gauge lines form the majority, the investment in high-speed lines has increased notably in recent years[33]. Moreover, metric gauge lines are mainly concentrated in the Cantabrian area (see Table 3 and Figure 1).

Table 3. Public Railway Network. Rail gauge categories. 2019

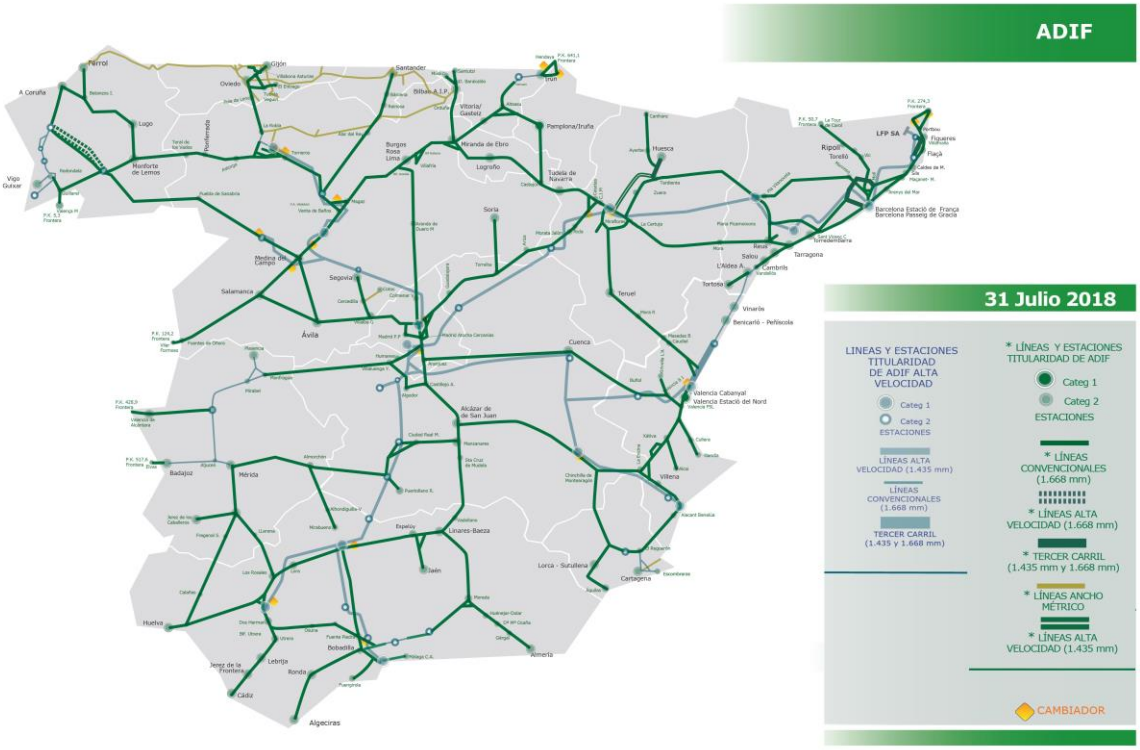
PUBLIC RAILWAY NETWORK	
Infrastructure	**Kilometres**
Standard gauge High-Speed network (1,435 mm)	2,571
Iberian gauge High-Speed network (1,668 mm)	84
Iberian gauge Conventional network (1,668 mm)	11,250
Dual gauge network (Iberian and Standard gauge)	190
Metre gauge network (1,000 mm)	1,193
TOTAL	**15,290**

Source. 2019 Network Statement. ADIF and ADIF AV.

[32] Article 4 of Act 38/2015.

[33] According to the Annual Accounts of ADIF AV for 2017, the value of investment in the high-speed rail network amounts to over €33.5 bn, with €12,951 million adding for sections under construction.

Figure 1. Public Railway Network. 2019



LINES AND STATIONS OWNED BY ADIF ALTA VELOCIDAD	* LINES AND STATIONS OWNED BY ADIF
Category 1 Category 2	Category 1 Category 2
STATIONS	STATIONS
HIGH SPEED LINES (1,435mm)	* CONVENTIONAL LINES (1,668mm)
CONVENTIONAL LINES (1,668mm)	* THIRD TRACK (1,435mm and 1,668mm)
THIRD TRACK (1,435 and 1,668mm)	* METRIC GAUGE LINES
	* HIGH SPEED LINES (1,435mm)
	CHANGEOVER

Source. 2019 Network Statement. ADIF and ADIF AV.

Investment in the high-speed network, which covers 2,655 km, represents a cumulative sum of over €45 bn. The financing of this investment consisted of European Union funds, which accounted for approximately 25% of the total,

capital contributions from the State and debt taken on by the infrastructure manager, for an amount exceeding €15 bn[34].

Since 2005, ADIF has been responsible for the main functions of the former Railway Infrastructure Manager (known as GIF for its Spanish name "Gestor de Infraestructuras Ferroviarias")[35]. That is, the maintenance, operation, upgrading and development of rail infrastructures of RFIG. ADIF also manages the rail traffic and allocates the available capacity among rail operators[36].

ADIF is constituted as a public company, reporting to the Ministry of Public Works, with functions comparable to those performed by infrastructure managers in other European countries. The LSF guarantees the independence of the rail operators from ADIF by means of providing the infrastructure manager with a legal personality different to that of any rail operator, and establishing that the members of the highest governance and administration bodies of ADIF must be impartial and have no conflict of interest[37].

In a model of vertical separation of activities as the one adopted in Spain, in which the infrastructure is a public monopoly, an essential function of ADIF is to **ensure the right of access for operators to the infrastructure in a transparent and non-discriminatory manner**.

In order to access the infrastructure, operators must pay infrastructure access charges to ADIF, which are considered as taxes in Spain and they are annually determined in the General State Budget. Access charges are set to recover the costs directly attributable to the operation of the rail service. That is, those costs incurred by ADIF for allocating capacity, managing traffic and ensuring traffic safety (charge for capacity allocation) and for maintaining and preserving the rail infrastructure (charge for using the railway lines) and the electrification facilities

[34] State contributions to finance the high-speed network have been very small. For example, in 2017, the contribution was established at €293.47 million compared to investments of €2,330 million and in 2018, the State contribution amounted to €312 million compared to an expected investment value of €2,713 million (CNMC(2018b): INF/DTSP/173/18, pages 25 and 26).

[35] The Railway Infrastructure Manager (GIF), created in 1997, was a public body responsible for the construction and maintenance of the infrastructure.

[36] ADIF was split into two public companies: Adif and Adif AV, following the approval of Royal Decree-Law 15/2013. Whereas Adif manages the conventional and metric gauge network, Adif AV does the same for the high-speed network.

[37] In particular, it is incompatible for a member of the rail infrastructure administration body to be part of the management body of a rail operator.

and their replacement costs (charge for using the traction power transformers and distribution installations)[38].

In addition to the costs directly attributable to operating the service, the LSF anticipates an added mark-up over the charge for using the railway lines whenever the market can accept it in order to recover the financial expenses and other costs that allow the infrastructure manager to achieve the economical sustainability of the infrastructure[39].

With regard to the **provision of the rail passenger or freight transport service**, the LSF requires a rail operator licence[40] and safety certificate[41] for rail operators to operate in the market. It also requires the approval of the rolling stock[42], qualifications for the engine drivers and other rail staff[43], and capacity allocation by ADIF, based on the rules, deadlines, procedures and criteria contained in the Network Statement.

The gradual liberalisation of rail transport in Spain has led to the service currently provided on a competitive basis, at least de jure, in the liberalised segments: freight[44], international passenger transport and passenger transport with primarily touristic purposes, whereas the rest of commercial passenger transport services remains a public monopoly until its liberalisation in 2020.

In order to facilitate the liberalisation of passenger transport, Royal Decree-Act 22/2012 divided RENFE into four state companies: Renfe Viajeros, Renfe Mercancías, Renfe Alquiler de Material Ferroviario and Renfe Fabricación y Mantenimiento, with Renfe-Operadora being 100% owner of the share capital of all these new companies and parent of the group with corporate and service functions.

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38 ADIF also obtains resources through State capital contributions, fees and prices for the provision of complementary and auxiliary services and financial resources from borrowing operations.

39 Article 97.5.2 of Railway Sector Act 38/2015.

40 Article 50 of the LSF establishes that, for the awarding of the railway licence, operators must demonstrate their financial capacity, guarantee the competence of their staff and have the status of a public limited company. There is a single licence for the entire Railway Network in the General Public Interest.

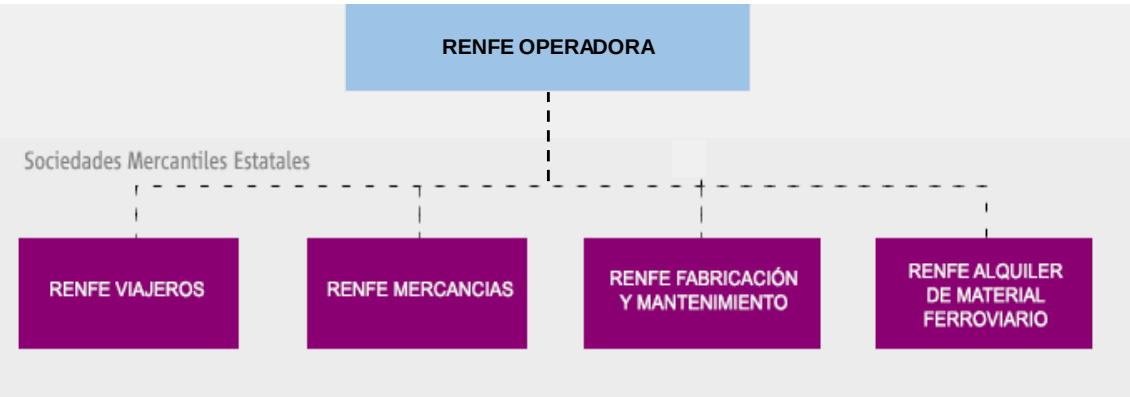
41 Article 66 of the LSF.

42 Order FOM/233/2006.

43 Order FOM/2872/2010.

44 Rail freight transport has been liberalised since 2005, although until 2007 no rail operators other than Renfe Mercancías entered the market. In 2017, nine companies provided rail freight services, in addition to Renfe Mercancías (see CNMC (2018c)).

Figure 2. Structure of Renfe-Operadora



Source. Amended from Renfe.

Finally, the LSF establishes the **conditions for access of operators to the rolling stock and its maintenance**, which are essential elements to operate in the market, by means of imposing obligations on Renfe Alquiler de Material Ferroviario and Renfe Fabricación y Mantenimiento[45], in order to facilitate the access of operators to the stock in a transparent, objective and non-discriminatory manner. Renfe-Operadora will also ensure the independence of the members of the Board of Directors of Renfe Alquiler de Material Ferroviario and Renfe Fabricación y Mantenimiento with respect to public or private rail operators.

III.3. Current situation

According to the INE (Spanish National Statistics Institute), rail transported over 600 million passengers in Spain in 2017, 2.5% more than in the previous year[46]. Demand for rail transport in 2017 remained below 2006's maximum of 628 million, despite displaying continuous growth since 2014.

According to Eurostat[47], the modal share of railway transport is below that of other modes of land passenger transportation, accounting for 6.6% of all passenger-kilometres transported in 2016[48]. This figure is below the European average of 7.7% (see Figure 3).

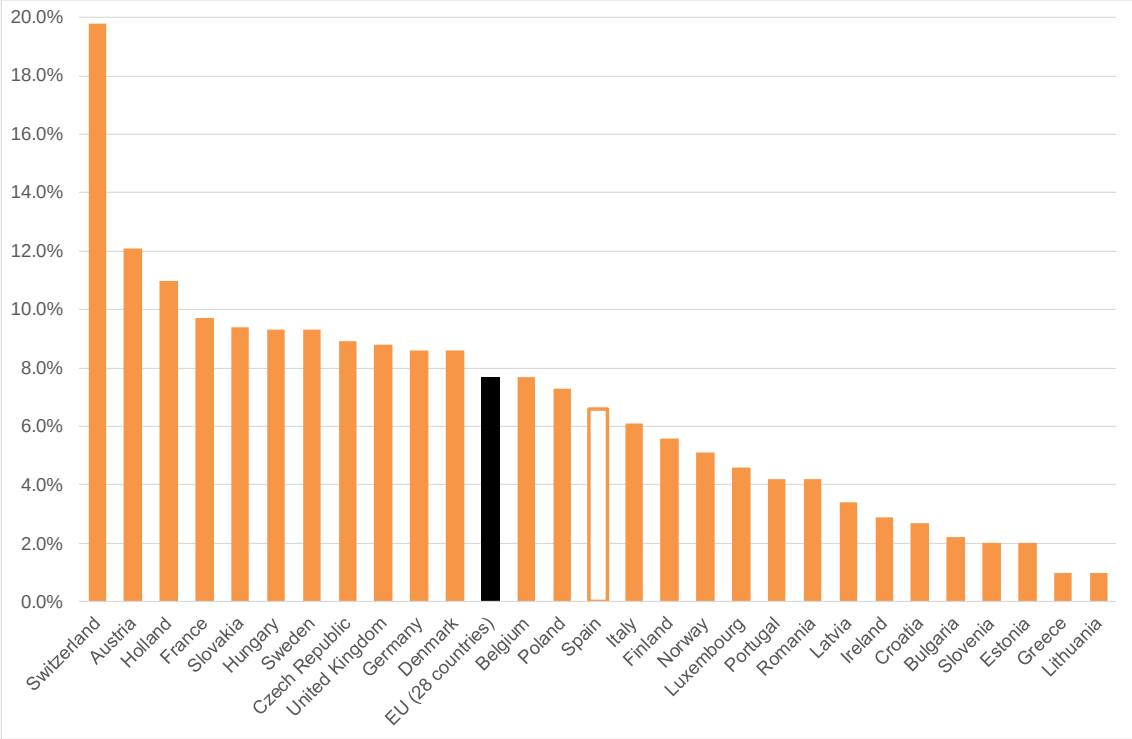
[45] Sixteenth supplementary provision of Railway Sector Act 38/2015.

[46] 600,030,000 passengers in 2017, Passenger Transport Statistics.

[47] Eurostat, Modal split of passenger transport, Transport Database.

[48] Land transport is dominated by private vehicles, which transported 81.6% of all passenger-kilometres in 2016, according to Eurostat.

Figure 3. Modal share of passenger transport by rail in Europe (2016)



Source. CNMC (2018b).

Railway transport services can be classified according to distance travelled into suburban services, which travel between towns over a distance of less than 50 km; regional services, between 50 and 300 km; and long-distance services, which link populations over 300 km. In turn, it is possible to differentiate between regional and long-distance high-speed services and conventional services, according to the type of infrastructure used and their operational speed[49].

This classification determines whether the service is subject to a Public Service Obligation. Thus, the suburban and regional services provided on both the conventional and high-speed network are subject to PSOs[50].

Moreover, all services not affected by PSOs are regarded as commercial services. This classification includes international passenger transport services (liberalised since 2010), domestic passenger transport with primarily touristic

[49] The high-speed services use the high-speed network, UIC and Iberian gauge, which allows for speeds of over 300km/h, whereas the conventional services travel at slower speeds, mainly on the Iberian and metric gauge network.

[50] Declared in the Cabinet Agreement of 14 December 2018.

purposes (liberalised since 2013) and high-speed services and other conventional long-distance services (hereinafter, HS and LD, respectively), which are currently provided by a sole operator and that will be liberalised in the working timetable starting on 14 December 2020[51].

Of total rail passengers transported in 2018, only 33.6 million used commercial services (5.4% of the total), split between HS (21.3 million) and LD (12.3 million) services[52]. In turn, PSO services transported 559.8 million suburban passengers (89.4% of the total), 24.2 million (3.8%) conventional regional passengers and 8.7 million (1.4%) high-speed regional (AVANT) passengers[53].

The relevance of PSO services diminishes when accounting for distance travelled, representing 43.1% of all passenger-kilometres[54] transported in 2017, against 56.9% for commercial services. HS services performed the largest share of total traffic (9,979 million passenger-kilometres in 2017, 38.3% of the total). As can be seen in Figure 4, the high-speed segment has experienced substantial growth in recent years, which has been parallel to the expansion of the network. The opening of the line connecting Madrid and Barcelona in 2008, and the commissioning of the Levante Eastern corridor in 2011 illustrate these developments. AVANT services have also expanded since 2006, whereas conventional regional services and suburban services have stagnated.

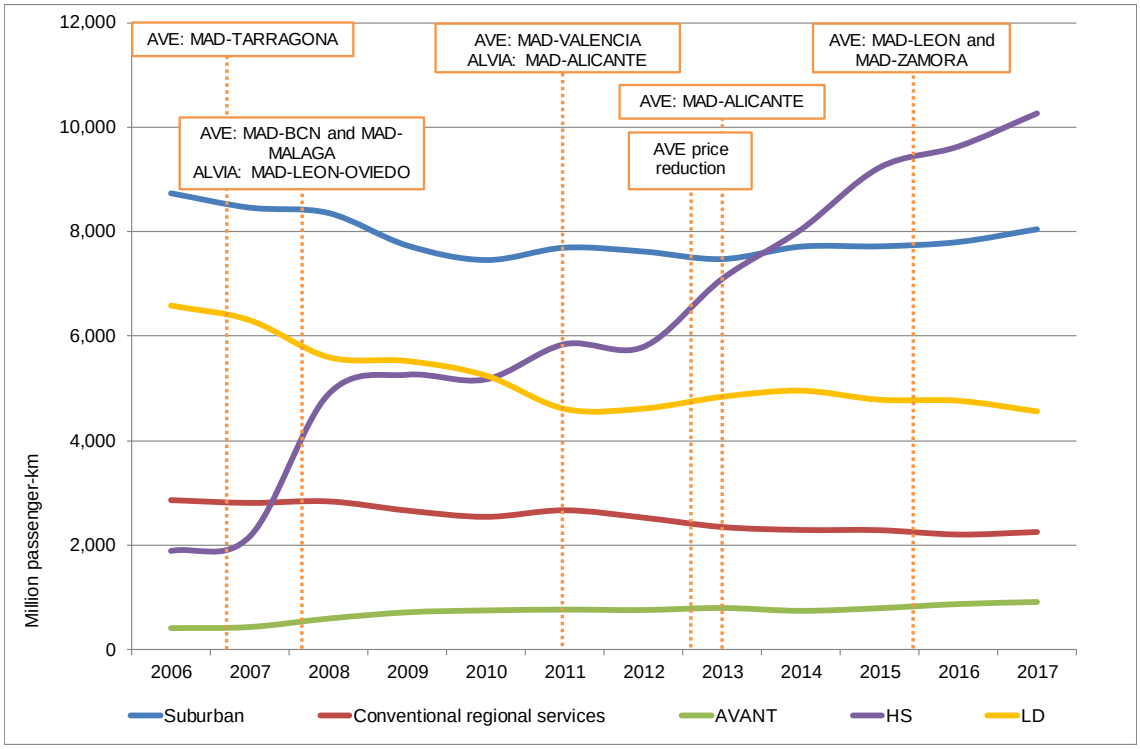
[51] Article 3.2 of Directive 2016/2370 and first temporary provision of Railway Sector Act 38/2015.

[52] Tourist services are of lesser importance, accounting for 31,000 passengers in 2017. As a result, they will not be take into account in this study. Moreover, international service data are included within HS services.

[53] Data from Passenger Transport Statistics of INE and the Transport Statistics of the Ministry of Public Works.

[54] A passenger-kilometre is the unit of measurement representing the transport of one passenger by rail over a distance of one kilometre.

Figure 4. Passenger-kilometres by railway segments: 2006-2017



Source. Compiled by author based on data from CNMC (2018b) and the 2017 Observatory for Railway Transport in Spain.

Note: passenger-kilometres transported by Renfe-Operadora. AVE and Alvia are brands of HS and LD services provided by Renfe. Data do not include suburban services transferred to Autonomous Communities. In 2016, Catalonia's FGC and Basque Country's Euskotren transported 1,333 million passenger-kilometres according to the 2017 Observatory for Railway Transport in Spain published by the Ministry of Public Works.

III.3.1. Demand for commercial services

Total passenger-kilometres for commercial rail services has increased by 24.2% between 2013 and 2017, in response to a reduction in AVE prices and the commissioning of new high-speed routes[55].

Therefore, passenger-kilometres of HS services increased by 40.6% during this period, whereas those of LD services remained practically unchanged. In 2017, HS services accounted for 67% of total commercial passenger-kilometres.

[55] The route connecting Madrid and Alicante opened in 2013. Sections Valladolid-Venta de Baños-Palencia-Leon and Olmedo-Zamora, in the Northern corridor, began operating on 25 September 2015 and 14 December 2015, respectively (CNMC (2018b): INF/DTSP/173/18).

The distribution of passenger-kilometres between the different corridors reflects the geographical heterogeneity of demand, which accumulates in a few corridors and routes, especially regarding HS services. Thus, the North-Eastern high-speed corridor transported 26% of commercial passenger-kilometres in 2017, and the first three high-speed routes, Madrid-Barcelona, Madrid-Seville and Madrid-Malaga accounted for 42% of total demand in terms of passenger-kilometres[56].

Regarding the evolution of traffic, as shown in Table 4, the North-Eastern, Eastern and Northern corridors stand out with an increase in passenger-kilometres of over 10% between 2015 and 2017. These performances are due to the strong demand for HS services on the Madrid-Barcelona route and the commissioning of new high-speed sections in these corridors.

In contrast, Cross-country and Mediterranean corridors, with a stronger presence of LD services, have recorded lower demand growth in recent years. The only exceptions are the Northern corridor, where the opening of new high-speed sections in 2015 has fuelled demand for LD services, and the Southern corridor, where LD services have grown due to the Madrid-Cádiz route[57].

[56] CNMC (2018b): INF/DTSP/173/18, page 6.

[57] The Alvia services between Madrid and Cádiz recorded a 21% increase in passenger-kilometres between 2015 and 2017.

Table 4. Passenger-kilometres (millions) of the main railway corridors

Corridors	2015	2016	2017	Δ15-16	Δ16-17
HS	**9,230**	**9,632**	**9,979**	**4.4%**	**3.6%**
North-Eastern	3,495	3,660	3,866	4.7%	5.6%
Southern	2,424	2,495	2,561	2.9%	2.6%
Eastern	1,412	1,499	1,572	6.2%	4.9%
Cross-country	1,301	1,337	1,299	2.7%	-2.8%
International	541	524	554	-3.2%	5.7%
Northern	56	118	127	110.7%	7.9%
LD	**4,784**	**4,765**	**4,852**	**-0.4%**	**1.8%**
Northern	1,372	1,424	1,420	3.8%	-0.3%
Cross-country	1,065	1,002	972	-5.9%	-3.0%
Mediterranean	847	858	871	1.3%	1.5%
Southern	702	723	791	3.0%	9.5%
Eastern	555	523	556	-5.8%	6.3%
North-Eastern	244	235	242	-3.6%	3.1%
Total commercial	**14,014**	**14,397**	**14,831**	**2.7%**	**3.0%**

Source. Compiled by author based on data from CNMC (2018b).

III.3.2. Supply of commercial services

Supply of commercial services has increased in response to demand growth during the last decade, although its growth has been more modest. Between 2013 and 2017, the number of commercial train-kilometres rose by 1.3%, whereas supplied seat-kilometres increased by 6.8%. The lower growth of train circulations *vis-à-vis* supplied seats points to an increase in the number of seats per train, which has increased from 302 to 322 in this period.

In 2017 train-kilometres grew for the first time since 2014, recording a 1.6% increase compared to the previous year, reaching 60.8 million, whereas seat-kilometres have grown by 2.4% (see Table 5).

From a geographical perspective, supplied seat-kilometres reflect the distribution of passenger-kilometres, concentrating around the North-Eastern and Southern corridors. The growth of Eastern and Southern LD corridors stand out with growth rates close to 9% in 2017. Regarding high-speed lines, the North-Eastern and Eastern corridors record the highest growth rates (Table 5).

Table 5. Seat-kilometres (millions) of the main railway corridors

Corridors	2015	2016	2017	Δ15-16	Δ16-17
HS	**12,866**	**12,831**	**13,161**	**-0.3%**	**2.6%**
North-Eastern	4,879	4,977	5,183	2.0%	4.1%
Southern	3,345	3,251	3,273	-2.8%	0.7%
Eastern	2,085	1,981	2,117	-5.0%	6.9%
Cross-country	1,604	1,604	1,579	0.0%	-1.5%
International	852	808	792	-5.2%	-1.9%
Northern	101	211	217	110.1%	2.8%
LD	**7,794**	**7,492**	**7,653**	**-3.9%**	**2.2%**
Northern	2,391	2,356	2,321	-1.5%	-1.5%
Cross-country	1,635	1,560	1,573	-4.6%	0.9%
Mediterranean	1,354	1,320	1,332	-2.5%	0.9%
Southern	1,098	1,087	1,182	-1.0%	8.8%
Eastern	926	802	876	-13.4%	9.3%
North-Eastern	390	368	369	-5.5%	0.1%
Total commercial	**20,660**	**20,323**	**20,814**	**-1.6%**	**2.4%**

Source. Compiled by author based on data from CNMC (2018b).

As can be seen in Figure 5, the distribution of seat-kilometres across the railway network closely resembles that of demand. In 2017, HS services supplied 63% of seat-kilometres, performing 67% of traffic in terms of passenger-kilometres. This slight imbalance means that HS services present a higher utilisation rate[58] than LD services.

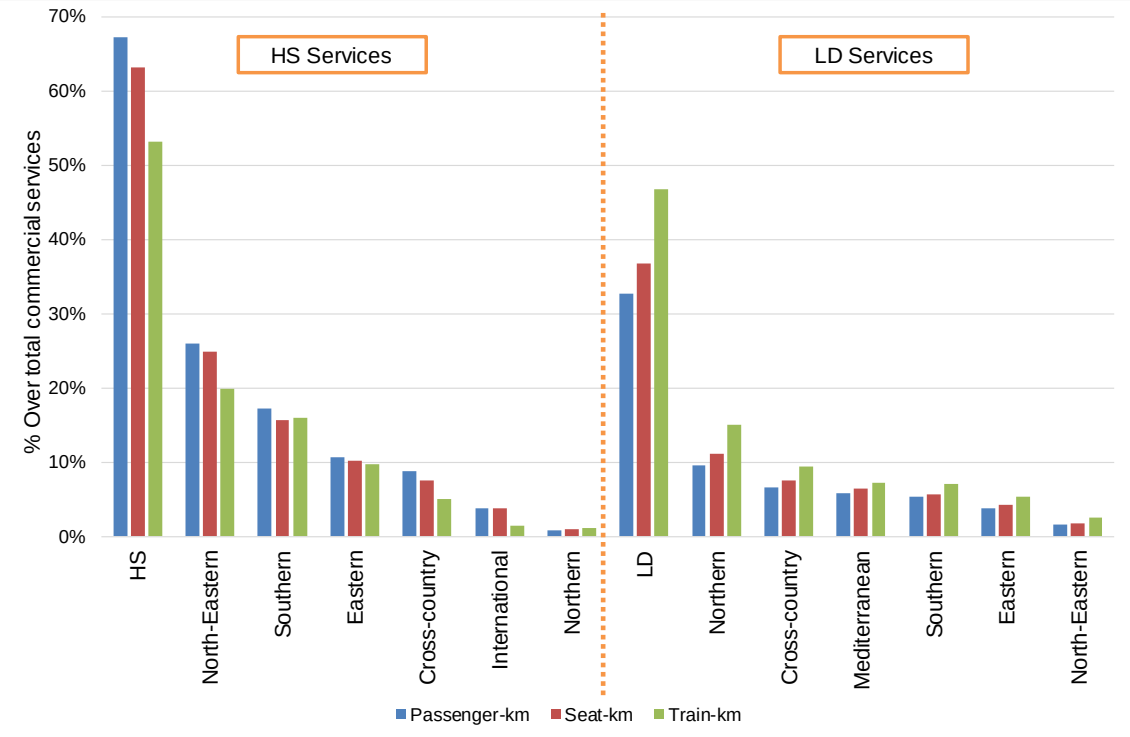
Analysing the utilisation rates of the different corridors, the largest rates can be found in the Cross-country and Southern high-speed corridors, reaching 82% and 78% respectively. The Northern corridor presents the lowest utilisation rate, standing at 61.2%.

On the other hand, the distribution of train-kilometres across the different types of services and corridors is more homogeneous than that of demand and seat-kilometres. Consequently, HS services record a higher number of transported passengers and seats per train than LD services (365 compared to 269 in 2017).

[58] The utilisation rate is defined as the number of passenger-kilometres over the number of supplied seat-kilometres.

The North-Eastern high-speed corridor provides the highest number of seats per train with 458 in 2017.

Figure 5. Supply and demand distribution between main railway corridors (2017)



Source. Compiled by author based on data from CNMC (2018b).

III.3.3. The railway infrastructure: network utilisation rates and financial position of ADIF AV

In Spain, commercial passenger transport services operate on both the conventional and high-speed network. In the first case, commercial services travel over approximately 6,500 km of conventional tracks, accounting for 57% of the total kilometres of the conventional network[59], which they share with PSO and freight transport services.

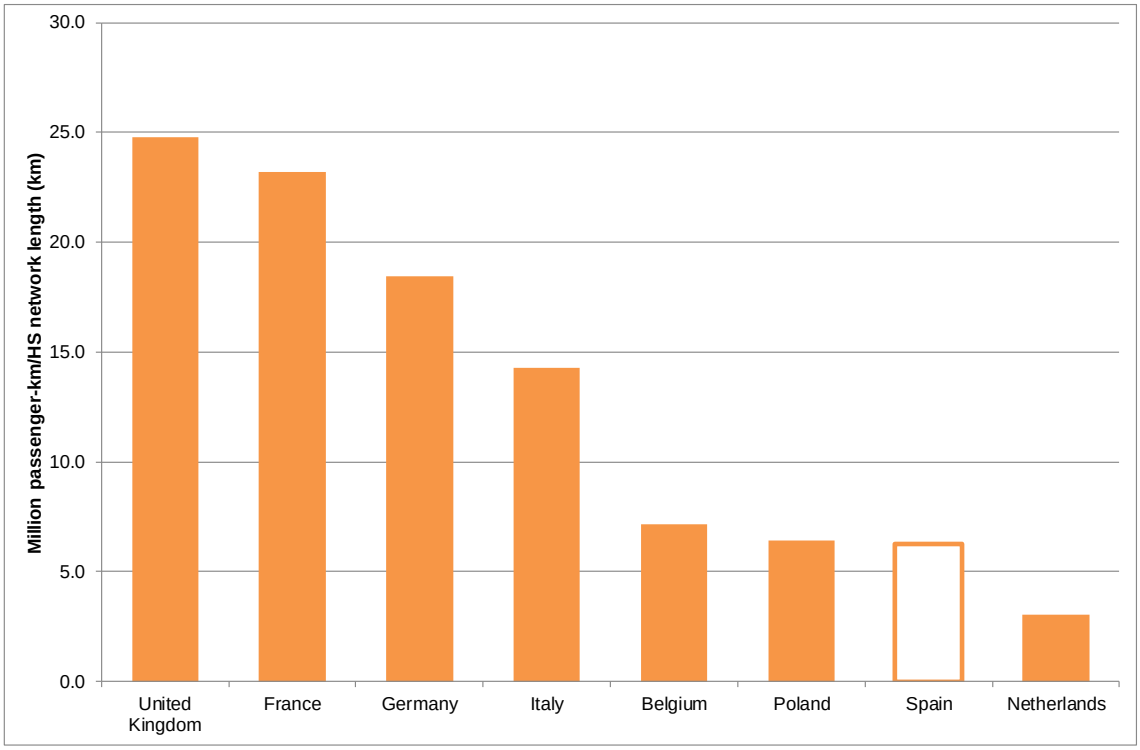
As for the high-speed network, commercial services operate over 2,655 km, the total length of high-speed infrastructure built. Spain's high-speed network is the longest in Europe, and the third longest worldwide, and it continues to expand,

[59] CNMC (2018b): INF/DTSP/173/18.

with 904 new kilometres planned for construction in the coming years[60]. This network is used by both commercial HS and LD services and by AVANT services, which are subject to PSO.

Despite the variety of services that operate in the Spanish high-speed network, its utilisation rate is substantially lower than that of other European countries. During 2016, 6.2 million passenger-kilometres were transported in Spain per kilometre of network built, which reflects a lower network utilisation rate than that of our European peers, with the exception of the Netherlands (see Figure 6).

Figure 6. Utilisation rate of the High-Speed network in Europe (2016)



Source. DG MOVE (2018) Statistical pocketbook.

A useful indicator to illustrate the low saturation of Spanish high-speed lines is the capacity utilisation rate, which relates the number of daily train movements on a section of the network compared to the maximum number of daily movements supported by the technical specifications of that section. According to the 2019 Network Statement published by ADIF AV, the capacity utilisation rate of the Spanish high-speed network is relatively low, standing at 24% in

[60] UIC (2019) High Speed Lines in the World. The length of the Spanish high-speed network is the third longest in the world, behind China and Japan.

interurban sections. By route, traffic is unevenly distributed across the infrastructure, so capacity utilisation rates range from 9% in the Albacete-Alicante route to 41% in the Madrid-Barcelona route (find a more detailed analysis in section V.1).

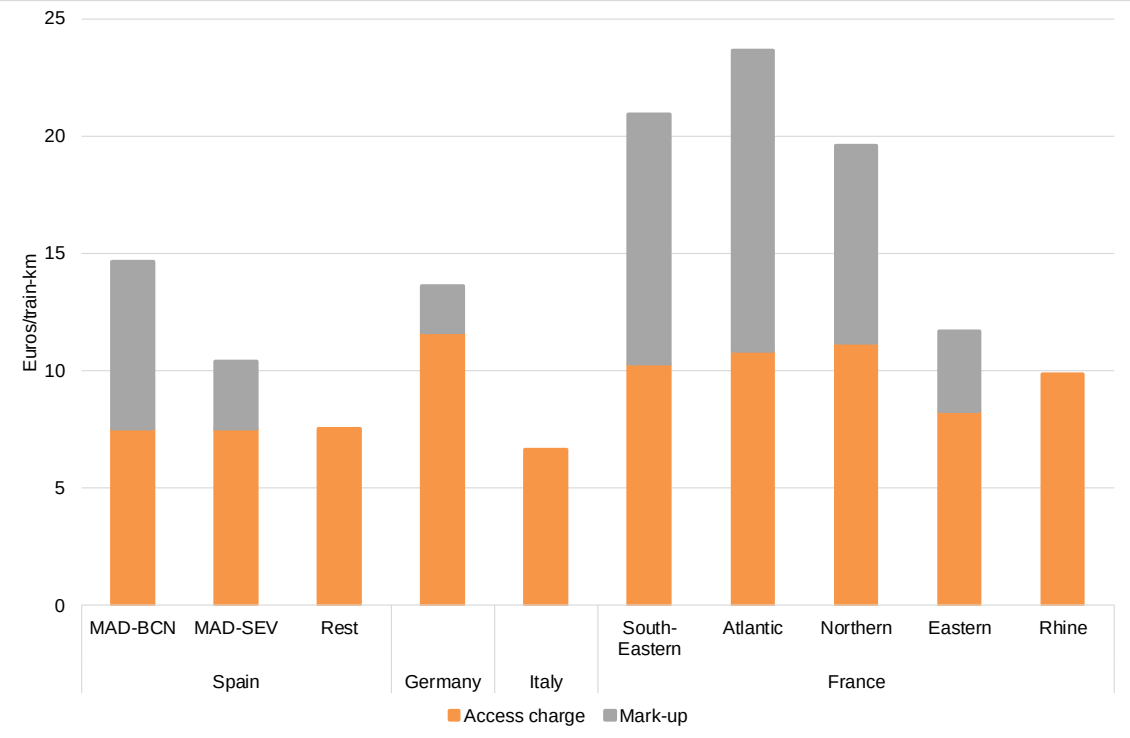
The investments undertaken for the construction of the high-speed network have substantially increased the indebtedness of the infrastructure manager, ADIF AV. Since 2012, ADIF AV has increased infrastructure access charges with the aim of generating additional revenue. Thus, access charges for commercial train-kilometres have increased by €3.33 between 2012 and 2017, up to €8.33. Consequently, revenues from infrastructure access charges have risen by 75.6%, reaching €506 million last year.

Compared to those of neighbouring countries, Spanish high-speed infrastructure access charges, including mark-ups[61], are comparable to German charges and exceed those in Italy, and are below the French, which apply a significant congestion mark-up (Figure 7)[62].

[61] Includes the Spanish mark-up to recoup costs for the financial sustainability of the infrastructure manager, the German mark-up for the prioritisation of "express" services over the rest of traffic and the French congestion mark-up.

[62] CNMC (2018b): INF/DTSP/173/18.

Figure 7. High-speed infrastructure access charges in Europe (2017)



Source. CNMC (2018b).

III.3.4. The railway operator: RENFE

Despite the growth of HS services recorded since the opening of the Madrid-Barcelona route in 2008, services operated by RENFE continued to record reduced overall occupancy and utilisation rates[63]. This led the operator to implement a price reduction for high-speed services in 2013.

The simultaneous implementation of RENFE's commercial policy and the increase in ADIF AV's infrastructure access charges led to the deterioration of RENFE's accounts. Thus, the operator recorded its lowest historical result in 2014[64], with losses in the commercial services segment amounting to €139 million.

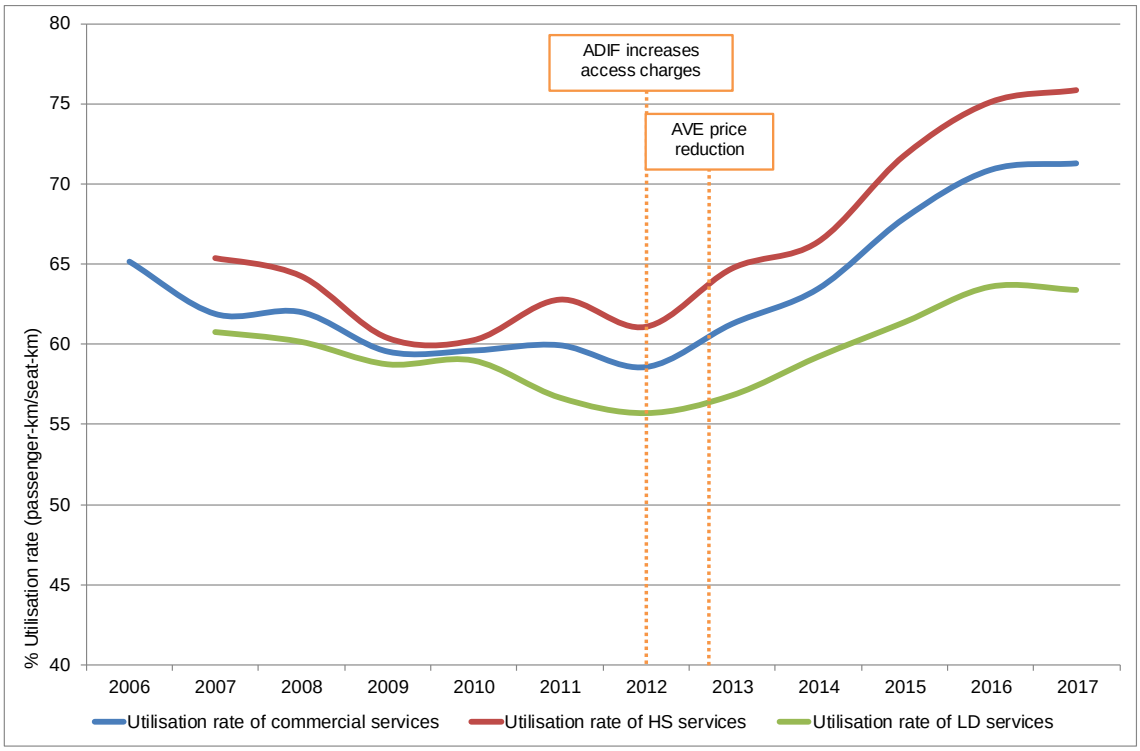
Since then, RENFE has adapted its train and seat supply policy to reduce its average costs and cover the increase in infrastructure access charges. The

[63] The occupancy rate refers to the number of passengers transported per seat, while the utilisation rate is defined as the number of passenger-kilometres over the number of supplied seat-kilometres. The latter accounts for the distance travelled by passengers, whereas the occupancy rate assumes that all passengers travel over the same distance.

[64] CNMC (2018b): INF/DTSP/173/18.

supply of seats has grown to a lesser extent than demand, leading to considerable improvements in occupancy and utilisation rates since 2015, as illustrated by Figure 8. Moreover, the operator has reduced access charges paid per seat by operating coupled trains in double composition[65], allowing it to offer a larger number of seats for each train movement[66].

Figure 8. Utilisation rate of HS and LD services



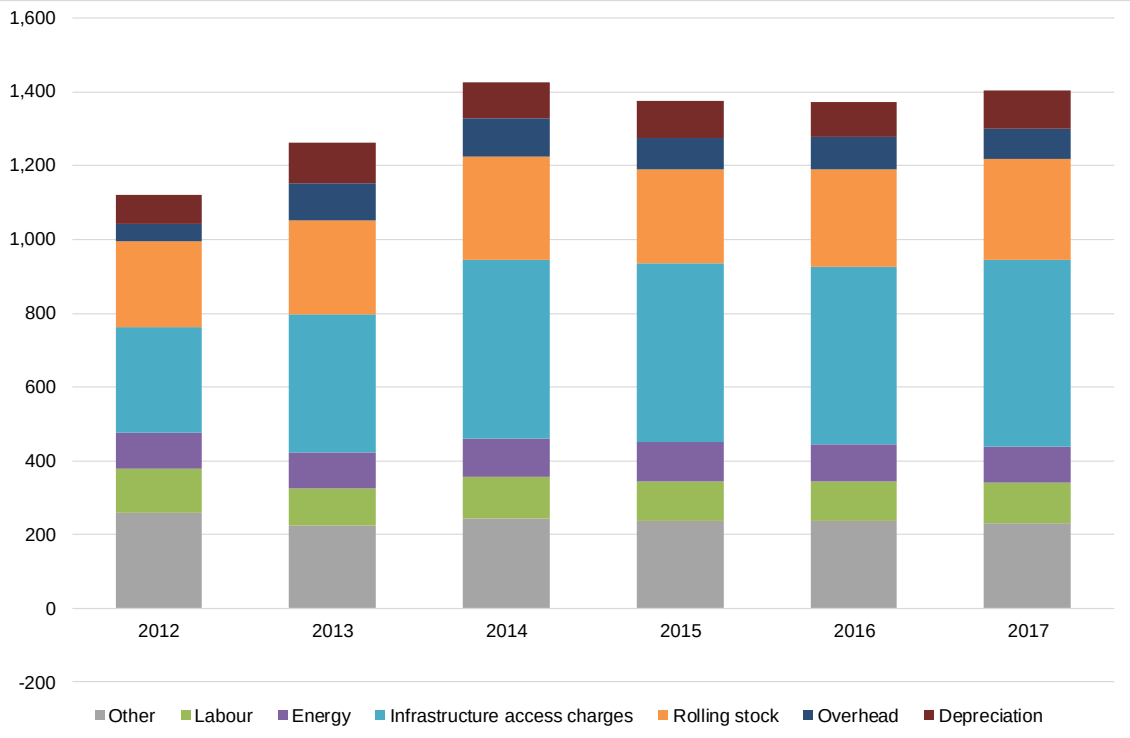
Source. Compiled by author based on data from CNMC (2018b) and the 2017 Observatory for Railway Transport in Spain.

As shown in Figure 9, RENFE's total costs increased by 25% between 2012 and 2017. During this period, infrastructure access charges increased by 75% as a result of ADIF AV's policy, accounting for 35% of the operator's total costs in 2017.

65 The double composition method allows for the coupling of two complete rolling stock units into a single train, effectively doubling the number of seats per train movement.

66 CNMC (2018b): INF/DTSP/173/18.

Figure 9. Evolution of RENFE's total costs (commercial services)



Source. CNMC (2018b).

RENFE's cost reduction efforts have translated to a fall in average costs per passenger and passenger-kilometre of 14.8% and 12% respectively between 2012 and 2017. This has contributed to the recovery of RENFE's accounts, recording a positive income statement in 2016 and 2017 (Table 6).

Table 6. Evolution of RENFE's financial position (commercial services)

€ Million	2012	2013	2014	2015	2016	2017
Revenues	1,150.5	1,199.9	1,287.8	1,366.1	1,429.5	1,491.7
Total costs	1,120.1	1,263.6	1,426.8	1,374.6	1,371.7	1,403.3
Operating income	**30.4**	**-63.8**	**-139.0**	**-8.4**	**57.8**	**88.4**

Source. Compiled by author based on RENFE's annual accounts.

IV. LESSONS FROM THE EUROPEAN EXPERIENCE

Although the liberalisation of domestic commercial passenger railway markets in the EU will not become effective until 2020, some European countries have already started the liberalisation process. According to IRG-RAIL[67], 5 European countries (Germany, Denmark, Poland, Sweden and the United Kingdom) have liberalised their domestic passenger services, both commercial and PSO, with *de facto* competition in both segments. In another group, including Austria, Slovakia, Hungary, Italy, Latvia and the Czech Republic, commercial services have been liberalised and effective competition exists. Nevertheless, a significant number of European countries, including Spain, Finland and France, have still not liberalised their domestic railway passenger transport services.

Table 7. Liberalisation of domestic passenger services by rail in the EU

Service type	*De jure* liberalisation	*De facto* liberalisation	Not liberalised
Commercial services	Bulgaria, Estonia, Lithuania, Luxembourg, Romania	Austria, Czech Republic, Denmark, Germany, Hungary, Italia, Latvia, Poland, Slovakia, Sweden, United Kingdom	Belgium, Croatia, Finland, France, Greece, Macedonia, Netherlands, Norway, Portugal, Slovenia, Spain, Switzerland
PSO services	Bulgaria, Estonia, Italy, Netherlands, Switzerland	Germany, Denmark, Norway, Poland, Portugal, Sweden, United Kingdom	Austria, Belgium, Croatia, Finland, France, Greece, Hungary, Latvia, Lithuania, Luxembourg, Macedonia, Romania, Slovakia, Slovenia, Spain

Source. Compiled by author based on data from IRG-RAIL 6th Marketing Monitoring Report (March 2018) and the European Commission's Sixth report on monitoring development of the rail market.

Note: no data available for PSO services in Czech Republic. *De jure* liberalisation is considered to exist when legislation allows open access of rail operators into the domestic market, while *de facto* liberalisation refers to the situation where at least one new operator has effectively entered the domestic market.

The European experience offers some conclusions regarding the effects of opening passenger railway markets to competition.

[67] See 6th *Market Monitoring Report* (March 2018). https://www.irg-rail.eu/irg/documents/market-monitoring/186,2018.html.

Appendix I of the Study includes a detailed description of the different liberalisation processes implemented by European countries and their effects on the structure of the market.

IV.1. Effects of liberalisation in the European context

The liberalisation of domestic passenger services has affected several aspects of the market that are analysed below.

IV.1.1. Demand for rail services

The liberalisation of railway passenger transport has increased demand significantly, regardless of which competition model was adopted: competition *in* the market, competition *for* the market or a mixed system (the latter is the Spanish case, where commercial services will be open to competition in the market, whereas PSO services will be subject to exclusive concessions).

Several countries with **competition in the market** report increases in the number of passengers. Between 2012 and 2015 the number of passengers have risen in Czech Republic (from 3.6 million to 6.9 million, +91%), Italy (+65%) and Austria (+25%)[68].

Countries with **competition for the market** also report demand increases. In the United Kingdom the franchise system contributed to reverse the stagnation of the modal share of railway transport. After its introduction, passenger-kilometres recorded a cumulative increase of 85% between 1998 and 2015[69].

A similar situation arose in Germany after introducing competitive tendering for regional PSO services. Thus, passenger-kilometres rose by 48% between 1996 and 2014[70]. In contrast, commercial services recorded a slowdown during the same period. As described in Appendix I, although competition in the market for commercial services is possible, several market factors hinder *de facto* entry, so long-distance services have token competition (less than 1%)[71].

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68 Finger et al. (2016).

69 Smith (2016).

70 Link (2016).

71 BnetzA (2018), page 22. Available on:

https://www.bundesnetzagentur.de/SharedDocs/Downloads/EN/BNetzA/PressSection/ReportsPublications/2018/GermanMarketAnalysisRailway2018.pdf;jsessionid=1CC0A9F05D4442D4CBCAB10A1ED69BD5?__blob=publicationFile&v=3.

In short, the liberalisation of national rail transport services has led to a significant increase in demand, regardless of how competition is introduced in the market.

IV.1.2. Railway activity and infrastructure managers

Liberalisation has also increased activity in the railway network in terms of train-kilometres in circulation. This result can be observed in both countries with competition in the market and those with competition for the market.

With regard to countries with **competition in the market**, competition from new operators has significantly improved frequencies in the serviced routes. In Italy, the alternative operator, NTV, has launched new connections, gaining a share of 26% of the domestic market in 2016. This trend can also be seen in Austria, where the entry of WestBahn, the alternative operator, has increased frequencies in the Salzburg-Vienna corridor, and the Czech Republic, where competition has led to very significant frequency increases on the Prague-Ostrava line[72].

In the case of countries with **competition for the market**, the introduction of competitive tendering procedures has increased railway activity (measured in train-kilometres), as shown in the following table:

Table 8. Increase of train-kilometres in countries with competitive tendering

Germany	United Kingdom	Sweden
+20% between 1996 and 2014	+30% between 1998 and 2016	+53% between 1990 and 2014

Source. Nash et al. (2016).

In conclusion, the rise in demand observed after the liberalisation of passenger railway markets has in turn translated into an increase in railway activity, in terms of train-kilometres. This has had a positive impact on the activity and income of infrastructure managers.

IV.1.3. Prices of rail services

The liberalisation of the markets has led to a reduction in prices for end users. In the railway sector, it is also necessary to take into account the evolution of the

[72] Finger et al. (2016).

cost of PSO services to public authorities, given that governments subsidise an important part of the service.

In countries with **competition in the market**, the entry of new operators has induced a substantial reduction in fares for end users, which, depending on the country and the market's initial conditions, has exceeded 40%[73]. These operators have also introduced innovations to the pricing structure, such as greater segmentation by class of seating or introducing loyalty programmes.

The **competitive allocation of PSO services** has led to a cost reduction for the authorities. In the case of Germany, competitive tendering has resulted in savings of between 15% and 26% depending on the region. Public subsidies to PSO services have also decreased in Sweden and, to a lesser extent, the United Kingdom after the introduction of tendering procedures[74].

In this way, the liberalisation of the market has reduced fares for end user, as well as the cost of financing PSO services.

The question of whether liberalisation has led to a more efficient provision of services is still subject to debate in the economic literature. Some authors[75] note that price reductions have been more intense than efficiency gains, worsening the long-term financial sustainability of the system.

However, NTV in Italy and Regio in the Czech Republic recorded profits in 2015[76], indicating that they are able to operate profitably with the aforementioned pricing system. The English CMA estimates that the costs of alternative rail operators are 29% lower than those of franchised companies, essentially due to lower staff costs (between 6% and 18%) and other aspects such as the marketing of services[77]. Moreover, in countries where these services have been liberalised, there is a tendency for operators to reduce the cost of providing the service. This is the case in Italy, where the incumbent has reached an agreement with its driving staff aimed at improving their productivity[78].

[73] This has been the case in Italy and Austria between 2012 and 2015 (Finger et al. (2016), page 6). See Appendix 1.

[74] Nash et al. (2016).

[75] Finger et al. (2016).

[76] Desmaris (2016).

[77] CMA (2016).

[78] Desmaris (2016).

IV.1.4. Quality of rail services

Finally, the introduction of competition in railway services has improved service quality in different ways for both types of competition. For example, in Germany, the average age of the rolling stock fell from 17.3 to 7.5 years as a consequence of competitive tendering[79]. In Italy, the new operator introduced new services such as free Wi-Fi access and multimedia services[80]. In the United Kingdom, the quality indicators published by the independent regulator suggest an improvement in quality after tendering PSO services[81].

Rail operators have also expanded the variety of services offered from a multimodal perspective. Such is the case of Italy where the alternative operator founded a coach company to offer door-to-door transportation, a strategy that was subsequently implemented by the incumbent operator.

In conclusion, there is significant consensus that liberalisation has benefitted consumers, by reducing prices and improving the frequency and quality of services. This has significantly increased demand and the utilisation of the rail infrastructure.

IV.2. Main risks and obstacles to effective liberalisation

The analysis of European experiences allows the identification of the main obstacles faced by potential entrants when accessing domestic passenger railway markets.

IV.2.1. Capacity in the railway network

The provision of rail services requires train paths that allow trains to travel between two points connected by the railway network. This raises specific problems in terms of market entry.

Firstly, entry is not possible if there is **insufficient capacity** for a potential entrant to achieve a minimum scale. This is the problem noted in the United Kingdom and Germany. In these cases, entry possibilities are severely restricted by the congestion of the rail network, as well as by the coexistence of commercial services, including HS ones, with PSO services over the same network. In contrast, in countries where the high-speed network is not used for other rail

79 Link (2016).

80 Desmaris (2016).

81 Nash et al. (2016).

services (suburban or regional), such as in Italy, capacity has not proved to be a barrier to entry.

Secondly, the **allocation of capacity** is an essential function of infrastructure managers, which needs to be performed in a neutral manner according to the regulatory framework. However, in a large number of cases discriminatory behaviour aimed at favouring the incumbent has been identified, in both passenger and freight markets:

- In the freight transport market, in both France[82] and Lithuania[83] the infrastructure manager has been sanctioned for its lack of independence and behaviour aimed at blocking the entry of competitors.
- In commercial passenger services, the infrastructure managers of Austria[84] and Italy[85] have also been accused of delaying entry into the market.

IV.2.2. Railway infrastructure access charges

Infrastructure access charges pose barriers to the entry of new operators. These charges may represent from 30% to 40% of total operating costs, particularly in the case of HS services. In Italy, a reduction of more than 30% of infrastructure access charges imposed by the railway regulator changed the dynamic of the market[86].

IV.2.3. Access to rail facilities

Passenger stations are part of the infrastructure that new alternative operators must have access to in order to provide transport services. This includes the provision of space to run their commercial activities or to differentiate their products from those of their competitors.

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82 Decision of the French Competition Authority No. 12-D-25, of 18 November 2012.

83 Decision of the European Commission No. AT.39.813 – Baltic Rail (2017).

84 The entry of WestBahn, an alternative operator, in Austria was delayed for almost three years, which led to complaints about ÖBB, a holding company comprised of the infrastructure manager and the incumbent rail service operator.

85 In Italy, NTV, the entrant operator, reported that the infrastructure manager (RFI) shared commercial information with TrenItalia, the incumbent and part of the same business group, regarding new routes that it intended to create.

86 Casullo (2016) and Desmaris (2016). See Appendix 1.

The Italian case is of special relevance to this matter, as the railway regulator (ART) intervened to safeguard NTV's access to the stations managed by the infrastructure manager (RFI), including the provision of spaces in station lobbies for the placement of ticket machines or VIP lounges[87].

Other important facilities are maintenance facilities for the rolling stock. NTV had to make an investment of approximately €90 million to build its own maintenance depots for its trains[88].

IV.2.4. Access to essential assets for the provision of services

Engine drivers and rolling stock are two inputs that are necessary for the provision of railway transport services. The lack of drivers is especially important in the case of passenger transport, where a higher sensitivity to punctuality and the reliability of services might result in high reputational and financial costs.

Rolling stock can also pose a significant barrier to entry, due to its high sunk costs, and for the time required to receive the authorisation to place it in service. European comparisons show that high-speed trains cost between €20 and €30 million per train. They could be even more expensive in Spain, as a result of the different signalling technologies present in the network, which require rolling stock to be interoperable within the different systems (ASFA, LZB, ERTMS, levels 1, 2 or both, etc.).

The high costs and time involved in obtaining new rolling stock imply a long time horizon for the manufacture and authorisation for entry into service by safety agencies. In the case of NTV, this process lasted more than 3 years[89].

IV.2.5. Provision of loss-making rail services

The provision of commercial rail services under a monopoly allows the monopolist to finance non-profitable connections with profit-making ones (cross-subsidies). The entry of alternative operators in the most profitable routes served by the incumbent reduces the margin to finance loss-making routes.

In Italy, TrenItalia (the incumbent) discontinued its unprofitable services once the market was opened to competition. Although NTV (entrant) initially covered some of the lines with lower demand it later abandoned this strategy, concentrating its

87 Desmaris (2016).

88 International Railway Journal, 14 December 2011.

89 Desmaris (2016).

resources on those with higher demand. Finally, the Italian government extended the PSO services to include some long-distance connections.

IV.2.6. Position of the incumbent

The alternative operators must compete with the incumbent, which has certain advantages derived from its presence in the market, its information on end customers, as well as its position in adjacent markets, such as the market for maintenance services. On certain occasions, the incumbent operator might also retain regulatory advantages that must be eliminated to safeguard competition.

V. CHALLENGES AND OBSTACLES FOR LIBERALISATION IN SPAIN

The opening up of rail passenger transport to competition in Spain is imminent, particularly for commercial services.

Commercial rail passenger transport services (not subject to PSO), as outlined above, will be liberalised in the working timetable that begins on 14 December 2020 and the provision of these services will be carried out in the market on a competitive basis.

In the case of PSO services, the European regulation establishes the opening up of these services from 2023[90], and the provision of the service of each line or set of lines will be awarded through a public tender to a sole operator, for a limited time, as a monopoly. In Spain, the tendering of PSO services is expected to be delayed until at least 2027 due to the recent direct awarding of the provision of these services to RENFE until that date[91].

The Spanish railway system has certain specific features that may favour liberalisation. Specifically, the unused capacity in the network and the limited overlap between the network that serves commercial services and those subject to PSO facilitate the entry of competitors. The liberalisation experiences in different countries, described in section IV of the Study, show that an opening up to competition has had the greatest impact in those countries where the rail network had excess capacity before liberalisation, specifically in countries where the high-speed network is a dedicated network not sharing sections with other PSO services.

However, there are also challenges and obstacles to achieve effective competition in the various activities involved in rail passenger transport.

Firstly, as indicated in section III, a vertical separation of activities model has been chosen in Spain that involves the structural separation of the infrastructure manager and the rail operators, in order to facilitate access to the rail network by operators. However, certain features of the rail infrastructure and the regulation of access to it may pose a significant barrier to entry for new operators and must be taken into account.

In addition to accessing the infrastructure, the provision of the transport service requires rail operators to have access to three types of productive factor: rolling

[90] Point 9 of article 1 of Regulation 2016/2338, of the European Parliament and of the Council, concerning the opening of the market for domestic passenger transport services by rail, establishes the obligation to award PSO contracts through a competitive procedure from 25 December 2023.

[91] Cabinet Agreement dated 14 December 2018.

stock, maintenance and drivers. In particular, the related markets for the rental and manufacturing of rolling stock and its maintenance have certain features that may prevent new entrants from providing the service under the same conditions as RENFE, the incumbent operator in the Spanish market.

Finally, there is a series of important conditions for the effective liberalisation of commercial services, resulting from the incumbent providing these services for a long period of time, as well as RENFE being part of the Ministry of Public Works. These factors generate important asymmetries between the incumbent and new operators, which may limit market entry. The coexistence of liberalised commercial services and PSO services provided under a monopoly regime during the first few years of the liberalisation may also cause significant distortions in competition in the first market.

All of these aspects are analysed below in more detail.

V.1. Railway infrastructure

Railway infrastructure consists of all main lines and sidings within the Public Railway Network (known by its acronym in Spanish, RFIG), as well as passenger transport stations, freight transport terminals and other service facilities.

As in other network industries, the characteristics of the railway infrastructure play an important role in determining the costs of entry into the market and the presence of economies of scale, shaping the behaviour of operators in a competitive environment. This section studies the technical and structural restrictions that could limit effective competition in the market.

V.1.1. Technical specifications of the lines

Certain technical characteristics of the Spanish railway infrastructure hinder the interoperability of passenger transport services, conditioning the dynamics of competition between market operators.

The Spanish Public Railway Network is comprised of two networks with different technical characteristics, namely the Iberian conventional network and the high-speed network. The conventional network has an Iberian-gauge (1,668 mm), whereas the high-speed network was built using an international gauge (1,435 mm). Moreover, the electrical voltage is different for the two networks (25 kV on the high-speed network compared to 3 kV on the conventional network), and the

signalling systems are also different (ERMTS or ASFA, although other systems are also present[92])[93].

This diversity of technical specifications may hinder entry by limiting the interoperability of rolling stock and the size of the scale economies attainable with it. Moreover, it aggravates the incidence of other barriers to market entry, reducing the available supply of rolling stock manufacturers and increasing maintenance costs, as will be analysed in later sections. The structural nature of these limitations offers few practical solutions, which highlights the need to address the other restrictions identified in this document.

V.1.2. Capacity of the railway lines

The international experience analysed in section IV of the Study shows that competition for new services may be limited by the lack of capacity on railway lines. The provision of rail services requires the allocation of paths that allow trains to travel between two points connected by the network. This limitation poses specific challenges in terms of market entry, which will not take place if there is not enough capacity for a potential entrant to achieve a minimum scale that allows for the recovery of its sunk costs.

The experiences of the United Kingdom and Germany illustrate this issue. In these countries, entry possibilities are severely restricted by the saturation of the rail network, as well as by the coexistence of commercial and PSO services over the same network. In contrast, in countries where the high-speed network is not used for other rail services (suburban or regional), such as in Italy, capacity has not proved to be an entry barrier.

As outlined in section III of the report, Spanish lines present no congestion problems, as their utilisation rate is below the European average[94]. In accordance with the information provided by ADIF and ADIF AV on their main lines[95], only

[92] Specifically, the LZB system is present in the high-speed Madrid-Seville route, requiring the installation of modules on the rolling stock to convert the signal to the European system ERTMS (ADIF).

[93] CNMC (2018c): INF/DTSP/041/18 and Network Statement of ADIF and ADIF AV 2019.

[94] DG MOVE (2018): Statistical Pocketbook and "European Commission's Sixth report on monitoring development of the rail market".

[95] ADIF and ADIF AV. 2019 Network Statement.

24% of the capacity available on high-speed routes and 28% of the capacity on other intercity routes is being used[96].

Capacity utilisation rates are unevenly distributed across the different railway axes that comprise the RFIG, although they do not reach 50% in any of the axes (Table 9). In high-speed lines, the Madrid-León and Madrid-Barcelona axes record the largest number of train movements with respect to the infrastructure maximum, whereas the Medina-Zamora and Orense-Santiago de Compostela axes are less intensively used. As for other long-distance lines, the Olmedo-Santiago de Compostela axis stands out compared to the relatively lower utilisation of the Madrid-Barcelona axis.

Table 9. Capacity utilisation rates in the main railway axes

AXES	CAPACITY UTILISATION RATE			NETWORK KILOMETRES		
	HS*	Other intercity lines**	Total	HS*	Other intercity lines**	Total
Axis 01 Madrid Chamartin - Irun / Hendaya		29.2%	29.2%		1,403	1,403
Axis 02 Madrid Chamartin - Zaragoza - Lleida - Barcelona - Portbou / Cerbere		26.0%	26.0%		484	484
Axis 03 Madrid Chamartin - Valencia - San Vicente de Calders		33.6%	33.6%		663	663
Axis 04 Alcazar de San Juan - Cordoba - Sevilla - Cadiz		23.9%	23.9%		1,645	1,645
Axis 05 Madrid Atocha - Caceres - Valencia de Alcantara		40.8%	40.8%		500	500
Axis 06 Venta de Baños - Leon - Ourense - Vigo		26.1%	26.1%		1,724	1,724
Axis 11 Madrid Chamartin - Valladolid - Palencia - Leon	37.9%	39.0%	38.1%	217	128	345
Axis 12 Madrid Atocha - Barcelona - Frontera Francia	37.8%	10.7%	34.7%	795	79	874
Axis 13 Madrid Atocha - Levante	15.9%		15.9%	600		600
Axis 14 Madrid Atocha - Toledo / Sevilla Santa Justa / Malaga Maria Zambrano	20.4%		20.4%	647		647
Axis 16 Olmedo - Medina - Zamora - Ourense - Santiago de Compostela	12.2%	48.5%	17.8%	84	99	183
Total Axes	**23.7%**	**28.2%**	**26.8%**	**2,342**	**6,724**	**9,066**

Source. Network Statement of ADIF and ADIF AV 2019. Data from June 2018.

Notes: *High-speed refers to lines allowing maximum speeds greater than 200 kilometres/hour along 2/3 of their length. **Other intercity lines used mainly by passenger services.

There are several factors to take into account when assessing the current low congestion of Spanish railways:

[96] The capacity utilisation rate relates the number of daily train movements on a section of the network compared to the maximum number of daily movements supported by the technical specifications of that section.

- Firstly, the recent construction of the network partially explains the existence of excess installed capacity. As previously indicated by the CNMC[97], given the long useful life and high construction costs of the network, *"it is foreseeable that during the early years of operation its use will be lower than the traffic for which it has been designed"*.
- Moreover, the information provided by the infrastructure manager refers to the daily capacity of the lines, concealing hourly variations in capacity utilisation, which could be much higher during peak hours.
- Finally, the low congestion of the lines reflects the existence of bottlenecks in other points of the network, especially in platforms and holding tracks of the main passenger stations, which impede more frequent train movements in the rest of the infrastructure.

In any case, the low capacity utilisation of the network does not exclude its inefficient use by the service operator. It is possible that the coexistence of excess capacity in the infrastructure, and its exclusive utilisation by a single operator have given rise to suboptimal operational dynamics:

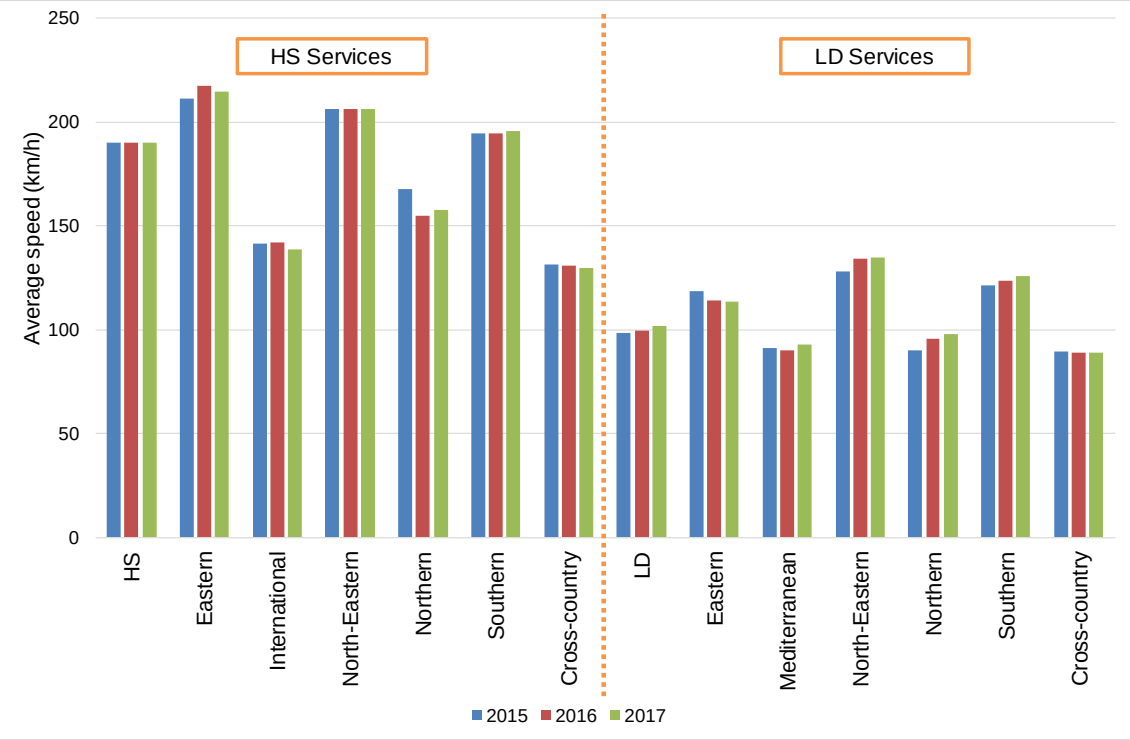
- As stated by the European Court of Auditors[98], operating speeds far below the ones for which the infrastructure was designed not only constitute an inefficient use of resources, but also reduce available capacity in the lines further[99]. Thus, whilst some high-speed corridors show average operating speeds close to 200 km/h (East, North-east and South), Cross-country, International and Northern corridors record average speeds ranging between 130 km/h and 160 km/h, closer to those of LD services (Figure 10).

97 CNMC (2018b): INF/DTSP/173/18.

98 European Court of Auditors (2018).

99 Slower speeds require the allocation of train paths for longer periods, which impedes their allocation to other trains.

Figure 10. Average speed (km/h) of the main railway corridors



Source. Compiled by author based on data from CNMC (2018b) and Renfe.

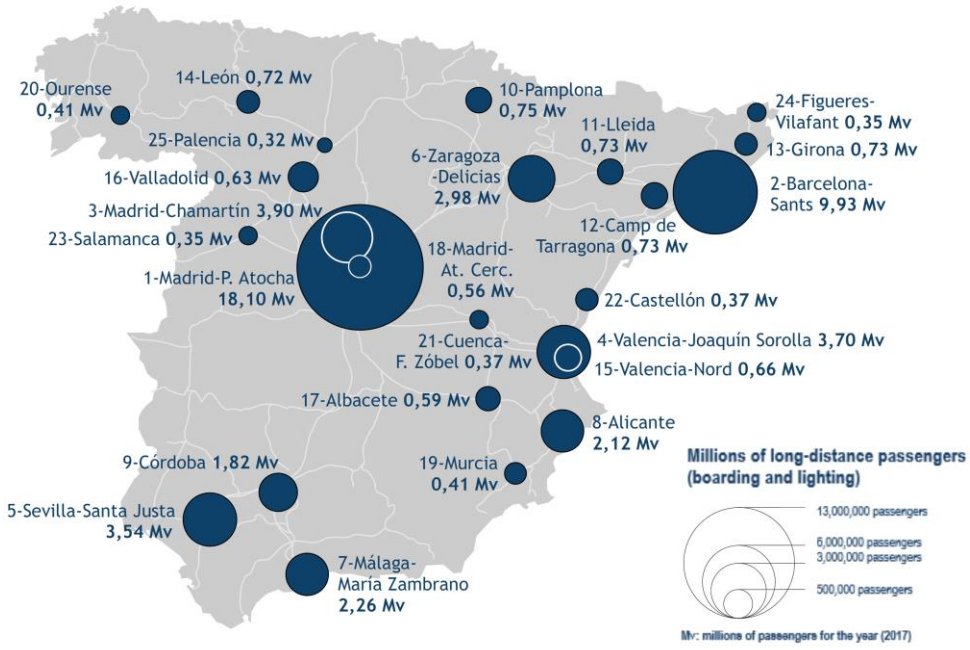
- Moreover, as evidenced by the international experiences previously described, the coexistence of different types of service over the same network, with differing frequencies, speeds, journey lengths and numbers of stops, could generate bottlenecks in certain segments, impeding the use of the network as a whole. This is especially relevant in the case of Spanish high-speed lines which are used by HS services, LD services and AVANT services. Proper management of rail traffic by the infrastructure manager requires capacity to be allocated according to criteria that take into account the different use each service makes of the network, in such a way that maximises overall capacity. Section V.2 offers a detailed analysis of the capacity allocation criteria.

V.1.3. Capacity of the terminals

The CNMC has outlined the strategic importance of access to railway stations[100] as physical locations where commercial operators provide their retail services. The lack of available capacity in passenger platforms generates a bottleneck that restricts the use of the rest of the network.

There are almost 1,500 passenger stations in the Spanish railway network, of which around 30 are considered to be of special strategic importance, as they exceed 300,000 passengers per year, which represents 90% of all passengers of commercial services[101]. In 2017, the stations that accounted for the highest number of commercial passengers boarded and alighted were Madrid-Puerta de Atocha (18.1 million passengers); Barcelona-Sants (9.9); Madrid-Chamartín (3.9); Valencia-Joaquín Sorolla (3.7) and Seville-Santa Justa (3.5), as shown in Figure 11.

Figure 11. LD and HS commercial passengers by station in 2017



Source. Ministry of Public Works. 2017 Observatory for Railway Transport in Spain.

[100] CNMC (2019a): "Resolution laying down principles and criteria for the application of the Implementation Regulation 2017/2177 of the European Commission on access to service facilities and rail-related services" (STP/DTSP/118/18).

[101] CNMC (2019a): STP/DTSP/118/18.

The congestion of the main stations could encourage a greater use of secondary stations by railway operators, as shown in previous experiences of the air sector and the French railway operator[102].

However, this strategy is limited by the availability of high-speed connections and alternative lines between destinations. Several construction projects are currently being undertaken to divert high-speed traffic from the main stations to less congested ones. Examples of these efforts are the new high-speed section that will connect the lines on the Northern corridor with those on the South and Eastern Corridor at Chamartin station, and the construction of a new station (La Sagrera[103]) for HS, LD and PSO services. Moreover, works to expand the capacity of passenger stations are projected for Puerta de Atocha, Chamartín and Sants[104]. The completion of these projects will enable higher frequencies of train movements and a more efficient use of the railway network.

For an effective liberalisation of commercial passenger services, the infrastructure manager must ensure an efficient management of traffic in stations and guarantee non-discriminatory access to them. This obligation extends not only to lines, but also to the provision of spaces in the stations for the location of commercial or ticketing services, or automatic ticket machines.

V.2. Access to the infrastructure

This section identifies the potential issues regarding access to the infrastructure by railway operators, including all main lines and sidings, as well as passenger stations.

V.2.1. Allocation of capacity in the infrastructure

As stated in section V.1, the capacity of the rail infrastructure poses a structural limit to the maximum number train movements permitted. For this reason, the regulation establishes a series of procedures to safeguard access to the

[102] Chiambaretto and Fernandez (2014).

[103] Network Statement of ADIF High Speed, 2019. See section 3.8.1. “Planned Actions”.

[104] CNMC (2018d): “Agreement issuing a report on ADIF and ADIF AV 2019 Network Statements” (STP/DTSP/119/18).

infrastructure by operators in a non-discriminatory manner, and establishes the infrastructure manager[105] as the entity responsible for facilitating this access[106].

Ordinary capacity allocation procedure

The allocation of the different train paths to passenger transport operators is performed in accordance with the capacity allocation procedure described by ADIF and ADIF AV in their respective Network Statements. A Network Statement is a document informing rail operators of the specifications of the available infrastructure and service facilities, and of their access conditions, enabling them to plan their services.

Train paths are allocated either through an annual prior reservation procedure for the next working timetable[107], or through *ad hoc* allocation on a date close to the departure of the train[108]. The manager will accept operator requests if there is available capacity and will initiate a procedure for coordinating conflicting requests. In this latter case, the manager will try to accommodate all requests.

When it is impossible to satisfy requests for infrastructure capacity after the coordination procedure, the infrastructure manager must declare the infrastructure to be congested[109], employing a set of alternative criteria for capacity allocation[110], which it can modulate to provide access to all applicants[111].

In the event of congestion, regulation prioritises traffic on specialised lines, which are those lines where the manager has previously declared a preference for a specific type of traffic in certain time periods. The manager can use this procedure to prioritise LD or HS traffic over their respective train paths, preventing bottlenecks. After the specialised lines, preference is given to public interest services, international services and capacity allocated in framework agreements.

[105] Infrastructure managers comprise the Spanish railway infrastructure managers (ADIF and ADIF AV), the companies to which they delegate their responsibilities under article 21.2 of Act 38/2015, on the Railway Sector, and operators of the service facilities.

[106] Article 20.1 of Act 38/2015 on the Railway Sector.

[107] The working timetable covers the period from the second Sunday in December of one year to the second Saturday in December of the following year. As a result, the liberalisation of commercial services is foreseen for the working timetable that begins on 14 December 2020.

[108] CNMC (2019a): STP/DTSP/118/18.

[109] Article 17 of Order FOM/897/2005.

[110] Criteria contained in article 11 c) of Order FOM/897/2005.

[111] Article 17.3 of Order FOM/897/2005.

After liberalisation, frictions may arise regarding access by new operators to certain sections of the network, passenger stations or service facilities during times of peak demand. The capacity allocation procedure, and especially the criteria that will govern the coordination procedure, must guarantee transparent, objective and non-discriminatory access by new entrants to the infrastructure, promoting alternatives that allow the coexistence of different candidates over the infrastructure for the times and infrastructures with the highest demand.

The infrastructure managers must also establish a regulated coordination procedure, to determine the information to be exchanged between the participants and limit potential conflicts in the allocation of train paths, complying with the confidentiality requirements set forth in the regulatory framework. In this regard, it is worth recalling the specific responsibility of the CNMC to monitor and control the activity of infrastructure managers in relation to the Network Statement and the capacity allocation criteria[112].

Capacity allocation framework agreements

In addition to the annual capacity allocation procedure, the regulation[113] allows managers and applicants to conclude agreements regarding the use of capacity for a period exceeding the duration of the working timetable. Although these agreements are not allowed to specify the train path assigned to operators, a guaranteed number of train paths and reference time slots may be established.

New operators must undertake substantial investment in facilities and rolling stock, which require additional instruments to guarantee the availability of capacity in the network in the long-term. Framework agreements between the infrastructure manager and operators constitute an ideal tool for reducing the uncertainty faced by operators in their investment decisions, encouraging entry into the market.

However, the presence of these agreements entails certain risks, as, by assigning part of the capacity to an operator in the long term, they reduce the capacity available for other new operators for the duration of the agreement. In Spain, the possible use of these agreements by the incumbent operator to limit competition from other operators in the liberalised market should be monitored. Infrastructure managers should strike a balance between guaranteeing a minimum capacity for the investor to enter the market, while maximising the number of different railway

[112] Article 11.2.a) of Act 3/2013 on the creation of the CNMC and article 32.4 of Act 38/2014 on the Railway Sector.

[113] Article 38.3 of Act 38/2015 on the Railway Sector and article 13 of Order FOM/897/2005.

operators. For this purpose, “different” operators are those which do not form part of the same business group and whose shareholders do not hold controlling stakes or exert decisive influence in other applicants.

Similarly, the duration of the agreement should be proportional to the scale of the investment that justifies it. The regulation establishes a general duration of five years, which can be extended if justified by the existence of commercial contracts, specialised investments or risks. Exceptionally, a duration of over fifteen years is permissible when the agreement involves large-scale, long-term investment, and when such investment is covered by contractual commitments including a multiannual amortisation plan.

From all of the above follows the need to monitor the preparation and implementation of framework agreements to avoid any possible negative effects arising from them. It is worth outlining the power that CNMC has the power to approve framework agreements prior to their adoption by the infrastructure manager[114]. This power is in addition to the general power of the CNMC, as a sector regulator, to monitor the activity of the infrastructure manager in relation to infrastructure access, the allocation procedure and its results, as well as to resolve any disputes that arise between operators and the infrastructure manager regarding these matters.

V.2.2. Railway infrastructure access charges

In Spain, the railway infrastructure manager (ADIF) is the body responsible for the determination, review and collection of infrastructure access charges, in accordance with the applicable legal and regulatory system[115].

The LSF[116] determines that infrastructure access charges will respect some general principles, taking into account aspects such as the degree of congestion of the infrastructure and its proper functioning, the promotion of new rail transport services, as well as the need to encourage the use of underused lines, guaranteeing, in any case, optimal competition between rail operators.

[114] The Railway Regulation Committee has this power according to article 13.3 of Order FOM/897/2005, and now it is the CNMC´s by virtue of the second additional provision of Act 3/2013 on the creation of this body. Furthermore, Implementation Regulation 2016/545 of the Commission attributes to the CNMC other supervisory functions in the procedure for concluding framework agreements.

[115] Article 23.1.k of Act 38/2015 on the Railway Sector.

[116] Article 96 of Act 38/2015 on the Railway Sector.

Directive 2001/14/EC[117] determines that charging systems (or infrastructure access charges) must allow equal access without discrimination to all companies and must provide incentives for the railway infrastructure managers to optimise its use.

In Spain, infrastructure access charges are taxes. According to national legislation, the taxable event of these taxes is the private use of the public railway domain[118]. Thus, the essential elements of the infrastructure access charges are established by law (specifically, in the General State Budget Act)[119].

The nature of infrastructure access charges as taxes is an obstacle for ADIF duties, such as the optimisation of the use of the railway infrastructure through the tariff system, since the determination of infrastructure access charges is limited to calculating the amount of the fee in each specific case under a pre-determined formula. Therefore, the current charges setting system prevents ADIF from having the flexibility required for optimal infrastructure management.

The charges setting system is essential for the liberalisation of rail passenger transport, given its importance in total costs of the provision of commercial services[120]. For this reason, infrastructure access charges may impose a barrier to entry for operators. Moreover, this system should also be predictable so that rail operators can make their investment decisions.

However, the fact that any review of infrastructure access charges must be included in the State Budget Act[121], due to their nature of taxes, implies that, as outlined by the CNMC[122]: *"the periods for prior publication are not effective in providing certainty regarding their evolution. Thus, this procedure creates*

[117] Considering 11 of Directive 2001/14/EC.

[118] Article 97.5 of Railway Sector Act 38/2015 establishes, for the charge for using the railway lines of the RFIG, that the net tax payable is calculated by means of applying the amount determined in the State Budget Act to the taxable base for each type of charge per train-kilometre, depending on the line type, service type and traction type.

[119] A Ministerial Order established infrastructure access charges until 2013. The CJEU ruling of 28 February 2013, Case C483/10 Commission vs. Spain determines that charges cannot be set by applying a formula established in a Ministerial Order because this fact deprives ADIF of the independence of infrastructure management, given that the body setting the charges must be independent from the regulatory body, the Ministry of Public Works. Since this ruling, charges have been determined in the State Budget Act in each year.

[120] Access charges accounted for 36% of the total costs of RENFE's commercial services in 2017 (CNMC (2018b)).

[121] Article 100.2 of Act 38/2015 on the Railway Sector.

[122] CNMC (2017), "Agreement for issuing a report on the Draft Royal Decree, modifying the Railway Sector Regulation, approved by Royal Decree 2387/2004, of 30 December (IPN/CNMC/037/17)"

uncertainty for rail operators and candidates about the level of infrastructure access charges and this does not correspond to the European framework".

Directive 2012/34/EU reinforces the role of independent regulatory bodies by giving them the power to control the structure and level of infrastructure access charges. However, the fact that infrastructure access charges are taxes in Spain impedes or limits compliance by the rail regulator with these functions since the CNMC cannot modify the level of infrastructure access charges, at its own initiative or in response to a dispute, once they are approved in the General State Budget[123].

V.2.3. Investment in the high-speed network and ADIF's debt

The railway sector in Spain faces the challenge posed by the high investment in the high-speed network that, as outlined in section III of the Study, has been funded to a significant degree through borrowing by ADIF. The high level of indebtedness requires ADIF AV to gather sufficient resources to cover its financial costs.

The LSF[124] foresees the recovery of ADIF's costs not directly attributable to the rail service, including those of a financial nature, through a mark-up or addition to infrastructure access charges whenever the market can accept it[125]. The level of the mark-up is set in the State Budget Act, taking into account criteria such as train-kilometres and seat-kilometres, differentiating between the different lines[126].

This mark-up, which currently represents approximately 30% of ADIF's fee income, is likely to increase in the future to cover the financial costs of the additional 904 km of high-speed network under construction, representing a 30% increase compared to the current network. Additional increases in mark-ups could become a significant barrier to entry for new operators, as they may not be offset by the reduction in infrastructure access charges resulting from the increase in rail traffic after liberalisation[127].

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[123] CNMC (2015), "Report on the Draft Act on the Railway Sector (IPN/DTSP/001/15)".

[124] Article 97.5.2 of Act 38/2015 on the Railway Sector.

[125] Article 96.4 of Act 38/2015 on the Railway Sector.

[126] The fact that rail fees are treated as taxes also limits the possibility for differentiation in the mark-ups that can be set by infrastructure managers.

[127] The current level of fees in the high-speed network covers the costs directly attributable to the operation of the network.

A high level of mark-ups to cover ADIF's financial costs would not be, in many cases, "accepted by the market." In the current context, in which RENFE provides commercial services as a monopoly, ADIF takes into account the profits of the operator as an indicator of the potential to add the mark-up to the current infrastructure access charges[128].

In a liberalised market, as already pointed out by the CNMC[129], cost allocation distinguishes between costs directly attributable to the exploitation of the train service (the costs generated by the train journey), which are recovered through infrastructure access charges, and fixed costs (derived from the construction of the railway network and others not directly related to the provision of the service), which are recovered through the mark-up. Fixed costs, in accordance with the economic literature on infrastructures[130], may be allocated using Ramsey prices[131]. These prices allow the setting of the mark-up that the market can accept, taking into account the different features of the rail operators and lines.

V.2.4. Access to passenger transport stations

In a liberalised environment, it is important for new operators to be able to carry out their commercial activities in passenger stations. It is worth highlighting the strategic importance of access to railway stations, not only as part of the infrastructure where operators provide their transport services but also as a space to market their product and to differentiate it from those of their competitors.

This strategic importance is reflected in previous international experiences such as the Italian, where the regulator (ART) had to intervene to safeguard access by the new entrant (NTV) to the stations managed by the infrastructure manager (RFI), which is vertically integrated with the incumbent operator (FSI). ART settled various disputes and ensured non-discriminatory provision of spaces in station lobbies for the placement of ticket machines or VIP lounges.

[128] ADIF and ADIF AV, in their 2017 fee proposal, justify the addition for type A (high speed) lines due to the favourable evolution of this market segment and the increase in average train occupancy, allowing the revenues of operators to increase.

[129] CNMC (2016): "Report on the 2017 fee proposal of ADIF and ADIF AV (STP/DTSP/200/16)".

[130] See Oum and Tretheway (1988).

[131] In this way, the mark-up that recovers the fixed costs would be inversely proportional to the elasticity of demand, in such a way that the most inelastic operators/lines would face a higher mark-up.

Spanish regulation regards station buildings, their information panels and spaces for ticketing services, as service facilities. Thereby, they are considered to be part of the railway infrastructure, to which operators must be guaranteed access in a non-discriminatory basis[132], extending this obligation to all services provided in them.

In accordance with the 2019 Network Statement of ADIF and ADIF AV[133], this includes lobbies, waiting rooms, cleaning or storage sidings, and the provision of information from the operator of the facility to operators and passengers. In all cases, request for access or provision of the service is performed in accordance with the capacity allocation procedure described earlier in this section.

ADIF must therefore take the corresponding actions to ensure non-discriminatory access to these facilities and services, providing new entrants with the corresponding spaces in stations under the same conditions as RENFE. These principles will also apply to other station facilities providing services adjacent to passenger transportation services.

V.3. Access to rolling stock and its maintenance

Access to rolling stock constitutes an important entry barrier for rail operators due to the high investment and the time required for its authorisation to put into service.

High-speed trains entail investments between 20 and 30 million euros per train. This amount could be even higher in Spain, due to the different signalling technologies, which require, to ensure complete network coverage, that the rolling stock is interoperable in the different signalling systems (ASFA, LZB, ERTMS, levels 1, 2 or both, etc.).

Related markets for the sale and rental of rolling stock have been defined at European level as different markets since there are differences that make, for practical purposes, few substitute markets in the short-term[134]. Compared to the acquisition of rolling stock, the rental has a significantly lower cost and, therefore, operators face lower market entry costs. In addition, the acquisition of railway material may be slower because it requires approval, which may lengthen the purchase period by between two and three years.

[132] Articles 42.1 and 43.1 and Appendix IV of Act 38/2015 on the Railway Sector, and Implementing Regulation 2017/2177 of the Commission.

[133] Network Statement of ADIF and ADIF AV, 2019.

[134] CNC (2012): “Report on competition in rail freight transport in Spain”.

At European level, the **rental of rolling stock** is relatively common. For example, as part of the liberalisation in the United Kingdom the former public operator was divided into independent companies dedicated to different activities, creating three rolling stock leasing companies[135], which were later privatised. Another example is Denmark, where the incumbent is obliged to provide rolling stock to operators providing rail transport services in the country[136].

As outlined by the CNMC[137], the special features of the railway network in Spain make access to rolling stock a greater entry barrier than in other Member States.

In particular, the option of renting rolling stock is limited by several factors. Firstly, the use of Iberian gauge, which is different to International gauge, impedes access to European rolling stock for the operation of conventional LD lines, an aspect exacerbated by other technical differences and different infrastructure regulations. Secondly, Renfe Alquiler de Material Ferroviario does not currently have rolling stock for passenger transport[138], so new entrants would have to compete on Iberian gauge lines by purchasing of rolling stock. The geographic market for the manufacture of this material is national, which may potentially translate into higher prices due to a lack of international competition in its manufacture.

Since Renfe Alquiler de Material Ferroviario is not expected to have rolling stock for new operators in the short-term, it is advisable to establish temporary measures that facilitate access by third parties to the material owned by RENFE under transparent, objective and non-discriminatory conditions, once RENFE's rolling stock needs have been assessed and excluding rolling stock to serve PSO services.

However, even if Renfe Alquiler de Material Ferroviario were to have rolling stock for rent, the fact that it belongs to the RENFE group could encourage discriminatory behaviour to hinder access by new entrants to the rolling stock, either through a price that is too high, a delay in making it available or by providing old or outdated rolling stock[139]. In this regard, there is a precedent for the abuse

[135] CNMC (2014): PRO/DTSP/0001/14.

[136] CNC (2012): "Report on competition in rail freight transport in Spain".

[137] CNMC (2018e): IPN/CNMC/014/18.

[138] In 2017, there was a disposal of all the rolling stock for passenger transport from Renfe Alquiler de Material Ferroviario to Renfe Viajeros, so there is currently no rolling stock available to rent by future entrants into the market for commercial services (Annual accounts of Renfe Alquiler de Material Ferroviario S.M.E. S.A. for 2017, pg. 36).

[139] CNMC (2014): PRO/DTSP/0001/14.

of Renfe-Operadora's dominant position in the provision of traction services[140] in the freight segment. This behaviour was sanctioned in the CNMC Council Decision dated 28 February 2017[141].

The sanctioning case against Renfe-Operadora
The CNMC Council Decision dated 28 February 2017 sanctioned two practices by RENFE. Firstly, a series of agreements and concerted practices between RENFE and the Deutsche Bahn Group that, due to their effect, restricted competition and led to market sharing that resulted in the prevalence of the status quo prior to liberalisation. These agreements translated into RENFE providing the traction service to the Deutsche Bahn Group in Spain under preferential conditions, and the Deutsche Bahn Group ceasing to provide its own traction and had long-term access to car storage areas owned by RENFE. This guaranteed the strong position of the Deutsche Bahn Group in the transport of freight by rail in Spain and, in particular, in the car transport segment. Secondly, an abuse of RENFE's dominant position in the retail markets for rail freight transport services and wholesale market for rail traction for freight transport, derived from RENFE's unwillingness to extend the commercial conditions agreed with Deutsche Bahn to other companies.

The **maintenance of rolling stock** is an adjacent market to the provision of transport services, ensuring that the rolling stock complies with the technical safety requirements. Maintenance services are provided in specialised facilities, which must be approved by the State Railway Safety Agency (known by its acronym in Spanish, AESF)[142].

Access to maintenance services is essential for new operators, who must prove compliance with a maintenance plan as a prerequisite for operating their rolling stock[143].

[140] Through the traction service, the operator makes the train and the driver available to the customer (as well as other complementary and support services), who is responsible for providing the carriages.

[141] CNMC (2017a): S/DC/0511/14.

[142] The AESF is the authority responsible for rail safety and responsible for the management and supervision of the safety of all elements of the rail system: infrastructure, rolling stock, rail staff and railway operation.

[143] Article 31 of RD 810/2007, of 22 June, approving the regulation on safety in circulation of the Railway Network in the General Public Interest.

Maintenance operations also have a high cost for rail operators[144], both in terms of the cost of the service and forgone profits while the rolling stock is out of service, which directly affects their profitability.

Regulation of access to maintenance facilities and services differentiates between two types of service: light maintenance, which covers regular repairs and technical inspections that do not require the unit's withdrawal; and heavy maintenance, which involves major works in specific facilities and requires the withdrawal of the rolling stock from service.

Operators of light maintenance facilities are currently obliged to provide non-discriminatory access to all operators. Access can be refused only when viable alternatives exist or when the facility has no capacity left to attend the petition[145]. In contrast, regulation exempts from this obligation to operators of heavy maintenance facilities dedicated to high-speed trains or other rolling stock that requires specific installations[146].

Building their own maintenance facilities could pose a significant barrier to entry for new entrants. For example, the Italian operator NTV invested approximately €90 million constructing its own workshops[147], which took two years to complete[148]. To mitigate this barrier to entry, other countries such as the United Kingdom have chosen to transfer the ownership of existing maintenance workshops to companies independent from the incumbent, to ensure non-discriminatory access to the maintenance services by rail operators[149].

In Spain, Renfe Fabricacion y Mantenimiento, a subsidiary of RENFE group, owns most of the workshops or maintenance facilities. Likewise, the provision of maintenance services is performed either directly by the subsidiary or through joint-ventures between the railway operator and the manufacturers of rolling stock[150]. Aside from RENFE's maintenance network, there are other workshops owned by private companies that provide maintenance services for freight

[144] In 2017, maintenance costs for the rolling stock of Renfe-Viajeros amounted to €472.3 million, representing 17.7% of the operator's total operating expenses.

[145] Article 44.2 of Act 38/2015 on the Railway Sector.

[146] However, article 44.3 of Act 38/2015 on the Railway Sector requires the service to be provided in a non-discriminatory manner to third parties when the operator of the workshops has offered its services to any rail operator.

[147] NTV made a €90 million investment jointly with Alstom to build its own maintenance workshop in Nola (International Railway Journal, 14 December 2011).

[148] The works began in June 2009 and were completed in September 2011 (Trepat, 2018).

[149] CNMC (2014): PRO/DTSP/0001/14.

[150] CNMC (2018e): IPN/CNMC/014/18.

wagons or auxiliary rolling stock[151]. Due to their smaller size and specialisation, it is unlikely that these workshops will put competitive pressure on RENFE, especially regarding high-speed maintenance services[152].

The exemption of the obligation to provide access to heavy maintenance facilities, and the fact that Renfe Fabricación y Mantenimiento belongs to the same group as Renfe-Viajeros, are factors that discourage this subsidiary from providing access to its maintenance services for other competitors.

Moreover, the large investments and prolonged periods involved in the construction of new maintenance facilities imply that new operators will have no real alternative to the incumbent's workshops for some years after the liberalisation of commercial services. This barrier to entry may be especially relevant for smaller operators and negatively affect their incentive to enter the market.

For this reason, regulation should include an obligation for RENFE to provide access to its heavy maintenance workshops to its competitors, in a transparent, objective and non-discriminatory manner, without excluding the application of the competition policy regulation where appropriate.

The barriers to the **rolling stock rental and maintenance market** identified in this section would be significantly reduced were the rental and maintenance units independent from the incumbent. For this reason, the independence of Renfe Alquiler de Material Ferroviario and Renfe Fabricación y Mantenimiento from its parent company, Renfe-Operadora, must be guaranteed, ensuring the complete legal, accounting and functional separation of these units from the operator. In the past[153], the CNMC has proposed the creation of independent rolling stock rental and maintenance companies through their privatisation following a competitive procedure[154].

On the other hand, the infrastructure managers must facilitate the construction of maintenance workshops, making land available for new operators to build their facilities, and simplifying the procedures necessary for their connection to the railway network. To this end, other countries have implemented interesting

[151] CNMC (2019a): STP/DTSP/118/18.

[152] During 2011, the subsidiary RENFE Integria held a 90% market share in the maintenance of freight trains, whereas in the wagon maintenance market this reached 95% (CNC (2012): "Report on competition in rail freight transport in Spain").

[153] CNMC (2014): PRO/DTSP/0001/14.

[154] In the United Kingdom, in order to eliminate the advantages of the incumbent, independent rolling stock rental companies were created (the so-called Rolling Stock Leasing companies or ROSCOs).

initiatives, such as the creation of joint ventures between infrastructure managers, manufacturers and rail operators to promote the construction of maintenance networks alternative to that of the incumbent operator, which facilitates access into this market by new entrants.

V.4. Engine drivers

Driving staff are an essential input for the provision of railway passenger transport services, so, in order to guarantee the proper functioning of the railway market, it must be ensured that rail operators have access to this type of staff.

The liberalisation of passenger transport in Spain and other European countries will predictably lead to a growth in rail transport, which will in turn increase the demand for trained and certified engine drivers to provide these services in the Member States.

Given the gradual liberalisation of the different types of rail transport, Directive 2007/59/EC aims to facilitate the mobility of engine drivers between Member States, guaranteeing the recognition of licences and certificates and establishing a set of minimum requirements for obtaining both the basic licence and the supplementary harmonised certificate.

Article 4 of this Directive establishes the certification of engine drivers at a community level and the documents that demonstrate the skills and qualifications required to drive trains. First, a licence is required demonstrating that the train driver meets the minimum conditions established regarding general requirements and skills and, second, one or more certificates are required that state the infrastructures on which the holder is authorised to drive and the rolling stock they are permitted to use.

However, some aspects of the regulations[155] do not facilitate the mobility of engine drivers between rail companies[156]. This is because, although the licence belongs to the person in question[157], the driving certificate actually belongs to the body granting it, so it loses its validity when the train driver's relationship with this body ends[158]. Hence, a rail operator hiring an engine driver from another

[155] Order FOM/2872/2010 transposes some aspects of Directive 2007/59/EC on the certification of train and locomotive drivers in the Community's rail system into the Spanish legal system.

[156] CNMC (2012): "Report on competition in rail freight transport in Spain".

[157] Article 36.2 of Order FOM/2872/2010 determines that, in the event that a train driver stops providing their services for a rail operator, the licence will remain valid provided that they continue to comply with the conditions established in this Order.

[158] Article 41.3 of Order FOM/2872/2010.

company must request it again, even if the section of the rail network and the rolling stock are the same[159]. Moreover, when one rail operator hires an engine driver whose training has been funded, in whole or in part, by another rail operator, it must compensate that other operator for the expenses incurred for this training if the train driver has remained at the company for less than two years[160].

The requirements for training engine drivers, as outlined by the CNMC in the case of freight transport[161], may also be an entry barrier for new operators. In particular, the fact that a certificate for each section of the RFIG and type of rolling stock is required to engine drivers implies that they need to acquire practical training[162]. This means that if a company wishes to authorise a driver for a line for which it has no certified driver, it needs the help of a company with accredited drivers so that they can accompany the new driver in their practical training[163]. This requirement makes Renfe-Operadora essential so that other operators can qualify their drivers, as it is the only operator with certified engine drivers for virtually all RFIG lines.

Regarding engine driver training centres, it is worth highlighting that in recent years, new alternative centres to Renfe-Operadora and ADIF have been created[164], some of them belonging to the rail operators (Acciona, Captrain and Alsa). Although these centres provide access by new operators to engine driver training, RENFE's training centres have more resources and a larger capacity to train engine drivers, as noted by the CNMC in a recent decision regarding the driver training and selection processes by Renfe-Operadora[165].

[159] However, first additional provision of Order FOM/2872/2010 contemplates the possibility of accrediting the training, qualification and previous experience of train drivers, for accreditation purposes to obtain or recover the validity of the qualifications or certifications.

[160] Ninth additional provision of Order FOM/2872/2010.

[161] CNMC (2012): "Report on competition in rail freight transport in Spain".

[162] Article 30 of Order FOM/2872/2010.

[163] Ninth additional provision of Order FOM/2872/2010.

[164] There are currently 11 approved alternative training centres (Acciona, Captrain, Ceff, Cetren, Alsa, Create, Gesteme, LCR, Medway, Plasser Ibérica, Transfesa): http://www.seguridadferroviaria.es/agentes-sector-ferroviario/centros-formacion-homologados.

[165] The training centre associated with RENFE has the capacity to train up to 500 students per year, whereas the centres not controlled by RENFE trained 240 train drivers between 2013 and 2015 (see CNMC (2017b): STP/DTSP/053/17).

RENFE also currently employs the vast majority of engine drivers in Spain[166], so its recruitment processes have the ability to affect both the training and recruitment of engine drivers at the market level, and therefore the access by other operators to driving staff.

In fact, the recruitment processes for freight engine drivers carried out by RENFE between 2014 and 2016, which led to the hiring of 536 drivers by the operator in those years, had an impact on alternative operators who lost a significant number of engine drivers who joined RENFE[167]. This effect was aggravated by the fact that RENFE was not training drivers in that period, and hence, the discrepancy between training and recruitment led to a shortage of trained drivers.

In order to resolve these problems, in 2017, the CNMC imposed a series of measures[168], including the annual communication by RENFE to the rail operators of its driving staff needs for a period of 2 years, and RENFE's guarantee to provide at least a three-month period between the publication of its driving staff recruitment notification and the first exam.

Although the measures imposed on RENFE by the CNMC in the aforementioned decision have been effective so far in ensuring access by rail operators to the driving staff necessary to provide their freight transport services, it is important to take into account that 80% of Renfe's drivers work in the passenger transport segment, which was not liberalised market when these measures were imposed, so it may be necessary to review them when this segment is opened up to competition.

V.5. The incumbent operator and commercial services

This section analyses relevant factors for the effective liberalisation of commercial services. These result from the exclusive provision of railway services by the incumbent since 1941, the relationship between RENFE and the Ministry of Public Works, as well as the problems arising from the coexistence in the market of liberalised commercial services and exclusive PSO services during the first years after liberalisation.

[166] In 2017, RENFE employed 97% of train drivers in Spain (CNMC (2017b): STP/DTSP/053/17).

[167] Larger operators lost between 17% and 40% of their drivers (CNMC (2017), page 11).

[168] CNMC (2017b): STP/DTSP/053/17.

V.5.1. Independence of RENFE

In accordance with the regulatory framework, both the infrastructure managers and operators of the railway services owned by the Member States must be independent in terms of the management, administration and internal control of administrative, economic and accounting matters[169].

As noted by the CNMC in 2014[170], *"the credibility of the liberalisation process may be harmed if the rail operators perceive, albeit subjectively, that this relationship hinders symmetric access to information and/or the possibility to influence the body proposing the rules or the market regulator. Therefore, the liberalisation process should be accompanied by a strengthening of the CNMC as an independent regulatory body, awarding it sanctioning powers and especially greater functions in relation to the supervision of the accounting of the infrastructure manager, to guarantee the financial equilibrium and sustainability of the system."*

In 2014, to resolve these problems, the CNMC proposed[171] restructuring RENFE-Operadora to allow it to compete in the market under more efficient terms[172] and ensure a greater ability of the CNMC to determine the infrastructure access charges.

With regard to these recommendations, it should be noted that the restructuring of RENFE as parent company of four state trading companies (Renfe Viajeros, Renfe Mercancías, Renfe Alquiler and Renfe Mantenimiento) is now operational. The problems associated with the operation of these companies and their belonging to RENFE-Operadora have been addressed in previous sections, mainly section V.3. With regard to infrastructure access charges, although regulatory advances have been made since 2014, there are still obstacles that have been examined in section V.2.2.

[169] Article 21.2. LSF establishes that the infrastructure manager is independent from an organisational and decision-making viewpoint.

[170] CNMC (2014): PRO/DTSP/0001/14. Page 31.

[171] CNMC (2014): PRO/DTSP/0001/14.

[172] At the time of publication of the CNMC Think Piece (2014), the restructuring of RENFE-Operadora as parent company of four state companies (Renfe Viajeros, Renfe Mercancías, Renfe Alquiler and Renfe Mantenimiento) had taken place from a regulatory viewpoint but it was not operational.

V.5.2. The profitability of commercial services

Currently, commercial services provided by RENFE under a monopoly regime include profitable and unprofitable routes. Specifically, HS services are profitable as a whole, whereas LD services are not. According to the information provided by RENFE to the CNMC in 2017, 64.7% of high-speed lines were profitable, whereas only 19.5% of conventional long-distance lines achieved profits. Predictably, the liberalisation of the market for commercial services will result in the entry of new competitors on profitable routes.

As a result, the operator could reconfigure its supply of services after the liberalisation of commercial services. In Italy, Trenitalia cancelled its unprofitable services once the market was opened to competition. The new operator, NTV, initially covered some of the lines with lesser demand, but this strategy was later abandoned, concentrating its resources on those with higher demand. In the end the Italian government extended the PSO services to include some long-distance connections.

In Spain, a potential interruption of unprofitable routes would affect 67% of LD passengers, whereas only 5% of HS passengers would be affected.

However, the profitability of lines after liberalisation depends on factors that are not reflected in the current profitability of the routes. Firstly, as the CNMC has already noted[173], *"certain commercial lines that are not currently profitable could become so with more efficient management of the resources"* due to greater competitive pressure. Moreover, the profitability directly attributable to the line does not take into account the indirect benefits of its operation, which derive from network effects[174]. In this regard, RENFE could choose to maintain the coverage of its current network of commercial services to feed its main lines with passengers from secondary nodes.

A final factor to take into account is the possibility of providing transportation for these sections using other, more cost-efficient means of transport, offered either by the rail operators themselves or by other intermodal competitors. There are

[173] CNMC (2014). PRO/DTSP/0001/14.

[174] In the context of transport services, network effects refer to the phenomenon through which adding an additional connection to the network, such as a new service between Madrid and Albacete, increases the utility of the rest of the nodes in the network by providing users with a new connection as part of longer journeys, or the option to choose between several alternative travel routes (De Rus and Campos, 2015).

precedents of intermodal integration of railway operators in France[175] and Italy[176], where railway operators, SNCF, FSI and NTV, also operate intercity bus lines.

Alternatively, Public Service Obligations (PSOs) can be established for non-substitutable, unprofitable services with a high social impact, determining an economic compensation payable by the State for its provision, in accordance with European regulations.

V.5.3. Accounting separation and transparency in the management of commercial and PSO services.

As outlined in the previous section, the liberalisation of commercial passenger services will entail the entry of new operators into the most profitable lines and corridors. These new services will compete with an operator already established throughout the country and that will continue operating its PSO services under a monopoly regime. These services represent a substantial part of the market (43.1% of passenger-kilometres in 2017)[177].

Faced with the entry of new competitors, RENFE could have incentives to offer lower prices on the lines where entry occurs, at least temporarily, in order to expand its share of the market and divert resources from its competitors and, in extreme cases, block market entry. It could set prices below the cost of operating the lines in question, which could be financed either through price increases in lines where there is no competition, or through subsidies received for the provision of PSO services.

Moreover, the privileged position of Renfe-Operadora in both the passenger transport market and in related markets (freight, rental, maintenance) inherited from its position as state operator, lends itself to the use of cross-subsidies between these areas, allowing for a more aggressive competition in those where the threat of entry is greater. This strategy jeopardises the economic viability of smaller operators without necessarily increasing efficiency in the provision of the service[178], restricting long-term competition to the detriment of end users.

[175] Crozet and Guihéry (2018).

[176] Beria et al. (2018).

[177] CNMC (2018a). INF/DTSP/117/18.

[178] CNMC (2014). PRO/DTSP/0001/14.

Previous liberalisation experiences have resulted in sanctions for incumbent operators in the Netherlands[179] and the Czech Republic[180] for submitting loss-making bids for tender procedures. In turn, the French Competition Authority sanctioned the state operator SNCF for fixing predatory prices to restrict the entry of competitors in the freight segment[181].

Although approved in accordance with the transitory period established in European regulations, the recent direct awarding to RENFE of the monopoly for the provision of PSO services for 10 years, up to 2027, extendible for a further 5 years[182], postpones the introduction of competition for the market of PSO services for at least 4 years after the expected date[183].

Additionally, the compensation paid to RENFE in exchange for the provision of PSO services, which was determined in absence of a competitive procedure, might be excessive. Any excess could be used by the operator to offset losses incurred from competing more agressively in the commercial service market. To address this eventuality, competitive tendering of PSO services should be introduced as early as possible, in line with previous recommendations from the CNMC[184]. In this regard, the authorities should not make use of the 5-year extension period permitted by the current PSO contract, and they should ensure the proper design of public tender procedures in order to introduce market competition into the PSO services as soon as possible.

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[179] In 2017, the Dutch Authority for Consumers & Markets fined Dutch Railways NS for abusing its dominant position after submitting a loss-making bid for a PSO contract in the province of Limburg. This tender was a pilot for possible future decentralised contracts that would allow the coexistence of regional and national operators on the same railway tracks (Authority for Consumers & Markets).

[180] In 2017, the Czech operator České Dráhy was sanctioned in a similar proceeding, after submitting loss-making bids in the tenders for the Plzeň-Most and Pardubice-Liberec routes. The sanction was appealed and is pending resolution (Thomson Reuters). The European Commission is also investigating the company over the fixing of predatory prices on the Prague-Ostrava route (European Commission).

[181] Decision no.12-D-25, of 18 December 2012.

[182] Contract between the General State Administration and the State Trading Company Renfe Viajeros, SME, S.A., for the provision of public rail passenger transport services on suburban, conventional medium-distance, high-speed medium-distance (AVANT) and metric gauge routes, responsibility of the General State Administration, subject to public service obligations between 2018 and 2027.

[183] Regulation 2016/2338 establishes the obligation to award PSO contracts through a competitive procedure from 25 December 2023 and limits to ten years the duration of the new contracts granted via direct awarding prior to this date.

[184] CNMC (2018e). IPN/CNMC/014/18.

Another necessary but not sufficient condition to avoid the cross-subsidisation of services and to reduce the uncertainty faced by new entrants is to guarantee accounting separation and transparency in the management of commercial and PSO services by RENFE, as previously proposed by the CNMC[185]. The regulations[186] and the current PSO contract mandate accounting separation for RENFE's services, and a correct allocation of operating income and costs to each segment (suburban, conventional regional services and AVANT, HS, LD and metric gauge). The CNMC has the power to monitor compliance with applicable accounting provisions and the absence of cross-subsidies between branches of activity[187].

In this regard, a recent report by the Court of Auditors[188] noted that while the operator's analytical accounting systems improved in 2016, there remained deficiencies and room for improvement. Given the importance of avoiding cross-subsidisation for the effective liberalisation of commercial services, and the deficiencies present in RENFE's analytical accounting to this date, the CNMC considers that independence between the commercial and PSO segments must be reinforced, consolidating the accounting, functional and legal separation of the two activities and assigning their provision to independent companies.

V.5.4. Conflict between commercial and PSO lines: the economic equilibrium test

The LSF[189] allows regulatory bodies to impose limits on the right of new commercial services to collect or drop off passengers at any station *"when a PSO service covers the same or an alternative route and exercising that right compromises the economic equilibrium of the PSO service"*. This measure intends to protect the economic viability of the PSO service, which could be affected by the presence of competition in stations with the highest number of passengers.

The power to determine whether the new service compromises the economic equilibrium of the PSO services rests with the CNMC, which will perform an

[185] CNMC (2014): PRO/DTSP/0001/14.

[186] Article 58.1 of Act 38/2015 on the Railway Sector.

[187] Article 11.1.h) of Act 3/2013, on the creation of the National Commission on Markets and Competition, and the sole additional provision of Royal Decree 2387/2004, approving the Regulation on the Railway Sector.

[188] Tribunal de Cuentas, TCU [Court of Auditors]. Report No. 1,289 (2018). https://www.tcu.es/repositorio/59b71cb4-8e99-4361-b99a-26e32cf612c2/I1289.pdf

[189] Article 59.7 of Act 38/2015 on the Railway Sector.

objective economic analysis based on a methodology for the economic equilibrium test[190]. In response to a request to for an economic equilibrium test, the CNMC may grant access, modify it, deny it or grant it under certain conditions.

Although conflict between commercial and PSO services affects all European countries, it is especially important in Spain due to the presence of PSO services on the high-speed network. As can be seen in Figure 12, there are currently thirteen PSO services defined on the high-speed network, corresponding to high-speed regional services (AVANT). These services cover more than half of the network's stations and affect all high-speed corridors.

Figure 12. High-speed network and PSO services in Spain

Source. CNMC (2018f).

[190] The methodology for the economic equilibrium test will be prepared and published by the CNMC, in accordance with the guidelines contained in Implementing Regulation (EU) 2018/1795 of the European Commission. The CNMC has published Council Decision STP/DTSP/077/18, which establishes the methodology for the economic equilibrium test for international services, on the basis of which it has recently approved the entry of Arriva into the A Coruña-Porto line (CNMC (2019b): STP/DTSP/125/18).

The coexistence of commercial and PSO services could prevent new high-speed entrants from serving intermediate stops on these routes, damaging their expected occupancy rates and profitability. Moreover, European regulations allow the test to be performed only in relation to new services, validating the existing commercial services provided by the incumbent and giving it an advantage over new operators.

In the interest of an effective liberalisation of commercial services, a correct assessment of the benefits of new commercial services and their negative impact upon PSO services becomes essential, due to the potential deterrent effect on the entry of new operators. In this regard, European regulations[191] allow the consideration of other factors aside from the economic equilibrium of PSO services, such as benefits for consumers, improvements in the quality and performance of rail services and increases in the use of capacity resulting from the new services.

Among these factors, it is important to highlight the option to assess the impact of the new service taking into account the monetary value of the compensation specified in the PSO contract. This is especially relevant in light of the recent direct awarding of the PSO services to RENFE until 2027[192], in absence of a competitive procedure, as it allows for the examination of whether the agreed compensation is appropriate. This would prevent any modification or denial of access should the new commercial service result in a reasonable profit for the operator of the PSO service, albeit lower than initially specified in the contract[193]. In this regard, Implementing Regulation (EU) 2018/1795 allows the CNMC to recommend modifications to the definition of the PSO service to the competent authorities to ensure the coexistence of the new service with a properly compensated PSO service.

[191] Commission Implementing Regulation (EU) 2018/1795 laying down procedure and criteria for the application of the economic equilibrium test pursuant to Article 11 of Directive 2012/34/EU of the European Parliament and of the Council.

[192] Contract between the General State Administration and the State Trading Company Renfe Viajeros, SME, S.A., for the provision of public rail passenger transport services on suburban, conventional medium-distance, high-speed medium-distance (AVANT) and metric gauge routes, responsibility of the General State Administration, subject to public service obligations between 2018 and 2027.

[193] CNMC (2018f): Feedback to public consultation on European Commission Implementing Regulation laying down procedure and criteria for the application of the economic equilibrium test pursuant to Article 11 of Directive 2012/34/EU.

V.5.5. Advantages for RENFE derived from the combination of commercial and PSO services

Over the years, RENFE's commercial strategy has been adapted to reflect changes in consumer demand, improving its competitive position in relation to other modes of passenger transport, especially air transport. In this way, the company has adopted flexible pricing systems and discount policies in order to segment consumers and diversify its supply of products, combining its own services with others offered by third party companies.

Whilst some of these policies are desirable and improve the provision of services, others could have an anti-competitive effect, by transferring to the market for commercial services some of the market power obtained by the operator from its network scale and its advantageous position in adjacent markets. After the liberalisation of commercial services in the 2020 working timetable, RENFE will face new competitors in its commercial services whilst retaining a monopoly over PSO services. This implies that the operator could have incentives to extend its market power in the PSO segment to the liberalised market through commercial policies that exclude potential competitors.

This is the case for products that combine commercial routes with others subject to PSO, such as, for example, combined tickets. The possibility of contracting or offering bundles of PSO and commercial services should be offered to new entrants under the same conditions as RENFE's services, so that its offer can be replicated.

RENFE should also supply the relevant information regarding timetables and routes of its PSO services to new operators, so that they can be included in their websites and marketing spaces. In this context, the Ministry of Public Works should implement the shared information and integration systems for the commercialisation of tickets, combined tickets and bookings outlined in article 58.5 of Railway Sector Act 38/2015. Given the importance of these systems for the operation of the liberalised market, and the connection between the Ministry of Public Works and RENFE, the CNMC should be consulted during the development of these systems, *"including the possibility of introducing modifications to ensure adequate competition between the parties, avoiding distortions in the market"*[194].

These obligations must be extended to combinations of PSO and tourist services, which have already been liberalised, such as the Renfe Spain Pass that combines AVE tickets with Suburban tickets for residents abroad.

[194] CNMC (2018e). IPN/CNMC/014/18.

These obligations add to the accounting transparency and separation duties outlined in the previous section.

VI. CONCLUSIONS

The liberalisation of commercial passenger transport services by rail is an opportunity for the Spanish railway sector. Firstly, international experience shows that liberalisation is beneficial for end users by improving train frequency, quality of service and prices. Secondly, the increase in activity and demand seen in markets where these services have been liberalised generates additional resources that contribute to the sustainability of rail infrastructures.

Excess capacity in the rail network in Spain and the limited overlap between commercial and PSO services facilitates the entry of competitors. The liberalisation cases analysed in this study show that the opening up to competition had a bigger positive impact in those countries where the rail network has excess capacity, particularly where there is a dedicated high-speed network that does not share sections with other services, especially those subject to PSO.

Moreover, the presence of competitors limits the risk faced by infrastructure managers derived from the concentration of most of their activity into a single operator. In the current situation, unilateral decisions by RENFE in its commercial policy or in aspects as important as the purchase of rolling stock or investments in maintenance workshops and facilities may create bottlenecks that affect the businesses of ADIF and ADIF AV.

However, there are also challenges and obstacles to achieving effective competition in the market for commercial services in the different activities of the transport service.

Firstly, Spain has opted for a vertical separation of activities that involves the structural separation of ADIF and RENFE to facilitate access by other operators to the rail network. However, the fact that ADIF, ADIF AV and RENFE all belong to the so-called “Ministry of Public Works Group” may limit the desired independence resulting from the separation of ADIF and RENFE by reducing the transparency of both the operation of rail services and the management of rail infrastructures.

Secondly, certain technical features of the rail infrastructure and, in particular, the coexistence of Iberian-gauge and high-speed lines, hampers the interoperability of passenger transport services, which affects competition between market operators. Moreover, some aspects of the current regulation of the access to the infrastructure, such as capacity allocation and the setting of infrastructure access charges, may pose a significant entry barrier for new operators. It is also necessary to guarantee access by new operators to spaces in passenger stations on a transparent and non-discriminatory basis, under the same conditions as the incumbent operator.

Thirdly, the provision of the transport service requires rail operators to have access to three types of production factors: rolling stock, maintenance and drivers. There exist potential problems regarding access by future entrants to the rolling stock rental and manufacture markets and to maintenance facilities, which need to be addressed in order to prevent them from becoming a significant entry barrier. Access to engine drivers for the provision of commercial services may also be limited due to the power exercised by the incumbent in the driving staff recruitment and training market.

Finally, potential entrants must make large investments and face a significant asymmetry compared to the incumbent that has advantages inherited from being a monopolist in the market over a long period in terms of facilities that are difficult to replicate and information about the market and end users. If the regulatory and institutional framework does not grant sufficient guarantees, alternative rail operator will find difficult to bear the costs and risks derived from entering the rail market.

VII. RECOMMENDATIONS

This section states the main recommendations that, in the opinion of the CNMC, should be implemented to mitigate the obstacles to the liberalisation of commercial passenger transport services by rail in Spain. These considerations are complementary to those set out in the Agreement dated 25 July 2018[195], particularly with regard to the sanctioning system and powers of the sector regulator and railway planning and information to third parties.

ONE. Maintain the structural separation of ADIF and ADIF Alta Velocidad from RENFE.

The independence of the infrastructure manager has proved very important in the different international liberalisation cases analysed. As outlined above, in countries where infrastructure managers are not separated from the incumbent operator, the entry of a new operator led to a high level of conflict which required the regulator's intervention in aspects such as capacity allocation, access to railway facilities, such as passenger stations, and the analysis of the prices set by the incumbent.

The liberalisation of freight services in Spain has shown that the structural separation of network management and transport services is positive and it entails high levels of satisfaction for rail operators. This fact is reflected in the CNMC Report dated 19 December 2017 on the consultation of user representatives about their view of the rail market[196].

In short, the structural separation between both ADIF and ADIF AV and RENFE is a minimum necessary to provide certainty for potential entrants on the access to an essential element of the transport service, namely the rail network. This separation provides the infrastructure manager with incentives to maximise the capacity utilisation of such infrastructures, and it also limits supervision and regulation costs.

TWO. Ensure the full autonomy of ADIF, ADIF Alta Velocidad and RENFE.

In accordance with the European regulatory framework, infrastructure managers and operators of the rail services owned by the member states should be

[195] CNMC (2018e) : IPN/CNMC/014/18.

[196] https://www.cnmc.es/sites/default/files/1911706_2.pdf

independent in terms of the management, administration and internal control of administrative, economic and accounting matters.

Therefore, in order to ensure the success of the liberalisation, the CNMC recommends to progress with the autonomy of ADIF, ADIF AV and RENFE. In the case of the latter, this should also help give it more flexibility to adapt to a more competitive environment and be able to offer users greater advantages in terms of the quality and cost of the service.

In any case, the actions of the CNMC and the strengthening of its functions should contribute to decreasing the uncertainty for potential entrants due to the current relationship between RENFE and the Ministry of Public Works and, indirectly, with ADIF and ADIF AV.

THREE. Ensure adequate and sufficient access to capacity in the railway infrastructure and service facilities.

Maximise available capacity.

International experience shows that the availability of capacity in both lines and service facilities is essential for the liberalisation of domestic passenger transport services. Infrastructure managers are responsible for managing traffic in a way that reduces infrastructure bottlenecks and maximises its use by operators.

The current operation of the railway network may not be maximising its capacity, with operating speeds below those allowed by the infrastructure's design, and the coexistence of different types of services on the same tracks. After liberalisation, infrastructure managers must use the mechanisms at their disposal to address these issues, prioritising certain services based on objective and non-discriminatory principles.

It is worth highlighting the works being undertaken by infrastructure managers to increase capacity at passenger stations.

Provide certainty to potential entrants regarding capacity in the railway network.

Available capacity should be offered to rail operators in a transparent, objective and non-discriminatory manner. Infrastructure managers should offer operators new capacity resulting from current works to expand the capacity of stations or other projects as it becomes available.

To reduce uncertainty for railway operators, especially new entrants, infrastructure managers may conclude framework agreements assigning part of

the available capacity to an operator in the long-term. Infrastructure managers should strike a balance between providing certainty to the investor, while ensuring the provision of railway services by multiple operators.

Managers are therefore advised to provide framework capacity in a way that guarantees a minimum capacity for the investor to enter the market, without resulting in excessive commitments that discourage entry, therefore maximising the number of new operators in the market. The duration of the framework agreements should be proportional to the scale of the investments that justify them.

Finally, it is worth outlining the power of the CNMC to approve framework agreements prior to their adoption, as well as to monitor and control the activity of the infrastructure manager regarding infrastructure access, the allocation procedure and its results, and to resolve any disputes that arise between operators and the infrastructure manager.

Clarify the procedures for allocating capacity in the working timetables.

The scheduling of capacity compromised in framework agreements through the annual capacity allocation procedure must be carried out in a transparent, objective and non-discriminatory manner, ensuring the greatest possible diversity of supply.

Therefore, ADIF and ADIF AV must establish a regulated coordination procedure, to determine the information to be exchanged between the rail operators and managers and limit potential conflicts in the allocation of train paths.

Given the powers of the CNMC in relation to the monitoring of the Network Statement and conflict resolution, infrastructure managers must disclose the developments and agreements they reach.

Ensure non-discriminatory access to service facilities.

Finally, new operators must be granted access to other elements of the infrastructure, such as facilities for related services or passenger stations, including the provision of spaces in passenger stations for the location of commercial or ticketing services. Both ADIF and the operators of service facilities must take the necessary actions to ensure non-discriminatory access for new entrants, so that they can compete on equal terms with the incumbent.

FOUR. Improve the system for setting infrastructure access charges.

The system for setting infrastructure access charges is essential for the liberalisation of passenger transport services by rail given its importance in total costs of such services, and their potential to create a significant entry barrier for operators. This system must also be predictable so that operators can make their investment decisions.

However, the nature of infrastructure access charges as taxes does not ensure that certainty necessary for operators to undertake their investment decisions and prevents ADIF from being able to optimise the use of the infrastructure. The proposal is therefore to cease considering the infrastructure access charges as taxes.

Infrastructure access charges consist of two components: the access charge, which is set according to attributable direct costs of service, and a mark-up, which is added to the charge whenever the market can accept it.

Direct costs crucially depend on the evolution of rail traffic. The potential increases in traffic that will derive from the entry of new operators will predictably reduce the size of the infrastructure access charges, particularly in the high-speed network segment where the costs are already covered by the current level of infrastructure access charges.

In this regard, the methodology for estimating rail traffic that should be developed by infrastructure managers, in accordance with the Decision dated 27 September 2018[197], will serve as a framework for incorporating the traffic increases following the opening of the market into the calculation of infrastructure access charges.

One of the challenges faced by the railway sector in Spain is the high investment in the high-speed network, which has been financed mainly through borrowing by ADIF. This high level of indebtedness requires ADIF AV to achieve sufficient resources to cover its financial costs through a mark-up.

This mark-up, which may have to increase in the future to cover the financial costs of the new sections of the high-speed network, may create a significant entry barrier for new operators and may not be offset by the expected reduction of infrastructure access charges derived from increased rail traffic after liberalisation.

Finally, infrastructure managers may establish discounts for infrastructure access charges to encourage traffic growth and utilisation of the network's capacity. The design of incentives and discounts can reduce the entry barriers faced by rail

[197] CNMC (2018g): STP/DTSP/069/18.

operators, facilitating the entry of new competitors that, in turn, will result in increased traffic and, therefore, higher revenue for the infrastructure managers.

ADIF and ADIF AV should assess whether, in a context of the liberalisation of commercial services, the full implementation of the discount scheme allowed by the current regulatory framework could encourage the entry and growth of rail traffic.

FIVE. Ensure that new operators have access to rolling stock and its maintenance.

Access to rolling stock is an important entry barrier for rail operators due to the high investment and the time required for its authorisation to put into service.

In Spain, the option of renting rolling stock is limited by several factors. Firstly, the use of Iberian gauge, which is different to International gauge, impedes access to European rolling stock for the operation of conventional LD lines. Secondly, Renfe Alquiler de Material Ferroviario does not currently have rolling stock to rent for passenger transport.

Similarly, the lack of rolling stock currently available at Renfe Alquiler, together with the time required to put into service new rolling stock, hinders access by new operators during the first few years of the liberalisation. Therefore, having assessed the real needs of RENFE and excluding the stock necessary to meet PSO requirements, the recommendation is to take measures that facilitate access by new operators to part of RENFE's rolling stock in a transparent, objective and non-discriminatory manner.

Moreover, access to rolling stock maintenance facilities may be a considerable barrier to entry for new operators, given that Renfe Fabricacion y Mantenimiento, a subsidiary of RENFE group, owns the majority of maintenance workshops, which represents a very significant competitive advantage for the incumbent. The absence of alternatives to RENFE's workshop network and the existing relationships between the incumbent and the main rolling stock manufacturers pose significant barriers to the entry and expansion of new operators.

For this reason, infrastructure managers must facilitate and promote the creation of new maintenance facilities by third party operators. ADIF and ADIF AV must, to the extent possible, make land available to new operators for the construction of facilities and simplify the processes necessary to connect them to the railway network.

Nevertheless, the construction of new maintenance infrastructures by alternative operators will not be immediate and their maintenance network is not expected

to replicate the coverage of Renfe Fabricación y Mantenimiento. Therefore, it is necessary to ensure that Renfe Fabricación y Mantenimiento provides its heavy maintenance services in a transparent, objective and non-discriminatory manner, ensuring that new entrants have access to this service.

It would also be advisable to encourage the structural independence of Renfe Alquiler de Material Ferroviario and Renfe Fabricación y Mantenimiento from Renfe-Operadora, through the creation of independent rolling stock rental and maintenance companies that are completely separate from Renfe-Operadora.

SIX. Ensure effective competition in the markets for training and hiring of engine drivers.

Driving staff are a fundamental asset for the provision of passenger transport services by rail, so, in order to guarantee the proper functioning of the rail market, it must be ensured that new operators have access to this type of staff.

In this regard, in 2017 the CNMC imposed a series of measures on RENFE to ensure access by rail operators to the driving staff necessary to provide their freight transport services. Additional measures may be necessary to ensure the proper functioning of the engine driver staff recruitment and training markets when the commercial passenger transport services market is opened up to competition.

SEVEN. Not extending the contract directly awarded to RENFE for PSO services.

Following the liberalisation of commercial services from 14 December 2020, the new market operators will have to compete with an incumbent, RENFE, which will continue to provide the PSO services as a monopoly until at least 2027, receiving remuneration for this that has not been agreed in a competitive procedure.

In the new competitive framework, it will be essential to prevent RENFE from using the income received from providing the PSO services to subsidise the services in which it competes with other operators. In this context, one way of preventing cross-subsidies is to ensure that the income received by RENFE for the provision of PSO services is the result of a competitive procedure, and therefore, that there is no over overcompensation.

For this reason, the CNMC considers it essential to introduce competition for the market in the PSO services as soon as possible, not using the potential extension

of the contract entered into by RENFE and the General State Administration once it concludes in 2027. It is also recommended to ensure an adequate design of the public tender procedures, taking into account the principles of efficient economic regulation, to achieve effective competition for the market.

EIGHT. Prevent the incumbent from deriving a competitive advantage in the liberalised market from the operation of PSO services.

To avoid the appearance of cross-subsidies between the commercial and PSO segments, a necessary but not sufficient condition is to ensure RENFE's compliance with its accounting transparency and separation obligations. The company's accounts must reflect the costs of operating the service, properly allocated to each segment, and address the deficiencies and incorporate the improvements outlined by the Court of Auditors in its 2018 report.

Given the importance of preventing the cross-subsidisation of services, and the deficiencies present in RENFE's analytical accounting to this date, the separation between the commercial and PSO segments should be reinforced, to ensure the effective accounting, functional and legal separation of the two activities, and assigning their provision to independent companies.

Additionally, alternative operators must be given the opportunity to provide combinations of commercial and PSO services in the same conditions as Renfe-Operadora. Therefore, Renfe-Operadora should supply all relevant information regarding its PSO services to third parties in a transparent manner and allow third party operators to offer tickets combining their commercial services with PSO services.

APPENDIX I. EUROPEAN EXPERIENCES IN THE LIBERALISATION OF DOMESTIC RAIL PASSENGER TRANSPORT

A. GERMANY

The liberalisation of the railway sector in Germany started in 1994, with the liberalisation of all market segments. However, although there are no legal barriers to the provision of commercial services, the impact of liberalisation has been very limited.

According to a study by the German regulator (BNetzA)[198], the market share of alternative rail operators in long-distance commercial services was less than 1% in 2017.

The study attributes this situation to the sizeable investment in rolling stock required to enter the market. Additionally, BNetzA notes that providing long-distance services in a sustainable and profitable manner requires the availability of line capacity on attractive routes in the medium or long-term. This capacity is not always available given the congestion of the German network. Finally, infrastructure access charges are high compared to other modes of transport, so long-distance passenger services operate on a deficit basis in some segments and, from an economic standpoint, service cannot be offered for sections where demand is weak.

Additionally, other studies[199] have outlined regulatory uncertainty and the highly advantageous position of the incumbent as possible drivers of this situation, particularly in relation to capacity allocation procedure and access to the commercial station network.

The German Monopolies Commission[200] concluded in 2015 that the vertical separation of Deutsche Bahn was indispensable to achieve a competitive and undistorted market, along with the privatisation of its transport units.

In contrast, competition is more intense in the PSO segment, where competition for the market was introduced at the regional level. In this case, the share of alternative companies stands at 26%[201]. As can be seen in the following figure, the entry of new operators into these services has been accompanied by a much higher growth than that of commercial services.

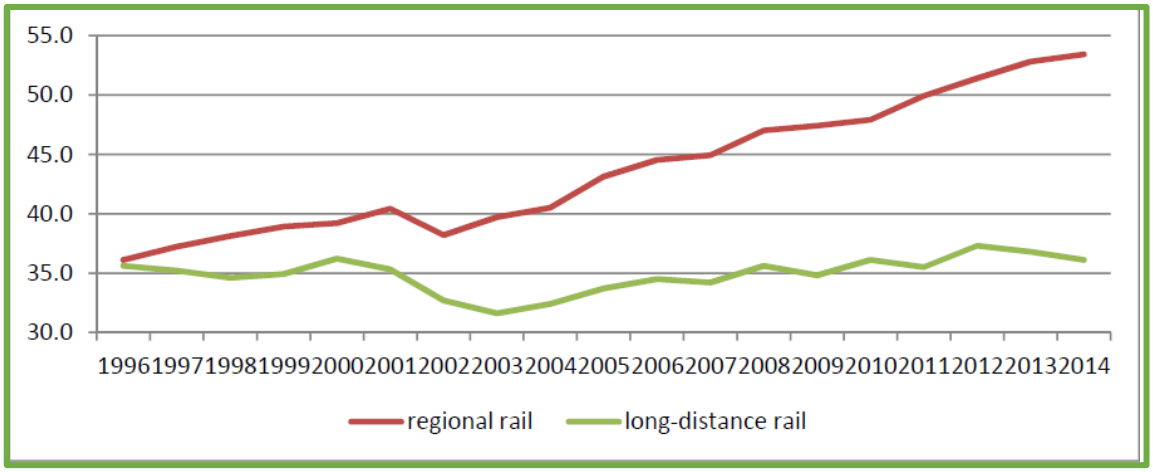
[198] BnetzA (2018).

[199] Beckers *et al.* (2009)

[200] Monopolkommission (2015).

[201] BnetzA (2018).

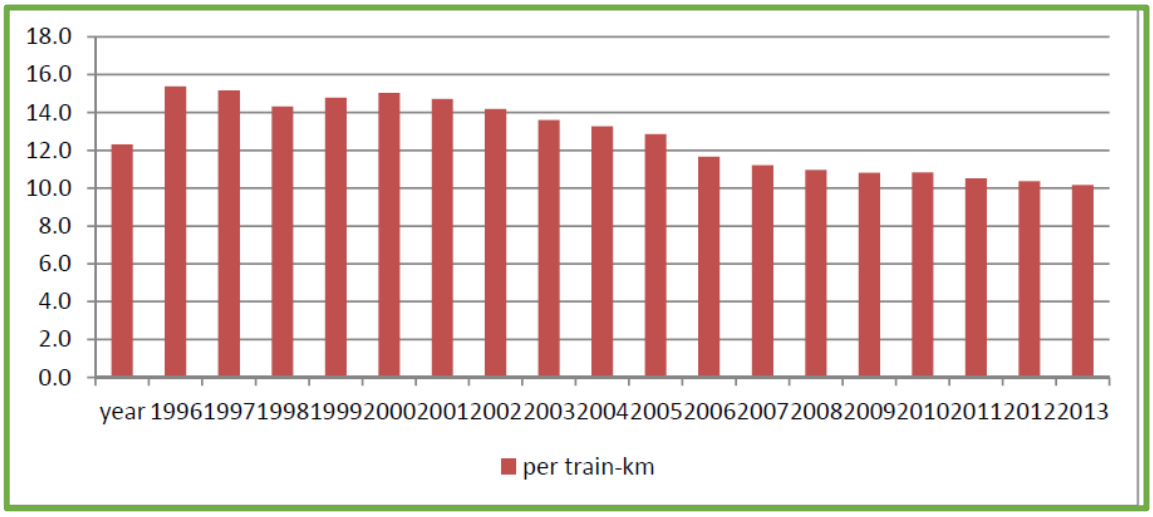
Figure 13. Evolution of commercial and PSO services in Germany



Source: Link (2016).

Competitive tendering has resulted in a reduction of subsidies granted by public authorities for the provision of these services[202].

Figure 14. Subsidy per train-kilometre for the provision of PSO services



Source: Link (2016).

[202] Nash *et al.* (2016).

B. AUSTRIA

The liberalisation of domestic rail passenger services took place in Austria on 9 January 2008. However, the first alternative company to provide commercial services, WESTBahn, was not founded until 2008. Effective operation was further delayed until 2011, when it started to provide its services on the Vienna-Linz-Salzburg corridor. This corridor is essentially the only one not affected by PSOs in Austria[203].

To perform its service, WESTBahn initially acquired a fleet of 7 trains. Later, in 2015, it acquired another 10 trains for a total of €180 million[204], which were delivered in 2017.

Thanks to this new rolling stock, service frequencies have increased substantially in the corridor, with WESTBahn adding 15 services to the 16 services offered by the Austrian incumbent (ÖBB). Moreover, following the entry of the railway operator, the incumbent purchased new high-speed trains[205].

The delay of almost 3 years in the entry into the market of the alternative operator was caused, at least in part, by the behaviour of vertically integrated ÖBB, which resulted in various complaints filed by WESTBahn in relation to discriminatory access to essential facilities and unfair competition involving predatory pricing[206].

WESTBahn is estimated to hold a market share of between 20 and 25% in the Vienna-Salzburg corridor, which translates into a 3% share of all commercial services in the Austrian market[207]. However, commercial services account for only 30.6% of the market[208].

C. ITALY

The Italian railway market was legally opened to competition on 1 January 2001. The operator NTV (Nuovo Trasporto di Viaggiatori) was created in 2006, although it could not start operating until April 2012. NTV obtained its safety certificate in

[203] Finger *et al.* (2016) and Casullo (2016).

[204] Global Railway Review, 13 May 2015.

[205] Finger et al. (2016).

[206] Casullo (2016).

[207] Casullo (2016).

[208] European Commission (2019): “Sixth report on monitoring development of the rail market”.

2008, but the acquisition, manufacture and authorisation of its new rolling stock took another three years, until 2011[209].

NTV's strategy is relevant due to the significant initial investments made, which included the acquisition of 25 high-speed trains from ALSTOM for €628 million, as well as the investment of another €90 million for the construction of a maintenance facility. In October 2015, NTV expanded its fleet with an order for eight Pendolino trains from the same manufacturer for €460 million, including their maintenance, which was extended in September 2016 for four additional trains, for a total of €230 million, maintenance included[210], and, lastly, for another five trains in November 2017[211]. By the time the rolling stock is delivered, NTV's fleet will amount to 37 trains, 25 high-speed and 12 Pendolinos, with a maximum speed of 250km/h.

Using its rolling stock, NTV increased significantly the supply of services in the Italian market, both in the Turin-Milan-Rome-Naples route, with 56 daily services, and in others, such as the Rome-Venice and the Adriatic corridor[212]. In total, NTV provides its services in 9 Italian cities and 12 stations, accounting for 26% of the Italian rail market[213].

[209] Desmaris (2016).

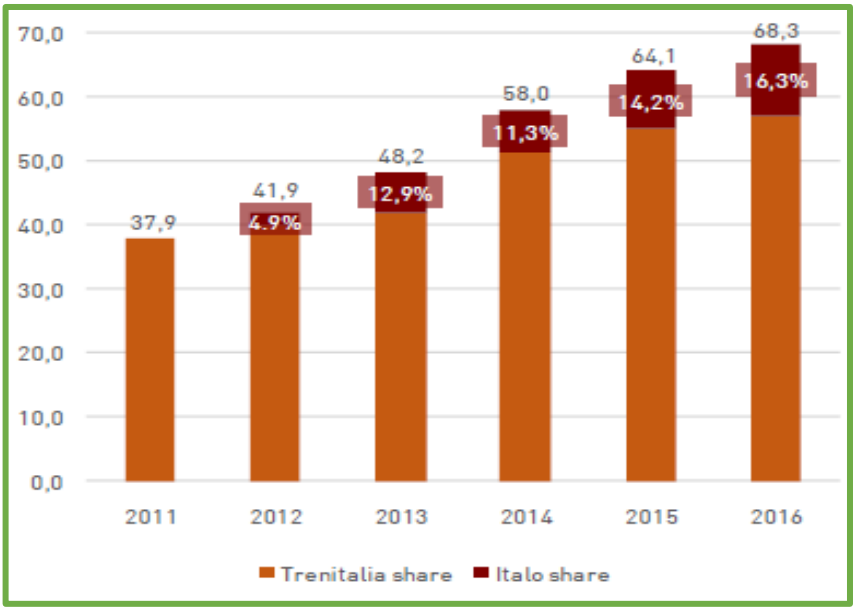
[210] Railway Gazette, 7 September 2016.

[211] Railway Gazette, 31 July 2018.

[212] Desmaris (2016).

[213] Finger *et al.* (2016).

Figure 15. Evolution of HS passengers in Italy (millions)



Source: Trepat (2018).

Note: Italo belongs to NTV.

The expansion of NTV has, as in previously discussed cases, led to several complaints regarding access to facilities owned by the infrastructure manager (RFI), which is vertically integrated with the service operator (Trenitalia). In this context, the intervention of the Italian regulator (ART) was essential to ensure transparent, objective and non-discriminatory access to stations and maintenance facilities[214]. In contrast, capacity in the railway network has not posed a barrier to entry in the market, partly because competition has been restricted to high-speed tracks, which presented available capacity at the time of NTV's entry.

Regarding NTV's entry process, it is worth highlighting that it was accompanied by a reduction in railway infrastructure access charges by the Italian Transport Ministry. The Ministry established a 15% reduction in 2014, which was confirmed and extended further by the regulator ART in October 2015, decreasing from €12.80 per train-km to €8.20 per train-km[215].

[214] Casullo (2016).

[215] Desmaris (2016).

Finally, it should be noted that NTV did not obtain profits until 2015, when it presented a positive result of €1.8 million[216]. In February 2018, the investment fund Global Infrastructure Partners III announced the acquisition of this railway operator for an amount of €1,980 million[217].

D. CZECH REPUBLIC

Although the Czech railway market was liberalised in 2003, it was not until September 2011 when the first competitor entered the market in the Prague-Ostrava corridor. Currently, most passenger services, both long-distance and regional, are operated by the incumbent (České Dráhy, CD) under a monopoly regime in exchange for public subsidies. Although open access exists *de jure* in the remaining long-distance corridors, the incumbent continues to receive subsidies as compensation for the operation of those corridors, which makes Prague-Ostrava the only *de facto* liberalised route[218].

Following the withdrawal of subsidies to the incumbent, the first alternative operator (RegioJet) entered in 2011, followed by the second (LeoExpress) in 2013. RegioJet is a local bus company, which entered into the rail market after purchasing second-hand trains from Austria. Meanwhile, LeoExpress, is a newly created operator owned by an investment fund, which acquired five new trains to operate in this corridor.

The entry of these operators has led to a substantial increase in rail service frequencies, especially at peak times (at night, the frequency has dropped), increasing from 23 daily trains before liberalisation to 40 daily trains in 2013[219].

As in the previous cases, the behaviour of the incumbent has resulted in different complaints relating to possible anti-competitive practices, particularly predatory pricing. However, new operators are estimated to hold a share of between 40% to 50% of the market in the Prague-Ostrava corridor, which accounts for 3.5% of the total market[220].

Finally, the liberalisation of the main route in the Czech Republic has in turn prompted the entry of new operators into the main route in Slovakia, between Žilina and Košice, in December 2014. The three Czech operators compete with

[216] Desmaris (2016).

[217] International Railway Journal, 7 February 2018.

[218] Finger *et al.* (2016).

[219] Tomeš *et al.* (2014).

[220] Casullo (2016) and Finger *et al.* (2016).

the Slovak incumbent (Slovak Railways), connecting the cities of Prague, Ostrava, Žilina and Košice[221].

E. UNITED KINGDOM

The United Kingdom was one of the first European countries to reform the railway sector encouraging the entry of new operators into the market through the 1993 Railways Act. This reform included the privatisation of the infrastructure manager. However, after the identification of several deficiencies in the railway system[222], the management and maintenance of railway infrastructures was entrusted to a public body called Network Rail[223].

With regard to rail services, in 1994 the former public monopoly, British Rail, was dismantled into one hundred companies providing every activity in the railway market: passenger transport, freight transport, maintenance of railway infrastructures, leasing of rolling stock and maintenance of rolling stock. All of these were privatised[224]. Additionally, all passenger services were tendered, and the incumbent was not permitted to bid, leading to its virtual disappearance. As a result the entire network of rail passenger services were operated by private franchisees by 1997[225].

The British liberalisation model is based on competition for the market, where rail passenger services are provided under exclusive concessions awarded through competitive tendering procedures in which operators bid for groups of services. This competition model has increased the utilisation of the railway network significantly, as can be seen in the following figure.

[221] Tomeš *et al.* (2014).

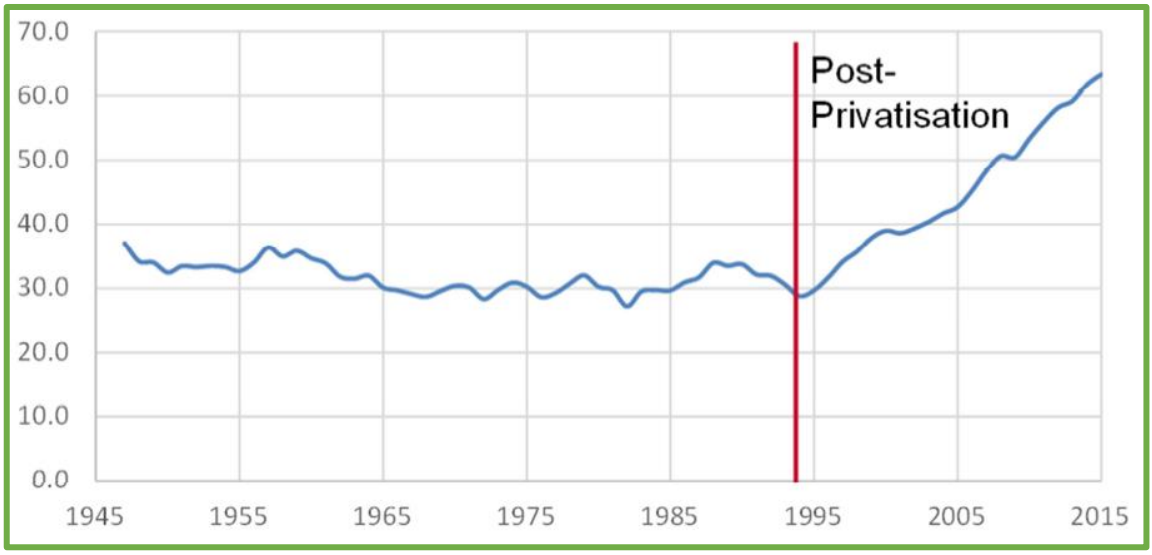
[222] The accident in Hatfield in 2000 sparked criticism due to the unsatisfactory quality of the infrastructure, which led to the replacement of the infrastructure manager Railtrack with Network Rail, abandoning plans for the private infrastructure management system.

[223] CNC (2012): “Report on competition in rail freight transport in Spain”.

[224] CNC (2012): “Report on competition in rail freight transport in Spain”.

[225] Smith (2016).

Figure 16. Evolution of the number of passenger-kilometres in the United Kingdom



Source: Smith (2016).

As in the German case, the liberalisation of PSO services has resulted in a reduction in subsidies for the provision of PSO services. According to CERRE, subsidies per train-km fell from £9.05 in 1996 to £5.15 in 2015. The reduction in public spending is the result of the improved efficiency of operators and the increase in traffic[226].

Moreover, there is a small degree of competition in the market arising from the overlap of some franchises, where operators partially operate on the same route. However, competition in the market only occurs in the case of two franchises, which represent 1% of the total market[227]. In the United Kingdom, competition in the market is permitted, subject to the availability of capacity on the network and so long as income from the new services does not come mainly at the expense of the existing franchise[228].

The Competition and Market Authority (CMA) concluded that new entrant operators contributed to increasing the supply of services in London, reducing prices due to their lower costs (up to 29% lower than the operators of the franchises)[229].

[226] Nash *et al.* (2016).

[227] Nash *et al.* (2016).

[228] Finger *et al.* (2016).

[229] CMA (2016).

The liberalisation process led to a considerable growth in demand for rail passenger transport and the volume of passenger-kilometres more than doubled between the beginning of liberalisation and 2015[230].

F. SWEDEN

Liberalisation in Sweden has followed a gradual process lasting more than two decades. The first stage, which started in 1990, was characterised by the existence of competition for the market through the tendering of exclusive public contracts[231].

Later, in the second stage, which started in 2010, the previous system coexisted with competition in the market[232]. Specifically, since 2011, the only route that is still closed to competition is the line between Arlanda Airport and Stockholm Central Station, where a private operator (A-Train) is licensed to provide the service exclusively until 2040 (although the operator does so as the winner of a concession that included the construction of the rail infrastructure).

In Sweden, the infrastructure manager is a public company vertically separated from the service operator. The entry of MTR led to complaints about the behaviour of the incumbent, SJ, in relation to access to its ticket sales platform. The Swedish Competition Authority concluded that this access was not essential for competition given that the entrant operator could design its own platform[233]. However, the competition authority has recently recommended that the Swedish Government regulate the on-line sale of train tickets as a way to resolve competition problems[234].

MTR has managed to establish itself in one of the country's main corridors, Stockholm-Gothenburg, where it has gained a market share of between 25% and 30%[235].

[230] Smith (2016).

[231] Alexandersson and Rigas (2013).

[232] Alexandersson and Rigas (2013).

[233] Finger *et al.* (2016).

[234] Letter from the Swedish Competition Authority to the Swedish government dated 4 June 2019.

[235] CMA (2016).

APPENDIX II. MAIN CORRIDORS IN THE RAIL NETWORK

Corridor	HS Routes	LD Routes
Levante	Madrid - Alicante	Madrid - aguilas
	Madrid - Valencia	Madrid - Alicante
		Madrid - Castellon
		Madrid - Murcia - Cartagena
		Madrid - Valencia - Gandia
		Madrid - Xativa - Valencia
Nordeste	Madrid - Barcelona	Madrid - Logroño
	Madrid - Zaragoza - Barcelona	Madrid - Pamplona/Logroño
	Madrid - Zaragoza - Huesca	
Mediterraneo		Barcelona - Murcia - Lorca/Cartagena
		Barcelona - Valencia - Alicante
		Figueres - Barcelona - Valencia - Alicante
Norte	Madrid - Leon	Galicia - Pais Vasco
	Orense - Santiago - La Coruña	Madrid - Bilbao/Hendaya
		Madrid - Bilbao/Irun
		Madrid - Galicia
		Madrid - Gijon
		Madrid - Leon - Vigo
		Madrid - Lisboa
		Madrid - Santander
		Madrid - Vitoria
		Miranda - Bilbao
		Salamanca - Madrid
		Vigo - Oporto
Sur	Madrid - Malaga	Madrid - Algeciras
	Madrid - Sevilla	Madrid - Almeria
		Madrid - Cadiz
		Madrid - Huelva
Transversales	Barcelona - Sevilla/Malaga	Barcelona - Asturias
	Valencia - Malaga	Barcelona - Asturias - Galicia
	Valencia - Sevilla	Barcelona - Galicia
	Zaragoza - Sevilla	Barcelona - Pais Vasco
		Barcelona - Sevilla/Malaga
		Barcelona - Valladolid
Internacional	Barcelona - Lyon	
	Barcelona - Paris	
	Barcelona - Toulouse	
	Madrid - Barcelona - Marsella	

Source. Compiled by author based on data from Renfe.

BIBLIOGRAPHY

ADIF (2019): “Declaración sobre la Red ADIF 2019” [2019 Network Statement], *Administrador de Infraestructuras Ferroviarias*.

ADIF AV (2019): “Declaración sobre la Red ADIF Alta Velocidad 2019”, [2019 Network Statement], *Administrador de Infraestructuras Ferroviarias de Alta Velocidad*.

Alexandersson, G., and Rigas, K. (2013): “Rail liberalisation in Sweden. Policy development in a European context”, *Research in Transportation Business & Management*, *6*, 88-98.

Baumol W., Panzar J.C. and R.D. Willig (1982): “Contestable Markets and the Theory of Industry Structure,” Harcourt College.

Beckers, T., Von Hirschhausen, C., Haunerland, F., & Walter, M. (2009): "Long-distance passenger rail services in Europe: Market access models and implications for Germany", *18th International Symposium on Transport Economics and Policy*, p. 287.

Beria, P., Nistri, D. and Laurino, A. (2018): “Intercity coach liberalisation in Italy: Fares determinants in an evolving market”, *Research in Transportation Economics*, *69*, pp. 260-269.

BNetzA (2018): “Railway market analysis 2018”, *Bundesnetzagentur*.

Campos, J. (2015): “La competencia en el ferrocarril: un análisis del nuevo marco institucional en Europa y en España”, *Fedea Policy Papers - 2015/12.*

Casullo, L. (2016), “The efficiency impact of open access competition in rail markets: The case of domestic passenger services in Europe”, *International Transport Forum Discussion Paper*.

Chiambaretto, P. and Fernandez, A. S. (2014): “Transferring low-cost marketing practices from air to rail services: The Ouigo case”, *Research in Transportation Business & Management*, *10*, pp. 40-44.

CMA (2016): “Competition in passenger rail services in Great Britain. A policy document”, *Competition and Markets Authority*.

CNC (2012): “Informe sobre la competencia en el transporte de mercancías por ferrocarril en España”.

CNMC (2014): “PRO/DTSP/0001/14: Documento de reflexión sobre el proceso de liberalización del transporte de viajeros por ferrocarril”, *Comisión Nacional de los Mercados y la Competencia.*

CNMC (2017a): "S/DC/0511/14: Resolución Expte. Renfe-Operadora", *Comisión Nacional de los Mercados y la Competencia.*

CNMC (2017b): "STP/DTSP/053/17: Resolución sobre la solicitud de intervención de la asociación de empresas ferroviarias privadas en relación con los procesos de selección y contratación del personal de conducción ferroviario", *Comisión Nacional de los Mercados y la Competencia.*

CNMC (2018a): "INF/DTSP/117/18: Informe de supervisión del mercado de transporte de viajeros por ferrocarril sujetos a obligaciones de servicio público", *Comisión Nacional de los Mercados y la Competencia.*

CNMC (2018b): "INF/DTSP/173/18: Informe de supervisión del mercado de servicios comerciales de transporte de viajeros por ferrocarril 2017", *Comisión Nacional de los Mercados y la Competencia.*

CNMC (2018c): "INF/DTSP/041/18: Informe sobre los servicios de transporte de mercancías por ferrocarril 2017", *Comisión Nacional de los Mercados y la Competencia.*

CNMC (2018d): "STP/DTSP/119/18: Acuerdo por el que se emite informe relativo a las declaraciones sobre la Red 2019 de ADIF y ADIF ALTA VELOCIDAD" [Agreement issuing a report on ADIF and ADIF AV 2019 Network Statements], *Comisión Nacional de los Mercados y la Competencia.*

CNMC (2018e): "IPN/CNMC/014/18: Acuerdo por el que se emite informe sobre el anteproyecto de ley por el que se modifica la Ley 38/2015, de 29 de septiembre, del Sector Ferroviario", *Comisión Nacional de los Mercados y la Competencia.*

CNMC (2018f): "Contestación a la consulta pública de la Comisión Europea sobre el Reglamento de Ejecución por el que se establece el procedimiento y los criterios para la aplicación del test de equilibrio económico, con arreglo al artículo 11 de la Directiva 2012/34/UE" [Feedback to public consultation on European Commission Implementing Regulation laying down procedure and criteria for the application of the economic equilibrium test pursuant to Article 11 of Directive 2012/34/EU], *Comisión Nacional de los Mercados y la Competencia.*

CNMC (2018g): "STP/DTSP/069/18: Resolución sobre la propuesta de cánones de ADIF y ADIF Alta Velocidad para 2019 y por la que se adoptan medidas para el próximo ejercicio de supervisión de acuerdo al artículo 11 de la Ley 3/2013, de 4 de junio", *Comisión Nacional de los Mercados y la Competencia.*

CNMC (2019a): "STP/DTSP/118/18: Resolución por la que se aprueban los principios y criterios para la aplicación del Reglamento de Ejecución 2017/2177 de la Comisión Europea, relativo al acceso a las instalaciones de servicio y a los

servicios ferroviarios conexos" [Resolution laying down principles and criteria for the application of the Implementation Regulation 2017/2177 of the European Commission on access to service facilities and rail-related services], *Comisión Nacional de los Mercados y la Competencia.*

CNMC (2019b): "STP/DTSP/125/18: Resolución por la que se aprueba la prueba de equilibrio económico en relación con el nuevo servicio internacional entre Oporto y A Coruña notificado por Arriva Apain Rail, S.A.", *Comisión Nacional de los Mercados y la Competencia.*

Crozet, Y. and Guihéry, L. (2018): "Deregulation of long distance coach services in France", *Research in Transportation Economics*, *69*, pp. 284-289.

De Rus, G. and Campos, J. (2005): "Los fundamentos económicos de la política de transporte europea: un análisis crítico", *University Library of Munich (Germany) Paper No. 12395*.

De Rus, G. (2006): "The prospects for competition", in J.A. Gómez-Ibáñez and G. de Rus (eds), Competition in the railway industry. An international comparative analysis, 177-191. *Edward Elgar. Cheltenham*.

Desmaris, C. (2016): "High speed rail competition in Italy: A major railway reform with a" win-win game"?", *International Transport Forum Discussion Paper*.

European Commission (2019): "Sixth report on monitoring development of the rail market".

European Court of Auditors (2018): "Special report n° 19/2018: A European high-speed rail network: not a reality but an ineffective patchwork".

Fageda, X., Jiménez, J. L. and Perdiguero, J. (2011), "Price rivalry in airline markets: a study of a successful strategy of a network carrier against a low-cost carrier", *Journal of Transport Geography*, *19*(4), pp. 658-669.

Finger, M., Kupfer, D., & Montero-Pascual, J. J. (2016): "Competition in the railway passenger market", *Florence School of Regulation (FSR), European University Institute*.

IRG-RAIL (2019): "Sixth market monitoring report", *Independent Regulators' Group - Rail*.

Link, H. (2016): "Liberalisation of passenger rail services: case study Germany", *Centre on Regulation in Europe (CERRE) Report.*

LLevat, M. y Llobet, G. (2016): "El Futuro del Ferrocarril de Mercancías en España", *Fedea Policy Papers - 2016/25*.

Monopolkommission (2015): “Special Report on competition on German railway markets”.

Ministerio de Fomento (2019): “Informe 2017. Observatorio del ferrocarril en España” [2017 Observatory for Railway Transport in Spain].

Nash, C., Crozet, Y., Nilsson, J. E., and Link, H. (2016): “Liberalisation of passenger rail services”, *Centre on Regulation in Europe (CERRE) Report*.

Oum, T.H and M.W. Tretheway (1988): “Ramsey Pricing in the Presence of Externality Costs”, *Journal of Transport Economics and Policy* Vol. 22, No.3, pp. 307-317.

Smith, A. (2016): “Liberalisation of passenger rail services: case study Britain”, *Centre on Regulation in Europe (CERRE) Report*.

TCU (2019): “Informe No. 1.289 de fiscalización del grado de cumplimiento por Aguas de las Cuencas de España, S.A., Aguas de las Cuencas Mediterráneas, S.A., el Grupo Renfe-Operadora, Ferrocarriles de Vía Estrecha, el Administrador de Infraestructuras Ferroviarias y ADIF-Alta Velocidad, de las recomendaciones incluidas en informes de fiscalización”, *Tribunal de Cuentas [Court of Auditors].*

Tomeš, Z., Kvizda, M., Nigrin, T., and Seidenglanz, D. (2014): “Competition in the railway passenger market in the Czech Republic”, *Research in Transportation Economics*, *48*, 270-276.

Trepat Borecka, J. (2018): “Italo: the pathfinder experience of the competition in the high-speed rail passenger market. The keys to success”, *Bachelor's thesis, Universitat Politècnica de Catalunya*.

UIC (2019): “High Speed Lines in the World”, *Union Internationale des Chemins de fer.*

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