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REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

Fifth report on monitoring developments of the rail market

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List of abbreviations

CEF	Connecting Europe Facility
DG MOVE	EC Directorate-General for Mobility and Transport
EFSI	European Fund for Strategic investments
ERADIS	the European Union Agency for Railways database of interoperability and safety
ERDF	European Regional Development Fund
ERTMS	European Railway Traffic Management System
ESIFs	European Structural and Investment Funds, include Cohesion Fund, European Regional Development Fund, European Social Fund, European Maritime and Fisheries Fund and the European Agricultural Fund for Rural Development
GVA	Gross Value added
HICP	Harmonised Index of Consumer Prices
IM	Rail infrastructure manager
INEA	EU Innovation and Networks Executive Agency
km	kilometre
KPI	Key performance indicator
NIP	National Implementation Plan
NPV	Net Present Value
NSA	National Safety Authority
p-km	passenger-kilometre
PPP	Purchasing Power Parity
PRIME	Platform of Rail Infrastructure Managers In Europe
PSO	Public Service Obligation
Recast Directive	Directive 2012/34/EU establishing a Single European Railway Area
REGIO	EC Directorate-General for Regional and Urban Policy
RFC	Rail Freight Corridor
RMMS	Rail Market Monitoring Survey
RMMS Regulation	Commission Implementing Regulation (EU) 2015/1100 for rail market monitoring
RU	Railway undertaking
RU Dialogue	Dialogue of Railway Undertakings
TEN-T	Trans-European Transport Network
t-km	tonne-kilometre
the Agency	European Union Agency for Railways, until June 2016 called European Railway Agency (ERA)
train-km	train-kilometre
UIC	Union Internationale des Chemins de Fer
UIRR	Union Internationale pour le transport combiné Rail-Route

List of Countries

AT	Austria
BE	Belgium
BG	Bulgaria
CF	Cohesion Fund
CH	Switzerland
CY	Cyprus
CZ	the Czech Republic/Czechia
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
EU	European Union
EU13	EU Member States having joined EU as from 2004
EU15	EU Member States having joined EU before 2004
FI	Finland
FR	France
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	the Netherlands
NO	Norway
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
UK	the United Kingdom

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Introduction

This Commission Staff Working Document accompanies the Fifth Report from the Commission to the Council and the European Parliament on monitoring development of the rail market. While the Fifth Report provides a very compact overview of the latest trends, the current documents develops each topic in more depth. In addition, on the DG MOVE website, the data and graphs used in this document have been made available in Excel format1.

Coverage of the Report

This document presents a non-exhaustive report[2] covering the main developments in EU rail market along the lines of the **topics listed in Article 15 (4) of Directive 2012/34/EU** establishing a single European railway area[3] (hereinafter the 'Recast Directive'), according to which the European Commission has to report every two years to the European Parliament and the Council on:

1. The evolution of internal market in rail services;
2. Services to be supplied to railway undertakings (Annex II to the Recast Directive)
3. The framework conditions, including inter alia:
   - infrastructure charging
   - capacity allocation
   - investment made in infrastructure
   - developments as regards prices
   - quality of rail transport services
   - rail transport services covered by public service contracts
   - licensing
   - degree of market opening
   - harmonisation between Member States
   - development of employment and related social conditions
4. The state of the Union railway network
5. The utilisation of access rights
6. Barriers to more effective rail services
7. Infrastructure limitations
8. The need for legislation.

The main focus of this document is on developments between 2009 and 2014. Where available, 2015 data are incorporated. Depending on data availability, some comparisons are drawn with the 2011 (rather than the 2009) situation.

The sources of data include Rail Market Monitoring Survey (RMMS) responses, the Statistical pocketbook "EU Transport in Figures"[4], Eurostat[5], statistics collected by various sectoral organisations[6] and *ad hoc* presentations and studies. Contributions from the Member States, national regulators and stakeholders participating in the Working Group for Rail Market Monitoring in the framework of the Single European Railway Area Committee, have also been considered. In

1 http://ec.europa.eu/transport/modes/rail/market/market_monitoring_en

2 In addition to rail *market* report, the European Union Agency for Railways publishes bi-annual reports on *safety* and *interoperability* performance

3 Directive 2012/34/EU of the European Parliament and of the council of 21 November 2012 establishing a single European railway area OJ L 343, 14.12.2012, p. 32

4 http://ec.europa.eu/transport/facts-fundings/statistics/pocketbook-2016_en.

5 http://ec.europa.eu/eurostat/web/transport/data/database

6 UIC, UIPP

addition, the results of two studies commissioned by the EC in 2014-2015 – *Cost and Contribution of the Rail Sector* and *Prices and Quality of Rail Passenger Services*[7] - have formed the basis for the analysis presented in sections 4.4 and 4.5.

All EU Member States are covered, except Cyprus and Malta having no railways. In addition Norway participates in the Commission's Rail Market Monitoring exercise (hereinafter 'the RMMS') and is included in most parts of the report. However, EU total and average figures, where presented, do not include Norway or Switzerland. In addition, 2013 and 2014 RMMS responses were not received from Greece and Ireland did not respond to the 2014 survey. Croatian data are available only as from 2013.

The implementing act for rail market monitoring

This is the last report drawing on voluntary RMMS questionnaires to Member States. As from July 2015 the Commission Implementing **Regulation (EU) 2015/1100 for rail market monitoring**[8] (hereinafter 'RMMS Regulation') sets rules for mandatory data collection. The questionnaire annexed to the Regulation was developed in close cooperation with the Member States and stakeholders participating in the Working Group for Rail Market Monitoring. While mainly building on the existing RMMS, the new questionnaire includes also some new indicators, e.g. on revenues and traffic outputs, public service contracts, infrastructure charges and employment. With a better defined data requirements and a mandatory collection process, the new reporting arrangements are expected to lead to more consistent and coherent data. Member States' reports will be submitted electronically and, after validation, will be made publicly accessible.

7 http://ec.europa.eu/transport/modes/rail/studies/rail_en.htm

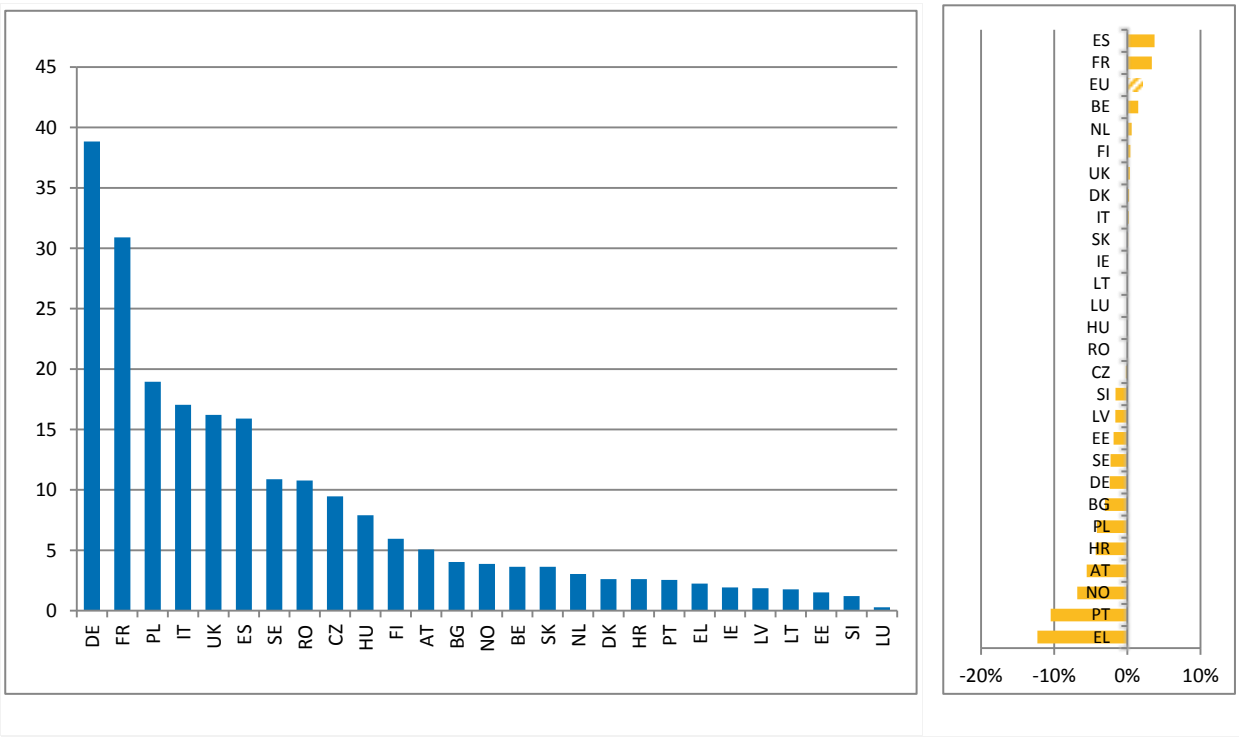
8 Commission Implementing Regulation (EU) 2015/1100 of 7 July 2015 on the reporting obligations of the Member States in the framework of rail market monitoring, OJ L 181, 9.7.2015, p. 1

1. The state of the Union railway network

1.1. Description

The rail network is the backbone of the EU's transport infrastructure. The importance attached to rail as a sustainable and clean mode of transport is reflected in the TEN-T Guidelines[9], in the objectives of the Connecting Europe Facility[10] and the Cohesion Fund[11] priorities. National and European authorities are working together to ensure the necessary support for building new but also for improving existing rail infrastructure as a part of EU-wide multimodal network.

Figure 1 – Length of national rail networks (2014) and relative change since 2009
(length of lines, thousand km)



Source: Statistical pocketbook 2016 (based on UIC, IRG annual market monitoring reports, national statistics (BE, DE, FR) and Eurostat, DE 2009 - an estimate

The total length of rail network in 2014 was about 220 thousand kilometres (km), which is about 2% more than in 2009. As shown in Figure 1, in relative terms the rail network in use has increased the most in Spain and France and decreased in Greece, Portugal, Norway and Austria.

9 Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network, OJ L 348/1, 20.12.2013

10 Regulation (EU) No 1316/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility, amending Regulation (EU) No 913/2010, OJ L 348, 20.12.2013, p. 129

11 Regulation (EU) No 1300/2013 of the European Parliament and of the Council of 17 December 2013 on the Cohesion Fund, OJ L 347, 20.12.2013, p. 281

Box 1 – Challenges with the quality of network data

Network length is usually expressed in **line-km**, which refers to a rail route between two points. A line section can consist of single or multiple **tracks** – i.e. the pairs of rails. Sparsely populated countries have a higher share of single tracks, where smaller centrally positioned and densely populated countries have a high share of multiple tracks.

While data on the length of **lines** is usually available, there could be significant variations in reported values for some countries depending on the scope of reporting. For example, for the biggest European network in Germany, depending on source, the following data can be found:

Source	Reporting year	Value (km)	Comment
Eurostat	2013	41 328	Statistics collected on a voluntary basis from the National Statistical Institutes, the reported value may include lines of trams and industrial railways
IRG Rail	2014	38 836	All lines in commercial use managed by different infrastructure managers
UIC	2013	33 446	Only the network of DB Netz AG

Regarding data on the number of **tracks, line speed** and **electrification**, data are collected by Eurostat, but on a voluntary basis, which affects availability and data coverage. Therefore, in this document all network data is taken from the DG MOVE publication 'EU transport in Figures, Statistical pocketbook 2016', where the data from various sources (UIC, Eurostat, national statistics, sectoral sources) are combined using the best available options.

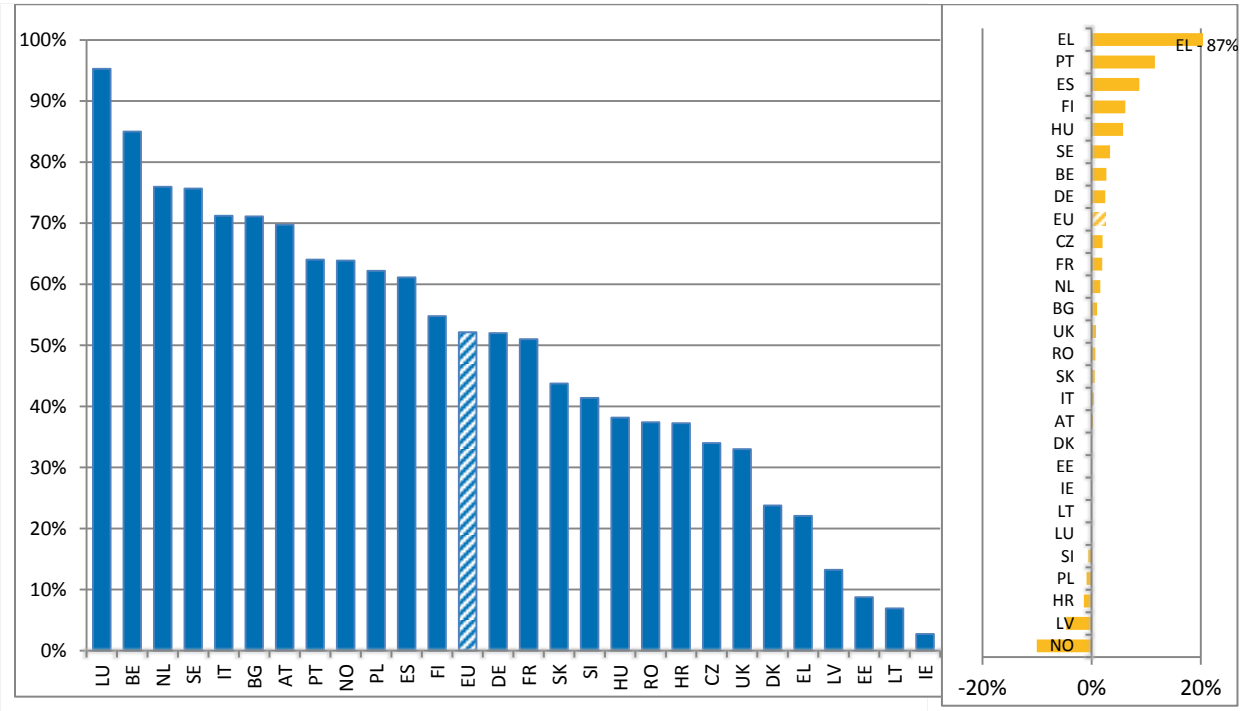
At the same time good quality data on the network and its capabilities, such as maximum axle load, length of trains, electrification, line speed etc. are essential for monitoring the network quality and interoperability. In addition, many key performance indicators (such as traffic volumes and costs) are 'normalised' using line and track kilometres. Therefore, DG MOVE has undertaken, with the assistance of a consultant and in cooperation with Member States and the sector, a task of populating the **TENtec database**[12] with good quality network data, covering at least the core and comprehensive network. DG MOVE is also cooperating with Eurostat as to refine the definitions applicable to network statistics and thus improve the quality of reporting.

According to available statistics from Eurostat, about 60% of rail lines are single **track**. In Belgium, the United Kingdom and the Netherlands the share of multiple tracks (double or more) is more than 70%, while in sparsely populated Finland and Sweden less than 20% of the whole network has multiple tracks.

Since 2009, it is estimated that 2800 km of **electrified lines** has been added to the European rail network. The proportion of electrified lines has since 2009 increased 1.6 percentage points and was in 2014 52%. As shown in Figure 2, there are marked differences between the Member States - in Luxembourg and Belgium more than 80% of lines are electrified, while in the Baltic States and Ireland electrification rates are below 15%. Most progress between 2009 and 2014 was made in absolute terms in Spain (+781 km) and in relative terms in Greece (+87%). For the coming years Banedanmark (Danish infrastructure manager) and Network Rail (the UK infrastructure manager) have launched large-scale projects for the electrification of major parts of their networks.

[12] TENtec is the EC information system to coordinate and support the TEN-T policy by storing and managing technical, geographical and financial data for the analysis, management and political decision-making related to trans-European transport networks and the Connecting Europe Facility.

Figure 2 – The proportion of electrified networks *(2014)* and relative change since 2009 *(%)*



Source: Statistical pocketbook 2016 (based on UIC, IRG annual market monitoring reports, national statistics (BE, DE, FR) and Eurostat

Note: Reported reduction in electrified lines in LV and NO could be due to changes in the scope of reporting (e.g. exclusion of side tracks without regular traffic in Norway)

Travel speeds and high speed network

There are major differences between countries in terms of **travel speeds**. Despite the significant investment in the modernisation of the rail network in Eastern Europe, there are still regional networks where maximum permitted speed for passenger trains is 120 km per hour or even less. These are mainly in the Baltic States, Poland, Hungary, Romania, and Bulgaria[13].

As regards the travel speed of freight trains, in some national networks and international rail freight corridors it is 50-60 km/h. However for the most of international freight trains, especially in central and eastern Europe, the average speed is between 20 and 30 km/h. On some international routes freight trains run at an average speed of only around 18 km/h[14].

Figure 3 – Length of dedicated high speed lines *(km, 2015)*

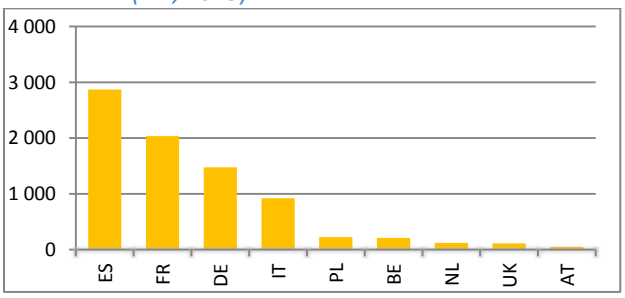
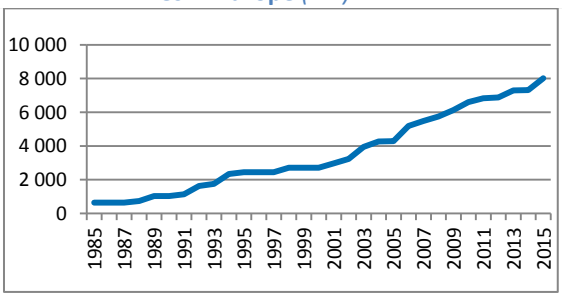


Figure 4 – Long term evolution of high speed lines in Europe *(km)*



Source: Statistical pocketbook 2016

13 6th Report on Economic, Social and Territorial Cohesion

14 The report of the European Court of Auditors 'Rail freight transport in the EU: still not on the right track'.

High speed lines[15] make up part of the rail networks of Belgium, Germany, Spain, France, Italy, the United Kingdom, the Netherlands, Austria (see Figure 3) and since 2015 also in Poland. In total 3.4% of the European rail network is high speed. Over the last six[16] years the high speed network has been expanded by 1 400 km (31%). More than 110 billion passenger-km (p-km) or 26% of all p-km in 2014 were run on high speed lines. The Spanish high speed network with its 2 871 km in operation and 1 200 km under construction is the second largest in the world after China[17]. In Denmark, Germany, France, Italy and Austria, another 1 200 km of high speed lines are under construction and new lines are planned in the United Kingdom and Sweden. In addition, large sections of the conventional rail network have been upgraded for use by high-speed trains. By 2030 the planned high-speed TEN-T should extend to over 30 000 km[18].

Building high speed lines requires significant investment and, while there is always a societal dimension linked to railway developments, achieving high utilisation rates is nevertheless crucial for mitigating burdens. A recent study by the Feder Foundation[19] noted that only one high speed line in Europe – Paris/Lyon – generates profits while all other high speed lines are dependent on public subsidies. Table-1 presents the utilisation rates of high speed lines by high speed trains in 2014[20]. The best utilisation rate has been achieved by High Speed 1 in the United Kingdom, operating a dedicated line between London and the Channel Tunnel. Achieving high utilisation rates is more challenging for larger networks. In these terms the French high speed network clearly outperforms the others. The use of extensive high speed networks in Spain is 5 times lower than in in France and almost 4 times lower than in Germany. In the Netherlands, after the technical difficulties of launching the services with FYRA-trains, Thalys-trains are the only high speed trains operated on HLS-Zuid.

Table-1 – Utilisation high speed lines for high speed services *(2014)*

	BE	DE	ES	FR	IT	NL	UK
Traffic with high speed rolling stock *(million p-km)*	910	24 316	12 788	50 659	12 794	242	4 360
Length of high speed lines *(km)*	209	1 352	2 515	2 036	923	120	113
Proportion of high speed network compared to total network *(line km)*	6%	3%	16%	7%	5%	4%	1%
Utilisation rate *(million high speed p-km per line km per year)*	4.4	18.0	5.1	24.9	13.9	2.0	38.6

Source: Statistical pocketbook 2016, based on UIC data

15 High speed lines are defined as lines or sections of lines on which trains can go faster than 250 km/h at some point during the journey

16 Data on high speed networks are available also for 2015, therefore comparison is made not between 2014 and 2009, but between 2015 and 2009

17 Study on the Results and Efficiency of Railway Infrastructure Financing within the European Union, Directorate-General for Internal Policies, European Parliament, http://www.europarl.europa.eu/RegData/etudes/STUD/2015/552308/IPOL_STU(2015)552308_EN.pdf

18 6th Report on Economic, Social and Territorial Cohesion

19 Albalate and Bel, 2015, referred to in the Study on the Results and Efficiency of Railway Infrastructure Financing within the European Union

20 Usage of high speed lines by conventional trains is excluded from this analysis

1.2. Missing links and cross border vision

Cross-border projects to remove missing links and bottlenecks between national networks and creating the European single rail area are key components of the **TEN-T policy supported by CEF financing**. For instance – Öresund – the fixed rail and road link between Denmark and Sweden – has been completed and has brought positive socio-economic benefits to neighbouring regions. On-going projects include for example Evora-Merida (PT/ES), Gent-Terneuzen (BE/NL), Trieste-Divača (IT/SI), Karlsruhe-Basel (DE/CH) and Katowice-Žilina (PL/SK). The estimated cost of completing the TEN-T network is EUR 700 billion, a significant part of which goes to cross-border projects.

In addition, assuring connection between smaller cities in neighbouring countries can contribute to improved economic and social well-being. These links, even if not included in the TEN-T Network, can serve as feeder lines providing access to the TEN-T comprehensive network. Other initiatives, mostly stimulated through EU regional policy, are intended to identify and support such projects, if viable.

In response to the initiative of the EP Committee of Transport and Tourism, which aimed to map the cross-border rail sectors having been abandoned over the last decades, DG MOVE proceeded with an analysis of a selection of discontinued local connections. The aim was to identify necessary conditions for taking some of these projects forward and key factors for them being successful. The results are summarised in the brochure *State of Play of Cross Border Railway Sections in Europe* (February 2016).

The results of the analysis showed that apart from traditional financing issues, there are many additional barriers for implementing cross border rail projects. These include:

- administrative and legal hurdles, such as different permission, concession and procurement rules in Member States;
- political barriers, such as unaligned political priorities or opposition from local communities to building a line;
- technical barriers in terms of different standards applicable to rail lines and rolling stock , variations in safety certification rules;
- operational barriers, such as different languages, infrastructure charging approaches, issues with ticket sales and with the access to service facilities.

Several efforts are ongoing to facilitate and overcome these obstacles. The Fourth Railway Package has given a new role to the European Union Agency for Railways (the Agency)[21] to provide EU level safety certification and vehicle authorisation. Some operational barriers, as regards train drivers, will be addressed during the ongoing evaluation of the Train Drivers Directive[22] and implementing rules will be established to facilitate access to service facilities[23]. DG MOVE has also commissioned a study on 'Permitting and facilitating the preparation of the TEN-T Core Network Corridors' and the new Procurement Directive[24] contributes to the simplification of cross-border projects.

Box 2 – Evaluation of the Train Drivers Directive

It is not only networks and rail vehicles, but also train drivers that need to be interoperable across the borders. Consequently, the main objective of the Train Drivers Directive is to facilitate the mobility of train drivers in the

21 Until 16 June 2016 called European Railway Agency

22 Directive 2007/59/EC of the European Parliament and of the Council of 23 October 2007 on the certification of train drivers operating locomotives and trains on the railway system in the Community, OJ L 315, 3.12.2007, p. 51

23 See Box 9 for further information

24 Directive 2014/25/EU of the European Parliament and of the Council of 26 February 2014 on procurement by entities operating in the water, energy, transport and postal services sectors, OJ L 94, 28.3.2014, p. 243

context of the increasing opening of the railway market while as a minimum maintaining the current safety levels. The Directive lays down conditions and procedures for the certification of train drivers operating rolling stock on the railway market of the EU. It also specifies the tasks of competent authorities in the Member States, train drivers and other stakeholders such as railway undertakings and infrastructure managers.

The report[25] submitted in December 2013 by the Agency was a first assessment of the implementation of the Directive. In addition to its benefits, the assessment concluded that the Directive has some unclear or outdated provisions and therefore the scheme is not fully effective in terms of achieving a harmonised EU-wide certification system for train drivers. The latter, however, is crucial for ensuring safety, non-discrimination of drives as well as for cost-efficient cross-border operations.

Building on the report of the Agency, the Commission is currently conducting an evaluation of the Directive with the aim to provide a complete overview of its implementation as well as the effectiveness of its provisions. Depending on its results, the evaluation may form the basis for a review of the Directive.

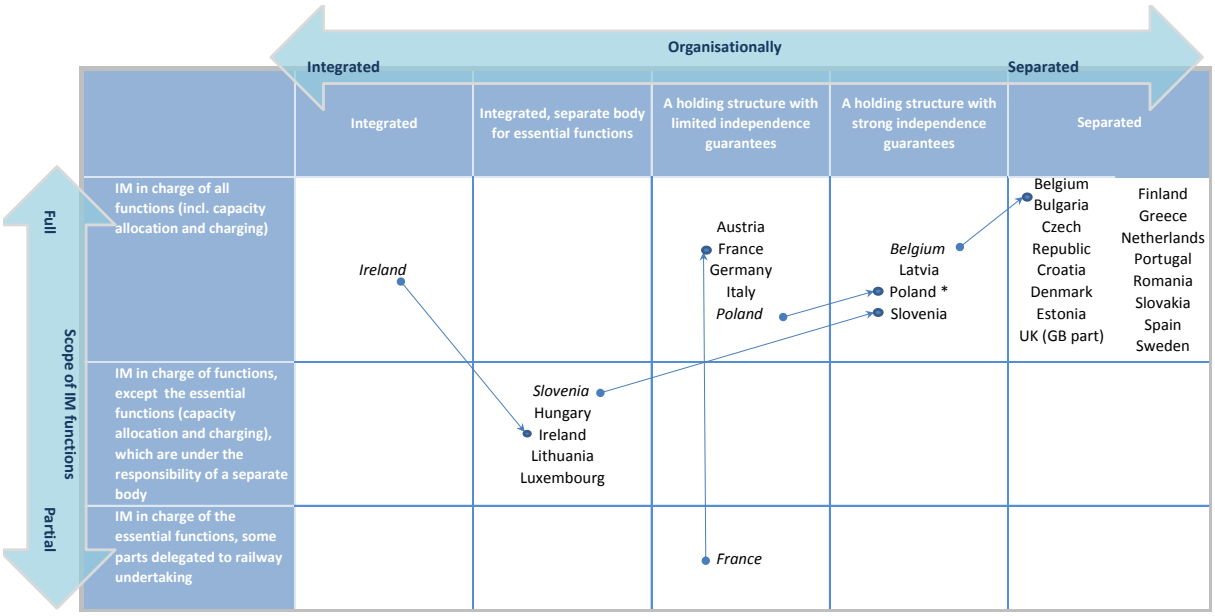
1.3. Infrastructure management

Management of rail infrastructure is in the hands of national infrastructure managers. Each Member State has one 'main' (incumbent) infrastructure manager taking care of the core part of the network, and other smaller infrastructure managers (mostly few, but e.g. in Germany and Sweden couple of dozens). These smaller infrastructure managers are responsible e.g. for specific lines, for regional infrastructure or for lines linking railways and service facilities. Transparent and non-discriminatory access to rail infrastructure is of a paramount importance for attracting more operators to the market. Infrastructure manages are also working on removing bottlenecks, raising efficiency as well as improving service quality, punctuality and reliability.

The Fourth Railway Package has proposed further measures to ensure that infrastructure managers perform all the functions needed to run rail operations in an optimised, efficient and non-discriminatory manner. Network efficiency can be improved further by pursuing interoperability and encouraging cross-border cooperation.

An overview of various national governance structures of the main infrastructure managers is provided in the scheme below.

Figure 5 – Institutional setting in the Member States *(end 2015)*



25 http://www.era.europa.eu/Document-Register/Documents/141118%20Art%2033%20report%20V1.1_final.pdf

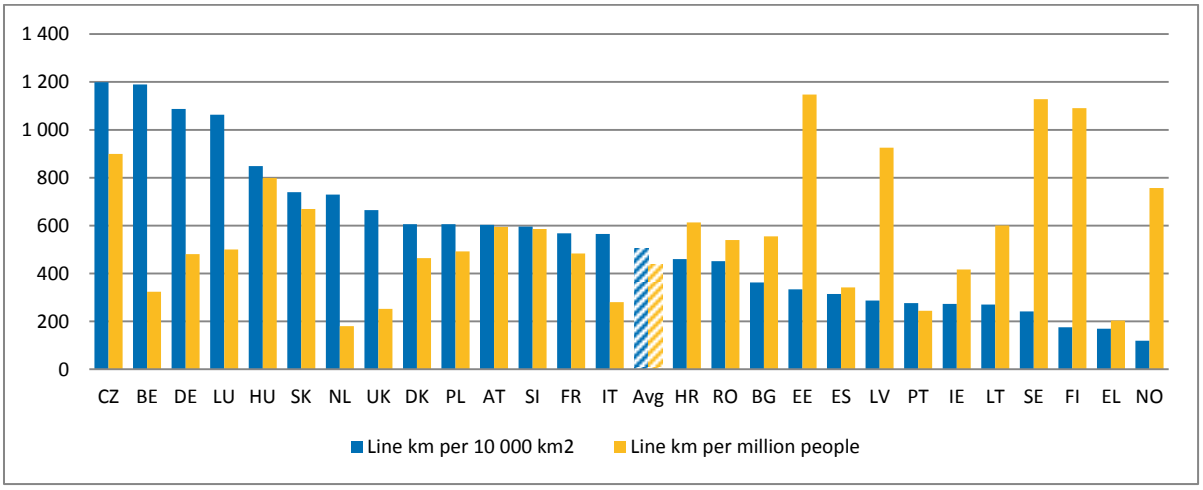
Since 2012 the following changes have taken place:

- In Belgium, the infrastructure manager is no longer part of a holding;
- In Slovenia, a holding structure was created and infrastructure manager's functions were merged;
- In Ireland, essential functions of infrastructure manager were separated, as required in case of integrated structures;
- In France, a new holding structure was set up, and all infrastructure management functions were reattributed to one single infrastructure manager, which is a subsidiary of the holding;
- Poland has a particular form of holding structure, where the State rather than the holding controls the infrastructure manager.

1.4. Infrastructure density

The Czech Republic, Belgium and Luxembourg with high population densities, have the most dense rail networks in terms of territorial coverage. Density of rail networks per inhabitant is the highest in sparsely populated Nordic countries, where ensuring connectivity of different regions requires relatively more km of lines. Interestingly, the Czech Republic and Hungary score high and Portugal and Greece low both in terms of lines per surface area as well as per inhabitant.

Figure 6 – Density of railway network in terms of surface area and population *(2014)*



Source: Statistical pocketbook 2016, based on Eurostat, UIC, IRG-Rail annual reports (BE, DE, FR), national statistics, Eurostat, estimates

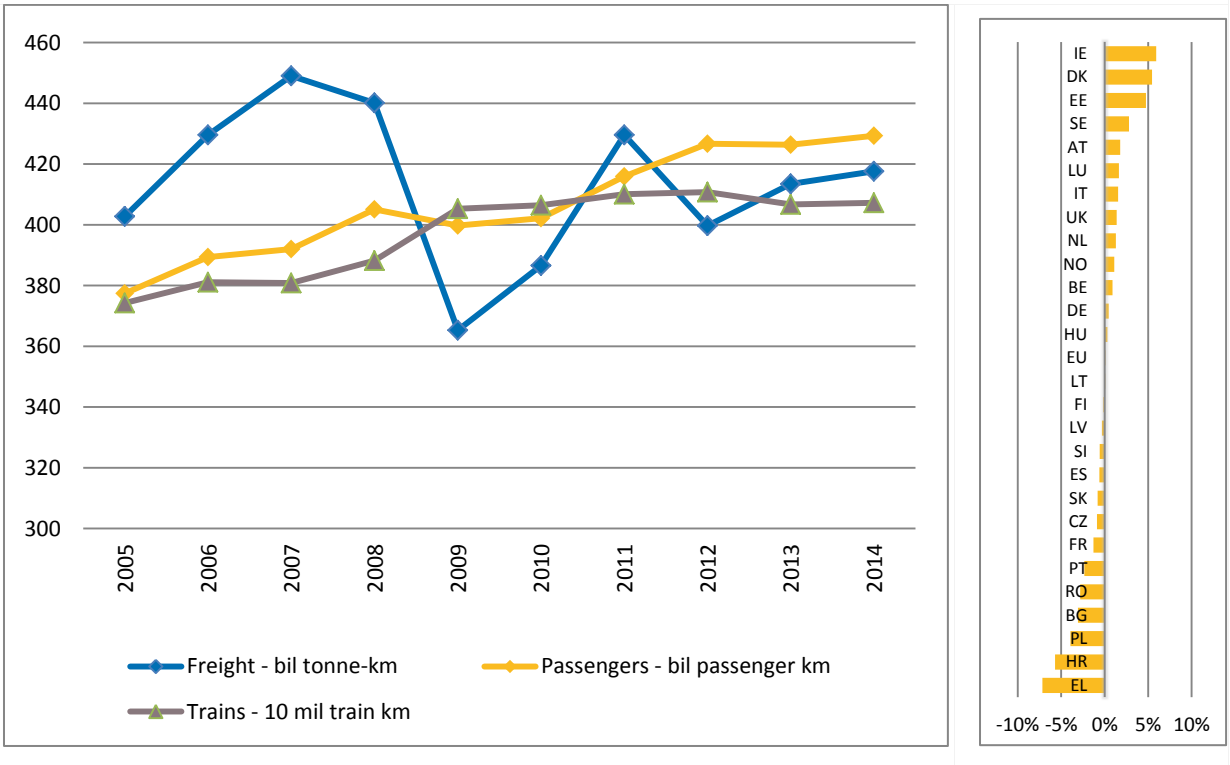
2. The evolution of the internal market in rail services

There are slight differences in total p-km and tonne-kilometres (t-km) as reported in the RMMS and Eurostat due to variations in the scope of reporting. The traffic volume indicators in this section are based on RMMS data (available as from 2007), because it provides break-downs between PSO and non-PSO services, domestic and international services and to some extent also traffic volumes in different market segments. Eurostat data (as presented in Statistical pocketbook 2016) are used to assess the modal split, which requires combining the data of different modes. Finally, for train-kilometres (train-km), the data of UIC, Eurostat and IRG-Rail have been combined in order to acquire a dataset as complete as possible. Data on train-km per type of traffic (freight and passengers) is unfortunately only partially available in Eurostat dataset and therefore is not used in the analysis.

2.1. Traffic volumes

Figure 7 looks at the **evolution of traffic volumes for passengers and freight** over the last 10 years. Despite an unfavourable economic climate across much of the EU since 2009, rail passenger outputs were almost not impacted by the crisis and have continued to grow on average 1% per year. Rail freight outputs in t-km in contrast dropped heavily in 2009, the low point of economic crisis and have not yet fully recovered. Total train-km (including both passenger and freight train movements) have effectively not increased indicating possibly certain productivity gains.

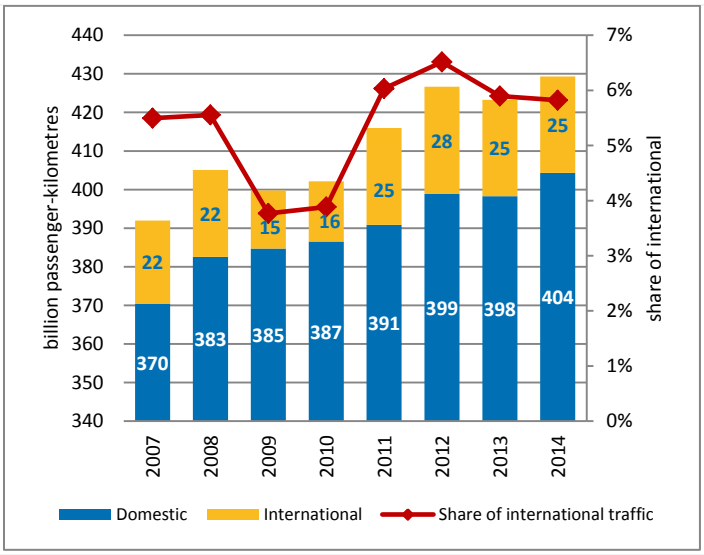
Figure 7 – Evolution of traffic volumes since 2005 and average annual change of train-km since 2009 *(%)*



Source: p-km RMMS, except IE and ES (Eurostat) and t-km RMMS, except IE, EL, ES and RO (Eurostat), train-km 2009 UIC, 2014 Eurostat, except BE, DK, FR, NL (IRG Rail 4th Annual Market Monitoring Report) and PT (an estimate).

2.2. Passenger market

Figure 8 – Evolution of rail passenger traffic volumes



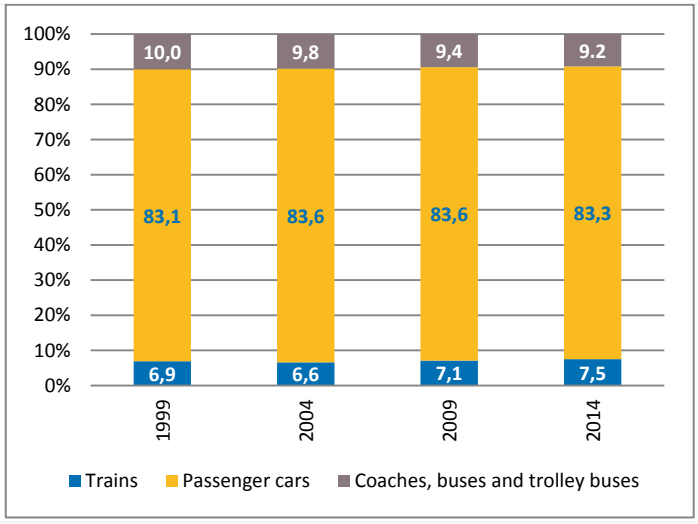
Source: RMMS except EL, ES, IE where a mixture of Eurostat data and estimates is used

In 2014, about 9.4 billion rail trips were made in EU countries. According to RMMS data, over the last five years to 2014, passenger rail demand in the EU increased by 30 billion p-km to 429 billion. This represents an average growth rate of 1.5% per annum. About 6% of passenger traffic is international.

While **domestic travel** has constantly increased, the **international traffic** remained the same compared to 2014. An increase of 5% or more took place only in France and in Portugal.

While volumes have grown, **the modal share of passenger rail** in land transport at the EU level has shifted only a half of percentage point from 7.1% to 7.5%.

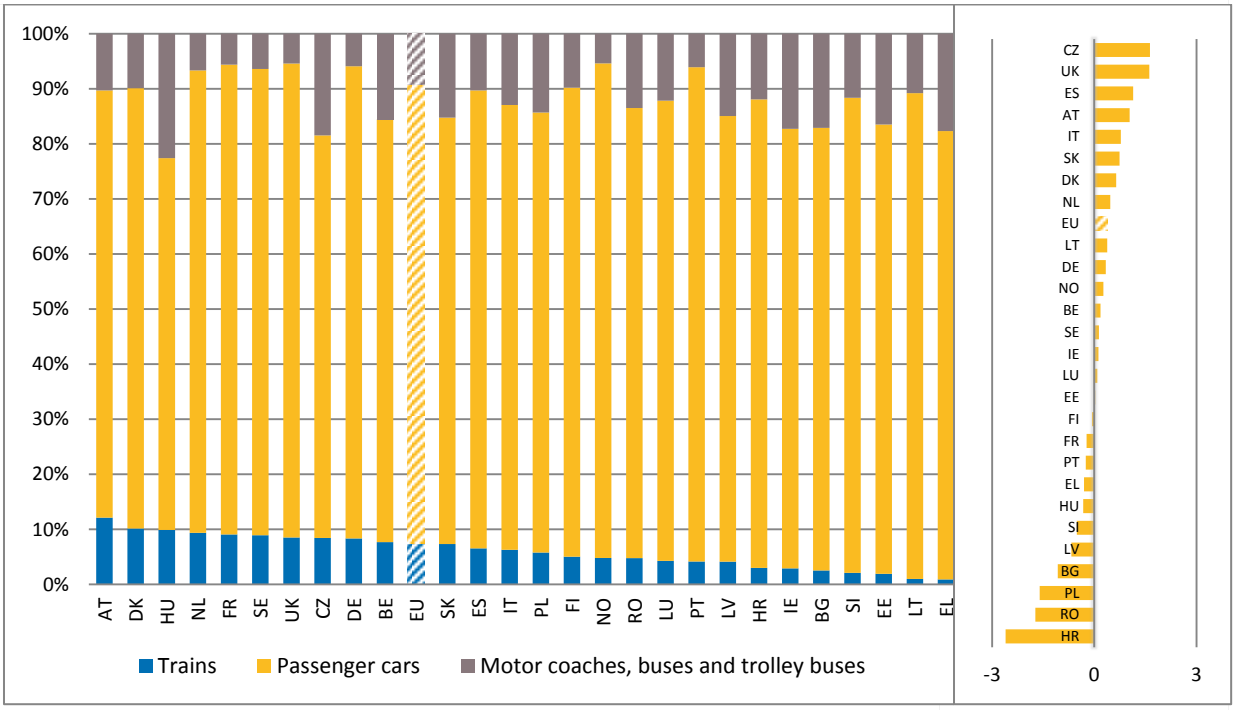
Figure 9 – Passenger land transport modal split *(%)*



Source: Eurostat and Statistical pocketbook 2016

It should however be noted that there are marked differences between Member States. Some Western European countries (the Netherlands, the United Kingdom) face the challenge of accommodating a modal shift towards rail on already saturated networks. Rail's modal share has increased also in the Czech Republic and Slovakia. At the same time some other Eastern European and peripheral countries (Latvia, Slovenia, Bulgaria, Croatia) cancel services due to financial constraints and decreased demand. The latter is often caused by low quality of services, where low frequency, long travel times and old fleet cause people to switch to other modes. This will in turn lead to a drop in revenue and to a vicious circle of service deterioration.

Figure 10 – Passenger land transport modal split by Member State *(2014)* **and change since 2009** *(in percentage points)*



Source: Eurostat and Statistical pocketbook 2016

Figure 10 shows that rail's modal share in passenger transport is higher than the EU average (7.5%) in nine Member States - Austria, Denmark, Hungary, the Netherlands, France, Sweden, the United Kingdom, the Czech Republic, Germany and Belgium, while Spain, Italy and Slovakia are also catching up. In Croatia, Romania, Poland and Bulgaria rail's share has declined more than 1 percentage point.

According to Figure 11 the **main markets for passenger rail travel** are in large and high-income Western European Member States. The growth of rail use since 2009 varied significantly, the largest relative increases in p-km over the last 5 years being in the United Kingdom, the Czech Republic and Luxembourg. An average decrease of 4 % or more per year has taken place in Romania[26], Bulgaria and Greece. Most dramatic reduction has taken place in Croatia, where according to available statistics passenger traffic has halved over the last 5 years[27].

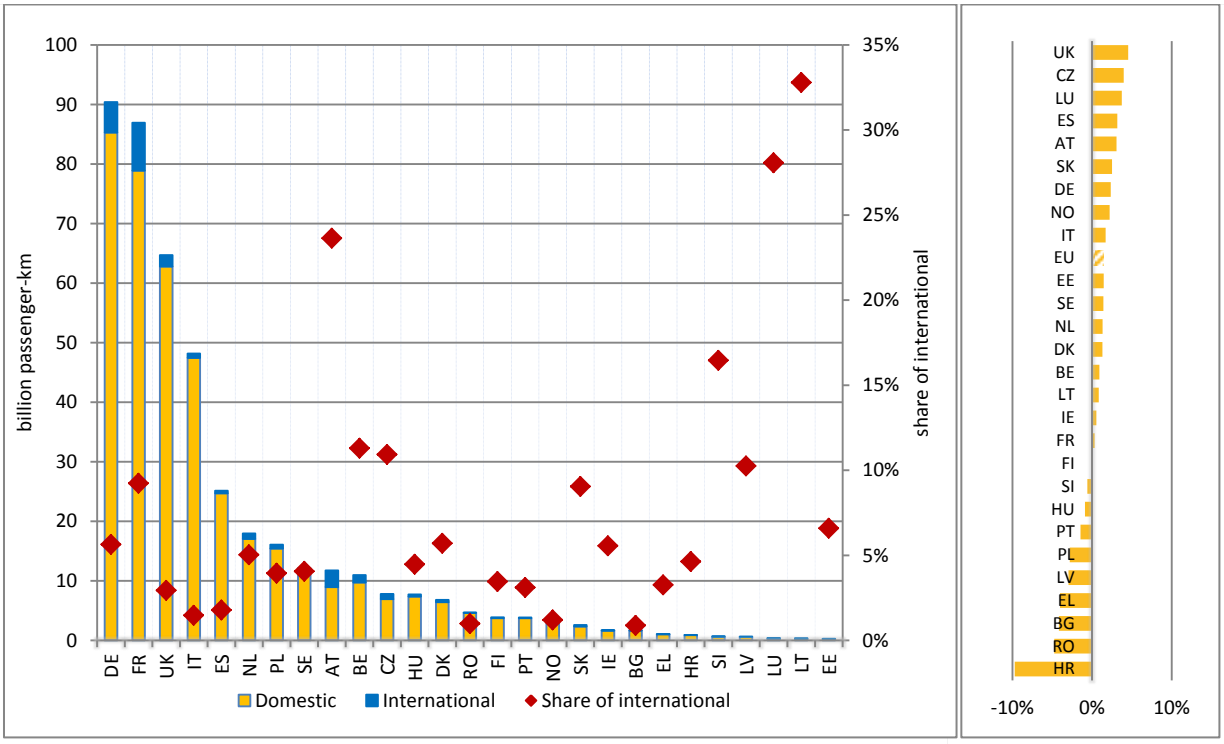
The **divergence in growth rates** in Member States reflects the impacts of a broad range of exogenous and endogenous factors. For example, increased access to car ownership and higher car use in EU13 Member States has suppressed rail demand in these countries. Conversely, the opening of new infrastructure or services, such as the West Coast Main Line upgrade works in the United Kingdom (2008) have supported rail demand and encouraged modal shift. Congestion on roads is also a strong factor supporting demand for rail services, in particular if facilitated by a suitable service offer and appropriate public policies (such as scarcity charge)[28].

26 However, this trend may have turned around - see Box 3

27 The dramatic decrease in HR might be partly caused by methodological issues: since the integrated transport system and ticketing has been introduced in Zagreb area, the passengers using integrated passes and tickets are not anymore included in railway statistics.

28 Source: Study on the *Cost and Contribution of the Rail Sector*(2015)

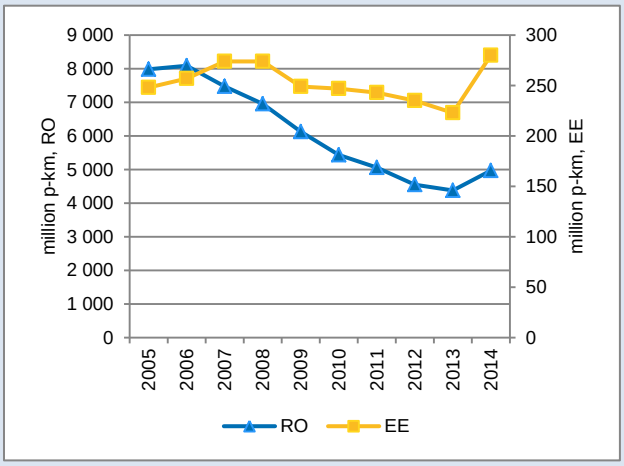
Figure 11 – Passenger traffic volumes by Member State *(p-km, 2014),* proportion of international traffic *(%)* and average annual change of volumes since 2009 *(%)*



Source: RMMS, except EL, ES, IE where a mixture of Eurostat data and estimates is used
Note: FR – drop in international traffic between 2012 and 2013 is due to a break in time series

In Eastern Europe, upgrading rail infrastructure and rolling stock and thus enhancing service quality appears of being the lever to support modal shift towards rail.

Box 3 – Turning around the negative trends in Estonia and Romania

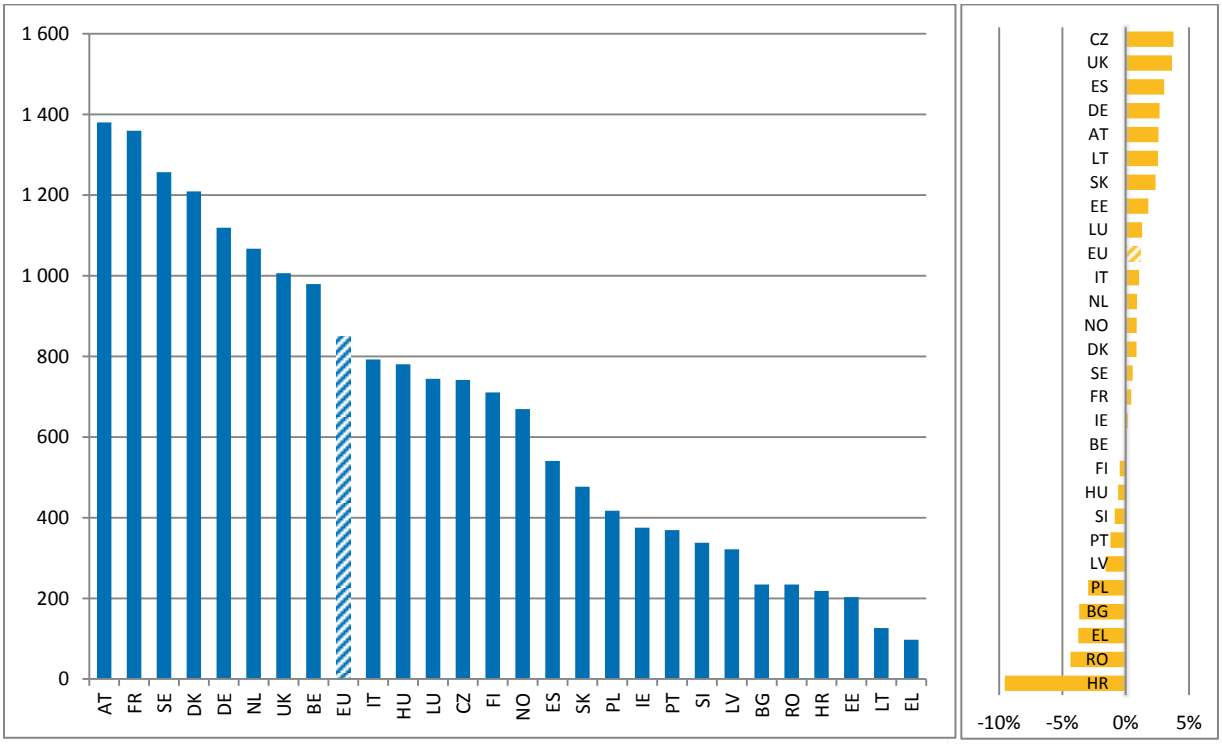


Source: RMMS

Until 2014, the volume of rail passenger services both in Estonia and Romania had been decreasing for more than 5 years. But it appears that both countries have managed to turn these negative developments around. In 2014 p-km in Estonia increased 27% and in Romania 13% and, according to national statistics, growth continued in 2015 (further +5% in Estonia and +4% in Romania). In both countries the upgrades of certain lines allowed for higher speeds and this helped the railways to gain popularity. In Estonia, in addition, new rolling stock was put into service, while in Romania ticket prices were reduced. It remains to be seen whether positive trends can be maintained.

Rail travel per inhabitant in Member States varies by a factor of ten. In 2014, estimated rail travel per capita was almost 1 400 km per year in Austria and France, and more than 1000 in Sweden, Denmark, Germany and the Netherlands; it keeps growing in all these countries. At the same time the propensity to travel by rail was less than 100 km in Lithuania and Greece[29].

Figure 12 – Propensity to travel by rail *(2014)* and its average annual change since 2009
(p-km per year per inhabitant)



Source: RMMS and Eurostat

2.3. Freight market

2.3.1. Evolution of volumes

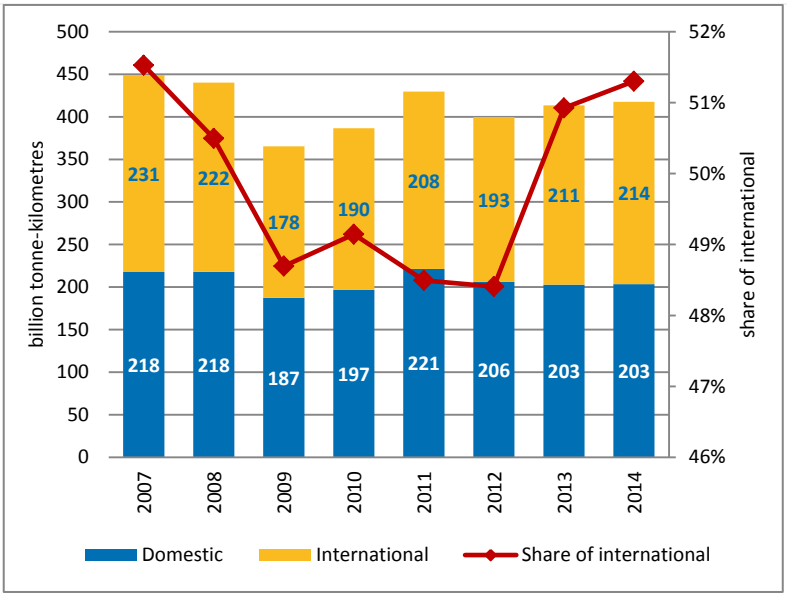
In 2014, more than 1.7 billion tonnes of freight was carried on EU railways. Figure 13 shows that rail freight outputs (t-km), while still being 7% lower than the 2007 peak levels, have recovered 14% between 2009 and 2014 reaching according to RMMS data to 417.6 billion t-km and showing average increase of 3% per year.

In terms of t-km, more than 50% of traffic in 2014 **was cross-border**, giving to rail freight a much stronger European dimension than is the case for passenger traffic (where the proportion of cross-border traffic is only around 6%). The proportion of cross-border rail freight is expected to grow further, taking into account that the competitive advantage of rail freight vis-à-vis road tends to grow with distance.

[29] It should be noted that, as an indicator, the propensity to travel depends besides rail demand also on the characteristics of the service offer – average distance travelled is usually higher in countries with a well-developed inter-city long distance network.

At the same time this means that rail freight is particularly affected by the lack of interoperability and sometimes lack of cooperation between the national railway networks, or in other words – the absence of a Single European Rail Freight Area.

Figure 13 – Evolution of rail freight traffic volumes



Source: RMMS

Box 4 – Interoperability of rail networks

There cannot be Single European Rail Area without interoperable networks and rolling stock able to run across national borders. In addition, standardisation of systems and equipment in its broader sense is crucial for achieving scale efficiencies and thus helping to reduce costs. Like highlighted in various parts of this document, lack of interoperability remains a key issue for international rail traffic.

For instance, across the EU, there are six standards for track gauge, 6 different power standards and 4 pantograph profiles for electric power supply. Loading gauges for freight wagons and containers also differ. For instance, Eurostar, the Channel Tunnel high speed train operator, which has started preparations for launching passenger services on the route London- Rotterdam-Amsterdam in late 2017[30], would need to find a way to comply with 10 different technical subsystems. Specific EU legislation exists to promote interoperability and overcome such differences[31], which is implemented with the assistance of the Agency. The Agency provides also detailed analysis of the trends of implementation of interoperability across the EU in its biennial interoperability reports[32].

In addition operational limitations in terms of capabilities of different network sections, such as maximum speed, electrification and permitted train length/axle load, can limit cross-border rail transport. The TEN-T Regulation[33] has set capability standards for the TEN-T core and comprehensive network.

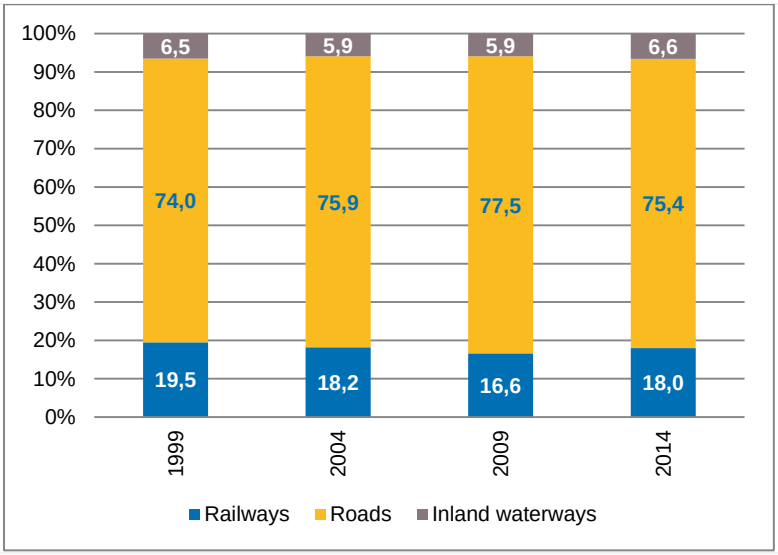
30 http://www.railwaygazette.com/news/high-speed/single-view/view/eurostar-plans-details-of-london-amsterdam-service.html

31 Directive (EU) 2016/797 of the European Parliament and of the Council of 11 May 2016 on the interoperability of the rail system within the European Union, OJ L 138, 26.5.2016, p. 44

32 http://www.era.europa.eu/Document-Register/Pages/Interoperabilitybiennialreport-2015.aspx

33 Regulation (EU) No 1315/2013

Figure 14 – Freight land transport modal split *(%)*

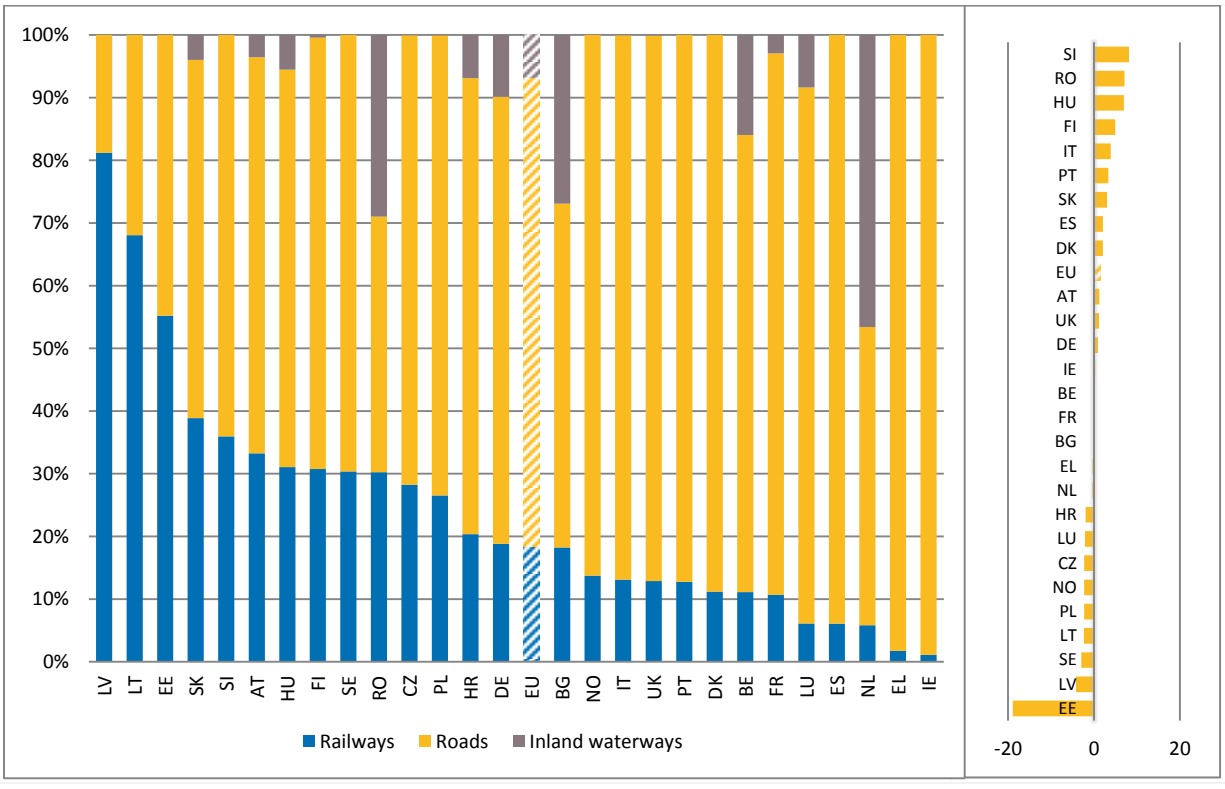


Source: Eurostat and Statistical pocketbook 2016

As shown in Figure 14 rail's **modal share in inland freight** transport (including railways, roads and inland waterways) was 18% in 2014 and has been relatively constant for several years. However as with passenger transport, behind a stable EU level average there are widely diverging trends at the Member State level.

Figure 15 shows that the modal share of rail freight in total surface transport varies between 80% in Latvia and 1% in Ireland. Overall, rail freight is more dominant in the Baltic States and Scandinavia. Lately several Eastern European countries (Slovenia, Romania and Hungary) have managed to significantly improve the rail's share in freight transport. A drastic decrease has taken place in Estonia due to rapidly dropping transit volumes (see below).

Figure 15 – Freight land transport modal split by Member State *(2014)* **and change since 2009** *(in percentage points)*



Source: Eurostat and Statistical pocketbook 2016

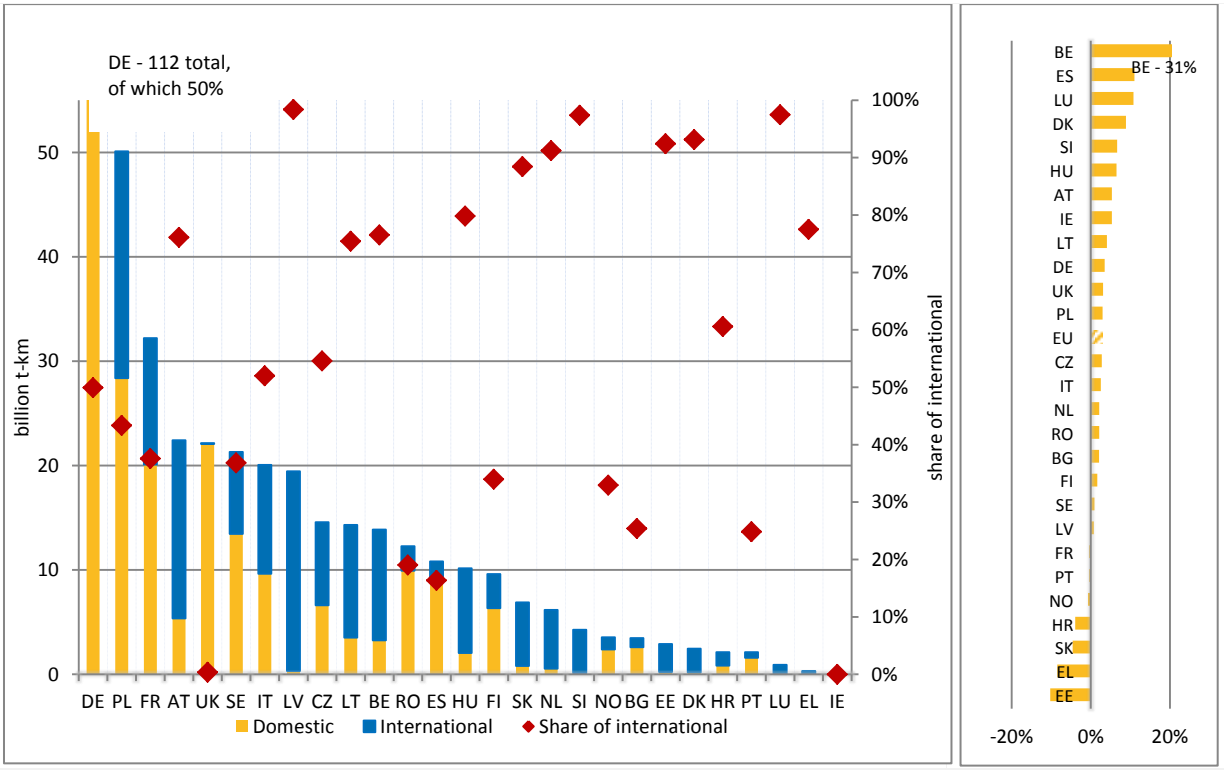
Box 5 – Inland freight transport modal split – adjusted methodology

The freight modal split data at the Member State level in this RMMS report differ from those used in earlier RMMS reports, given the changes applied by Eurostat for calculations.

The modal split is based on the total inland freight transport performance expressed in t-km. Complying with the relevant EU legal acts, data on rail and inland waterways transport are reported according to the 'territoriality principle' (transport on the national territory, regardless of the nationality of the haulier). However, road transport data is reported according to the nationality of the haulier (regardless of where the transport activity took place). Therefore, according to the new methodology, road transport data have been adjusted according to the 'territoriality principle' before calculating the modal split. More information on how this is done is available:

http://ec.europa.eu/eurostat/statistics-explained/index.php/Freight_transport_statistics_-_modal_split#Data_sources_and_availability.

Figure 16 – Freight traffic volumes *(t-km)* by Member State *(t-km, 2014)*, proportion of international traffic *(%)* and average annual change of volumes since 2009 *(%)*



Source: RMMS, except for EL, ES, IE, PT, RO where a mixture of Eurostat data and estimates is used
Note: BE: there appears to be a break in time series for international traffic as from 2013

As shown in Figure 16, countries with the highest absolute **freight volumes** are Germany, Poland and France. In small Member States, such as Estonia, Latvia, the Netherlands, Slovenia, Denmark and Luxembourg more than 90% of freight is international. Since 2009 (the low-point of economic crisis), in Spain, Luxembourg and Denmark[34] average annual increase has been close to 10% or more. Only in Croatia, Slovakia, Greece and Estonia there has been a further overall decline.

Estonia observed a decline in freight volumes of 51% since 2009. Rail freight traffic in the Baltic States consists mostly of bulk cargo originating in the Russian Federation and delivered to the ports

[34] In BE, the reported rapid increase in freight volumes might be due to a break in data series which seems to have been taken place between 2012 and 2013, where freight volumes more than doubled

of the Baltic Sea. These transit flows have been unstable over the recent years due to political instability, but also since the new Russian ports at the Baltic Sea have taken over a major part of this business. Of the three Baltic States, Estonia was most seriously hit and it appears that some of its freight traffic has been displaced to neighbouring Latvia, in part, due to lower access charges (both rail track access charges and port fees) in Latvia[35].

2.3.1. Future of rail freight

Despite the positive developments listed above, it is clear that with the current pace it will not be possible to reach the objective of the 2011 White Paper[36] to shift 30% by 2030 and 50% by 2050 of long-distance road freight to more energy-efficient transport modes such as rail and inland waterways. The European Court of Auditors notes in its report *Rail freight transport in the EU: still not on the right track* that overall, despite the EU policy objectives and the EU funding available for rail infrastructure, the performance of rail freight transport in the EU remains unsatisfactory. Market opening has achieved uneven progress in Member States and a Single European Railway Area is still a long way from being achieved. As regards the travel speed of freight trains, in some national networks and international rail freight corridors it is 50-60 km/h. However for the most of international freight trains, especially in Central and Eastern Europe, the average speed is between 20 and 30 km/h. On some international routes freight trains run at an average speed of only around 18 km/h[37]. Different national rules govern path allocation, infrastructure management and pricing making it more difficult for rail to compete with other modes of transport (in addition to other factors like the lack of level playing field between the different modes, the type of goods transported etc). This is particularly true for road transport, whose infrastructure is easily accessible across borders. As a result, rail freight transport performs poorly in terms of volume and modal share. The Court therefore recommends that the Commission and the Member States should help the infrastructure managers and railway undertakings to increase further the competitiveness of rail freight transport, particularly in terms of reliability, frequency, flexibility, customer orientation, transport time and price.

Box 6 – Revitalising rail freight

Recognition that longer-distance, cross-border transport is most likely to shift from road to rail is being reflected in EU policies, as it is the case with the development of the Rail Freight Corridors (RFC)[38], which is the key element of the European strategy to revitalise rail freight. The establishment of RFCs and their corresponding governance structures aims at improving the conditions for rail freight traffic along the corridors and to trigger its development in terms of volume, market share, quality and reliability. The corridor approach also fosters the cooperation between different stakeholders (primarily the Member States and the infrastructure managers), the coordination in terms of capacity offer, traffic management and conditions of use of the infrastructure, the harmonisation of processes and rules as well as prioritisation of investment. All nine corridors have been now set up and, based on the experience and feedback gathered so far (including stakeholder consultation process); an evaluation of the RFC Regulation is currently ongoing. The purpose of the evaluation is to assess whether there is a need to strengthen the corridor concept and to adapt it to the new

35 Cargo volumes handled at Latvian ports increased by 23% between 2004 and 2012 (see Rijkure. A and Sare. I (2013), *The Role of Latvian Ports Within Baltic Sea Region*, European Integration Studies, 2013 No 7)

36 White Paper Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system, adopted on 28 March 2011 (COM/2011/0144)

37 http://www.eca.europa.eu/en/Pages/NewsItem.aspx?nid=6971

38 Embedded in the Rail Freight Corridor Regulation - Regulation (EU) No 913/2010 of the European Parliament and of the Council of 22 September 2010 concerning a European rail network for competitive freight, OJ L 276, 20.10.2010, p. 22

needs and expectations of the sector.

In addition, the Commission fully supports the Rotterdam Ministerial Declaration and Sector Statement on rail freight[39], in the elaboration process of which it has closely participated. For the follow-up, it is crucial that the relevant national authorities would immediately launch efforts to increase the quality and reliability of rail freight services in Europe.

Rail freight has to face several challenges, which are to different degrees relevant to all market segments - trainload, wagonload and combined traffic:

- A quality challenge: improving reliability and punctuality, i.e. through higher interoperability and better co-operation across borders in the field of traffic and infrastructure management.
- A cost challenge: improving cost competitiveness by higher productivity and more efficient train operations, i.e. through improved and harmonised infrastructure standards, and by providing a more level playing field between transport modes.
- A service challenge: adding new added-value service features, supported by deployment of innovative technology, allowing rail to (re-)enter new / lost market segments.
- A political challenge: securing societal and political acceptance and support of rail freight, such as in the area of rail noise.

Crucially, good last-mile infrastructure is vital for the development of rail freight. Discussions are ongoing with stakeholders on how to best address these issues, including e.g. facilitation of access to information on European last-mile infrastructure and identification of success features for support programmes for modernisation and new constructions.

Finally, it is important to ensure that the same principles are applied for charges and taxes on different transport modes, notably the 'user pays' and 'polluter pays' principles, and that the overall framework conditions for various transport modes converge. This will, at the end, benefit rail freight. The Commission services have carried out substantial work in the past on the internalisation of external costs which also involved taxation and charges, and this work will be continued in the future. A comprehensive study on internalisation of external costs in transport, which will inter alia present a detailed analysis of transport related taxes and charges, will be launched in 2017.

2.3.2. Rail noise

Rail freight noise is the most sensitive environmental problem for the railway sector and a serious nuisance for citizens living close to railway lines. The European Environment Agency estimates that nearly 14 million Europeans are affected by rail noise.

A number of initiatives have been already adopted at the EU level in order to reduce noise exposure, including the Environmental Noise Directive 2002/49/EC, Technical Specification for Interoperability (TSI) on Noise[40], financial assistance under the CEF and modalities for noise-differentiated track access charges[41]. However, despite the efforts of the Commission and Member States, progress in tackling rail noise is rather slow. There is a risk that excessive levels of railway noise can lead to uncoordinated unilateral actions by Member States along the most important European rail lines, in particular the Rhine-Alpine corridor, such as applying speed restrictions and restrictions on operating at night. Such restrictions would negatively impact the competitiveness of rail freight.

39 http://ec.europa.eu/transport/themes/infrastructure/news/doc/2016-06-20-ten-t-days-2016/rfc-declaration.pdf
http://ec.europa.eu/transport/themes/infrastructure/news/doc/2016-06-20-ten-t-days-2016/corridor-sector-statement.pdf

40 Commission Regulation (EU) No 1304/2014 of 26 November 2014 on the technical specification for interoperability relating to the subsystem 'rolling stock — noise', OJ L 356, 12.12.2014, p. 421

41 Commission Implementing Regulation (EU) 2015/429 of 13 March 2015 setting out the modalities to be followed for the application of the charging for the cost of noise effects, OJ L 70, 14.3.2015, p. 36

Box 7 – Policy framework for tackling rail noise

Given that more than 50 % of rail freight transport is international and many wagons run across borders, any attempt to combat rail noise at source needs a European response. In order to assess what further steps could be envisaged, the Commission conducted an Impact Assessment in 2014, which indicated that at present the most effective way to mitigate rail noise is by retrofitting the existing freight wagons with composite brake blocks. This technical solution reduces rail noise by up to 10 dB which equals a 50% reduction in audible noise for humans. The Impact Assessment showed also that the preferable approach would be a policy mix encompassing application of harmonised noise-charging principles, financial support both at EU and national level, development of noise-related standards of railway infrastructure and a revision of the TSI on Noise.

The Staff Working Document on rail freight noise reduction[42] encapsulates the whole policy framework. The Commission now envisages a revision of the TSI Noise so that in future the noise limit values become gradually applicable not only to new wagons but also to existing fleet; first to international wagons (suggested timing 2022) and then to the whole fleet (suggested timing 2026). It is paramount to provide stakeholders with a stable timeframe, which will allow them to anticipate the necessary investment and to adopt suitable market strategy. The Agency has started preparations for the revision of the TSI Noise with planned adoption mid-2017.

2.3.3. Rail freight in multimodal context

Railways seldom provide door-to door delivery and therefore development of **multimodal solutions** is vital for its attractiveness. The study conducted by the Commission on the design features for support-programs for investment in last mile infrastructure (i.e. the movement of goods from a transportation hub to final destination) noted that while block trains and single wagon load transport still dominate the European rail freight market with 1.45 billion tonnes (82%), the intermodal transport accounts for 0.31 billion tonnes (18%) and is growing. The latter is triggered by rising maritime volumes, relevance for alpine transit and substitution of single wagon transport.

The above mentioned study also looked at the changes in the framework conditions for the rail freight market in Europe and concluded that over the last decades the opening of transport markets has led to increased intermodal competition for rail freight. There has been also a shift in the range of transported goods and with new cargo types the customers expect faster delivery and transparent transport chains with real-time information.

Therefore, to ensure that rail freight remains competitive, it is crucial to support its functioning in the intermodal context and to develop efficient solutions of combined transport[43]. According to UIRR, the Association of European Road-Rail Combined Transport, the performance or rail-road combined transport has over the last year grown by 12.2% in 2014 and 5.23% in 2015 in terms of t-km. Shorter distance domestic traffic has been decreasing, while cross-border and in particular intercontinental combined transport is increasing (+27% in 2015). Subsequently, the average distance travelled increased from 780 km in 2014 to 882 km in 2015, proving once again that combined rail-road transport in longer distance and cross-border services is more competitive vis-à-vis road-only services than short distance (domestic) transport.

[42] SWD(2015) 300 final, http://ec.europa.eu/transport/modes/rail/doc/2016-01-05-cswc-rail-noise-reduction.pdf

[43] *Multimodal transport* is any transport using several modes of transport for one journey without any specific characteristics or limitations. *Intermodal transport* is type of multimodal transport where the goods are carried in intermodal load unit such as container or trailer and it is the load unit that is transhipped from one mode to another as opposed to the goods being reloaded. *Combined transport* is a type of intermodal transport where the road leg is limited to a short distance and the major part of the route is carried out by rail, inland waterways or maritime transport.

Box 8 – Promoting combined transport

Given that the EU has not yet fully internalised external costs of all transport modes, the market does not provide appropriate price signals to users for shifting towards sustainable modes. Therefore, to ensure further development of combined transport, suitable legal and policy frameworks are needed to ensure wider use and investment into infrastructure and logistical solutions.

The **Combined Transport Directive**[44] targets this market failure by supporting combined transport with regulatory and fiscal measures. It was adopted more than 20 years ago and was evaluated in the framework of the REFIT agenda in 2016[45]. The evaluation identified several shortcomings, which the Commission is planning to address through an amendment of the Directive. The planned amendment is expected to give a further boost to combined transport in the EU and thus support sustainable development of the whole transport system. By improving the competitiveness of combined transport as an alternative to road transport, the initiative will contribute to decarbonisation and reduce transport related environmental pollution as well as improve road traffic safety and reduce congestion.

To support the development of combined transport, it is important that the clearance gauge of a line gives access to standard container trains. The Commission will publish a report providing the analysis of the state of the network in these terms and suggest measures for respective enhancements in early 2017.

[44] Directive 92/106/EEC of 7 December 1992 on the establishment of common rules for certain types of combined transport of goods between Member States, OJ L 368, 17.12.1992, p. 38

[45] SWD (2016) 140 (evaluation report) and SWD (2016) 141 (executive summary) http://ec.europa.eu/smart-regulation/evaluation/search/download.do?documentId=17165337

3. The evolution of the internal market in services to be supplied to railway undertakings

The Recast Directive introduced a set of **new rules for service facilities and rail related services**. The new legal framework applies to a broad range of facilities including passenger stations, freight terminals, marshalling yards and train formation facilities, storage sidings, maintenance facilities, cleaning and washing facilities, maritime and inland port facilities and refuelling facilities. The provisions also cover the services provided in these facilities as well as additional and ancillary services such as traction current supply, pre-heating of trains, arrangements for transport of dangerous goods, access to telecommunication networks and ticketing services in stations.

Box 9 – Service facilities and services - compliance with current rules and future developments

The new rules introduced by the Recast Directive have not yet been transposed in all Member States. Even where they have been transposed, basic rules such as publication of access conditions and charges are often not yet fully complied with. There are various reasons for this, including a lack of awareness of operators of services facilities and a degree of resistance towards publication of information that is considered as sensitive by certain stakeholders (e.g. charges for access to facilities). Given fragmentation of the market (a large range of different owners and operators of various sizes), there could be gaps in terms of overview of all service providers[46] and this complicates proper enforcement further.

Yet several Member States have already made progress by gradually improving compliance with the existing legal framework, and some have even tackled problems not yet addressed in the Recast Directive. These range from the development of templates to facilitate publication of information to sharing real time information on trains arriving at the facility and attempts to align deadlines for path allocation and allocation of capacity in service facilities.

In order to ensure a more coherent development of the service facilities market, the Commission services are currently preparing an implementing act to complement the basic legal framework. The act should help to codify best practice at an early stage and prevent divergences in implementation, which can be detrimental to the objective of a Single European Rail Area.

The Commission also aims at reducing the cost of traction current, which currently accounts for 10 to 30% of the transportation price. For instance, following EC requests, DB Netz (Germany) opened access to other current suppliers to its network. This resulted in a significant drop of energy prices and increase in third-party suppliers' market share.

Another aim is to create conditions allowing the suppliers to shift from an estimates based consumption billing to meter based billing. The latter would incentivise utilisation of energy friendly rolling stock and driving styles. Necessary conditions include on-board metering systems, transmission interfaces for metered data and a clearance system. SNCF Reséau (France) and ProRail (the Netherlands) have started to test a clearance system.

The main aim of the legislation is to increase the transparency of access conditions and charges applied and to ensure non-discriminatory access to facilities. Therefore, ownership and management of facilities needs to be monitored. RMMS information is rather complete for stations but still fragmented for other facilities and there is room for improvement as regards monitoring of this part of the rail market. In particular definitions of the various categories of facilities have not yet been

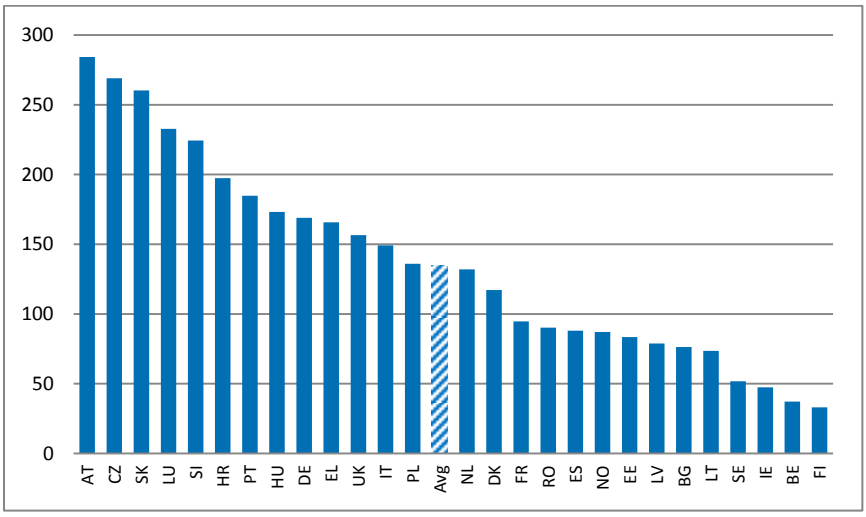
[46] The UK for example highlighted that (1) the majority of freight facilities have so far been unregulated and are operated by commercial entities and their exact number is not known. Many freight sites are controlled by freight operators but they are not clearly disaggregated into yards, sidings, refuelling, freight maintenance etc.

harmonised. Therefore any data presented in this section must be interpreted with care. The Commission services are cooperating with national regulators and Member States to refine definitions and improve the quality of reporting.

3.1. Passenger rail stations

There were about 30 000 stations in the EU in 2014[47], of which about 300 were **large stations** serving more than 25 000 travellers per day.

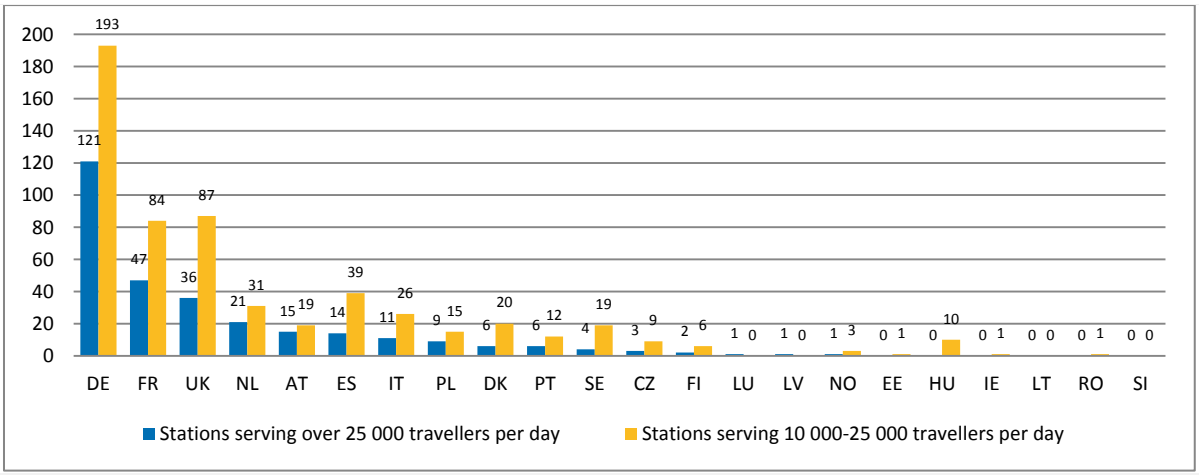
Figure 17 – Stations' density in relation to network length
(number of passenger stations per 1 000 line-km, 2014)



Source: Number of stations: RMMS and IRG Rail 4th Annual Market Monitoring Report for EL, HR and SK. Length of lines: Statistical pocketbook 2016

As shown in Figure 17, Austria, Czech Republic and Slovakia have more than 250 stations per 1 000 line-km (i.e. less than 5 km between two stations) while Finland, Belgium and Ireland have, according to RMMS data, less than 50 stations per 1 000 line-km (i.e. more than 20 km on average between two stations).

Figure 18 – Number of stations serving more than 10 000 travellers per day



Source: RMMS (data 2013 for IE), BE, EL, HR and SK - data not available.

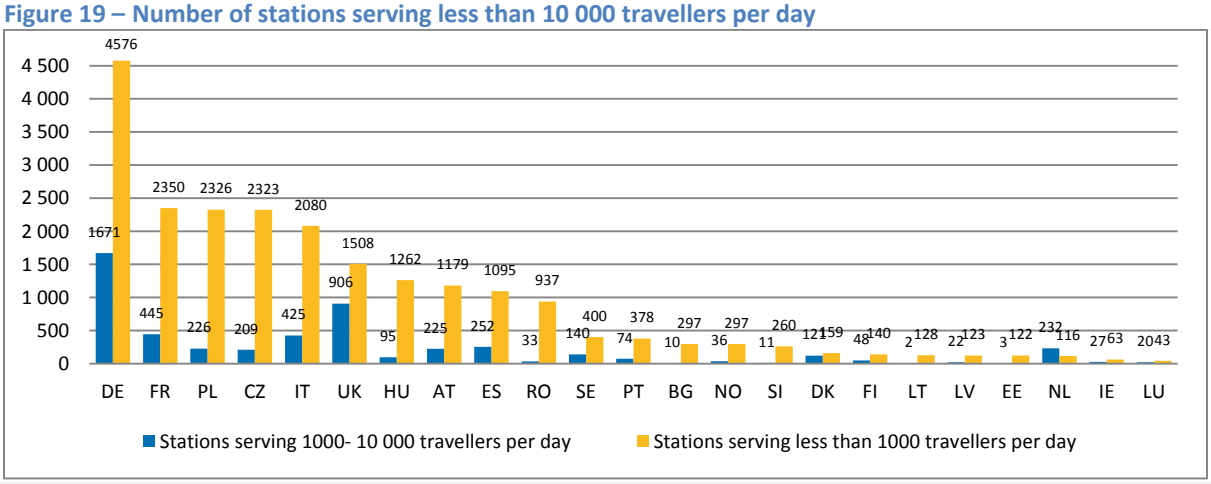
Figure 18 and Figure 19 present the **number of stations in different size clusters**. Germany, France and the United Kingdom have the highest number of large stations serving more than 10 000 travellers per day. Bulgaria, Lithuania and Slovenia reported that they do not have such stations[48].

47 Includes estimates for countries where data were not available (BE, EL, HR, IE, SK)

48 Data for IE are for 2013, data not available for BE, EL, HR and SK

Germany, France, Poland and the Czech Republic have a high number of smaller stations, serving less than 10 000 travellers per day. Very small stations serving less than 1 000 travellers per day outnumber the stations serving between 1 000 and 10 000 travellers per day in all countries except in the Netherlands.

Figure 19 – Number of stations serving less than 10 000 travellers per day



Source: RMMS 2014 except for IE and PL (2013 data) and BE, EL, HR, SK (data not available). For EE and SE: estimates for number of stations serving less than 1 000 travellers.

As shown in Table-2, **ownership/management of large stations** is concentrated in the hands of a few players. Infrastructure managers or incumbent railway undertakings are managers and often also owners. Governments own large stations in 7 countries, leaving the management to infrastructure managers or integrated companies.

Table-2 – Ownership (O) and management (M) of stations serving more than 25 000 travellers per day

	Number of stations (2014)	Incumbent railway undertaking	Other RUs	Infrastructure manager	Integrated companies	Government	Other private operators
CZ	3	O, M					
DK	6	O, M		O, M			
DE	121	O, M					
ES	14			O, M*			
FR	47	O, M		O			
HR	N/A			M		O	
IT	11			O			
LV	1			O, M			
LU	1				O, M	O	
NL	21	O, M		O, M			
AT	15			O, M			
PL	9				M	O	
PT	6			M		O	
SK	N/A			M		O	
FI	2	O				O	O
SE	4					O	
UK	36		M	O, M			
NO	1	O		M			

Source: RMMS. FR data reflects the situation in 2014 before the 2015 national railway reform. In SE the main infrastructure manager manages platforms in stations, the state-owned Jernhusen owns and manage around 50 station-buildings (out of around 160), including the three largest; the rest is owned by various entities such as local municipalities and private companies. *= in ES the management of commuter stations is entrusted to Renfe Operadora (incumbent RU).

The **ownership/management of small stations,** presented in Table-3, is more dispersed across the different players in all countries. In addition to government and main infrastructure managers, other railway undertakings and private operators are more involved in ownership and management of small stations.

Table-3 – Ownership (O) and management (M) of stations serving less than 1000 travellers per day

	Number of stations (2014)	Incumbent railway undertaking	Other RUs	Infrastructure manager	Integrated companies	Government	Other private operators
BG	297			M		O	
CZ	2 323	O, M					
DK	159	O, M		O, M			
DE	4 576	O, M	O, M	O, M	O, M		O, M
EE	122	M	M	O			
IE	63						
ES	1 095			O, M*			
FR	2 350	O, M		O			
HR	N/A			M		O	
IT	2080			O		O	
LV	123			O, M			
LT	128				M	O	
LU	43				O, M	O	
HU	1 262			M	O, M	O	
NL	116	O, M		O, M			
AT	1 179		O, M	O, M			
PL	2 326				M	O	
PT	378		M	M		O	
RO	937			O, M			
SI	260			O, M			
SK	N/A			M		O	
FI	140	O				O	O
SE	400			O, M		O, M	O, M
UK	1 508		M	O			
NO	297	O		O, M			O

Source: RMMS. FR data reflects the situation in 2014 before the 2015 national railway reform *= in ES the management of commuter stations is entrusted to Renfe Operadora.

Accessibility of stations for travellers with reduced mobility (including disabled people, people with temporary mobility restraints, elderly and accompanying persons such as parents with buggies) remains an EU wide challenge. Accessibility issues arise at different stages of a rail journey, not only at boarding a train and during the journey, but also in the preparatory stage. Given the societal dimension of rail transport, it is important for the sector to tackle this challenge making rail travel accessible to everybody and bringing new customers to rail.

Box 10 – Accessibility of stations to persons with disabilities and persons with reduced mobility

Commission Regulation (EU) No 1300/2014 of 18 November 2014 on the technical specifications for interoperability relating to the accessibility of the Union's rail system for persons with disabilities and persons with reduced mobility (PRM TSI) applies since 1 January 2015. The rules apply to infrastructure (e.g. obstacle-free routes in railway stations, visual and spoken information, platform width and height, and boarding aids) and to rail carriages (e.g. doors, wheelchair spaces, and information), making accessibility a mandatory requirement for newly built, upgraded or renewed rail infrastructure and rolling stock.

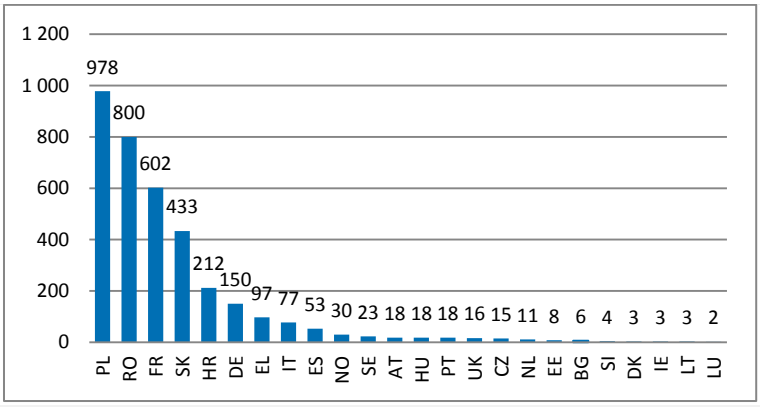
The Regulation requires Member States to adopt National Implementation Plans (NIPs) to progressively eliminate all barriers to accessibility. The NIP contains a strategy, including the criteria and priorities for stations and units of rolling stock to be designated for renewal or upgrading. This strategy shall be formulated in cooperation with infrastructure managers, station managers, railway undertakings and, where relevant, with other local authorities. Representative associations of users including persons with reduced mobility shall be consulted. The NIPs shall be notified to the Commission by 1 January 2017. Within six months of completion of the notification process, the Commission has to prepare a comparative overview of the strategies contained in the NIPs. On the basis of this overview, and in cooperation with the Advisory Body, the Commission shall identify priorities and criteria to further guide the implementation of the Regulation.

3.2. Other service facilities

Freight terminals

Based on RMMS data and as shown in Figure 20, Poland has the highest number of freight terminals, followed by Romania, France and Slovakia (with more than 400 terminals each). The widely diverging definitions used by Member States for freight terminals explain the major variations in figures between similar countries. For instance, Poland included 978 tracks with the possibility to load and unload owned by PKP PLK, while the United Kingdom reported only intermodal terminals[49].

Figure 20 – Number of freight terminals *(2014)*



Source: RMMS 2014 except for EL and IE (2012 data) and SE (DG MOVE estimates). For PL the figure indicates the tracks owned by PKP PLK with the possibility to load and unload, whereas there were 32 intermodal terminals at the end of 2014. UK figure refers only to intermodal freight terminals.

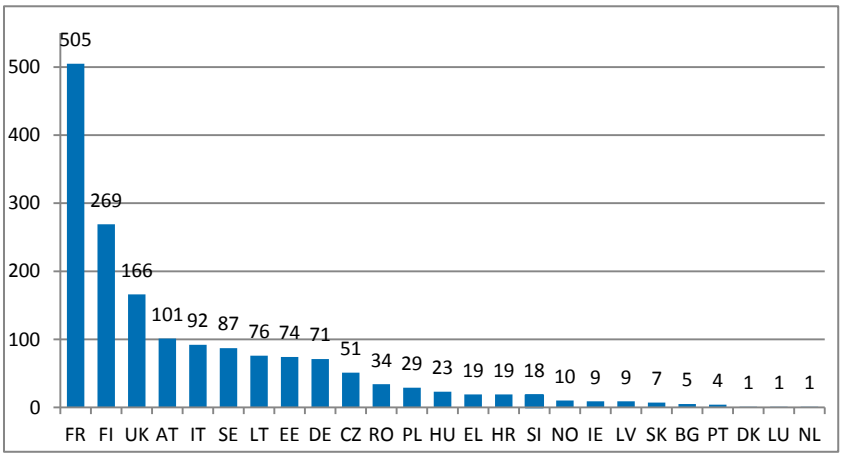
Ownership/management of freight terminals is mixed. Non-incumbent undertakings own and manage terminals only in Germany and the United Kingdom. The government may own terminals (as in Bulgaria, Croatia, Italy, Luxembourg, Hungary Portugal, Slovakia, Sweden and the United Kingdom) but does not manage them. Terminals are mostly managed by infrastructure managers (in 12 out of 23 responding countries) or other private operators (in 11 countries).

Marshalling yards and train formation facilities

As shown in Figure 21, France, Finland and the United Kingdom reported the highest number of marshalling yards and train formation facilities. However, again, there are divergences in definitions. For example, Germany's 71 marshalling yards and train formation facilities include only installations with gravity hill; including those without gravity hill would bring the figure to 236. Poland has reported 29 installations both with and without gravity hills (including 21 with gravity hill).

[49] For comparison, as PL clarified, that there were 32 intermodal terminals at the end of 2014

Figure 21 – Number of marshalling yards and train formation facilities *(2014)*



Source: RMMS except for FR and UK (2013 data) and EL and IE (2012 data)

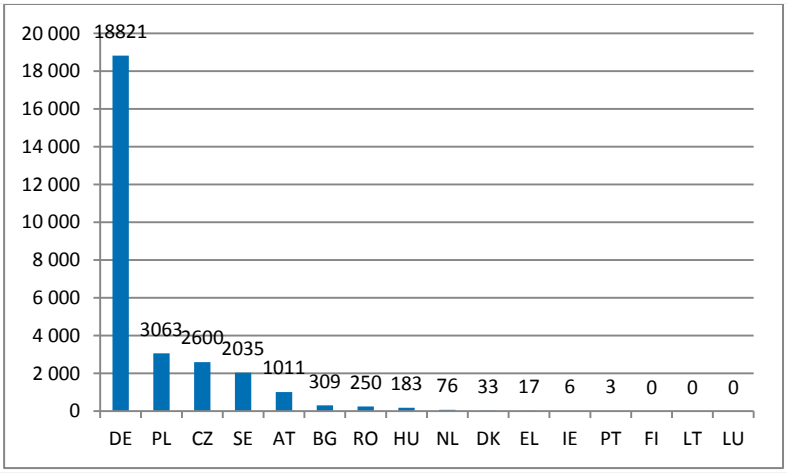
In terms of ownership and management, the infrastructure managers are owners of marshalling yards in 14 out of 22 responding countries. Governments own marshalling yards but they outsource the management, often to infrastructure managers (e.g. in Bulgaria, Croatia, Italy, Lithuania, Luxembourg, Hungary, Portugal and Slovakia).

Storage sidings

Storage sidings are sidings dedicated to temporary parking of railway vehicles between two assignments.

Again there are profound differences in definitions used in various countries as well as important reporting gaps (only 16 countries provided data in the RMMS). In most countries having provided data, infrastructure managers own and manage storage sidings. Government ownership is reported in Croatia, Luxembourg, Hungary and Slovakia, without associated management functions.

Figure 22 – Number of storage sidings *(2014)*

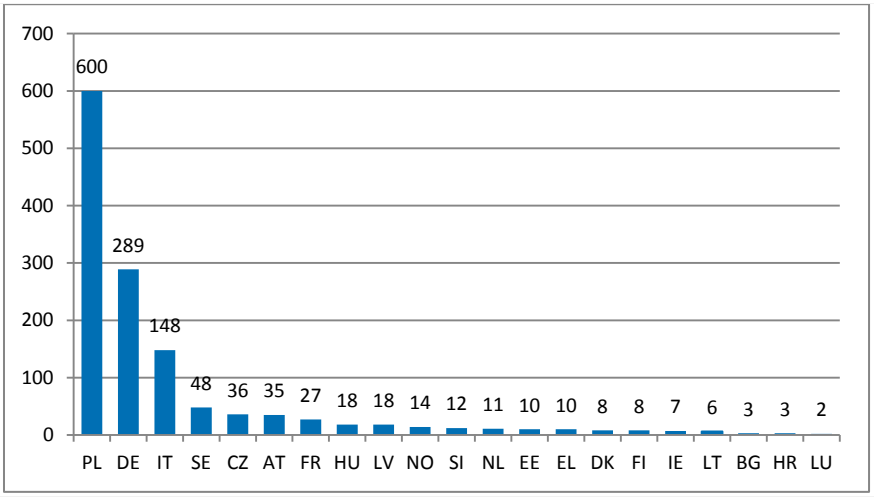


Source: RMMS 2014 except for EL and IE (2012 data). Figure for PL refers to stopping tracks; figure for CZ refers to all operational sidings on the network. In DE DB Netz AG had refined their infrastructure portfolio, therefore the 2014 figure is significantly lower compared to 2013 (some tracks are no longer marketed as storage sidings).

Maintenance facilities

Similar caveats in terms of definitions and comparability apply to maintenance facilities. Poland's data as reported in Figure 23 for example, includes five levels of maintenance from basic running checkouts to facilities for general overhauls.

Figure 23 – Number of maintenance facilities *(2014)*



Source: RMMS 2014, except for EL and IE (2012 data), HR and NL (2013 data) and SE (DG MOVE estimates). Figure for PL includes facilities of 5 levels of maintenance, from basic running checkouts of the technical state to facilities where general overhauls are done. Figure for DK covers only maintenance and technical facilities on state lines.

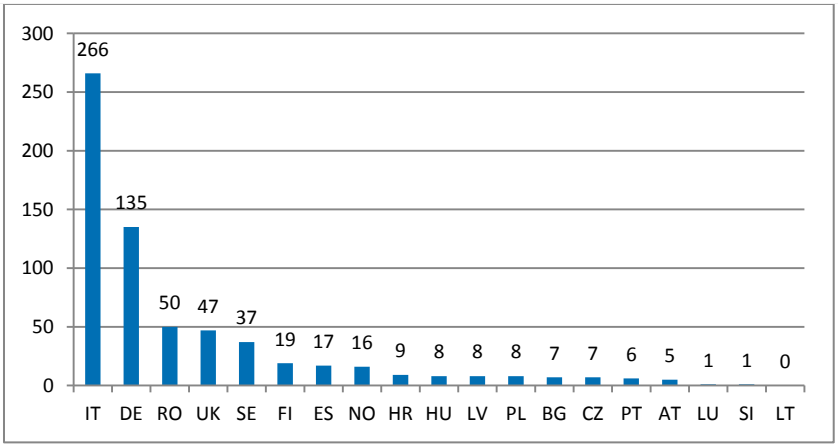
The 8 maintenance facilities reported by Denmark cover at the same time only major maintenance and technical facilities on state lines.

Based on the data provided by 22 Member States, ownership and management of maintenance facilities is distributed across different players. The government is owner but never a manager of maintenance facilities. 'Other railway undertakings' and private operators often own and manage these facilities.

Maritime and port facilities linked to rail activities

As shown in Figure 24, Italy, Germany, Romania, the United Kingdom and Sweden reported the highest number of these installations.

Figure 24 – Number of maritime and port facilities linked to rail activities *(2014)*



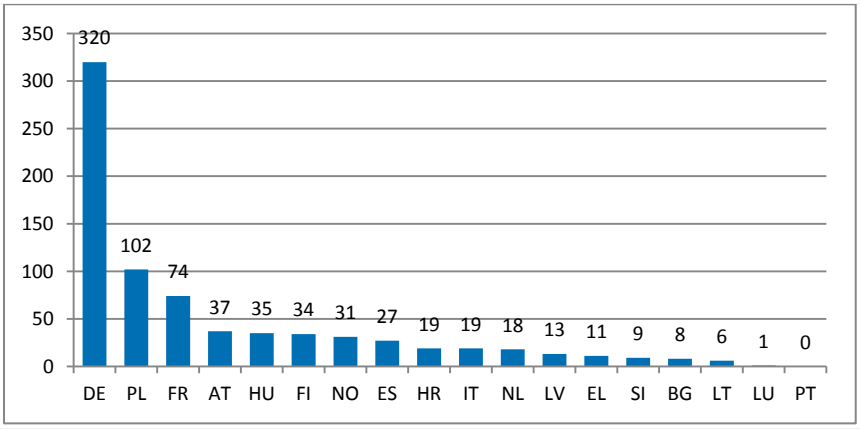
Source: RMMS, data 2014, FR and SK not relevant. Data for NO include 6 port facilities without tracks and/or lifting capacity.

Based on the data reported by 21 Member States, most maritime and port facilities linked to rail activities are owned and managed by private operators. In Germany and Romania the government owns and manages the installations, whereas only in Germany, Slovenia and the United Kingdom the incumbent railway undertaking or other railway undertakings are the owners.

Refuelling facilities

According to IRG-Rail, the market of refuelling facilities appears to be more competitive than marshalling yards, given the high number of these facilities which are operated by independent infrastructure managers. Also, in some cases – as in Norway- railway undertakings make use of on-demand tank trucks in addition to refuelling facilities[50].

Figure 25 – Number of refuelling facilities *(2014)*



Source: RMMS 2014, SK declared figure not relevant. Figures for EL, ES, LV and FR are from 4th Annual Market Monitoring Report (2016) – IRG Rail.

According to the RMMS, ownership and management of refuelling facilities is spread among various market participants, including non-incumbent operators. No respondent indicated government at the same time as an owner and manager of refuelling facilities.

[50] 4th Annual Monitoring Report (2016) by IRG-Rail

4. The evolution of framework conditions in the rail sector

4.1. Infrastructure charging

Infrastructure charges enable infrastructure managers to recover the cost they incur in providing infrastructure to train operators. The core principle is that the charges should cover at least "**direct" costs**.

Box 11 – Direct cost based charging

The EU rail legislation aims to provide a more precise calculation of direct costs as a basis for setting track access charges. According to the Recast Directive, the charges for the minimum access package (the core components of the infrastructure service, such as use of tracks, traction current, train control services) and for access to infrastructure connecting service facilities, shall be set at the cost that is directly incurred as a result of operating the train service. The clear rules on the modalities calculating the undelaying direct costs are specified in Commission Implementing Regulation 909/2015[51]

Direct cost based infrastructure charges ensure that the infrastructure manager does not lose money when accepting an additional train service and subsequently infrastructure managers should not reject any applicant willing to pay at least that level of charges. The rules for calculating direct costs include the prohibitions to levy higher charges for deviated trains and to recoup the wear and tear of infrastructure for which the infrastructure manager had received grants.

Effective implementation of the principle of direct costs charging requires that infrastructure managers have a good overview of their assets and understanding of cost causation so that they are able to allocate costs to the different services and various types of vehicles. By so doing it allows the infrastructure managers to also incentivise the use of less damaging rolling stock.

In addition to direct costs there are **other components of charging systems** that infrastructure managers can use to enhance:

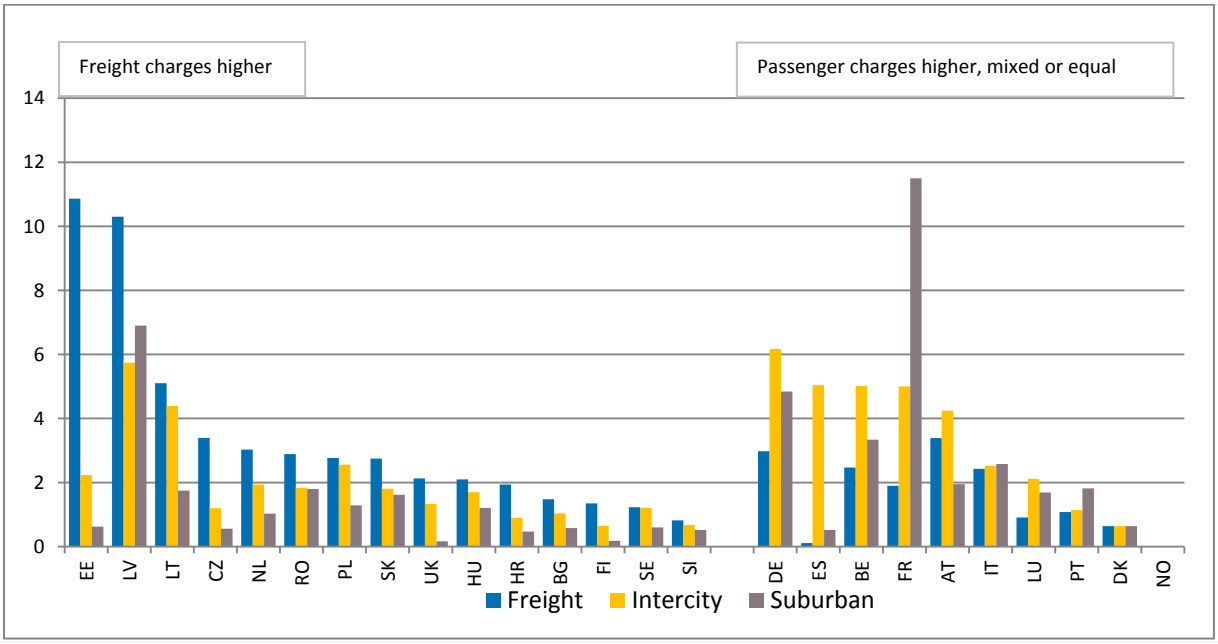
- the effective use of infrastructure capacity (e.g. scarcity charge, reservation charge, discounts to specific traffic flows)
- environmental performance (modulation of charges depending on noise emission and usage of diesel/electric locomotives);
- cost recovery of specific investment projects (charges based on long-term costs); and
- operational performance (penalties/rewards linked occurrence/avoidance of service disruptions).

In addition, mark-ups can be applied on top of the direct cost charges in market segments being able to pay such higher charges. The overall level of cost recovery through infrastructure charges affects the necessary level of government contribution and Member States may require different levels of cost recovery.

[51] Commission Implementing Regulation (EU) 2015/909 of 12 June 2015 on the modalities for the calculation of the cost that is directly incurred as a result of operating the train service (Text with EEA relevance) OJ L 148, 13.6.2015, p. 17

As a result of this and other factors, the level and approach to charging may vary both within the charging scheme of one infrastructure manager as well as between Member States. The current RMMS does not allow distinguishing between the various charging elements used by each Member State. Therefore, while comparing the level of charges as reported in the RMMS, the results need to be interpreted with caution.

Figure 26 – Track access charges for different categories of trains *(EUR per train-km, applicable 2016[52])*



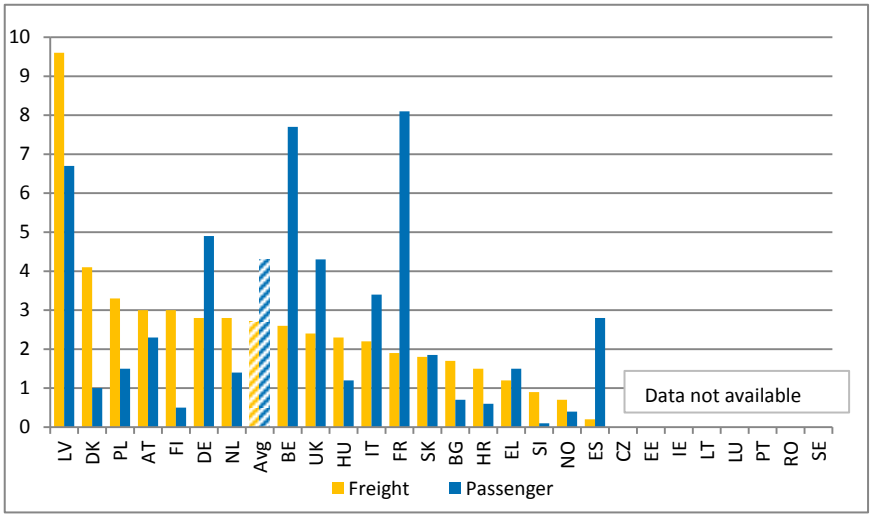
Source: RMMS

Notes: DK – break in time series as from 2016; HR, DE 2014 charges; LV 2015 charges; LT and SI arithmetic mean of min/max charges; FR - some train services excluded; EL, IE no data; NO – does no apply charges

Figure 26 illustrates the different situations in Member States. In most countries **charges for freight trains** are higher than **for passenger trains**, but in Germany, Spain, Belgium, France, Luxembourg and Portugal the situation is the other way around. In Austria, Italy, Sweden and Denmark there are no big differences or the results are mixed. Freight charges in the Baltic States are particularly high, which is to some extent justified due to higher permitted axle-loads. The intercity charges in Belgium, Germany, Spain and France are relatively higher because these include the charges for dedicated high speed lines. Suburban charges are most volatile (varying between EUR 0.17 in the United Kingdom and 11.50 in France) because their levels depend on national approaches to PSO contracts and rail financing (see section 5.1). In France, for example, the regions themselves (rather than railway undertakings) pay the so-called "redevance d'access" to the infrastructure manager for the rail services they have ordered under public service obligation. Norway does not apply charges to the major part of its network.

[52] In the current RMMS, the Member States report the applicable track access charges 2 years ahead.

Figure 27 – Average revenue from the charges for the minimum access package *(EUR per train-km, 2014)*

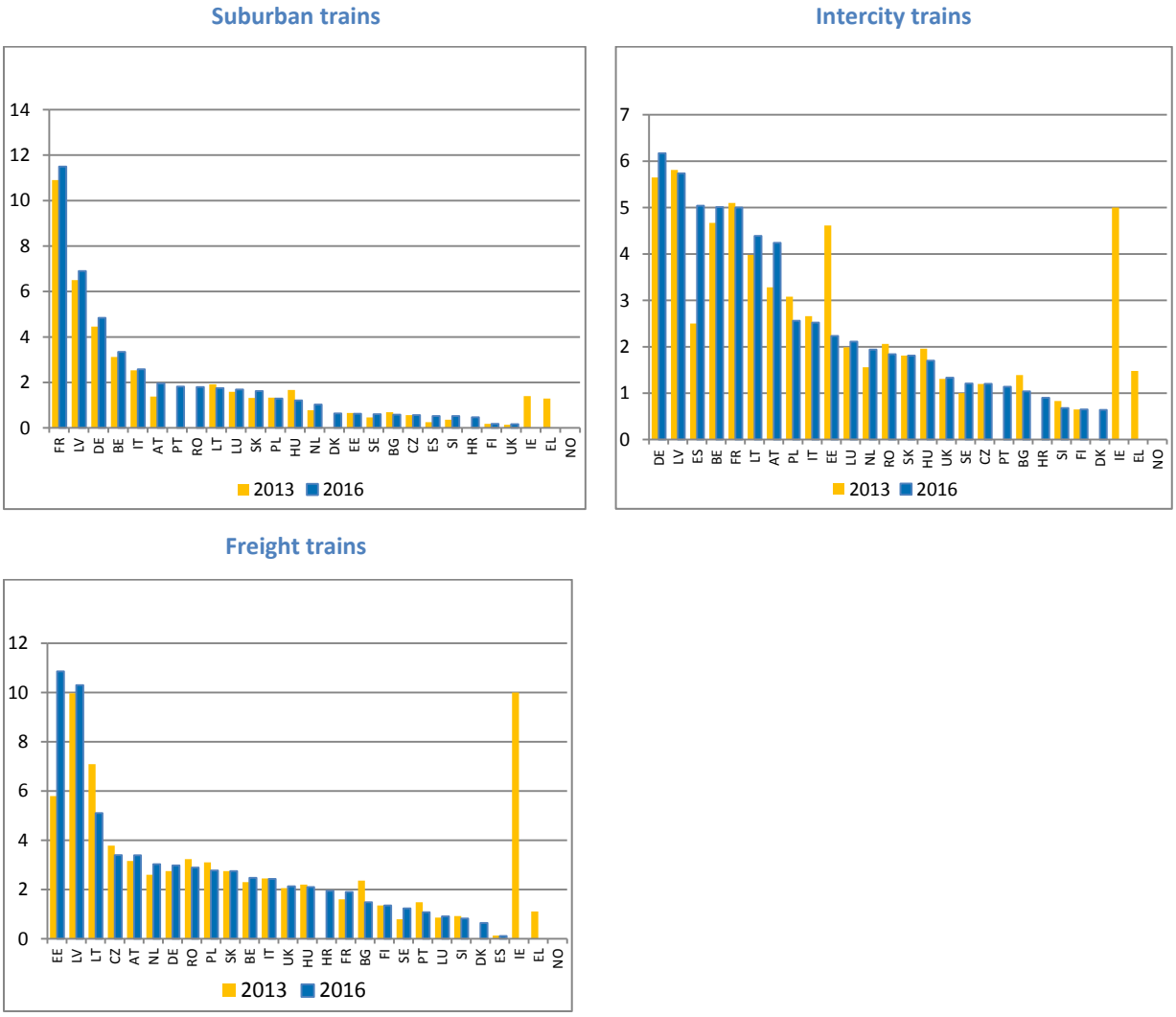


Source: IRG-Rail 4th Annual Market Monitoring Report

Better comparability of ***average*** **charges** between the Member States is possible by monitoring the average revenue (i.e. yield) from track charges per train-km. These data are available for most Member States in the IRG-Rail Annual Market Monitoring report and are presented in Figure 27. Only charges for the minimum access package are included and differentiation is made between freight and passenger trains. It is important to remember that this is an average value, while in each country charges for specific types of trains and/or specific lines could be very different from this average. The extremes on Figure 26 and Figure 27 are similar – the highest freight charges are in the Baltic States and the lowest in Spain, while the highest passenger charges are in France. In Slovenia passenger trains which operate under public service contracts are exempt from track access charges; therefore the average passenger charge per train-km is very low.

Figure 28 presents the evolution of the applicable track access charges between 2013 and 2016 in various market segments in each Member State, as reported in the RMMS. The figures show that the infrastructure managers with high charges and rapidly decreasing traffic levels may need to alter the level of their charges as to generate a constant level of revenues. This can trigger a shift from rail to road, unless the traffic is largely international. It should be also noted that the Polish and the Bulgarian infrastructure managers have reduced their direct cost based charges in response to an infringement procedure before the EU Court of Justice.

Figure 28 – Evolution of track access charges *(EUR per train-km, projected 2013 and 2016)*



Source: RMMS

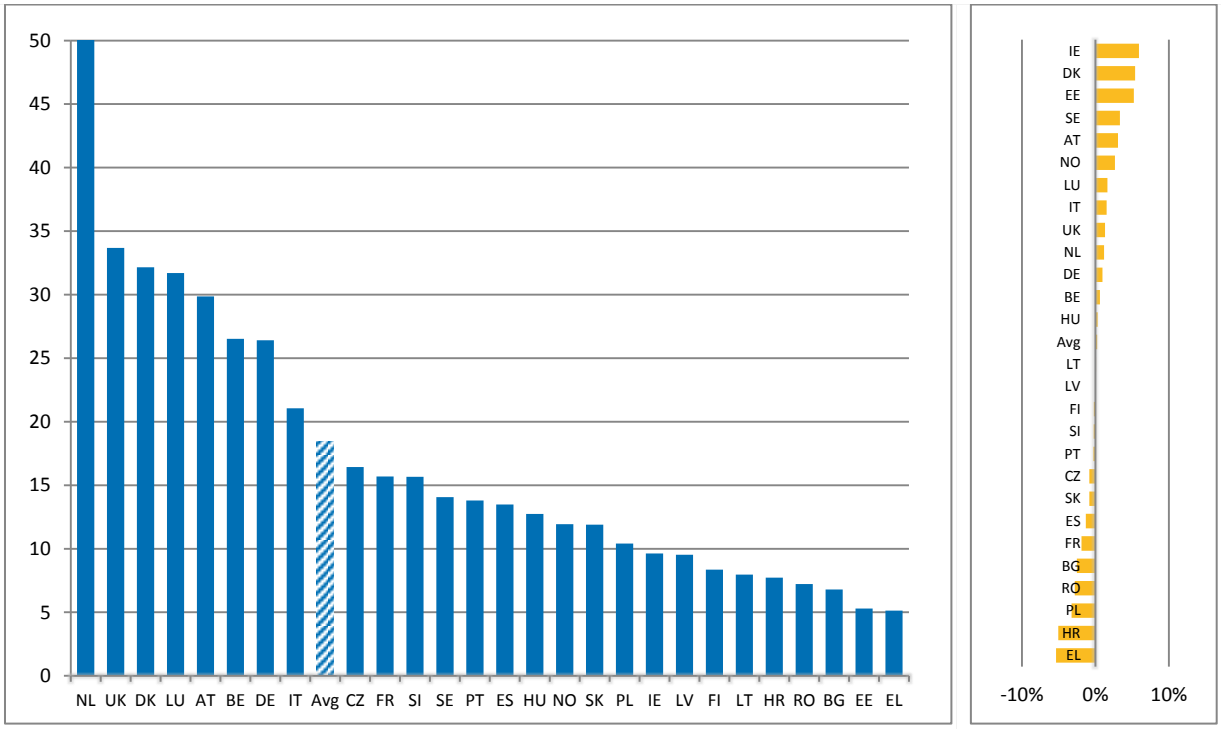
Notes: DK – break in time series as from 2016; HR, DE 2014 charges; LV 2015 charges; LT and SI arithmetic mean of min/max charges; FR - some train services excluded; UK increase only in line with inflation and currency movements; data for several Member States missing, NO – does no apply charges

4.2. Capacity allocation and congestion

4.2.1. Network utilisation rates

Capacity allocation schemes should encourage infrastructure managers to optimise the use of their infrastructure, while ensuring fair and non-discriminatory access of all operators to tracks.

Figure 29 – Network utilisation rates *(thousand train-km per line-km, 2014)* **and relative change since 2009**



Source: Eurostat and Statistical pocketbook 2016 (based on UIC, IRG annual market monitoring reports, national statistics and estimates

Figure 29 shows that rail infrastructure in some parts of Europe is increasingly busy. The Netherlands has by far the **most saturated network** running about 50 thousand train-km per each line-km per year and, according to available data, 70% of Dutch railway lines consist of multiple tracks. The next group of countries – the United Kingdom, Luxembourg, Denmark, Austria, Belgium and Germany run about 30 thousand train-km per each line-km per year, being still much higher than the EU average of 19 train-km per line-km. In all these Member States rail demand continues to increase setting high demands on infrastructure managers to accommodate the additional traffic, while at the same time maintaining the state of the network and its service quality. Over the last five years, the utilisation rates have in relative terms increased significantly also in Ireland, Denmark, Estonia and Sweden while declining in Greece, Croatia, Poland, Romania and Bulgaria.

Network utilisation rates provide a good basis for evaluation to what extent infrastructure managers are capable to recoup their costs from user charges. Network utilisation in Central Europe is three to five times that in the South East of the Europe, which means that the infrastructure managers in Central Europe can achieve better cost recovery rates. At the same time, many networks with already low utilisation rates have seen further strong decline of traffic levels, limiting their potential to recover the cost. This results in a widening financing gap, which can trigger a downward spiral for the rail system in that country as a whole, unless the State raises its subsidies.

4.2.2. Congested sections

Congested sections are of a particular concern in international corridors, given that saturated networks lead to degraded performance: rejected path requests, delays and longer recovery times in case of disruptions. Therefore, according to Article 47 of the Recast Directive, where after coordination of the requested train paths it is not possible to satisfy requests for infrastructure capacity, the relevant section has to be declared congested. The infrastructure manager has to carry out a capacity analysis to identify the reasons for the congestion and develop measures for easing the situation. According to the RMMS, in 2014 ten Member States had declared part of their network or certain nodes congested - in total more than 2000 km of tracks and 6 big passenger stations. In Sweden, the whole area of Stockholm has been declared congested.

Table -4 – Congested sections and nodes[53]

Member State	AT	CZ	DE	DK	HU	IT	NL	RO	SE	UK	NO
2014											
Tracks *(km)*	12	0	507	84	89	355	175	193	XXX*	652	71
thereof high-speed lines *(km)*											2
thereof lines for passenger transport *(km)*	12		507		89		175	193			71
Stations serving over 25 000 travellers per day *(number)*		1	2	1					XXX		2
Freight terminals (number)					1				XXX		
Marshalling yards and train formation *facilities (number)*				3	1				XXX		
2013											
Tracks (km)	12	581	507	84		348		214		181	71
thereof high-speed lines (km)											
thereof lines for passenger transport (km)	12		507			348					71
Stations serving over 25 000 travellers per day (number)		1	2	1							2
Freight terminals (number)											2
Marshalling yards and train formation facilities (number)											

Source: RMMS
* Indicates the whole Stockholm area

In addition to the sections which have been officially declared congested, there are many sections with highly saturated traffic levels. However, it is very challenging to capture the extent of this problem at the network level due to measurement difficulties.

Box 12 – Measuring available capacity

Railway capacity can be defined as the maximum number of trains that may be operated using a specific part of the infrastructure within a given time period and with a fixed level of service. Theoretical capacity is a complex issue depending not only upon infrastructure characteristics (e.g. signalling system, number of tracks, etc.), but also on the way it is utilised and its operating conditions such as temporary speed reductions, mix and length of trains running and heterogeneity and frequency of services. Therefore, capacity estimation requires usually a line by line assessment and very detailed data of the railway system (infrastructure and timetables).

53 As provided in Article 22 of Directive 2001/14/EC or, if transposed, Article 47(1) of Directive 2012/34/EU; situation at the end of the reporting period

At the same time, having a robust overview of constraints and remaining available capacity is pertinent for replying to important policy questions, such as:

- Is the existing rail infrastructure able to absorb the forecasted/expected traffic?
- Would the already planned interventions such as TEN-T policy and ERTMS (European Rail Traffic Management System) deployment guarantee an adequate available capacity and consequently adequate reliability and level of service?
- Will the congestion on some parts of the network become an extremely limiting issue for passenger or freight trains?
- Would the existing network be able to accommodate the potential demand of open access competitive services, which may require capacity at peak hours or along more profitable corridors?

The options for overcoming this gap in data and assessment is addressed in detail in the JRC Technical report *Capacity assessment of railway infrastructure*[54]. The Commission services have also launched a data collection exercise which should allow assessing the level of saturation of the TEN-T network.

4.2.3. Managing capacity shortage

Scarcity charges

To some extent, capacity problems can be managed by applying scarcity charges which reflect the scarcity of capacity of the identifiable section during periods of congestion. According to UIC, in 2012 Austria, Denmark, Germany, Luxembourg, the Netherlands, Sweden and the United Kingdom used scarcity charges[55]. EU law only allows such scarcity charges for a longer time if the infrastructure manager can demonstrate that it has exhausted all possible measures to do away with the causes of the problem. In order to ensure that applied scarcity charges were in line with EU rules and were not discriminatory, regulatory bodies need to develop the institutional capability to assess the capacity analyses and capacity enhancement plans of the infrastructure managers.

Framework agreements

Framework agreements are used for setting out the rights and obligations of an applicant and the infrastructure manager in relation to allocated infrastructure capacity and charges to be levied over a period longer than one working timetable period. Framework agreements are currently used by the main infrastructure managers in Germany, Austria, Italy, the United Kingdom, France and Greece. In conditions of limited capacity, it is important to set certain rules to framework agreements to ensure optimal use of infrastructure. The Commission accordingly adopted an Implementing Regulation on framework agreements[56] which established criteria for concluding and amending framework agreements in case other applicants are interested in the same capacity and no other solution can be found to fulfil their request.

54 http://publications.jrc.ec.europa.eu/repository/bitstream/JRC100509/jrc100509_capacity%20assessment%20of%20railway%20infrastructure.pdf

55 UIC (2012) INFRACHARGES, UIC Study on Railway Infrastructure Charges in Europe - Final Report

56 Commission Implementing Regulation (EU) 2016/545 of 7 April 2016 on procedures and criteria concerning framework agreements for the allocation of rail infrastructure capacity, OJL 94, 8.4.2016, p.1

Better planning capacity restrictions

Railway undertakings have underlined the importance of more timely and specific information on upcoming capacity restrictions in line with the guidelines of RailNetEurope[57]. The negative impact of planned capacity restrictions, such as maintaining a line, cannot be avoided but can be mitigated if infrastructure managers would consult railway undertakings beforehand and, in case of international services, coordinate among themselves to minimise the impact on users. Therefore, the Commission services are considering a review of scheduling rules as foreseen in Annex VII of the Recast Directive, to ensure the necessary lead times are respected.

Priority Rules

In congested lines the priority rules become important. In general, with few exceptions, passenger traffic has priority over freight and international over domestic. However, specific rules depend on transport strategies of each Member State.

In most Member States the rules for prioritisation of path allocation requests in case of conflicting interests are set in national legislation, but for example in France, Croatia and Sweden the priority rules have been provided only in the network statements of the infrastructure managers. In the Netherlands legislation provides both priority rules and minimum capacity allocations for each market segment. In the United Kingdom, track access contracts between the infrastructure manager and railway undertakings are pre-approved by the regulatory body.

In many countries (e.g. Hungary, Latvia, Poland, Norway) PSO services get the first priority due to their high value to society, while in some other countries (Austria, Estonia and Romania) international passenger traffic is prioritised. Often express trains get preferential treatment compared to commuter traffic.

As a result both the process of how the priorities are defined and to which market segments they apply, are very divergent. This can create obstacles for railway undertakings operating across borders, in particular to freight operators.

4.3. Infrastructure expenditure and funding

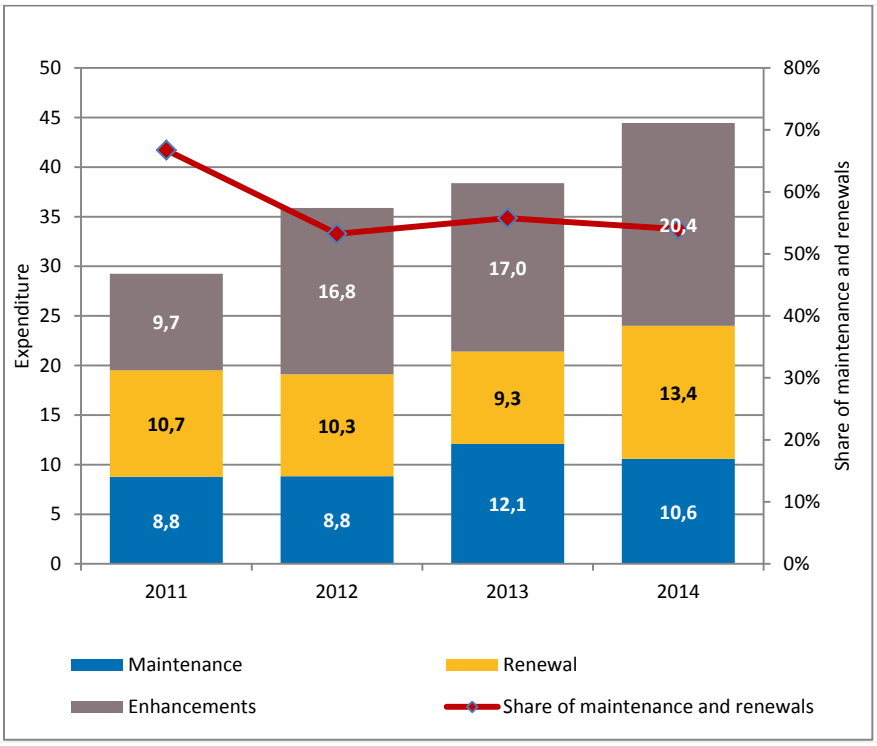
4.3.1. Infrastructure expenditure

Fostering railway infrastructure as part of the development of the TEN-T networks has been a prominent issue of European transport policy. The completion of the TEN-T network requires about 550 billion EUR until 2020. The total costs until 2030 for all transport modes are estimated by the Commission services at EUR 1.5 trillion[58].

[57] http://www.rne.eu/timetabling-documents

[58] 2011 Transport White Paper

Figure 30 – Evolution of infrastructure expenditure *(billion EUR)* and proportion of maintenance and renewal expenditure



Source: RMMS

According to the RMMS, infrastructure expenditure has constantly increased over the last four years from EUR 29 billion in 2011[59] to more than EUR 45 billion in 2014. The maintenance expenditure has fluctuated, while investment into renewal and enhancements has continuously increased. In 2014 25% of infrastructure expenditure went on maintenance, 29% on renewals and 45% on enhancements, while in 2013 the respective proportions were 32%, 24% and 44%.

Box 13 – Categories of infrastructure expenditure

The RMMS required reporting of infrastructure expenditure up to 2014 according to the following three categories:

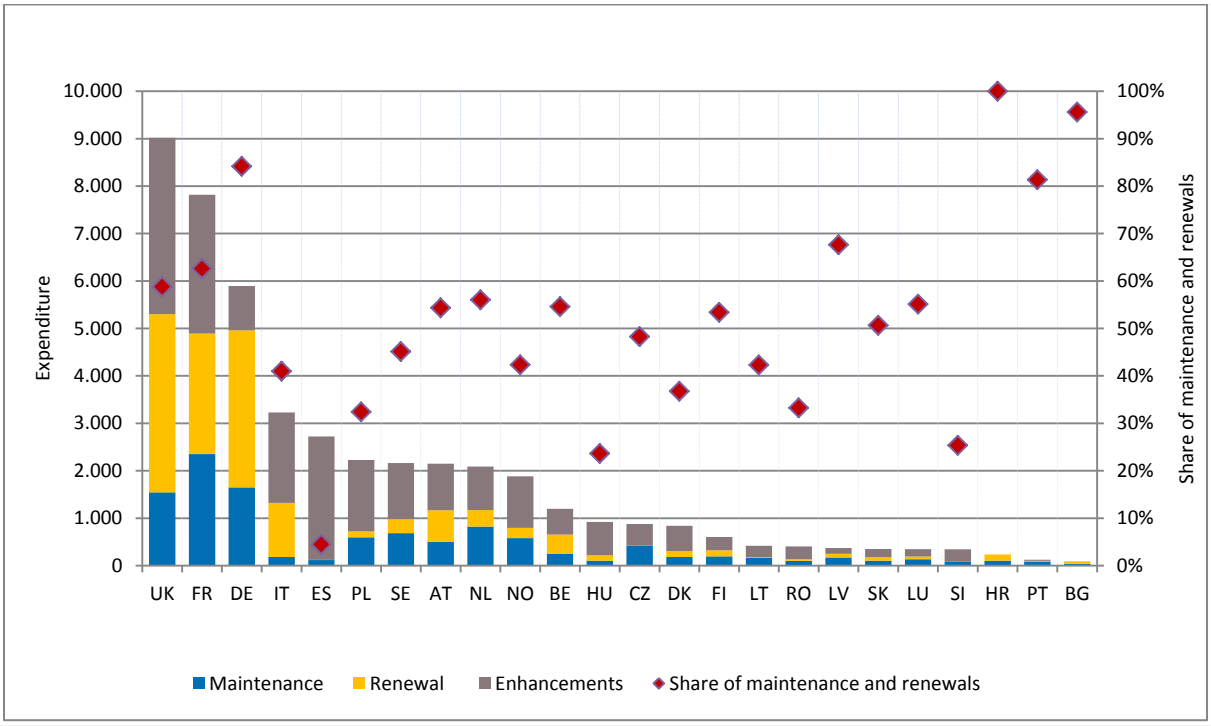
- "maintenance" – non-capital expenditure that the infrastructure manager carries out in order to maintain the condition and capability of the existing infrastructure
- "renewals" - capital expenditure on a major substitution work on the existing infrastructure which does not change its overall performance
- "upgrades" (or "enhancements") - capital expenditure on a major modification work of the infrastructure which improves its overall performance.

The RMMS Regulation adds the fourth category "new infrastructure", which was earlier included in "upgrades". Differentiating between "maintenance" and "renewals" or "renewals" and "upgrades" is not always straightforward. Therefore data reported contain some adjustments and is prone to national interpretation.

As shown in Figure 31, in 2014, the total infrastructure expenditure was highest in the United Kingdom and in France – much higher than in Germany, even if the German network is by far the largest in the EU. Both in France and the United Kingdom, the infrastructure managers have to catch up with the years of under-investment having at the same time significant investment into enhancements (including new infrastructure) ongoing. In Germany, the infrastructure expenditure in 2014 also increased rapidly (+57% compared to 2013) and additional 2 billion EUR was provided for maintenance and renewals.

[59] Earliest data available

Figure 31 – Total infrastructure expenditure in Member States *(million EUR)* and proportion of maintenance and renewal expenditure



Source: RMMS
Notes: CZ maintenance and renewal merged, EL, EE, IE data not available, HU some difficulties in categorisation

Maintenance and renewals

In conditions of increasing traffic in many States and demanding performance targets agreed with public authorities and operators, maintaining the existing network in order to uphold its safety and operational performance and to ensure reliable service, presents a major challenge for infrastructure managers. Many infrastructure managers have suffered from chronic maintenance underinvestment due to a shortage of funds, but also due to the fact that over the last decade priority was often given to the investment into new lines. Liquidating accumulated maintenance backlogs is in general more expensive and disruptive to services than continuous routine maintenance. Therefore it is important to ensure a sufficient and stable level of maintenance and renewal expenditure.

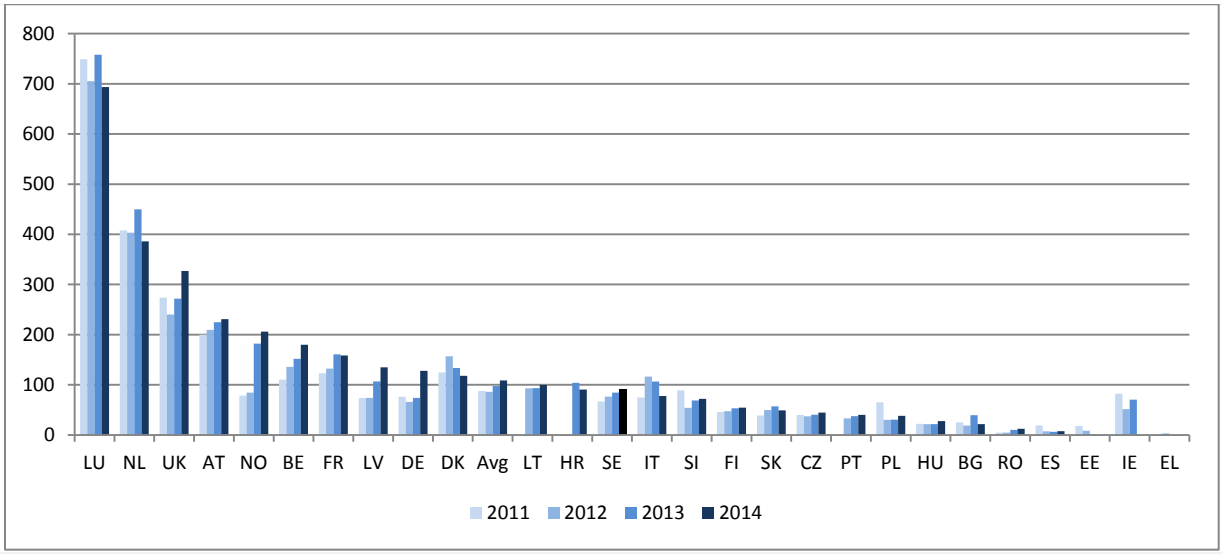
In 2014 Infrastructure managers invested EUR 24 billion in maintenance and renewal of lines. A median proportion of this expenditure in total infrastructure expenditure was 52%. The extremes varied between 4% in Spain, where very high proportion of investment goes into new high speed lines and 100% in Croatia. Since 2011 spending on maintenance and renewal has increased on average 6% per year, most significantly in Romania, Norway, Latvia, Germany and Belgium. The countries with remarkable decrease were Spain and Poland.

Figure 32 gives an overview of the evolution of maintenance and renewal expenditure since 2011 (the earliest available data) in Member States per line-km[60]. It should be emphasised, that expenditure between Member States should not been benchmarked. An adequate level of expenditure has to be established for each network individually, given that this depends on many factors including the length of the network, its architecture (e.g. distance between nodes and switches, signalling system, geographical conditions), the number of tracks, the traffic intensity and

[60] In analytical terms the use track-, rather than line-km for normalisation of maintenance costs would have been more appropriate, given that the States with a higher share of multiple tracks (e.g. BE, LU, NL, UK, FR) have also higher costs per line kilometre. However, good quality track-km data is not available (see Box 1)

current state of the network. For example, in France maintenance costs are predicted to increase, given that the country has to catch up with a maintenance backlog. In the Netherlands, the state of the network is good and maintenance expenditure is expected to decline due to efficiency gains. The high cost of the Luxembourg network is due to its specific architecture allowing trains to run either on left or right track in both directions and due to the relatively short distances between the nodes.

Figure 32 – Maintenance and enhancement expenditure in Member States in relation to their network length
(thousand EUR, per line-km)



Source: RMMS
Notes: EL no data for 2013 and 2014, EE partial information, IE no data for 2014, HU in 2014 difficulties in distinguishing between enhancement and renewal expenditure

The most notable relative yearly increase in maintenance and renewal costs in 2014 took place in Germany (+72%); but also in the United Kingdom and Latvia. The countries with continuous increasing trend of maintenance/renewal expenditure per line-km were Austria, Norway, Belgium, France, Latvia, Sweden and Portugal.

Enhancements

At the EU level investment into network enhancements have since 2011 almost doubled reaching EUR 20.5 billion in 2014. At the Member State level, the year-to-year amounts are volatile, depending on project pipeline and availability of funding. The top 5 – France, Spain, the United Kingdom, Italy and Poland – accounted for more than 60% of total EU enhancement investment in 2014. In addition Norway (not included in EU total), invested EUR 1.1 billion to enhance its network.

High speed lines

Not all Member States (e.g. the United Kingdom and Germany, and France partially) have managed to distinguish between the expenditure to high speed and conventional network. Nevertheless, at least EUR 7 billion (or 16% of total expenditure) were in 2014 reported to have been spent on high speed lines, of that EUR 4 billion in France, EUR 2.5 billion in Spain and EUR 0.4 billion in Italy. In Spain, the investment into new high speed lines absorbed 90% of total infrastructure expenditure.

4.3.2. Funding and financing

Sources to cover infrastructure expenditure include:

- own resources of infrastructure managers in the meaning of track access charges and other revenues; own resources are in general used for maintenance, but to a limited extent also for investment; 'other revenues' include income from renting facilities, such as shops in stations or selling land or structures no longer needed for railways;
- national subsidies in the meaning of network grants; depending on country, subsidies can be used for investment only, or both for investment and maintenance expenditure;
- EU funds (grants)- for investment only;
- Bank loans – usually for investment only.

According to the study *The Results and Efficiency of Railway Infrastructure Financing within the European Union Railway*[61] more than 50% of railway infrastructure investment has previously been funded by national budgets. EU co-funding added an average of 12% and the remainder was financed by concessions, PPPs, loans, equity capital or, to a lesser extent, by track access charges.

National funding and contractual agreements

Regarding national funding, there is at the moment no comprehensive overview of the level of subsidies provided by national governments to rail infrastructure managers[62]. To ensure that the infrastructure manager has mid-term assurance on availability of sufficient funds, the Recast Directive obliges the Member States to conclude contractual agreements between the competent authority and the infrastructure manager covering a period of at least five years. Contractual agreements should contain performance targets the achievement of which conditions the agreed level of funding.

By the end of 2014[63] at least five Member States (the Czech Republic, Estonia, Latvia, Portugal and Finland)[64] had no contractual agreement with any of their rail infrastructure managers. The duration of existing contracts varied between one year (for some smaller networks) and 30 years in case of the HighSpeed1 concession of in the United Kingdom. In general, in Eastern European countries duration of contracts was about 3-4 years, while in Western European countries 7-8 years. Most Member States had performance indicators attached to existing contracts, although the complexity varied widely from reliability indicators only to a range of 50+ indicators covering costs savings, energy performance, productivity, average speed, possessions, customer satisfaction etc.

EU funding

The EU can co-fund or support rail projects through the Cohesion Fund (CF), the European Regional Development Fund (ERDF)[65], the Connecting Europe Facility (CEF), the European Investment Bank (EIB) (mainly loans) and through the European Fund for Strategic Investments (EFSI, guarantees). CEF is the main EU funding instrument for TEN-T investment, while CF and ERDF are mostly used by EU13.

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61 A study commissioned by the policy department of budgetary Affairs of the European Parliament, http://www.europarl.europa.eu/RegData/etudes/STUD/2015/552308/IPOL_STU(2015)552308_EN.pdf

62 Some countries, e.g. UK provide comprehensive data about the financing of their rail system (c.f. http://orr.gov.uk/statistics/published-stats/gb-rail-industry-financial-information/gb-rail-industry-financial-information-2014-15), however this practice is not common to all States

63 The transposition deadline of the Recast Directive was June 2015

64 EL, IE – no data; NO has also no agreement, but it is not a Member State

65 Cohesion Fund and European Regional Development Fund are along with European Social Fund, European Maritime and Fisheries Fund and the European Agricultural Fund for Rural Development part of the European Structural and Investment Funds (ESIFs) which is European Union's main investment policy tool.

These funds play a major role in bridging the infrastructure investment gap in Europe, which is one of the Commission's top priorities.

In total more than EUR 33 billion in grants under the current financial framework (2014-2020) has been allocated to rail investment. As shown in Table -5, almost three quarters of the CEF funding and 37% of total EU transport funding has been dedicated to rail. Table -6 and Table -7 provide an overview of distribution of funds between different types of projects.

Table -5 – Global distribution of allocated funds to transport and rail projects from EU funds under current financial framework *(2014-2020, billion EUR)*

	Rail projects	All transport projects	Proportion of rail investment
ERDF and Cohesion Fund	18.7	70.1	27%
CEF	14.6	19.7	74%
Total	**33.3**	**89.8**	**37%**

Source: Innovation and Networks Executive Agency (INEA), DG REGIO

Table -6 – Distribution of funds from CEF to railways *(2014-2020)*

	2014 CEF call		2015 CEF call	
	Number of projects	Granted funding, *million EUR*	Number of projects	Recommended funding, *million EUR*
ERTMS	18	251.5	19	477.8
Rail Interoperability	8	28.1	4	12.0
Rail freight noise	2	6.2		
Multimodal logistics platforms	10	30.1	15	63.1
Railways	81	9 339.1	33	4 406.3
TOTAL	**119**	**9 655.0**	**71**	**4 959.2**

Source: INEA
Note: In 2015, railways and rail interoperability proposals could only be submitted by cohesion Member States and the rail freight noise priority was not addressed, as it is part of the annual work programme

Table -7 – Distribution of allocated funds to rail investment from European Structural and Investment funds *(2014-2020, million EUR)*

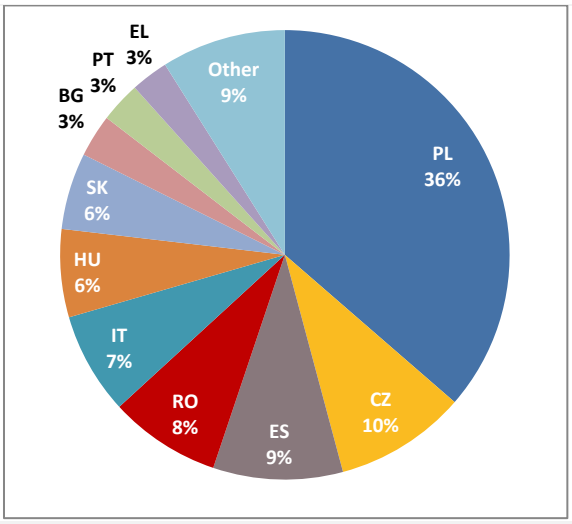
	Cohesion Fund	European Regional Development Fund	Total
Railways (TEN-T core)	5 334.9	2 511.0	7 854.9
Railways (TEN-T comprehensive)	4 089.4	424.8	4 614.2
Other railways	1 694.5	2 464.8	4 159.3
Mobile rail assets	1 358.9	668.8	2 027.7
TOTAL	**12 477.6**	**6 169.6**	**18 647.1**

Source: DG REGIO
Note: Numbers are based on the Operational Programmes adopted (as 23 June 2016), not including urban transport, intelligent transport systems and multi-modal transport investment

Figure 33 shows how EU rail funding is distributed among the Member States. Poland is by far the most prominent beneficiary receiving during this financial framework in total almost EUR 10 billion (equals to 30% of total EU funding). Overall, the distribution of funds under the CEF is more dispersed than under CF and ERDF.

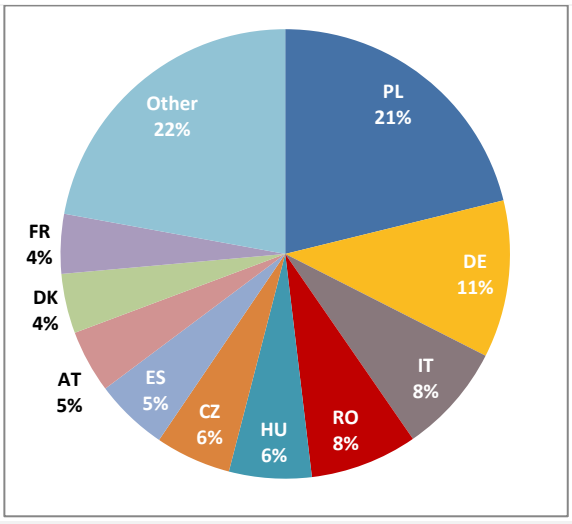
Figure 33 – Distribution of allocated funding by Member States *(2014-2020)*

CF+ERDF



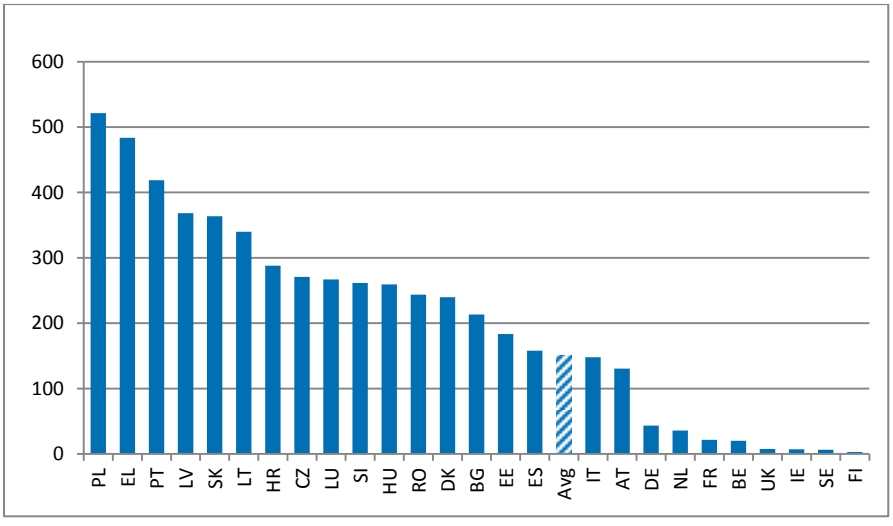
Source: DG REGIO

CEF



Source: INEA

Figure 34 – Total allocated EU rail funding in Member States in relation to their network length *(2014-2020, thousand EUR per line-km)*



Source: INEA, DG REGIO, Statistical pocketbook 2016 (based on UIC, IRG annual market monitoring reports, national statistics (BE, DE, FR) and Eurostat)

If normalised by line-km (Figure 34) Poland remains the main beneficiary with more than 500 thousand EUR per line-km.

Increasingly, the railways have to find ways to use other sources to finance their infrastructure than traditional public sector grants. This would allow them to gain further support for instance also through the European Fund of Strategic investments (EFSI).

Box 14 – European Fund for Strategic Investments

Bridging the investment gap in Europe to stimulate the European economy is one of President Juncker's top priorities. The transport sector can make an important contribution to this agenda. The European Fund for Strategic Investments (EFSI) is the heart of the Investment Plan for Europe which aims to address market gaps by mobilising private investment.

EFSI support can be combined with EU grants from the CEF, Horizon 2020 as well as from European Structural and Investment Funds, in particular from CF and ERDF.

Companies, utilities, public sector entities, national promotional banks or other banks, and bespoke investment platforms can apply. With no specific target allocated by sector, EFSI can support operations consistent with EU policies, recognising the importance of investment in transport infrastructures but also equipment and innovative technologies:

- Ports, locks, airports, roads, dedicated rail lines connecting urban centres, logistic platforms and the deployment of traffic management systems on track and on-board trains (ERTMS) or planes (SESAR).
- Rehabilitation and upgrade of the road and rail networks, including in urban city areas.
- Greening of maritime and inland waterways infrastructure, fleets and vehicles, including LNG for ships or barges, alternative fuels, including electric mobility for cars.
- Investment involving entities located or established in Member States and extending to countries falling within the scope of pre-accession and neighbourhood policies.

The European Investment Advisory Hub[66] has been set up as a joint initiative of the Commission and the European Investment Bank to help strengthen and accelerate investment. Services available via the Hub include project development support throughout all stages of the project cycle, as well as upstream or policy advice on market studies, sector strategies and project screening.

4.4. Developments as regards prices of passenger services

Sections 4.4 and 4.5 of this document are mostly based on the Commission *Study on the prices and quality of rail passenger services*[67] conducted by Steer Davies Gleave in 2015-2016. The study investigated how the fares and quality standards applicable to rail passenger services in Member States are set and have evolved. It differentiates between suburban, regional and intercity services and covers all Member States as well as Norway and Switzerland. The study also assessed the competitiveness of rail vis-à-vis air and road travel.

4.4.1. Overall evolution of fares and tickets

Each year millions of fares are calculated and marketed by a wide range of national, regional, local and urban authorities and operators. Therefore it is very challenging to assess the overall evolution of rail fares at EU level. Nevertheless, an attempt has been made to get an indication of historical trends by using Harmonised Index of Consumer Prices (HICP) and average yields.

HICP seems to be the only comparable tool available to track the trends of rail prices in all Member States. However it should be noted that at this level of disaggregation, the reliability of conclusions based on HICP data is limited[68]. Therefore the results presented on Figure 35 need to be interpreted with care.

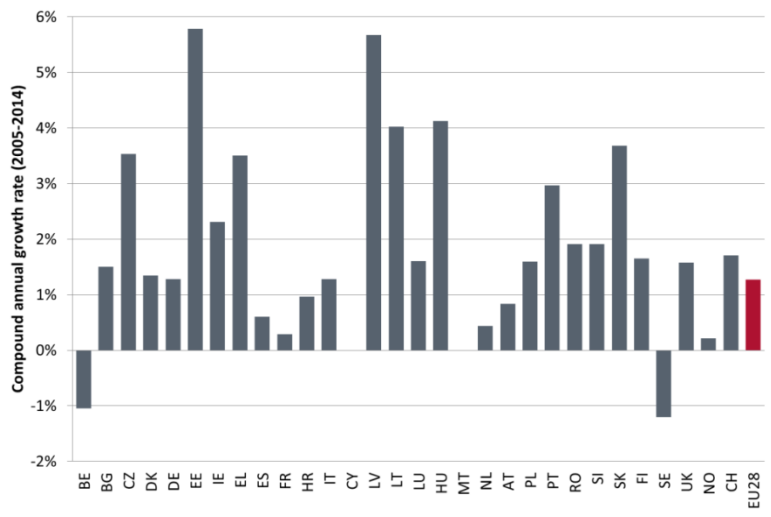
66 www.eib.org/eiah

67 http://ec.europa.eu/transport/modes/rail/studies/rail_en.htm

68 The HICP aims to be representative of the developments in the prices of all goods and services (in total prices of around 700 products/services are collected every month in different locations across the euro area)and measures the average change over time in the prices paid by households for a representative basket of essential consumer goods and services. The small sample of rail products included in this basket may not be representative of the rail market in general

In this chart, a value greater than zero suggests that rail travel is becoming more expensive than a basket of transport services (private and public) across all modes and vice versa.

Figure 35 – Harmonised Index of Consumer Prices: rail transport/all transport



Source: Steer Davies Gleave study *Prices and Quality of Rail Passenger Services*, analysis of Eurostat HICP data

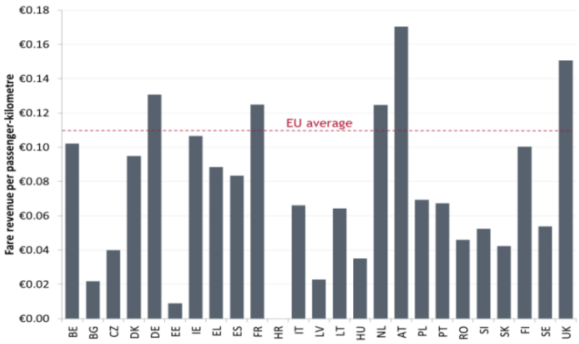
In all but two Member States (Belgium and Sweden), rail travel appears to be becoming more expensive relative to other modes. While across Europe the divergence is modest (approximately 1% per year), Estonia and Latvia are notable outliers where rail travel prices have increased considerably quicker than the prices of other modes. In Estonia this may be due to the reduction in Russian freight transit traffic, which previously cross-subsidised passenger journeys.

However, there are examples where open access competition (e.g. in Austria, the Czech Republic, Germany, Italy and Sweden) has led to fare reduction on certain lines.

National average yield data

A further possible way to compare national rail fares is to use the average yields – i.e. the ratio between the total passenger revenue and p-km reported at national level. However such a ratio includes multiple ticket types and mixes the impacts of the changes in fares with the impacts of changes in passengers' travelling habits.

Figure 36 – Fare revenue per p-km *(2012)*



Source: *Study on Prices and Quality of Rail Passenger Services*
Note: Data is not available for all countries

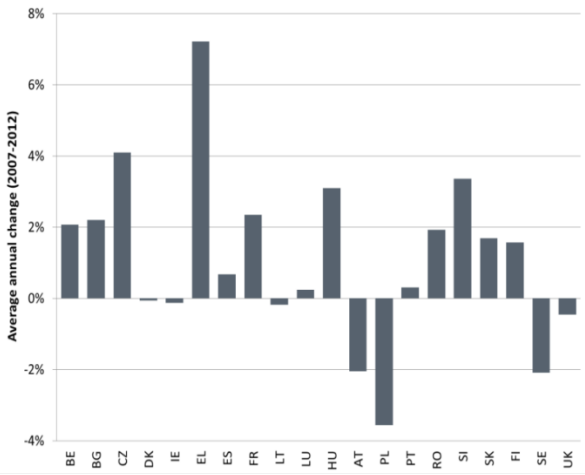
Figure 36[69] presents **average yields per Member State** in 2012. The highest average yields are found in high-income EU15 Member States with well-developed, high-quality passenger networks. Sweden is an exception to this general observation, having average fares broadly half those charged in neighbouring Denmark and Finland. The observed difference in average yield may

[69] There is no systematic information available on passenger revenues at the moment. The RMMS Regulation is expected to remedy the situation. Average yields for some Member States are provided in the IRG Rail 4th Annual Market Monitoring Report (2016). In addition, the study on Prices and Quality of Rail Passenger Services (2015) analysed the average yields. For some States the results provided in both sources are similar, while they diverge for others. Apart from different reporting periods (Prices and Quality -2012 and IRG 2014), another reason for differences is assumingly linked to the reflection of PSO compensation. In the IRG Rail report PSO compensation is explicitly excluded, while in the Prices and Quality study (which acquired data from public annual reports) there was always no clarity whether PSO compensation was included or not. In the analysis above, the data from Prices and Quality study are used because it covers a larger number of Member States (24 compared to IRGs 10).

reflect the proportion of operational costs covered, through necessity or design, by subsidies. As discussed later in section 4.6.2, the operating cost recovery from fare revenue in EU15 is typically higher than elsewhere in the EU. However, in some markets fares may be low, even if railway undertakings seek to maximise revenues, because of either low incomes or competition from other modes[70].

Figure 37 shows the **average annual change in average yield** between 2007 and 2012 for a sample of Member States where data was available. In the majority of cases, average yields have risen, although the average rate of increase varied considerably. The very high increases in average yield in Greece may be a result of large reductions in the number of passenger services on offer and consequent reductions in rail use. Despite well-documented increases in the United Kingdom rail fares, average yields fell between 2007 and 2012. This is probably due to passengers shifting from First Class and unrestricted tickets to Standard Class and yield-managed advance purchase tickets[71].

Figure 37 – Average annual change in revenue per p-km *(2007-2012)*

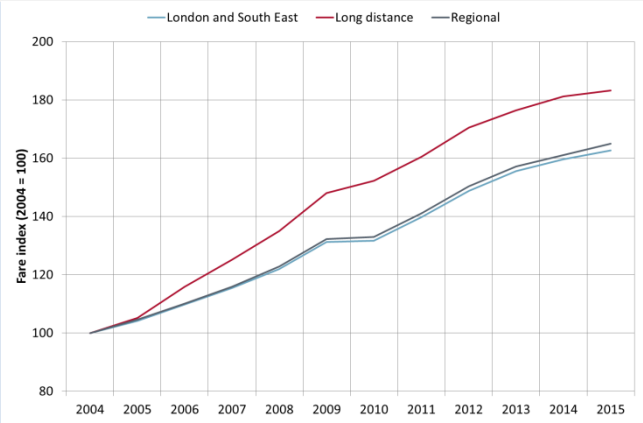


Source: *Study on Prices and Quality of Rail Passenger Services*
Note: average annual change calculated as a compound annual growth rate , data not available for all countries

Box 15 – National fare data

Some Member States publish time series data on national rail fares. Some results available are provided below.

Trends in Anytime fares in Great Britain (nominal)



Source: UK Office of Rail and Road

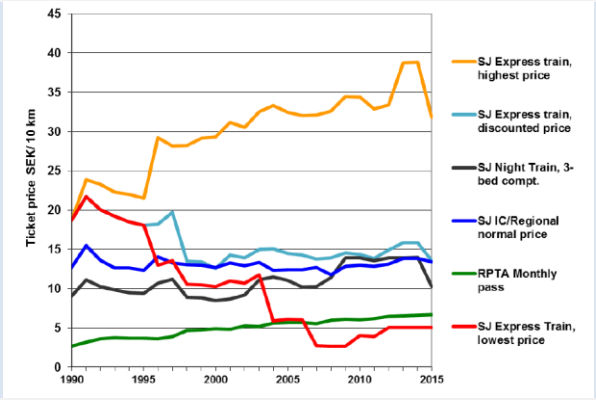
The UK Office of Rail and Road publishes time series data on rail fares, which indicates a steady annual increase in the real value of most fares over the period as whole, in the range of between 1% and 2% per annum.

70 In some Member States, particularly where services are poor, there is evidence of rail being considered an 'inferior good' – i.e. a good for which demand falls when consumer income rises

71 Due to the way in which the data presented has been constructed, part of the change in average yield in UK may also be due to a fall in the value of the pound relative to the euro over the same period, leading to an apparent fall in revenues when converted to euros

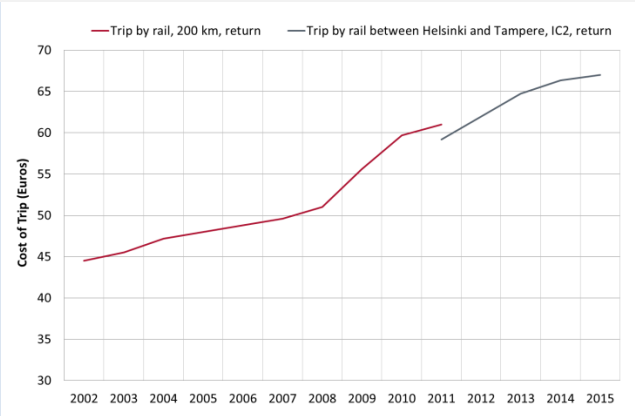
In Sweden, the Royal Institute of Technology has produced a report[72] which describes the changes in rail fares and patronage in Sweden between 1990 and 2015. According to this analysis, there is a considerable variation in Swedish rail fares (per 10 km) over the past 25 years. The price of SJ Express' highest fare has grown steadily year on year, whilst the lowest priced SJ Express fare decreased dramatically between 1990 and 2008 and has almost levelled off since. This is indicative of SJ's pricing policy, which has been strongly influenced by the introduction of yield management. The prices of other specific rail products have remained broadly fixed in real terms, with the exception of the RPTA Monthly pass which has grown steadily and has almost doubled since 1990. The downward trend observed on SJ services from 2014 can be partly explained by the complete market opening of Swedish railways in 2010. This has introduced some competition on the network and has pushed SJ to lower its fares.

Rail fare trends in Sweden



Source: The Royal Institute of Technology (KTH Sweden)

Rail fare trends in Finland



Source: Statistics Finland

The Finnish Transport Agency also provided an extract of time-series fares data, which shows a steady increase in in the cost of a 200km trip between 2002 and 2012. Between 2012 and 2015 the sample trip was changed, however, the trend observed is similar. Since the data only represents a trip type, it is not possible to infer whether fares on average followed the same pattern

4.4.2. Fares and tickets in different market segments

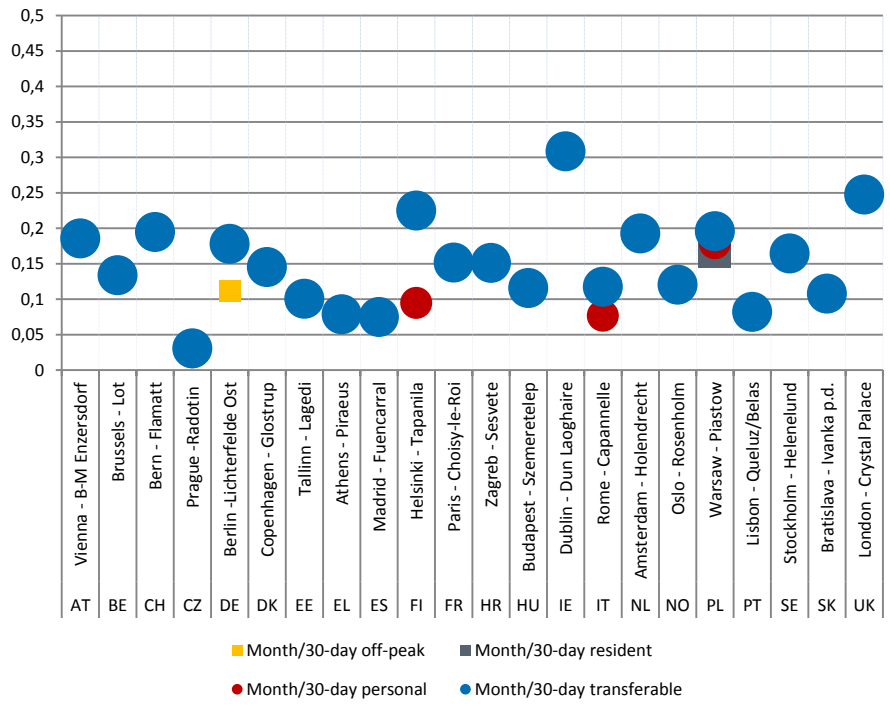
This section presents an overview of rail fares in various market segments in each Member State. The analysis is based on *an illustrative single station-to-station journey*, and fares per km for other station-to-station pairs might be considerably different. The fare data were collected during November 2015 and are converted at the market exchange rates and expressed in PPP-adjusted euros to reflect differences in purchasing power in different Member States. All fares per km have been calculated using the *straight-line distance* between the two cities identified. In some countries this will be closely related to the distance by rail but in others, such as Denmark, which has a large number of islands, this is not the case. Straight-line distances allow meaningful comparisons between modes and reflect the impact of direct versus indirect routing by different modes within this comparison.

[72] KTH Sweden (2015) *Development of supply and prices on Swedish railway lines 1990-2015*

4.4.2.1.Suburban fares

Suburban fares[73] are almost invariably in all Member States administered by the competent authority and may be common to rail and other modes. They are often "policy driven" aiming to increase train ridership, but some Member States consider also cost-recovery targets. However, no individual fare was set by calculating the “cost” of the service to which it applies. A range of single fares apply, but regular commuters will typically buy weekly, monthly or annual tickets, often valid on all modes, and offering increasing levels of discount relative to single tickets. Zonal fares structures are predominant in suburban markets as to simplify ticketing arrangements. There can be a wide variation between the suburban fares applied in cities in the same Member State.

Figure 38 – Suburban fares: monthly or 30-day *(PPP-adjusted fare EUR per km)*



Source: *Study on Prices and Quality of Rail Passenger Services*, based on railway and transport authority websites,
Note: monthly or 30-day fares have been divided by 40 to estimate the effective single fare for a commuter

Figure 38 outlines the results for selected station pairs. There are significant differences, but no clear-cut split between EU13 and EU15 as was observed in the analysis of average yields (Figure 36). Most of the fares are between EUR 0.07 and EUR 0.20 per km (PPP adjusted), Prague and Dublin being at lower and higher extremes. In Dublin a monthly zonal ticket is poor value if used only for commuting by train between Dun Laoghaire and Connolly (EUR 0.31 per km after PPP adjustment) and it is cheaper to a buy single ticket (EUR 0.21 per km after). In Prague fare levels do not appear to have been changed since 2011 and remain the lowest among the observed countries.

4.4.2.2.Regional and interurban fares

Regional and interurban fares may be set by national, regional or local competent authorities. In Member States with opened rail markets some fares may be regulated or left to the market. For instance, Sweden has no regulated fares, but long-distance operators must accept local fares administered by County authorities. In the United Kingdom, a range of fares are regulated with a degree of flexibility varying by location, market segment and ticket type.

73、 For the purpose of the analysis it was assumed that a suburban network consist of at least one line with regular services at intervals of 30 minutes or less connecting at least five stations within 10 km. Using this criterion it appeared that there were no regular suburban services in Bulgaria, Lithuania, Latvia, Luxembourg, Romania and Slovenia.

The analysis covered a range of fares on regional, interurban and high-speed routes including peak and off-peak single and return tickets and monthly passes. The overall conclusions were:

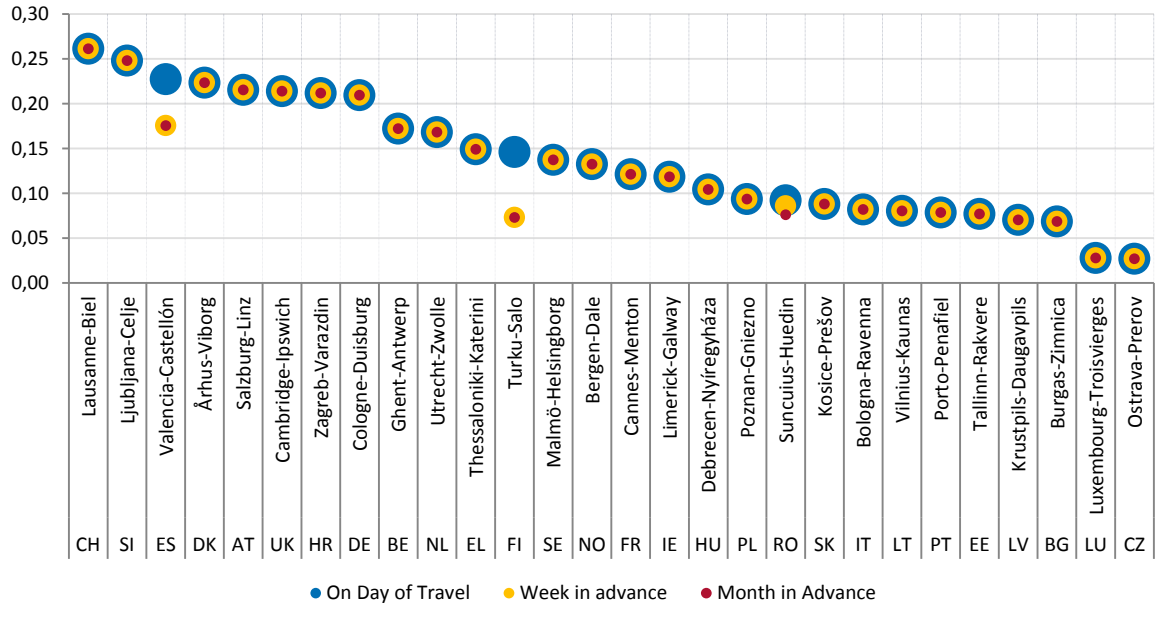
- The fares vary widely between Member States, ticket-types and booking horizons.
- On regional routes, in many Member States there is only one fare, and a return ticket costs the same as two single tickets.
- For interurban trips under 300 km, fares are often lower if booked in advance or restricted to off-peak trains. Where season tickets are available they are often significantly cheaper than buying daily tickets.
- For interurban trips over 300 km, fares per km tend to be lower than at shorter distances and may sometimes be constrained by competition from air services. Advance booking discounts are often available on more expensive Western European networks, with savings of up to 70% on full fares.
- For journeys on domestic high speed routes, fares varied widely. Advance booking discounts and yield management systems are common.
- For international journeys, fares per km are often higher than the domestic equivalent.

Below are the fares of regional and domestic and international interurban trips analysed in more detail.

Regional fares

Regional fares[74] varied from EUR 0.26 per km between Lausanne and Biel in Switzerland (where many citizens buy annual all-lines passes) to EUR 0.017 per km (for a monthly ticket) from the city of Ostrava to Prerov.

Figure 39 – Regional fares: peak single *(PPP-adjusted fare EUR per km)*



Source: *Study on Prices and Quality of Rail Passenger Services*, based on railway and transport authority websites

The most expensive fares were usually found on journeys in Western Europe, although some of the highest peak single fares were found in Slovenia and Croatia. Discounts for booking in advance or booking a round trip were only available in a few Member States and no distinction was made between peak and off-peak regional journeys. Finally, only in about half of all Member States was it

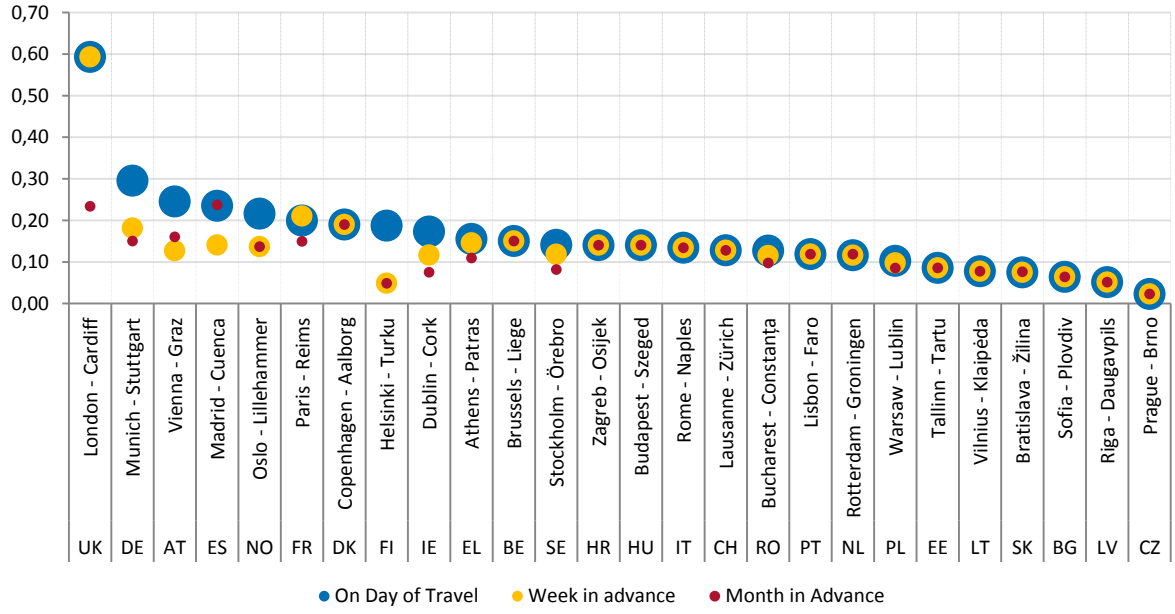
[74] Selection of station pairs covering distances of 50-100 km, which do not involve a major city.

readily possible to find a season ticket fare, although it is probable that fares may be available on request at a ticket office. For Member States where data was available, the saving per km[75] ranged from 2% in Sweden to 88% in Belgium.

Interurban fares

A distinction was made between interurban journeys below and above 300 km. For the former group, there were no effective domestic interurban services in either Luxembourg or Slovenia (Figure 40). Interurban services over 300 km exist in only 16 of the 28 States with rail networks (Figure 41).

Figure 40 – Interurban fares under 300 km: peak single*(PPP-adjusted fare EUR per km)*

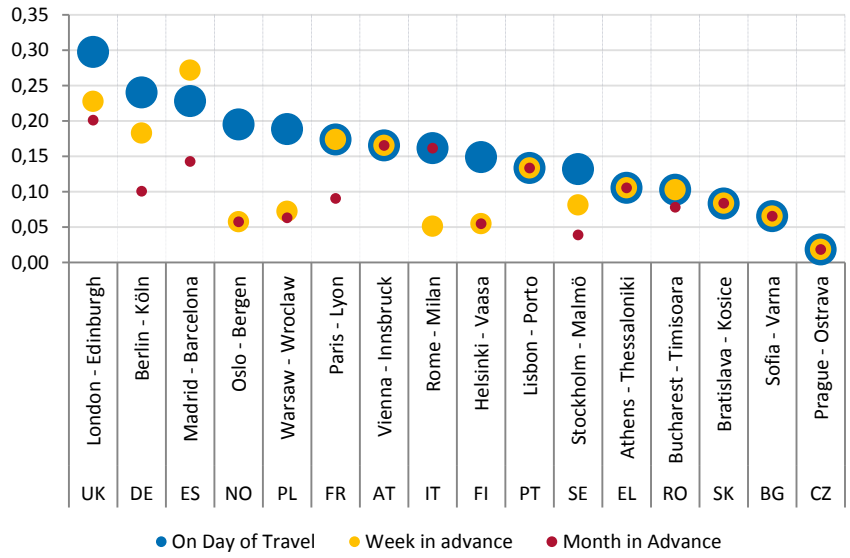


Source: *Study on Prices and Quality of Rail Passenger Services*, based on railway and transport authority websites

The highest peak single fare found **for trips under 300 km** was an unregulated single fare of £109 from London Paddington to Cardiff, equivalent after PPP adjustment to nearly EUR 0.60 per km and twice the cost of the next highest fare in Germany. However, other, advance purchase fares for this corridor with the same operator were as low as EUR 0.20 per km. For those Member States where it was possible to find monthly fares, these were significantly cheaper than 20 peak return tickets: the effective discount ranged from 19% in Latvia to 90% in Belgium.

[75] Calculated in comparison to 20 peak return tickets

Figure 41 – Interurban fares above 300 km: peak single *(PPP-adjusted fare EUR per km)*



Source: *Study on Prices and Quality of Rail Passenger Services*, based on railway and transport authority websites

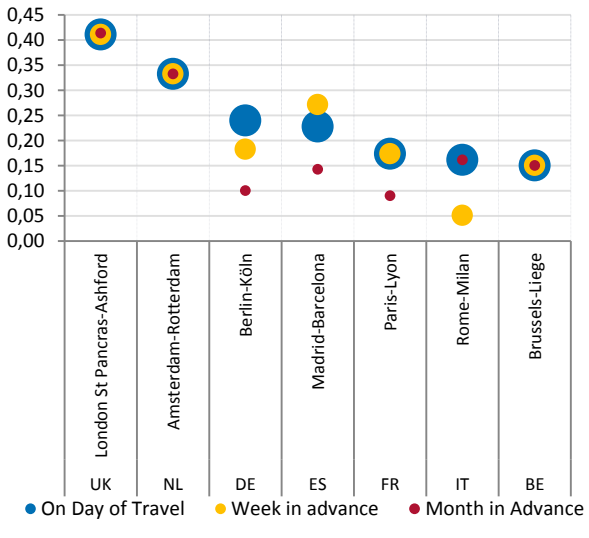
Note: In FR, DE, IT and ES, some or all of the journeys may be undertaken on high-speed rail infrastructure using high-speed rolling stock and the respective fares may be relatively higher, given that track access charges for high speed services are typically greater than those for conventional rail. This may affect comparisons drawn between Member States, but at the same time journeys on these corridors are both typical and representative.

The highest fare found **for trips over 300 km** was an unregulated single fare of £140.50 from London Kings Cross to Edinburgh, equivalent after PPP adjustment to nearly EUR 0.30 per km. On both interurban routes under and above 300 km, discounts were available when booking in advance and/or having a round trip. Particularly the more expensive Western European networks often offered savings of over 50%. In Eastern Europe advance booking discounts were less common, but at the same time, the walk-up fare on these routes was usually lower. In the pool of routes under consideration, the route Prague-Ostrava shows the lowest fare. Three operators provide passenger transport services on that line (not under PSO).

High speed fares

Domestic services that operate mainly or wholly on high speed lines in seven Member States were considered in this category and Figure **42** summarises the findings.

Figure 42 – **High speed fare: peak single** *(PPP-adjusted fare per km)*



Source: *Study on Prices and Quality of Rail Passenger Services*, based on railway and transport authority websites

The highest fare found was an unregulated off-peak single fare of £29.50 from Ashford to London, equivalent to over EUR 0.40 per km, assumingly reflecting the explicit premium placed upon high-speed domestic services to support capital cost recovery. The lowest fare found was EUR 0.05 per km in Italy, for a week-ahead fare using open access operator Italo. This low fare may be as a consequence of competition with the incumbent operator Trenitalia.

Advance booking discounts and yield management systems on high-speed services appear to be offered only in France, Germany, Italy and Spain. Nevertheless, the highest per km fare for both peak single and off-peak return fare types, in the United Kingdom and

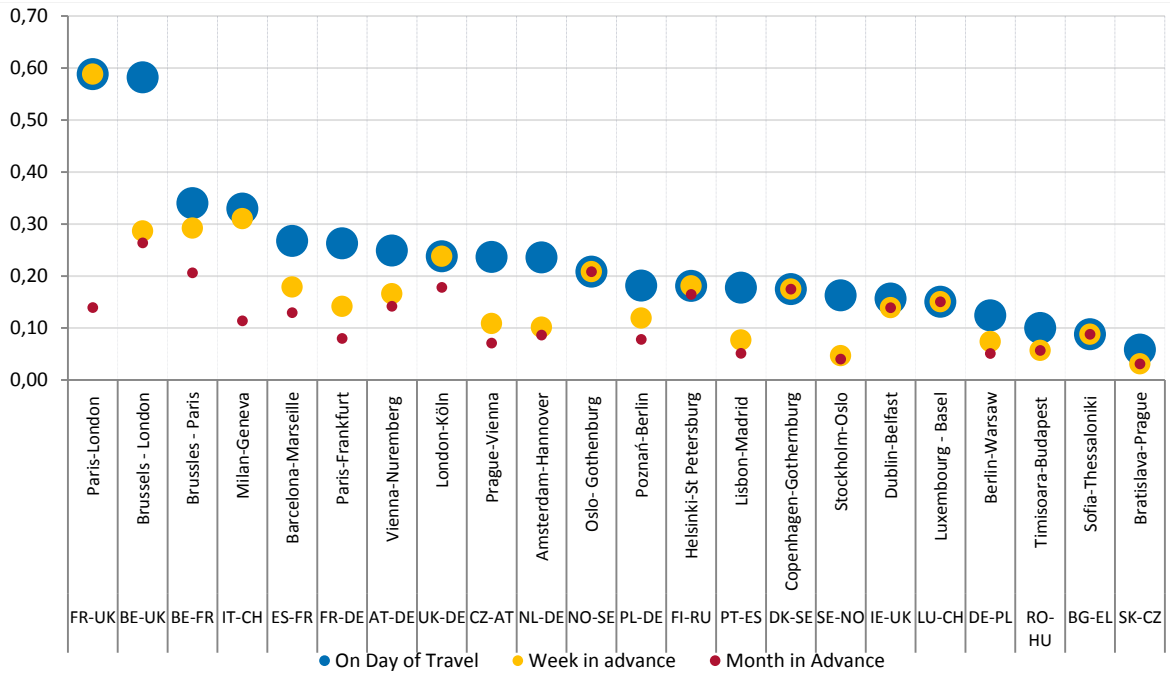
the Netherlands respectively, are on routes that do not appear to be yield managed.

International fares

Figure 43 summarises the average fares for a selection of international routes. The highest international fare found was a single fare of £170 from London St Pancras to Paris Gare du Nord, equivalent after PPP adjustment to nearly EUR 0.58 per km. The two routes served by Eurostar (Paris to London, Brussels to London) are the most expensive journeys within the sample, reflecting assumingly (1) the premium charged by HighSpeed1 in the United Kingdom to support capital cost recovery and (2) high access chargers applicable in the Channel Tunnel. The lowest peak fare found was EUR 0.031 per km from Bratislava to Prague.

Most international fares per km are roughly equal to, or higher than the fares for equivalent domestic journeys. At the same time, the advance booking discounts for international services are in general higher (up to 70%). This is likely to be because a greater proportion of international services are operated by non-incumbent operators who have the flexibility to yield manage.

Figure 43 – International fares: peak single *(PPP-adjusted fare EUR per km)*



Source: *Study on Prices and Quality of Rail Passenger Services*, based on railway and transport authority websites

Box 16 – Anomalies in fares

While analysing the fare data, some 'anomalies' in set fares were identified. Anomalous fares can be result of yield management practices, but could be caused also by inconsistent fares structures. The latter can arise where two different authorities set fares, for example at the boundary between competent authorities or where the regulatory framework allows differential changes to different types of fares. For instance:

- In Slovakia the kilometric fare, set in 2011 for suburban trips, is EUR 0.50 for the first five km and then an additional EUR 0.05 per km. This means that, for the 14-km journey examined, the kilometric fare of EUR 0.95 undercuts the cash single fare of EUR 1.20.
- In Greece and Romania, the return fares for regional trips were more than two single fares, in Bulgaria and France the same phenomenon was noted for selected trips under 300 km.

4.4.3. Intermodal competition

The *Study on Prices and Quality of Rail Passenger Services* also assessed how the travel costs and journey times in rail compare to equivalent journeys by car, bus or coach and air travel on regional and intercity routes[76]. The fares chosen were based on the cheapest peak single for travel on the day[77]. The suburban segment was not analysed, given that there was no detailed information or assumptions available on car parking charges, congestion levels and journey time reliability for selected routes.

It appeared that over very long distances airlines offer both the lowest costs and the fastest journey time, and are the dominant mode. For **domestic or international journeys over 300 km** rail operators may have to charge less than airlines unless they can offer a faster journey time between city centres (possible on high speed lines). Coach operators can compete with both air and rail by offsetting longer journey times with lower fares. Car is less attractive because of the cost and time penalties of entering and parking in large cities. Also, it is not possible to work or rest while driving.

For **domestic interurban journeys under 300 km**, air travel is not normally available, and coach and rail fares tend to depend on their relative speed and frequency, hence their market power. Car usage remains relatively unattractive due to the above-mentioned cost and time penalties of entering and parking in large cities.

On regional journeys, rail may face competition from coach but car may set an effective ceiling on their fares, unless there are extra high time and cost penalties linked to congestion and parking. Both rail and coach operators may be constrained to set fares, in some cases through PSO contracts, at levels low enough either to attract passengers from car or to be affordable to those with no car.

In every case the actual choice of mode may depend on the characteristics of the travelling party. Airlines can offer extremely low fares up to one year ahead, whereas rail can rarely confirm timetables this far ahead due to its reliance on engineering timetables issued by the infrastructure managers. This constrains the scope for rail operators to compete with airlines over longer booking horizons or to provide complementary travel services and through-ticketing.

4.4.3.1. Competition with car

The analysis on car competition considered one person per car and took into account the fleet structure, fuel cost and toll charges[78]. The result of the comparative analysis of costs and speeds of car[79] and rail travel for regional and interurban corridors are shown below.

[76] In addition, Steer Davies Gleave assessed also frequency and reliability of services in various modes. For details, see http://ec.europa.eu/transport/modes/rail/studies/doc/2016-04-price-quality-rail-pax-services-final-report.pdf

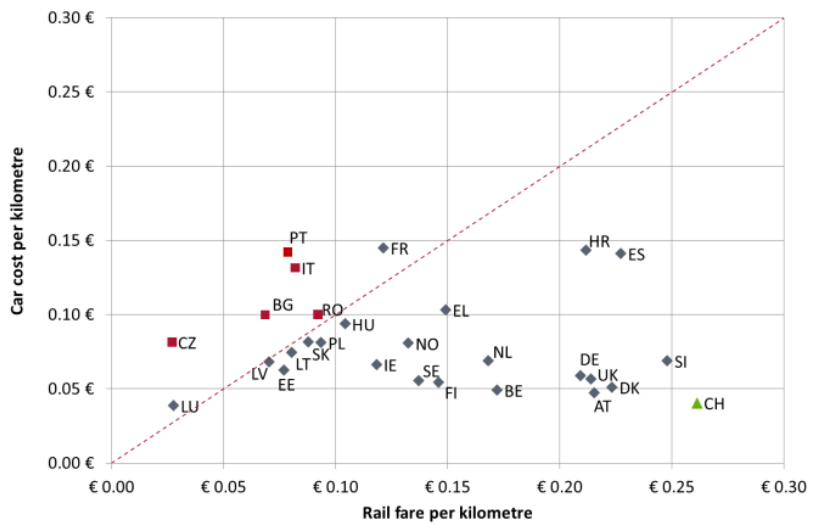
[77] Fares booked one month ahead can be lower.

[78] For a detailed description of the methodology see The Study on Prices and Quality of Rail Passenger Services, point 5.2

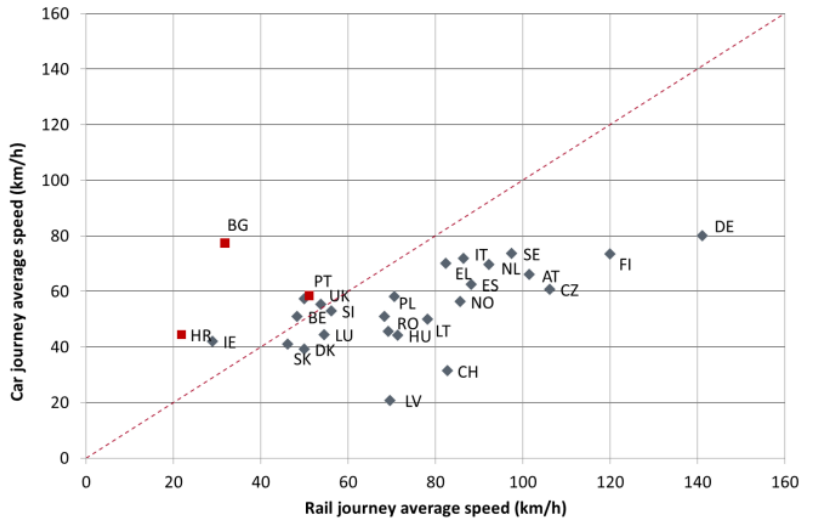
[79] Car cost includes fuel, tolls and marginal costs for wear and tear

Figure 44 – Comparison of rail and car travel: regional trips

Cost of travel



Speed of travel



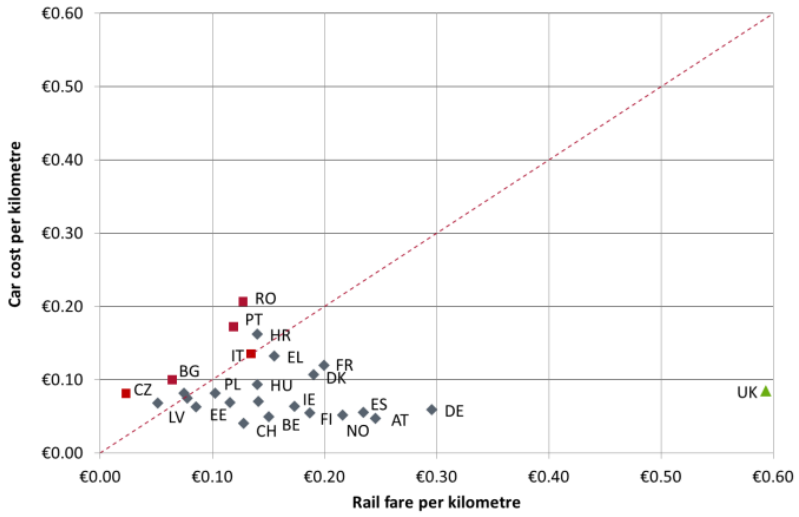
Source: *Study on Prices and Quality of Rail Passenger Services*, based on railway and transport authority websites
Note: data are for a single station-to-station pair and may not be representative

For most regional (Figure 44) and interurban (Figure 45) trips less than 300 km, rail journeys appear more expensive on a fare per km basis than the equivalent journey by car. The largest disparities for regional and interurban journeys less than 300 km are in Switzerland between Lausanne and Biel, and the United Kingdom between London and Cardiff, where the estimated cost of a rail journey is more than five times the cost of a car journey.

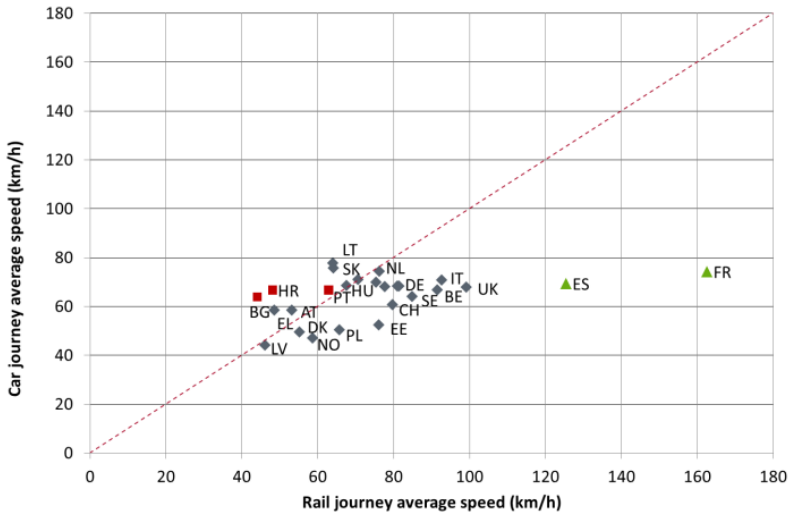
While rail journeys are generally more expensive than car journeys, also among EU13 Member States, the disparity is less marked. Rail journeys are cheaper for both regional and interurban journeys less than 300 km in Bulgaria, the Czech Republic, Italy, Portugal and Romania.

Figure 45 – Comparison of rail and car travel: intercity trips under 300 km

Cost of travel



Speed of travel

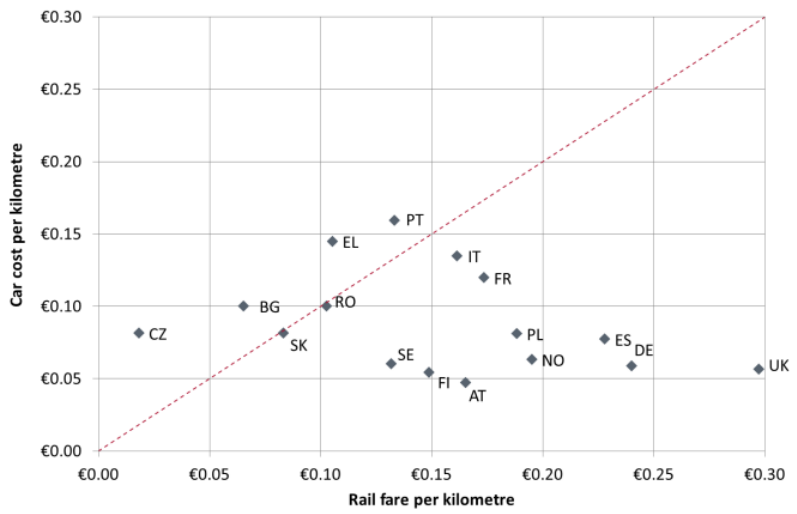


Source: *Study on Prices and Quality of Rail Passenger Services*, based on railway and transport authority websites
Note: data are for a single station-to-station pair and may not be representative

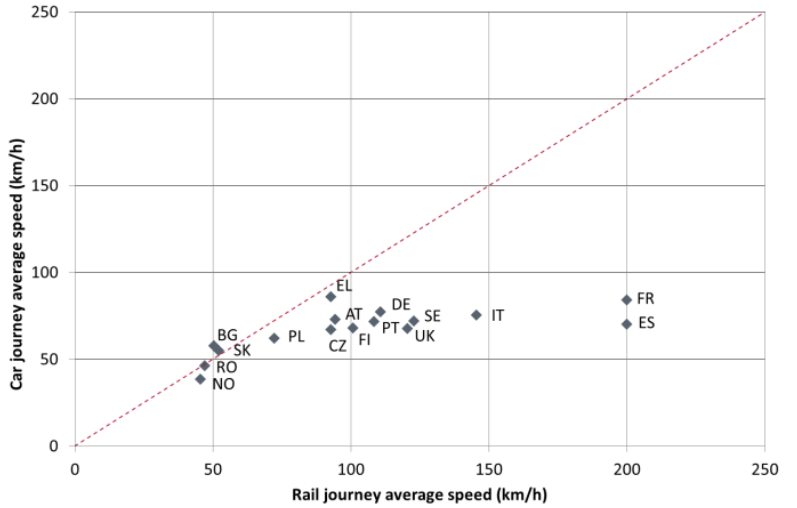
Similar trends were found in the longer distance interurban market (over 300 km) with rail journeys only cheaper than the equivalent journey by car in a handful of cases as shown in Figure 46.

Figure 46 – Comparison of rail and car travel: intercity trips over 300 km

Cost of travel



Speed of travel



Source: *Study on Prices and Quality of Rail Passenger Services*, based on railway and transport authority websites
Note: data are for a single station-to-station pair and may not be representative

The figures indicate that across all market segments, more expensive rail journeys also tend to be faster. Rail has a higher average speed than car for both regional and interurban trips under than 300 km in most EU15 countries. The fastest rail journeys, relative to the equivalent journey by car, are interurban trips in France between Paris and Reims and in Spain between Madrid and Cuenca, where rail has twice the average speed of car. Interurban trips over 300 km are almost always faster by rail.

In contrast, car travel is faster than rail for both regional and interurban trips in Bulgaria, Croatia and Portugal. The slowest rail service relative to car is the regional corridor in Bulgaria between Burgas and Zimnica where car is more than three times faster than rail.

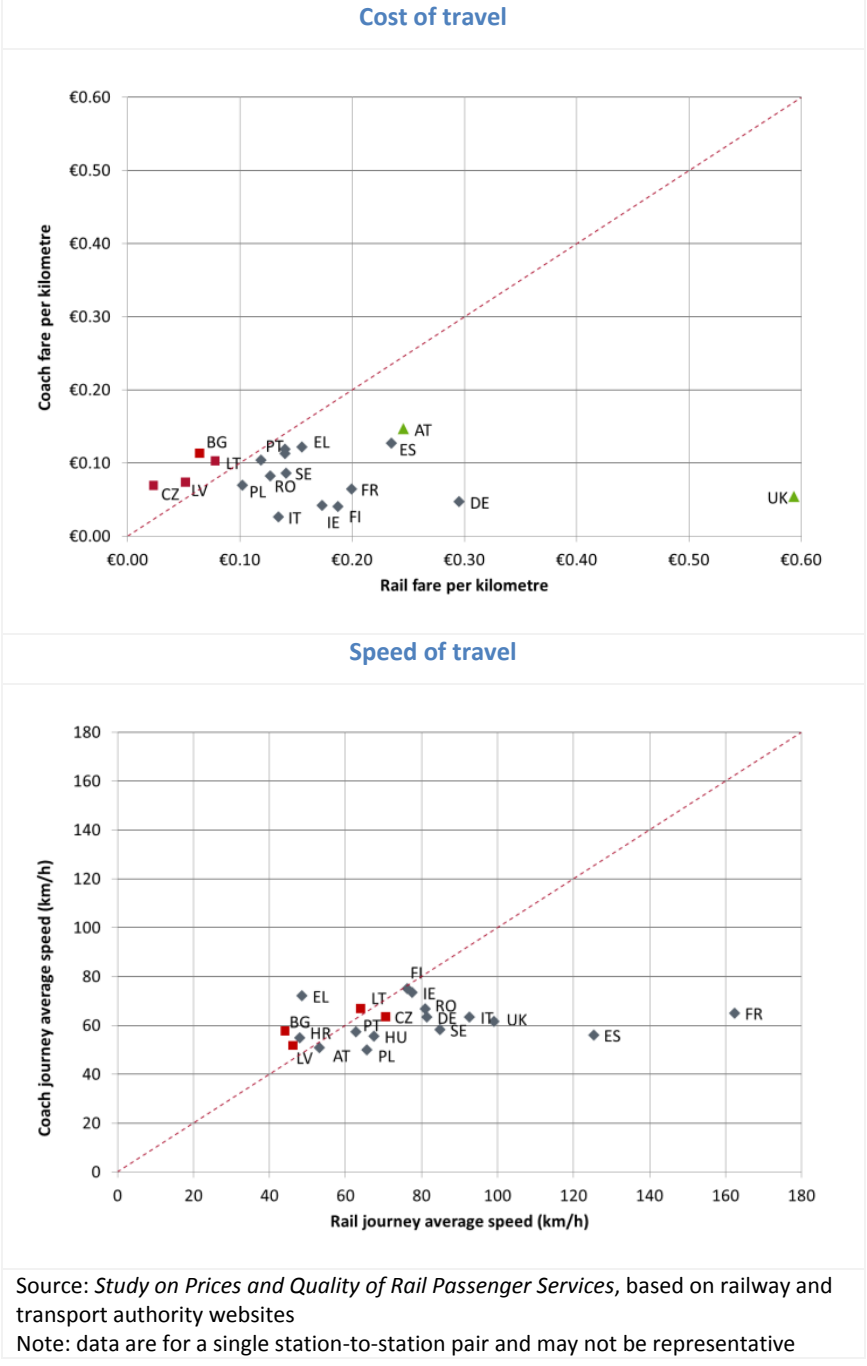
4.4.3.2.Competition with coach

Barriers to entering the coach market can still exist in some European countries. The analysis in this segment focussed on comparison of prices and travel speed in interurban trips under 300 km and international destination pairs[80]. The findings for interurban trips under 300 km are presented in Figure 47.

Most interurban rail journeys appear to be more expensive than the equivalent journey by coach. This may be because rail offers superior journey time, comfort and reliability and coach is therefore perceived as an inferior mode. None of the investigated interurban coach fares was higher than 0.2 EUR per km; the highest coach fare found was 22 EUR in Austria between Vienna and Graz in Austria. The largest price difference is the journey in the United Kingdom between London and Cardiff, where rail is six times the cost of the journey by coach. Peak rail fares between these points are not regulated while the connecting M4 motorway is often congested.

For Bulgaria, the Czech Republic, Latvia and Lithuania coach fares are higher than the equivalent rail fare while coach trips are only marginally faster than the corresponding rail service. In all other Member States apart from Greece and Croatia, rail services are typically faster than the parallel coach service.

Figure 47 – Comparison of rail and coach travel: interurban trips under 300 km

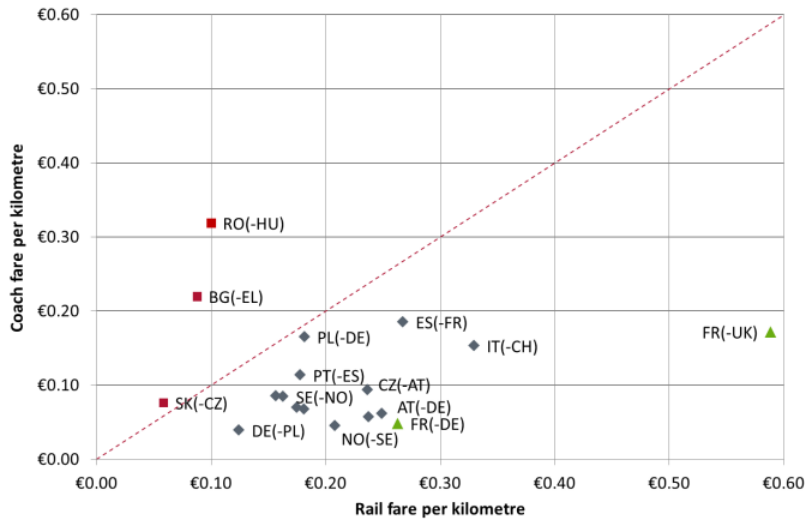


Source: *Study on Prices and Quality of Rail Passenger Services*, based on railway and transport authority websites
Note: data are for a single station-to-station pair and may not be representative

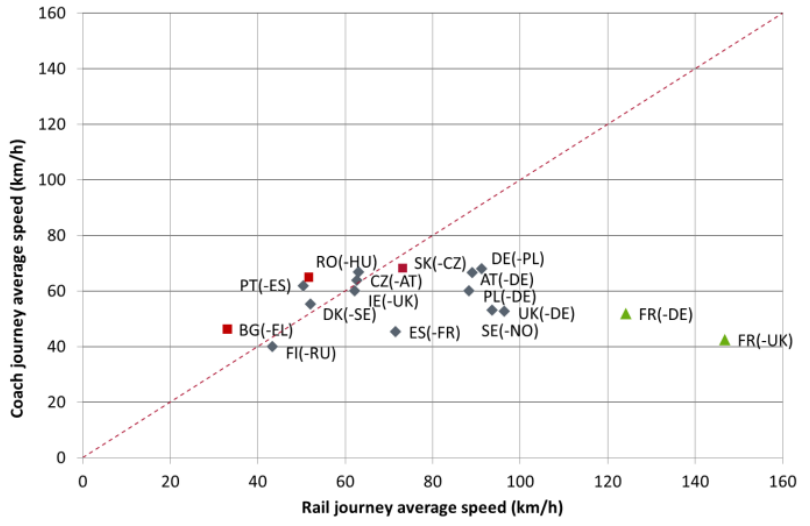
[80] For a detailed description of the methodology see The Study on Prices and Quality of Rail Passenger Services, point 5.15

Figure 48 – Comparison of rail and coach travel: international trips

Cost of travel



Speed of travel



Source: *Study on Prices and Quality of Rail Passenger Services*, based on railway and transport authority websites
Note: data are for a single station-to-station pair and may not be representative

Findings for international trips are presented in Figure 48 Most international rail services are more expensive than the equivalent coach service. As with interurban domestic journeys, this may be because rail often offers faster journeys and can therefore operate as a market "price-maker". However, in two corridors between Romania and Hungary, and Bulgaria and Greece, coach fares are between two and three times greater than the equivalent rail fare, despite average speeds being similar between modes. In this case it is likely that there are additional factors such as service frequency and quality which permit coach operators to charge a much higher fare.

The high speed rail services from Paris to London (FR/UK) and Frankfurt (FR/DE) are the fastest relative to the equivalent coach services. The percentage difference in fares is largest on the Paris to Frankfurt route, where the rail fare is over five times the cost of the equivalent coach fare. However, the absolute difference is largest on the Eurostar operated Paris to London route where the rail fare per km is EUR 0.42 higher than the equivalent journey by coach.

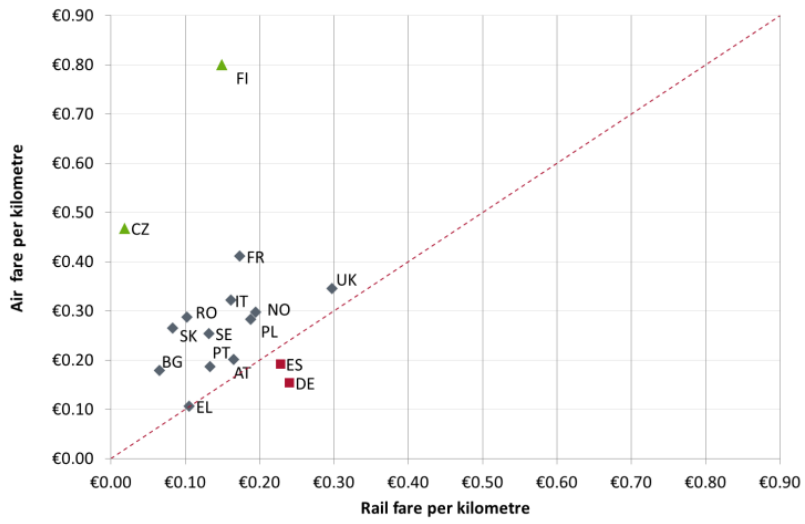
International coach journeys are more expensive than rail between Sofia and Thessaloniki (BG/EL), Timisoara and Budapest (RO/HU) and Bratislava and Prague (SK/CZ). Along these corridors, and as with domestic interurban services, coach can compete because it is almost as fast as, or faster than, the parallel rail service. Largely as a consequence of poor rail infrastructure, travel in Bulgaria is consistently cheaper and slower by rail than by car or coach, suggesting that rail is the inferior mode of land transport.

4.4.3.3.Competition with air

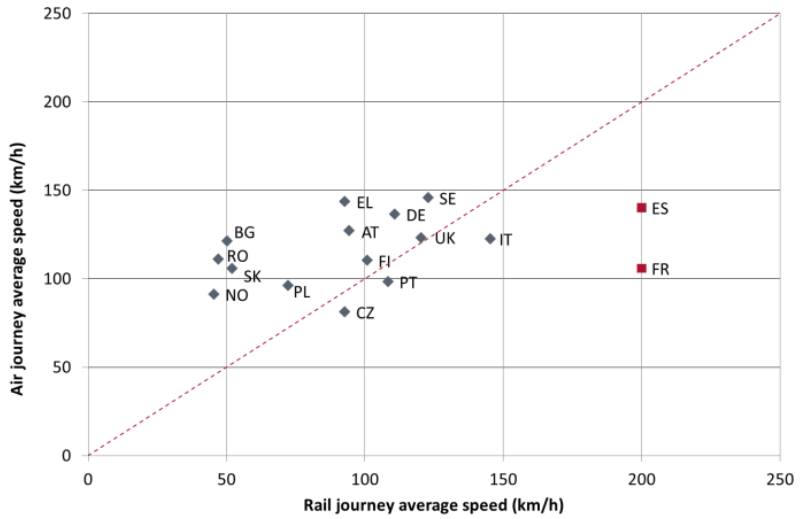
A sample of interurban (over 300 km) and international station pairs was assessed. Air travel assessment includes allowances for access and egress costs and time and check-in and border controls at the origin and destination airports[81].

Figure 49 – Comparison of rail and air travel: interurban trips over 300 km (lowest observed fare)

Cost of travel



Speed of travel



Source: *Study on Prices and Quality of Rail Passenger Services*, based on railway and transport authority websites
Note: data are for a single station-to-station pair and may not be representative

The costs of travelling by air were more than rail on all interurban routes except in Germany and Spain. The most expensive air costs, relative to rail fares, were in Finland between Helsinki and Vaasa and the Czech Republic between Prague and Ostrava. Both air routes seem to serve mainly business travellers with a relatively inelastic demand for travel.

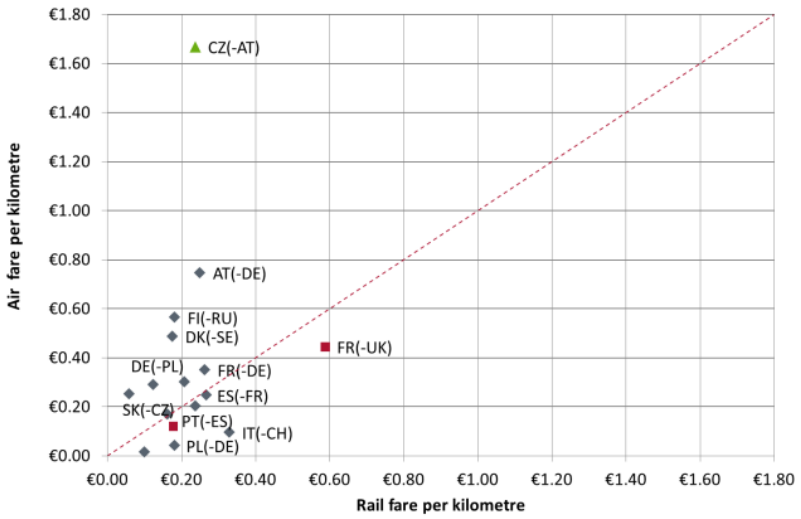
In most cases, on routes where rail travel was faster than air travel, it was nevertheless less expensive. For example in France, between Paris and Lyon rail offered double the average speed, and half the price of air travel. The corridor in Spain between Madrid and Barcelona is the only route on which rail was both faster and slightly more expensive than the air, suggesting that rail is the superior mode on this route.

[81] For a detailed description of the methodology see The Study on Prices and Quality of Rail Passenger Services, point 5.24 and 5.25

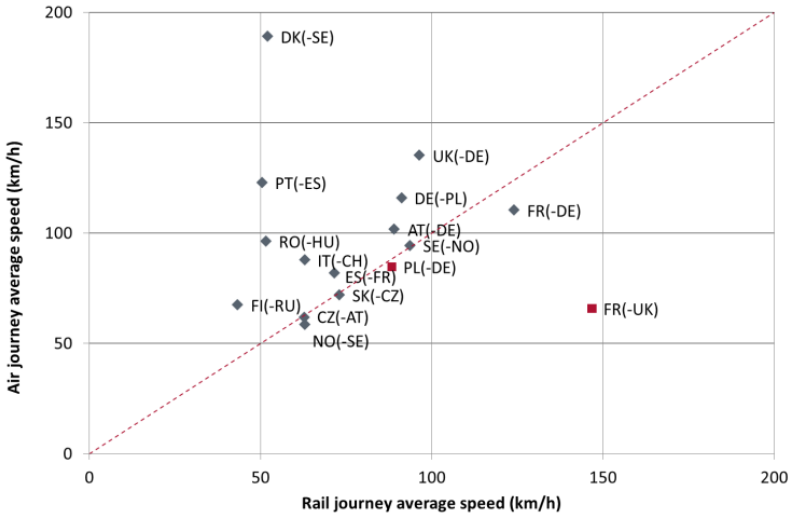
Rail was more expensive than air for more international journeys than domestic interurban journeys. The largest difference in fares was on Eurostar between Paris and London (FR/UK) which is twice as fast as the equivalent journey by air and 30% more expensive[82]. Air fares between Prague and Vienna (CZ/AT) were eight times higher than rail fares. This route is operated by a single airline and the main market may be last minute business travellers.

Figure 50 – Comparison of rail and air travel: international trips (lowest observed fare)

Cost of travel



Speed of travel



Source: *Study on Prices and Quality of Rail Passenger Services*, based on railway and transport authority websites
Note: data are for a single station-to-station pair and may not be representative

[82] The fares used in the analysis were based on the cheapest peak single for travel on the day, Eurostar fares can be much lower when booked a month ahead

4.5. The quality of passenger rail services

This section assesses the quality of passenger rail services. Freight services are not covered, because there is so far no systematic and comparable data on quality available[83].

Box 17 – Monitoring the quality of rail freight services in future

The 6th RMMS report in two years' time will hopefully provide some insights, as some data are expected to become available. First, according to the new RMMS Regulation, the Member States are expected to report on the punctuality of rail freight services, and where available also on the average speeds.

In addition, several industry initiatives for performance monitoring are ongoing. In its recent Statement *Boosting International Rail Freight*[84], the sector commits to work towards provision of a generic and comparable set of key performance indicators on the quality of service in Rail Freight Corridors (RFC) at regular intervals. Each RFC has to publish a yearly performance report and needs for that purpose a set of key Performance Indicators (KPIs). KPIs across the corridors are for the time being not harmonized and therefore RailNetEurope has developed a set of common KPIs for infrastructure managers. In parallel, the ECCO project bringing together the railway undertakings using the RFCs, is developing a set of KPIs reflecting the operators perspective. The International Rail Freight Subgroup of the RU Dialogue is trying to steer the process.

The corridors commit to communicating these performance indicators transparently along the corridors to the customers and to the public. The Commission will follow up the implementation of these commitments and assesses whether complementary steps have to be undertaken in the context of the ongoing evaluation of the RFC Regulation.

4.5.1. Punctuality and reliability

The information in this section builds on punctuality and reliability data from the RMMS dataset[85]. It should be noted that methods for calculating punctuality differ between Member States. In addition, data for some Member States or segments is missing.

According to the RMMS, a train should be considered as **punctual** if it is delayed by 5 minutes or less for regional services, and by 15 minutes or less for long-distance services. Member States that define on time services differently from this are reported in Table -8.

83 Some data is available from the report of Rail Freight Corridors (see http://www.rne.eu/rfc-corridors for links to all corridors), but not necessarily comparable

84 http://ec.europa.eu/transport/themes/infrastructure/news/doc/2016-06-20-ten-t-days-2016/corridor-sector-statement.pdf

85 available only for years 2012-2014

Table -8 – Quality: services defined as on time in the RMMS

	Regional services	Long-distance services
AT	Delayed 5 minutes or less	Delayed 5 minutes or less
DK	Delayed by 2 minutes 29 seconds or less	Delayed by 4 minutes 59 seconds or less
FR	Delayed 5 minutes and 59 seconds or less	Delayed by: • 5 minutes or less for a journey of a maximum duration of one hour and a half • 10 minutes or less for a journey of a duration between one hour and a half and three hours • 15 minutes or less for a journey of a minimum duration of three hours
DE	Delayed by 5 minutes 59 seconds or less	Delayed by 5 minutes 59 seconds or less
LT	Delayed 5 minutes or less	Delayed 5 minutes or less
NL	Delayed 3 minutes or less	Delayed 5 minutes or less
ES	Delayed by: • Less than 10 minutes for "middle distance" services • Less than 3 minutes for "commuter services	Delayed by: Less than 5 minutes (AVE long-distance services) Less than 10 minutes (other long-distance services)
PL	Delayed 5 minutes or less	Delayed 5 minutes or less
UK	Delayed 5 minutes or less	Delayed 10 minutes or less

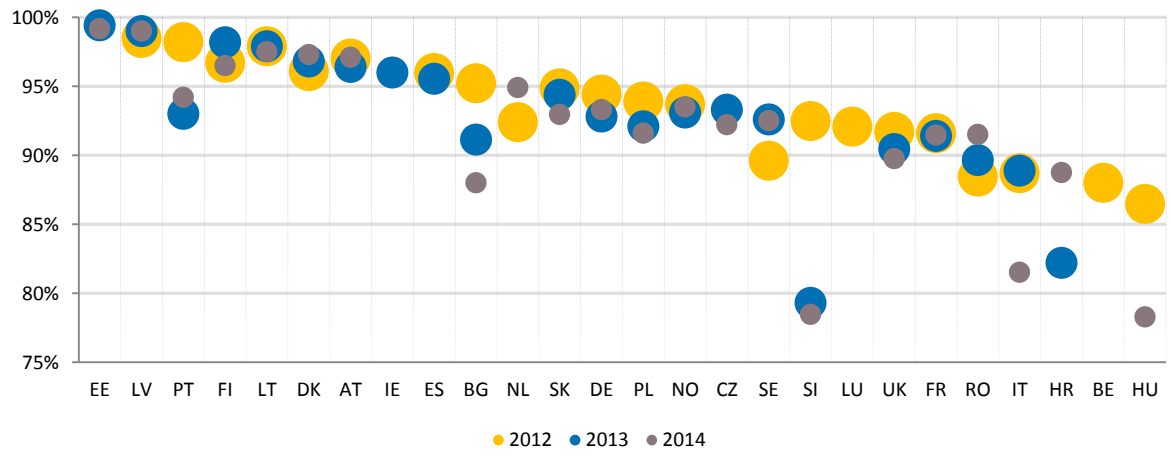
Source: RMMS

The comparability of statistics is further complicated by the fact that the selection of measurement points may vary[86].

Figure 51 illustrates that the proportion of regional and local services arriving at their destination "on-time" ranges from 99% in Estonia to 78% in Hungary. However, given the range of exogenous and endogenous factors that might affect the level of punctuality, as well as variations in thresholds, this comparison between the Member States cannot be considered conclusive.

Nevertheless, it seems that the best performing Member States have small passenger rail networks, and Spain is the only large network recording punctuality over 95%. This can be due to the fact that utilisation rates of the Spanish network are relatively low. Three of the best performing regional and local networks are those of the Baltic States where the number of passenger services is limited on the infrastructure dominated by freight traffic.

Figure 51 – Punctuality of regional and local passenger services, percentage of services on time

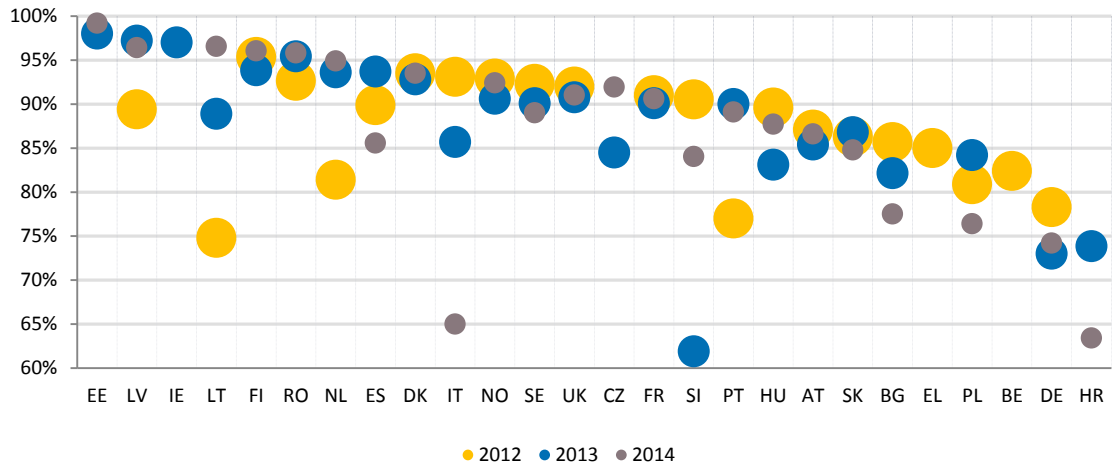


Source: *Study on Prices and Quality of Rail Passenger Services*, based on RMMS data
Note: definition of "on time" varies, see Table -8

The punctuality of long-distance services is shown in Figure 52 and tends to be worse than regional and local services. The number of on-time trains ranges from 99% in Estonia to 63% in Croatia.

86 E.g. punctuality can be measured as an average across all stations on the line or only at the final station

Figure 52 – Punctuality of long distance passenger services, percentage of services on time

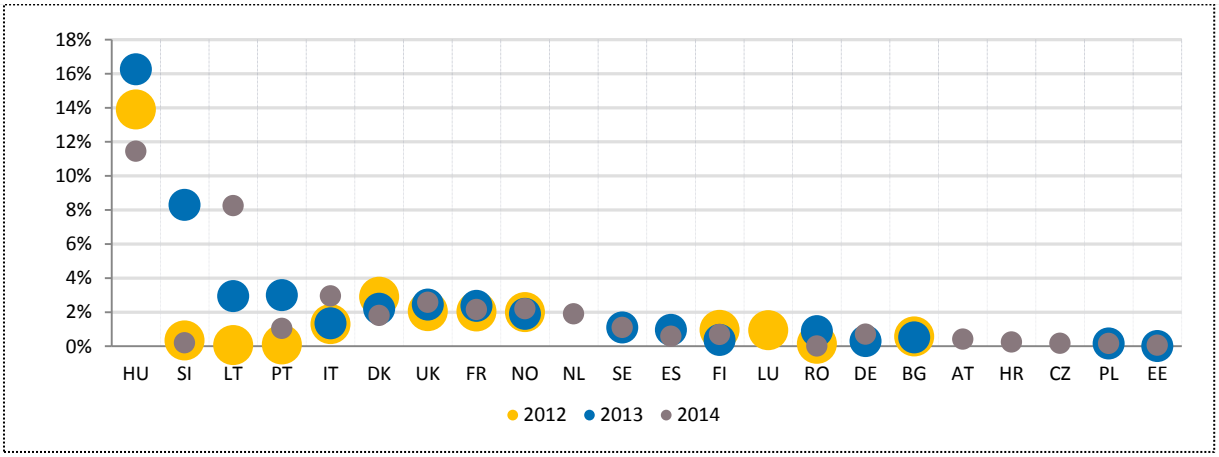


Source: *Study on Prices and Quality of Rail Passenger Services*, based on RMMS data
Note: definition of "on time" varies, see Table -8

Germany and Italy, two of the largest networks have some of the lowest long-distance punctuality scores, both with fewer than 75% of services being on time. While the punctuality threshold used in Germany is stricter than in Italy (5:59 and 15 minutes respectively) the punctuality of long-distance services in Germany is nevertheless significantly worse than in Austria, the Netherlands and Denmark which apply an even stricter 5-minute threshold. As with regional and local services, the relatively small networks of the three Baltic States (and Ireland) are the best performing. Punctuality may be hardest to maintain on busy lines, particularly if they carry a mix of long-distance and regional passenger services and freight services.

Reliability is defined as the proportion of scheduled passenger services that are cancelled. As can be seen in Figure 53 and Figure 54, comparable data is only available for some Member States. As a consequence it is difficult to make meaningful generalisations.

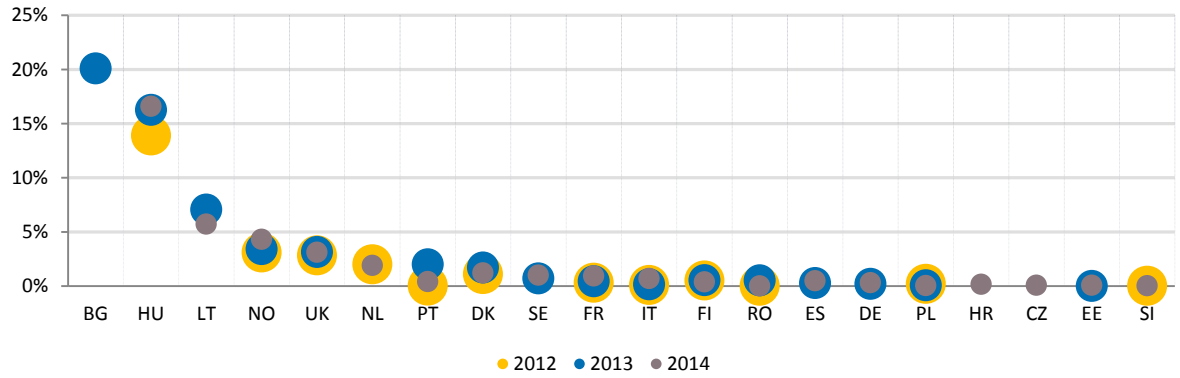
Figure 53 – Reliability of regional and local passenger services, percentage of services cancelled



Source: *Study on Prices and Quality of Rail Passenger Services*, based on RMMS data

Based on data available, it can be said that a high level of cancellation is limited to operations in a few Eastern European Member States. This may, in part, explain Lithuania's relatively strong performance against punctuality metrics: if a train is cancelled it cannot be recorded as late. No Western or Central European Member States cancelled more than 3% of regional or 5% of long-distance services.

Figure 54 – Reliability of long-distance passenger services, percentage of services cancelled

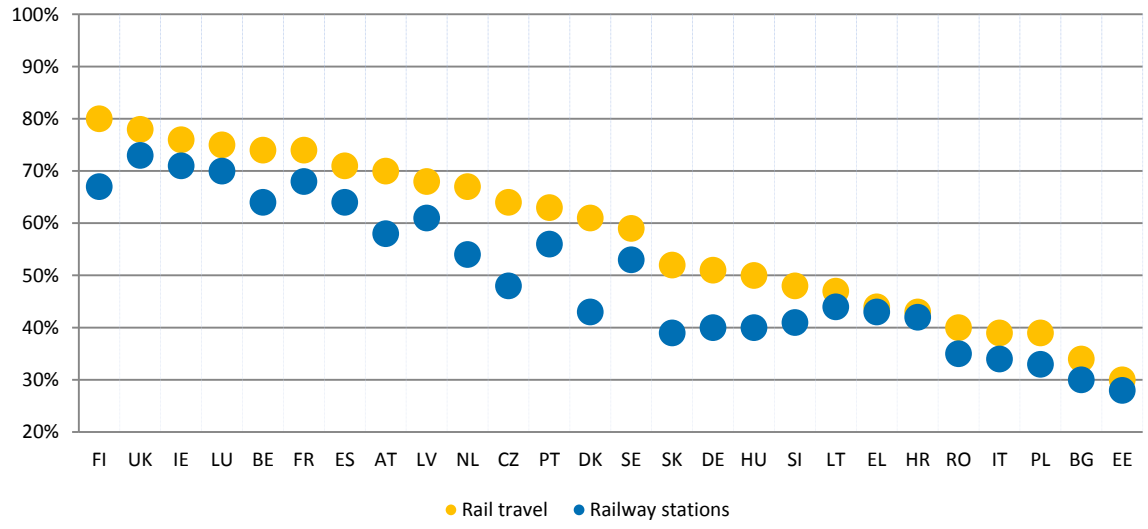


Source: Source: *Study on Prices and Quality of Rail Passenger Services*, based on RMMS data

Customer satisfaction

The principal source of comparable pan-European data on customer satisfaction with rail services is the Eurobarometer survey of *Europeans' satisfaction with rail services*, which was last undertaken in 2012-2013. Overall, at that time roughly half (51%) of respondents scored their level of satisfaction with railway stations and rail services as "high" or "good", with the remainder (49%) recording "medium" or "low" satisfaction levels. Positive satisfaction scores were typically more prevalent in Western European Member States. However, Germany and Denmark underperformed compared to their Northern European peers, and Latvia outperformed the other Baltic States by a considerable margin. A slightly larger proportion (55%) of respondents scored their level of satisfaction with rail services as "high" or "good" compared to satisfaction with railway stations.

Figure 55 – Proportion of high and good satisfaction scores for railway stations and rail services



Source: *Study on Prices and Quality of Rail Passenger Services*, based on Flash Eurobarometer 382a 2012-2013,
Note: "High" and "good" satisfaction scores have been combined

Box 18 – Passenger Rights

When buying a rail ticket, passengers expect services to take place as promised – i.e. departing and arriving on time. However, if it happens that a train is cancelled or delayed, passengers have the right to adequate information and if the delay is more than one hour, EU rules apply for refund, rerouting, meals and accommodation. These rules are set in the **Rail Passenger Rights Regulation**[87] in application since 2009. The Regulation provides a basic set of rights to protect rail passengers on their journeys in the EU, notably in case of accidents, long delays or missed connections. It also contains provisions for assisting passengers with disabilities or reduced mobility. The overall aim is to give assurance to rail passengers that their rights are protected and by so doing increase the attractiveness of rail vis-à-vis other modes.

In August 2013, the EC adopted a report to the European Parliament and Council on the application of the Rail Passenger Rights Regulation. The report showed that, in general, the application of the Regulation was satisfactory. However, it also identified some major shortcomings which impede uniform rail passenger protection in the EU:

- The Regulation allows Member States to exempt certain domestic services from the application of the entirety of the Regulation. Currently, only 5 Member States apply the Regulation in full.
- Owing to exemptions, the rights of persons with disabilities or reduced mobility to assistance may be reduced in certain Member States; these rights need also to be updated in line with the commitments the EU and Member States made by adhering to the United Nations Convention on the Rights of Persons with Disabilities.
- Enforcement is not uniform among Member States. This creates an unequal playing field regarding the rules applied to railway undertakings and could therefore distort competition.
- There are currently no consistent responses to ensure that passengers who are stranded in situations of major transport disruption (e.g. massive strikes, natural catastrophes, terrorist attacks etc) receive adequate assistance and protection in all Member States.
- Railway undertakings have to pay financial compensation to passengers for delays of more than one hour irrespective of the cause of the delay and even in cases where undertakings were not responsible and could not prevent it (*force majeure)*. Passenger rights legislation for other transport modes includes a clause exempting transport companies from having to pay compensation in such situations. This could result in an unequal playing field for rail operators.

The Commission services have started to assess the economic, social and environmental impacts of different policy options for best tackling these problems. The aim is to strike the balance between the adequate protection of passengers' rights and the economic burden on the rail sector. Depending on the results of the impact assessment, the Commission may table a revised proposal of the Regulation in early 2017.

4.5.2. Safety

A common regulatory framework for railway safety is set in Directive 2004/49/EU[88] (the Railway Safety Directive). With a view to establishing a Single European Rail Area, the Directive sets out a framework for harmonising national safety rules, safety certification of railway undertakings, the tasks and roles of the national safety authorities and the investigation of accidents. The Agency prepares a thorough report on the safety performance of European railways.[89]

Managing and monitoring safety

Rail safety in Europe is managed at operational, Member State and EU level. The railway undertakings and the infrastructure managers are expected to assess the risks relating to the safe

87 Regulation (EC) No 1371/2007 of the European Parliament and of the Council of 23 October 2007 on rail passengers' rights and obligations, OJ L 315, 3.12.2007, p. 14

88 Directive 2004/49/EC of 29 April 2004 of the European Parliament and of the Council on safety of the Community's railways and amending Council Directive 95/18/EC on the licensing of railway undertakings and, OJ L 164, 30.4.2004 p. 44; was in force in 2014. The Fourth Package replaced it with Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety, OJ L 138, 26.05.2016, p. 102.

89 http://www.era.europa.eu/Document-Register/Pages/Railway-Safety-Performance.aspx

operation of trains and establish a safety management system. At Member State level, the national safety authorities (NSAs) evaluate the quality of safety management systems when issuing safety certificates for operators and safety authorisations for infrastructure managers.

The NSAs have the legal obligation to report to the Agency all significant[90] accidents occurring on their territory. In case of serious[91] accidents, the National investigation Bodies must notify the Agency of the ongoing investigations and send to the Agency their final report once the investigation is closed.

Box 19 – The Fourth Railway Package and the Recast of the Railway Safety Directive

The Fourth Railway Package includes the recast of the Railway Safety Directive, involving principally a revision of safety certification arrangements and migration to a single safety certificate. Instead of the current two-part system, a single safety certificate, valid in all Member States in which the railway undertaking operates, is to be granted on the basis of a single application. This is consistent with the general objective of the Fourth Package: to eliminate administrative and technical barriers so as to enhance the competitiveness of rail versus other modes of transport.

In addition, the Agency would have a greater role and become an EU-wide authority as regards safety certification of railway undertakings. NSAs will continue to act as principal supervisors for railway undertakings and to issue safety authorisations for infrastructure managers. To ensure that they do so according to similar criteria and procedures, the Agency would be authorised to monitor their activity, performance and organisation of NSAs.

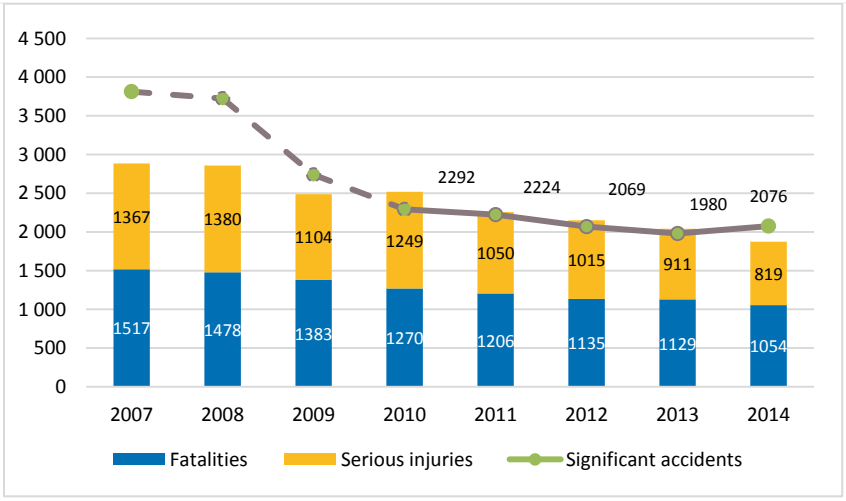
90 "Significant accident" means any accident involving at least one rail vehicle in motion, resulting in at least one killed or seriously injured person, or in significant damage to stock, track, other installations or environment, or extensive disruptions to traffic. Accidents in workshops, warehouses and depots are excluded. Significant damage is damage that is equivalent to EUR 150,000 or more.

91 "Serious accident" means any train collision or derailment of trains, resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment, and any other similar accident with an obvious impact on railway safety regulation or the management of safety; 'extensive damage' means damage that costs at least EUR 2 million in total.

Safety Performance in 2014

Figure 56 and Figure 57 present the main indicators of safety performance, as collected by the Agency.

Figure 56 – Significant accidents and resulting causalities

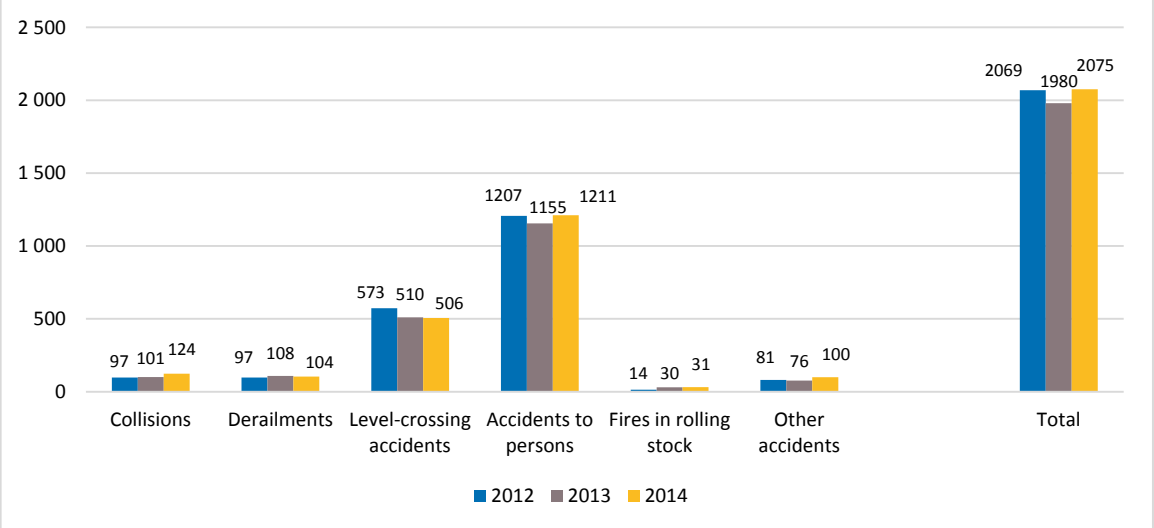


Source: "Railway Safety Performance in the European Union 2016", the Agency
Note: EU-28 for 2010-2014 and EU-27 for 2007-2009

There were about 1 000 rail fatalities in 2014. Railway safety continued to improve between 2009 and 2014, with fatalities, serious injuries and significant accidents all decreasing.

Excluding suicides, more than two thirds were accidents to persons caused by rolling stock in motion and level crossing accidents, the latter not being related directly to the rail system.

Figure 57 – Significant accidents per type of accident (EU-28)



Source: "Railway Safety Performance in the European Union 2016", the Agency

In 2014 seven accidents, as reported in Table -9, were categorised as serious.

Table -9 – Serious accidents in Europe *(2014)*

Date	MS	Location	Accident	Outcome
12/01/2014	IT	Firenze SMN	Collision of train with buffer stop	1 fatality, damage
26/01/2014	DE	Bitterfeld - Wolfen	Freight train derailment	damage
12/07/2014	BG	Kaloyanovets	Passenger train derailment	1 fatality, damage
17/07/2014	FR	Denguin	Rear-end trains collision	2 serious injuries, damage
01/08/2014	DE	Mannheim Hbf	Trains collision	4 serious injuries, damage
13/08/2014	CH	Tiefencastel	Passenger train derailment	1 fatality, 4 serious injuries, damage

Source: "Railway Safety Performance in the European Union 2016", the Agency

Table -10 – Fatality risk in different modes *(2009-2013)*

Transport mode	Fatalities per billion p-km
Airline passenger	0.01
Railway passenger	0.14
Bus/Coach occupant	0.16
Car occupant	2.28
Powered two-wheelers	37.50

Source: Safety Report 2015, **the Agency**
Note: EU-27 in 2008-2012

Rail remains nevertheless one of the safest modes of transport.

4.6. Rail transport services covered by public service contracts

Public Service Obligations (PSO) mean requirements defined or determined by a competent authority in order to ensure public passenger transport services in the general interest that an operator, if it were considering its own commercial interests, would not assume or would not assume to the same extent or under the same conditions without reward[92].

4.6.1. PSO scope

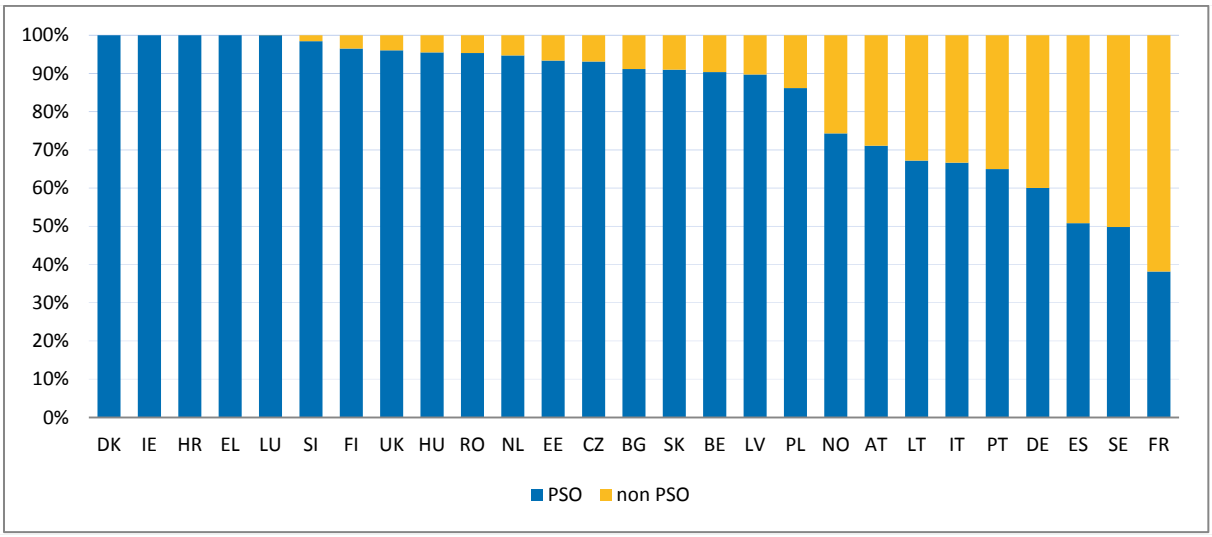
According to the RMMS, 68% of the p-km by rail in 2014 were made using PSO services (291 billion p-km out of 428 in EU28[93]). Compared to 2012 the proportion of PSO services in total rail passenger services has increased 4 percentage points.

Like shown in Figure 58, the proportion of PSO services in the total passenger traffic varies widely between the Member States. In Denmark, Ireland, Croatia, Greece and Luxembourg all passenger services are under PSO. In general, the larger Western-Europeans countries (except the United Kingdom) have relatively less PSO services.

92 Regulation (EC) No 1370/2007 of the European Parliament and of the Council of 23 October 2007 on public passenger transport services by rail and by road, OJ L 315, 3.12.2007, p.1

93 Data 2014 except EL and ES (2012) and IE and NL (2013)

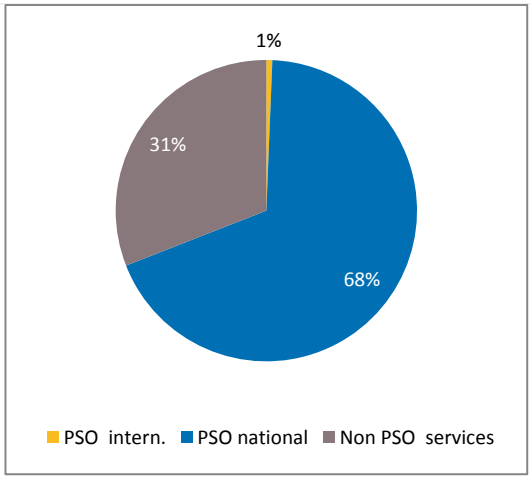
Figure 58 – PSO Services as % of total passenger services *(2014)*



Source: RMMS, 2014 data except for IE and NL (2013) and EL and ES (2012). Domestic PSO for FR includes also the train services TET, TER and Transilien (operated only by SNCF, and not by RATP)

Public service obligations target almost exclusively national lines; in international traffic the proportion is only 1%, Luxembourg having the highest share of international lines under PSO.

Figure 59 – Split of PSO national, PSO international and non PSO services - EU *(million p-km, 2014)*



Source: RMMS, data 2014 except for IE and NL (2013), only countries for which the split between domestic and international PSO was available (excludes CZ, EL, ES and SE).

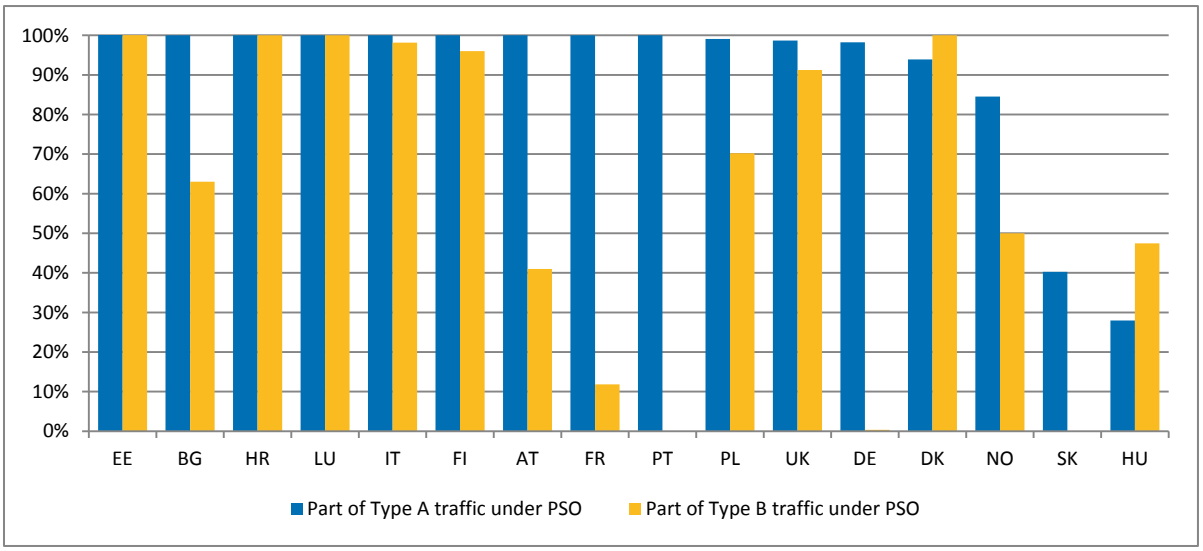
Table -11 – Proportion of international PSO in total PSO services *(2014)*

	PSO (international)	PSO (national + international)	*% of International PSO in total*
LU	115	409	28%
SI	109	686	16%
SK	234	2 351	10%
IE	96	1 568	6%
DK	388	6,804	6%
HR	43	927	5%
NL	752	17 018	4%
PL	407	13,851	3%
BE	183	9 917	2%
DE	100	54 300	0.2%
UK	51	62 173	0.1%

Source: RMMS, 2014 data except for IE and NL (2013), only countries having reported PSO contracts for international services.

The RMMS asked the Member States to report also the proportion of the traffic under PSO for type A (regional, suburban) and type B (long distance) traffic. The results are summarised in Figure 60. As expected, regional and suburban traffic is more often subject to PSO, while long distance traffic is more suitable for commercial services.

Figure 60 – Percentage of traffic under PSO for both type A and type B traffic[94] *(2014)*



Source: RMMS, data 2014, only for those Member States who provided data

4.6.2. PSO compensation

Ensuring the provision of public rail services usually implies the need for compensating undertakings which, either after a tender or a direct award, commit to a certain level of service[95]. In most countries providing data via the RMMS, the PSO compensation per train-km is higher than EUR 5[96] and the total support provided was around EUR 20 billion..

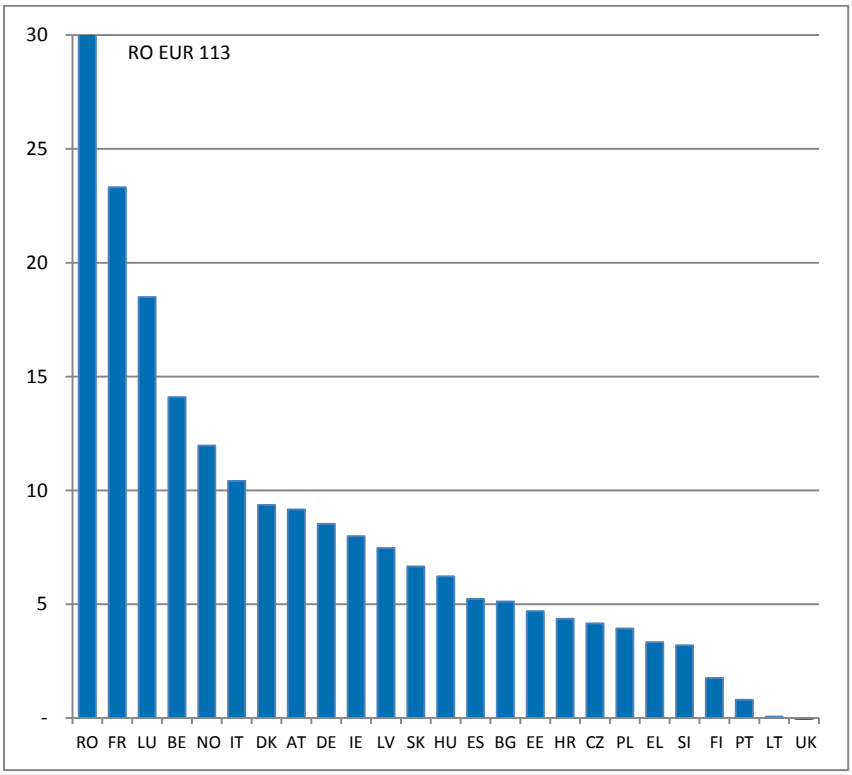
In terms of trends the picture is mixed: between 2011 and 2014, PSO compensation increased in absolute terms in 10 countries (Austria, Belgium, Denmark, Germany, Estonia, France, Italy, Luxembourg, Latvia, Poland, Norway) and decreased in 7 countries (Bulgaria, the Czech Republic, Hungary, Lithuania, Portugal, Romania, the United Kingdom). Lithuania, the Netherlands, the United Kingdom and Finland rely less on subsidies as a source of income, their proportion of farebox revenue in total revenues of PSO operations being significantly above the average. Nevertheless, their PSO obligations cover almost all the passenger lines (except in Lithuania).

94 UIC type A includes suburban and regional traffic and UIC type B includes intercity traffic

95 The United Kingdom represents a notable exception, where PSO arrangements overall result in net revenue for the State. This is linked to the peculiar structure of the British passenger market with its system of concessions where railway undertakings either receive or pay compensations to operate certain lines, the cost of which is recuperated through rail fares.

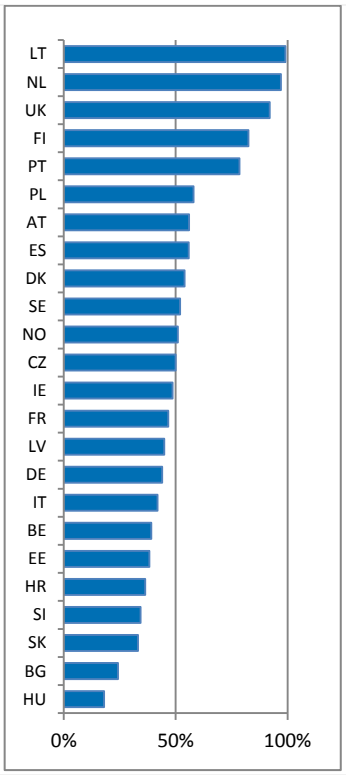
96 Excluding Romania, which is clearly an outlier

Figure 61 – PSO compensation per train-km *(EUR/train-km, 2014)*



Source: RMMS, 2014 data except EL, ES, IE (2012). In DE a small amount of regional traffic (about 11 m train-km) are not subsidised, whereas a very small part of long-distance traffic services receives subsidies. FI includes traffic compensated with exclusive rights without any direct financial compensation. BG includes total amount of PSO compensation and compensation for tariff obligations. DK: ticket revenue from gross contract Oresund not deducted.

Figure 62 – Proportion of fare-box revenue *(2014)*



Source: RMMS, data 2014 except for PL, SE (2013), BE, IE, ES, PT (2012), CZ (estimates). FR: average of Transilien, TER, TET.

Box 20 – Provisions on competitive tendering of rail public service contracts in the Fourth Railway Package

The "market pillar" proposals of the Fourth Railway Package include amendments to Regulation (EC) No 1370/2007 introducing the principle of competitive awards of public service contracts for passenger transport by rail and a number of other provisions fostering the cost-efficiency of public rail transport services. More specifically, the agreement reached by the European Legislator in April 2016 will introduce the principle of competitive award of rail public service contracts at the latest in 2023. Under certain circumstances Member States can choose to continue to directly award rail contracts, for instance in case of small, complex or technically and geographically isolated networks, however, in this case provisions for quality and/or cost-efficiency improvements need to be ensured in contractual conditions using clearly defined performance targets. Competent authorities would publish a reasoned decision on such a direct award and inform the European Commission within one month. To encourage compliance with legal requirements, competitors can ask for an independent assessment of that decision as part of a review process.

Additionally, to foster competition for rail contracts, competent authorities will have to undertake and publish an assessment of whether they must take measures to ensure non-discriminatory access to rolling stock, which is the most important market entry barrier for new railway operators. Finally, the legal text clarifies the conditions under which competent authorities can define public service obligations and their scope of application as well as measures of staff protection in the case of a change of public transport operator.

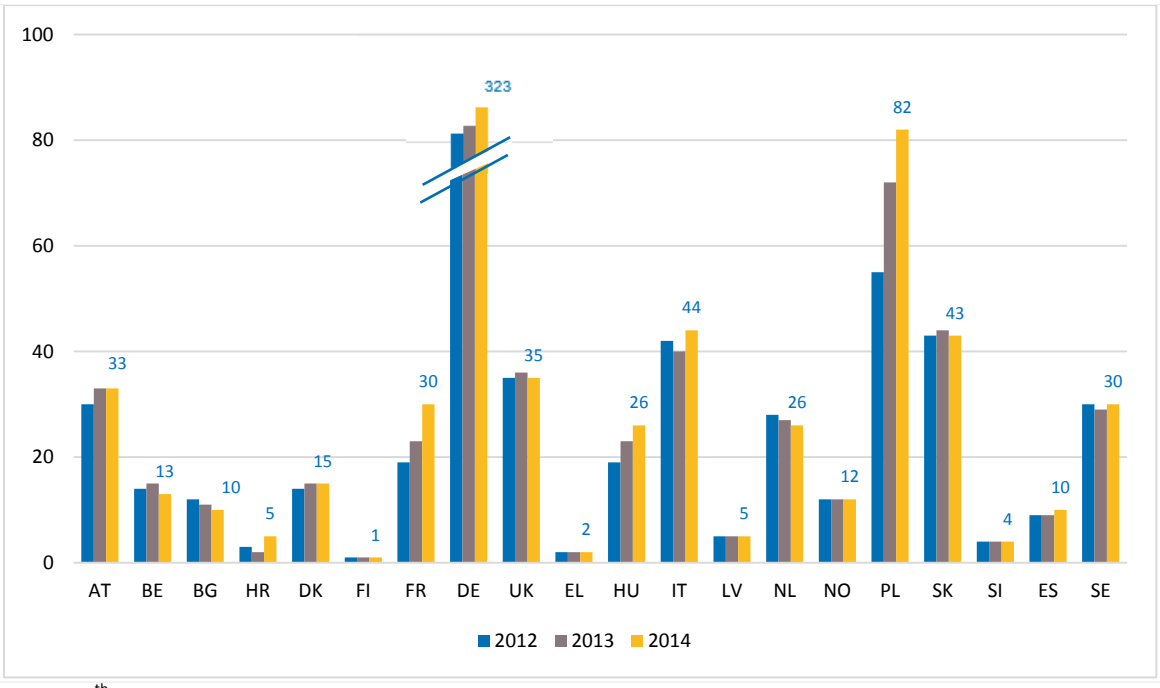
4.7. Licensing

A railway licence is an authorisation issued by a licensing authority to an undertaking, by which it's capacity to provide rail transport services as a railway undertaking is recognised. Fees for licensing can range from none to EUR 70 000, depending on Member State and content of application.[97] Licensing of railway undertakings is regulated by Articles 16 to 25 of the Recast Directive. Licensing ensures that access rights to railway infrastructure are applied throughout the EU in a uniform and non-discriminatory manner. A licence may cover only passenger or freight services or both. It is valid throughout the EU, as long as the railway undertaking fulfils the obligations laid down in European legislation.

The Commission adopted the implementing Regulation (EU) 2015/171[98] on certain aspects of licensing procedure to facilitate access to the market of new operators. The act reduces the administrative fees for start-up railway undertakings and shortens the time-to-market. It ensures that national licensing authorities publish all relevant licensing data immediately on the website of the Agency.

According to IRG data (Figure 63), between 2012 and 2014 Germany had the highest and Finland and Greece the lowest number of active undertakings (1 and 2, respectively). In the same period, the total number of active undertakings showed a clear increasing trend in Poland, France[99] and Hungary. A slight decrease appeared in Bulgaria and the Netherlands.

Figure 63 – Trend in total number of active railway undertakings



Source: 4th Annual Market Monitoring Report (2016) – IRG Rail, data not available for all countries

97 Impact assessment accompanying the proposal for a Regulation of the European Parliament and of the Council on the European Union Agency for Railways, SWD (2013) 8.

98 Commission Implementing Regulation (EU) 2015/171 of 4 February 2015 on certain aspects of the procedure of licensing railway undertakings Text with EEA relevance, OJ L 29, 5.2.2015, p. 3

99 France changed its reporting practices to IRG in that period: until 2013 only undertakings with a safety certificate were included, whereas from 2014 all undertakings providing rail transport services for passengers were reported (4th Annual Market Monitoring Report (2016) – IRG Rail, page 20)

Box 21 – Licensing data as available in ERADIS database

Licences for the performance of rail transport services within the EU and the European Economic Area according to the Recast Directive and the relevant national legislation should be uploaded by national authorities on ERADIS, the Agency's database of interoperability and safety[100]. Therefore, in principle, the information about the number of licences by different categories (active/inactive, freight/passenger etc) should be available from this database.

The 2014 RMMS questionnaire still asked the Member States to report the data about licensing in case it was *not* up to date in ERADIS. In total, 15 countries provided licensing data in the RMMS, 10 countries did not provide data but declared that the ERADIS database was up to date and 2 countries did not provide any information. Of the 15 countries having provided licensing data, 6 declared that the ERADIS database was up to date whereas the remaining 9 did not give any indication on the status of ERADIS.

Comparing the ERADIS figures to RMMS data or to the information in the IRG-Rail Annual Market Monitoring Report showed however in most cases significant inconsistencies. It is not clear whether this is due to a delayed upload of instances in ERADIS or due to different interpretations of the data to be reported. Therefore, future effort is needed to clarify the reasons behind the inconsistencies and to improve the data quality and accessibility in ERADIS.

4.8. Degree of market opening and utilisation of access rights

Over the last 25 years the opening of the rail market to competition has been one the major areas of effort by the Commission, aiming at developing a strong and competitive rail transport sector and at strengthening the position of railways vis-à-vis other transport modes. Rail freight transport has been opened since the beginning of 2007, for both national and international services[101], while the market for international rail passenger services (including cabotage) has been opened since 1 January 2010[102]. The provisions for opening domestic rail passenger services as from December 2020[103] are included in the Fourth Railway Package.

100 The ERADIS database on licences is publicly available on the website of the Agency (https://pdb.era.europa.eu/safety_docs/licences/default.aspx)

101 Directive 2004/51/EC of 29 April 2004 amending Council Directive 91/440/EEC on the development of the Community's railways (Second railway package of 2004), OJ L 315, 3.12.2007, p. 44

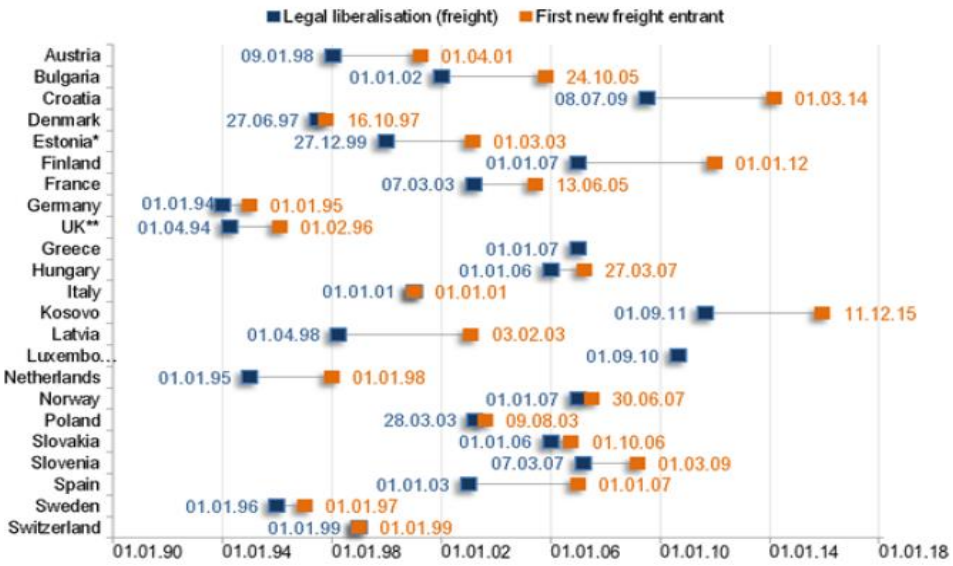
102 Directive 2007/58/EC of the European Parliament and of the Council of 23 October 2007 amending Council Directive 91/440/EEC on the development of the Community's railways and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure (Third railway package of 2007), OJ L 315/44 3.12.2007, p.44

103 The rules to request paths will enter into force in January 2019, but trains will effectively be able to run as from December 2020 (timetable 2021)

4.8.1. Legal liberalisation and actual entry in the rail market

Many of the Member States opened their rail freight markets before the European legal obligation (Figure 64). This has not been the case for passenger markets, which have so far been opened in less than half of the countries (Figure 65).

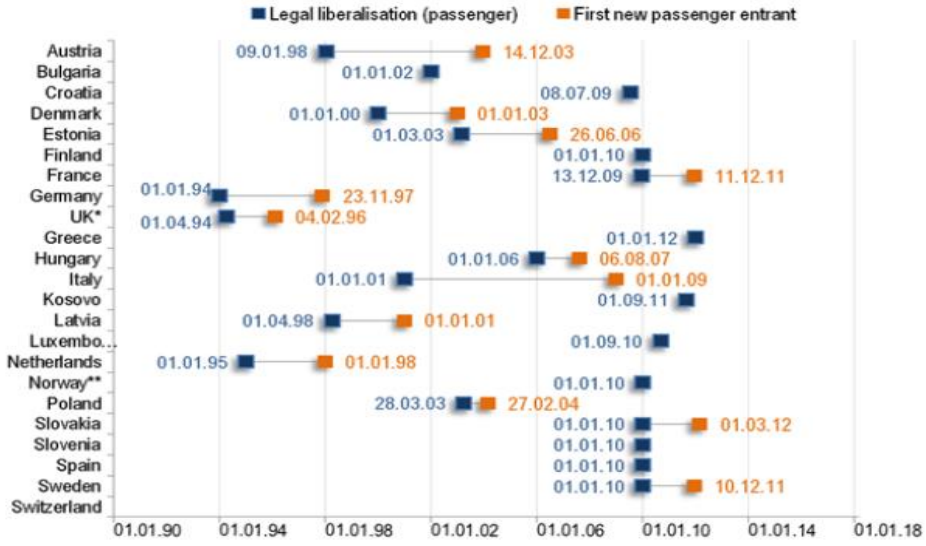
Figure 64 – Legal liberalisation and entry of the first competitor in the freight market



Source: IRG Rail, 4th Annual Market Monitoring Report (2016), Annex

Notes: * EE had a new freight entrant before legal liberalisation on 1st March 2003
** UK: The dates given refer to the liberalisation of the market in Great Britain; the rail market in Northern Ireland continues to be owned by the State. Where exact dates are not available, they have been set to the appropriate year

Figure 65 – Legal liberalisation and entry of the first competitor in the passenger market



Source: IRG Rail, 4th Annual Market Monitoring Report (2016), Annex, FR, EL, NO, ES: international services).

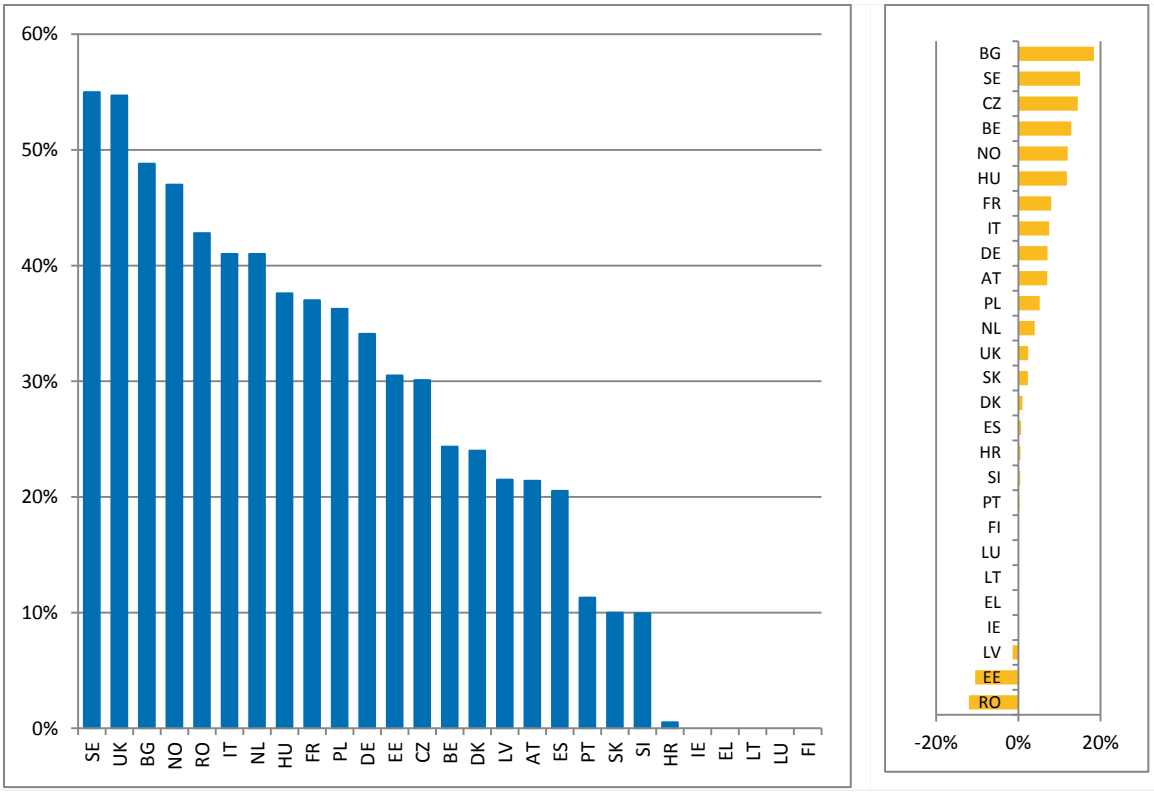
Notes: * UK: The dates given refer to the liberalisation of the market in Great Britain; the rail market in Northern Ireland continues to be owned by the State
**IRG Rail considers the market of NO partly liberalised in January 2010 although a new operator entered the market already in 2006

Legal liberalisation, however, does not correspond necessarily to real cases of competition and a gap between *de jure* liberalisation and new entry is quite common. In some cases, as in Greece and Luxembourg for freight and in Bulgaria, Croatia, Finland, Greece, Luxembourg, Slovenia and Spain for passenger transport, entry never occurred after *de jure* liberalisation[104]. At the same time, Estonia and Norway had new entrants (in freight and passenger markets respectively) before the markets were opened.

4.8.2. Freight market opening

As shown in Figure 66, the market shares of competitors (i.e. undertakings other than the incumbent or principal undertaking) in the rail freight market widely differ between the Member States. In the majority of States the market share of competitors is higher than 20%, while in seven countries (Sweden, the United Kingdom, Bulgaria, Norway Romania, Italy and in the Netherlands) it is more than 40%. In Finland, *de jure* liberalised since 2007, a competitor entered the market in 2012 and had not yet achieved noticeable market presence in 2014[105].

Figure 66 – Market share of competitors in the freight market *(2014, % of t-km)* **and evolution 2011[106]-2014** *(in percentage points)*



Source: RMMS, 2011- 2014 data except SE (2010 data used for 2011), PT and SI (2012 data used for 2011), LU (2010 data used for 2011 and 2012 data for 2014), IT 2014 data 4th Annual Market Monitoring Report (2016) – IRG Rail

In a majority of Member States the market shares of competitors in rail freight transport continued to increase between 2011 and 2014, in particular in Bulgaria, Sweden, the Czech Republic, Belgium, Norway and Hungary (more than 10 percentage points). In Belgium and the Czech Republic the main alternative operators doubled their market shares, while in Bulgaria the growth of the competitors'

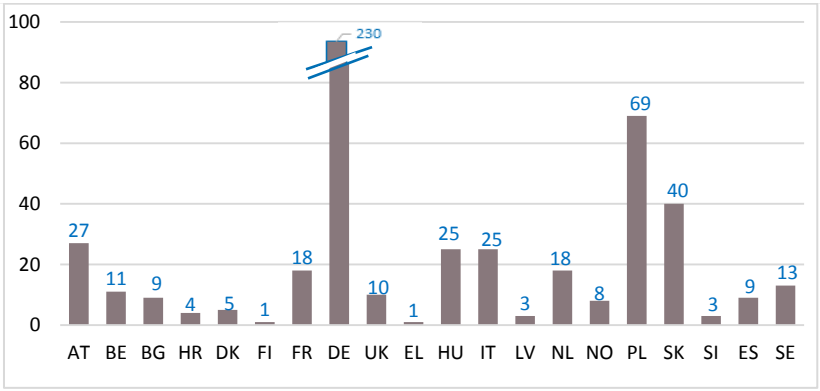
104 Data taken from the 4th Annual Market Monitoring Report (2016) by IRG Rail

105 VR Group's first competitor in rail logistics began operations in the Imatra area in autumn 2012. A third railway company aiming to provide freight services has obtained a safety certificate from the Finnish Transport Safety Agency in 2015

106 In this section 2014 data is compared to 2011, given that 2009 data was incomplete

market share (+18 percentage points) was spread between various operators. Exceptions to this growing trend were Estonia and Romania, where the main alternative operators lost about quarter of their market shares between 2011 and 2014.

Figure 67 – Number of active railway undertakings in freight market *(2014)*

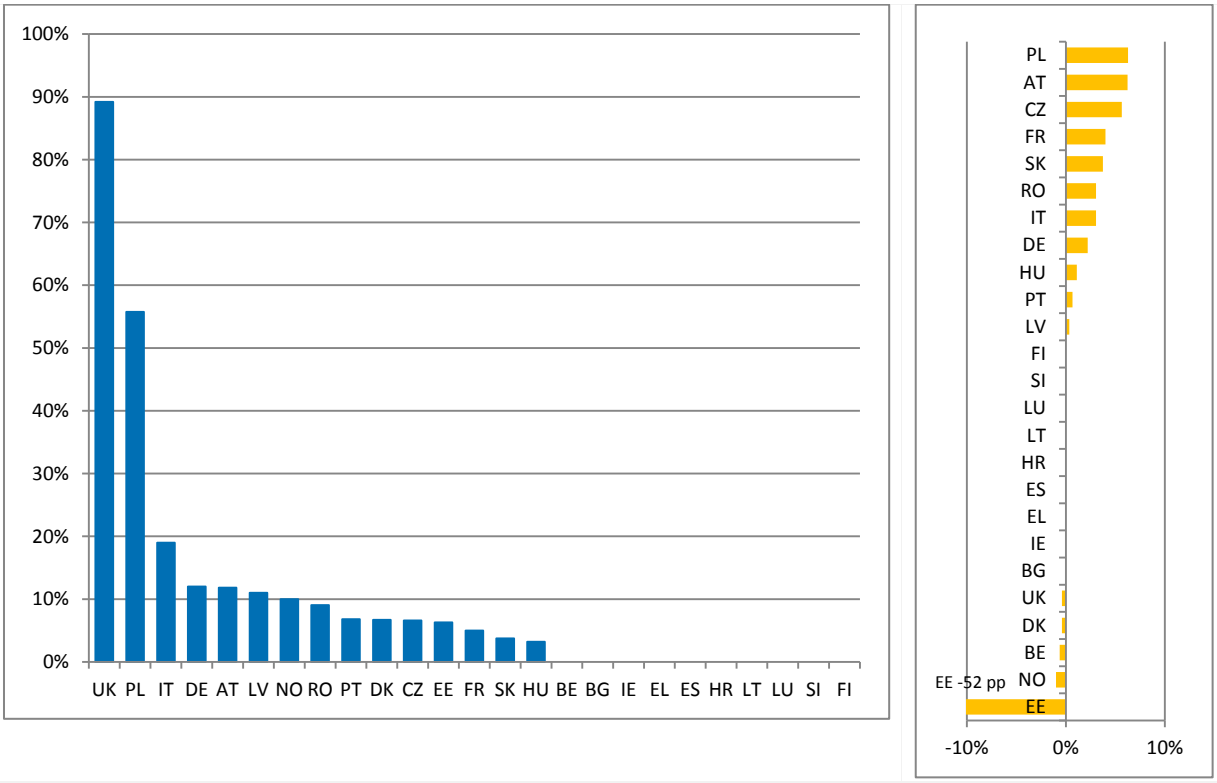


Source: 4th Annual Market Monitoring Report (2016) – IRG Rail

The number of undertakings active in the freight market (Figure 67) was particularly high in Germany, Poland, Slovakia, Austria, Hungary and Italy. No clear, common trend can be identified in Europe looking at the variation in the number of active railway undertakings between 2012 and 2014. It should be noted, however, that for an assessment of competitive pressure, the number of active railway undertaking should be monitored together with their market share.

4.8.3. Passenger market opening

Figure 68 – Market share of competitors in the passenger market *(2014, % of p-km)* **and evolution 2011-2014** *(in percentage points)*



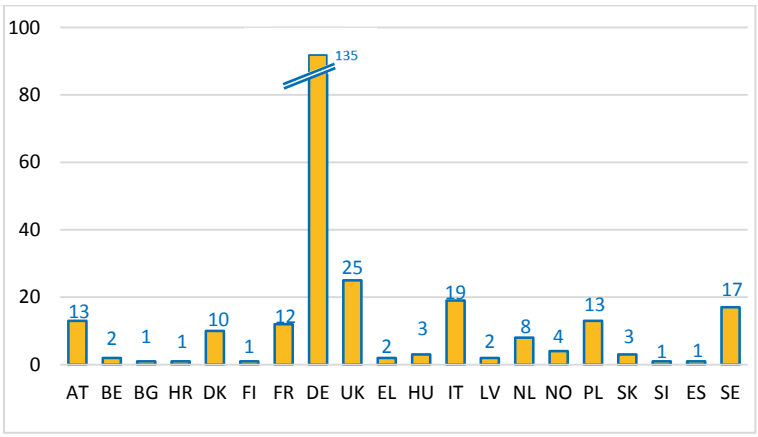
Source: RMMS, 2011-2014 data, except for Ireland (2013 data used for 2014), PT (2012 data used for 2011) NL and SE (confidential), LU (estimates) IT data from 4th Annual Market Monitoring Report (2016) - IRG Rail .

Figure 68 demonstrates that market shares of competitors in the rail passenger market are comparatively lower and less diverse than in the freight market, also due to the different stage of

market opening. In most countries incumbents keep a market share of well over 80%, with the notable exceptions of Poland (44.3%)[107] and the United Kingdom (11%[108]). At least in 15 countries competing operators have entered the rail passenger markets.

Similarly, the progression in market shares of alternative operators between 2011 and 2014 has been more modest in the passenger rail transport market than in the freight market. The pace of growth was the highest in Poland, Austria and the Czech Republic – around 6 percentage points. In Estonia in 2014, the predecessor of the incumbent Estonian Railways 'Elron', earlier operating only suburban services, took over all domestic passenger services from Edelaraudtee (ex-new entrant passenger operator). This means that as from 2014, all but international services (6% of the market) are again operated by an incumbent operator.

Figure 69 – Number of active railway undertakings in passenger market *(2014)*



Source: 4th Annual Market Monitoring Report (2016) – IRG Rail

As shown in Figure 69, Germany, the United Kingdom, Italy and Sweden had the highest number of undertakings active in passenger rail transport.

Competition in passenger railways takes the form of (a) competition for the market - via public service contracts or service concessions, giving an undertaking the exclusive right to operate on a specific route or bundle of routes, and (b) competition in the market where two or more operators compete on the same route (open access). Regional and suburban trains are usually run through public service contracts, whereas long distance and high speed trains may be more frequently operated under open access. In the United Kingdom a particular franchising system with competitively tendered public service contracts for bundles of lines has been put in place. Open access competition in the passenger rail transport

Table -12 – Market entry by domestic Open Access Operators

Country	Open access operator	Service	Begun	Ended
AT	Westbahn	Long distance	Dec-11	
CZ	RegioJet	Long distance	Sep-11	
	Leo Express	Long distance	Dec-12	
DE	HKX	Long distance	Jul-12	
	InterConnex	Long distance	Dec-01	Dec-14
IT	NTV	High speed	Apr-12	
	Arenaways	Long distance	Nov-10	Feb-12
SE	BlåTåget	Long distance	Nov-11	
	Öresundstå(Veolia)	Long distance	Dec-11	
	MTR express	Long distance	Mar-15	
SK	RegioJet	Long distance	Dec-14	
UK	Grand Central	Long distance	Dec-07	
	First Hull Trains	Long distance	Sep-00	
	Wrexham Shropshire & Marylebone	Long distance	Jan-08	Jan-11

Source: RMMS 2014, Steer Davies Gleave analysis *Competition in passenger rail services in Great Britain*, March 2016 – CMA, **http://www.topky.sk**
Note: excluding cabotage by high speed international services and airport-only operators)

107 Incumbent's market shares in Poland calculated with reference to PKP Intercity SA and PKP SKM sp Z.o.o.

108 Given the peculiar structure of the UK market the term "principal' is used instead of “incumbent” undertaking.

market has developed in Austria, the Czech Republic, Germany, Italy, Slovakia, Sweden and the United Kingdom, with different degrees and results. In the Czech Republic two alternative operators compete directly with the incumbent on the Prague-Ostrava route. In Slovakia Regiojet operates domestic open-access long-distance services between Košice and Bratislava. In Italy open access competitor NTV targeted the high speed line.

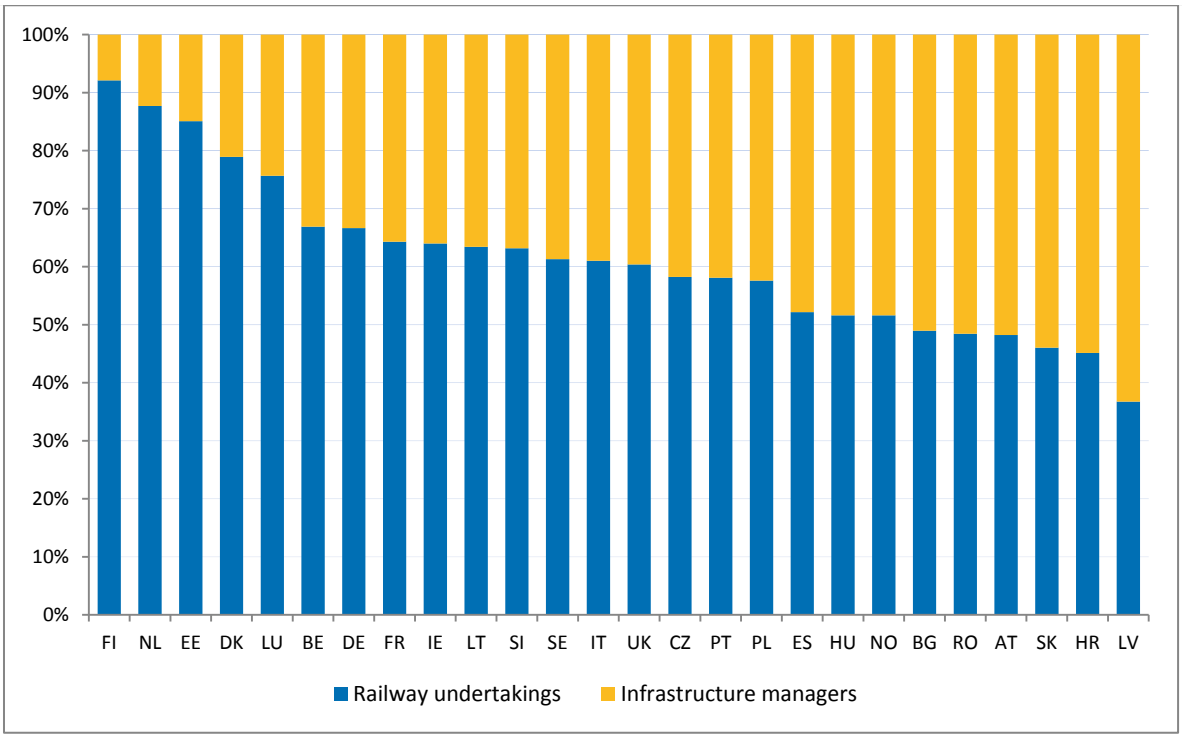
4.9. Development of employment and social conditions

4.9.1. Employment in rail

Based on the RMMS, about 900 000 people were employed either by railway undertakings (549 000) or infrastructure managers (357 000) at the end of 2014. In many Member States railway undertakings are among the largest national employers[109].

Within the sector, railway undertakings generally employ a higher proportion of labour force compared to infrastructure managers. The overall percentage of staff in infrastructure managers is higher in South and Eastern Europe and lower in Northern Europe (Figure 70).

Figure 70 – Proportion of labour force between infrastructure managers and railway undertakings *(2014)*

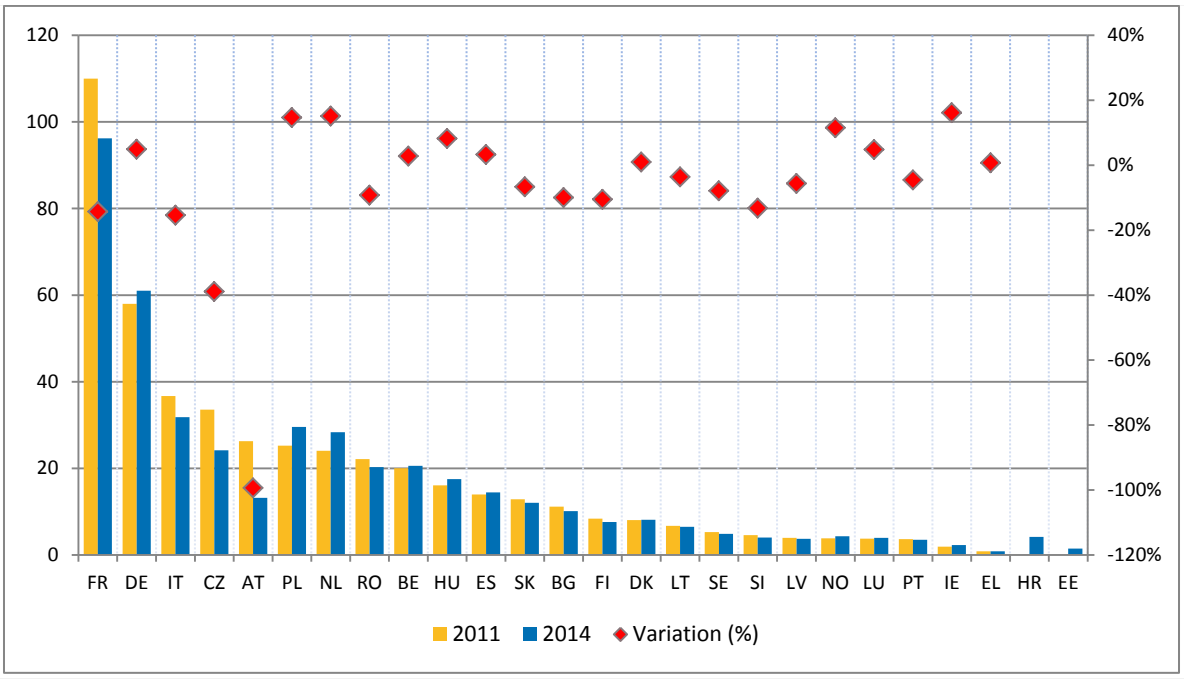


Source: RMMS 2014 except for IE (data 2013 for RUs and IMs) and BE (data 2013 for IMs). FR infrastructure managers' staff includes RFF and SNCF Réseau.

Total employment has decreased between 2014 and 2011 by 4% being relatively more significant among infrastructure managers.

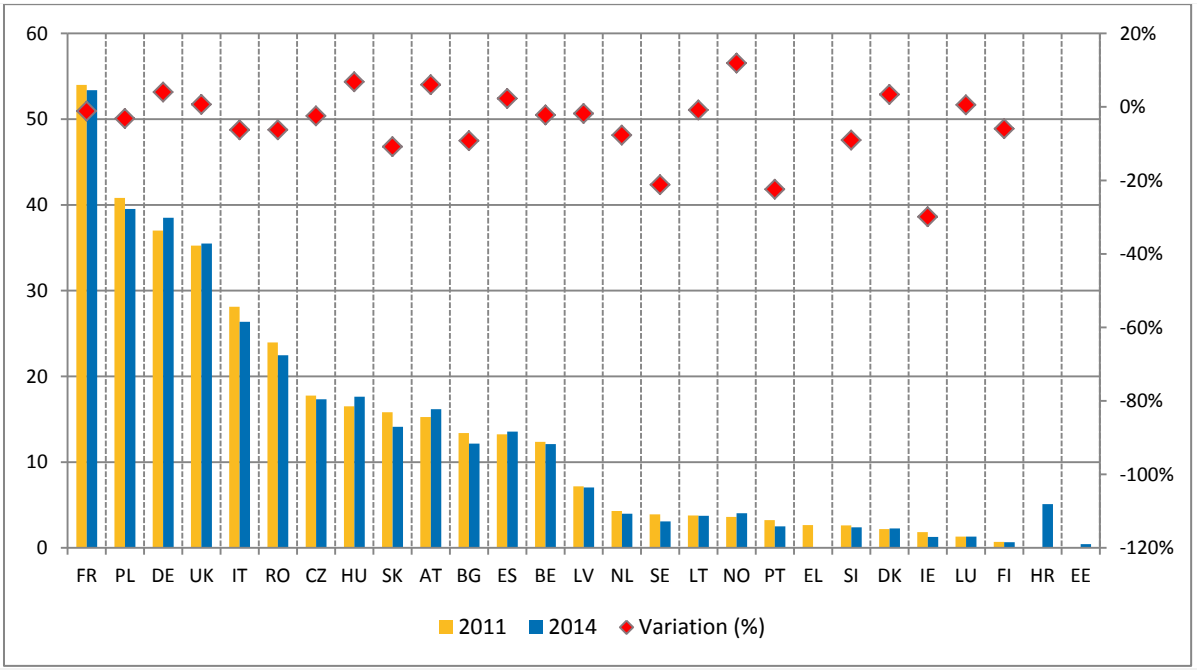
[109] EC, Impact Assessment for the Fourth Railway Package – Part 1 (30/1/2013) http://eur-lex.europa.eu/resource.html?uri=cellar:0f7c7e73-b211-418a-88dc-e211a3e21c17.0001.05/DOC_1&format=PDF

Figure 71 – Staff employed in incumbent rail undertakings *(2014, thousand)*



Source: RMMS. UK 2011 and 2014, HR and EE 2011 not available. EL data 2012 and IE data 2013 for 2014. CZ 2014: whole CD group. DK 2014: includes DSB, Oresund, Private lines and Metro (Freight N/A). DE 2011: not including incumbent's IM and rail related facilities staff. EE 2014: includes Estonian Railways, GoRail, ELRON and Edelaraudtee. NL 2014: includes NS staff outside NL. SE 2014: SJ AB and Green Cargo AB. NO 2014: include NSB Persontog (NSB AS and Gjøvikbanen AS), Flytoget AS, CargoNet, Cargo Link, LKAB Malmtrafikk AS and Grenland Rail.

Figure 72 – Staff employed in infrastructure managers *(2014, thousand)*



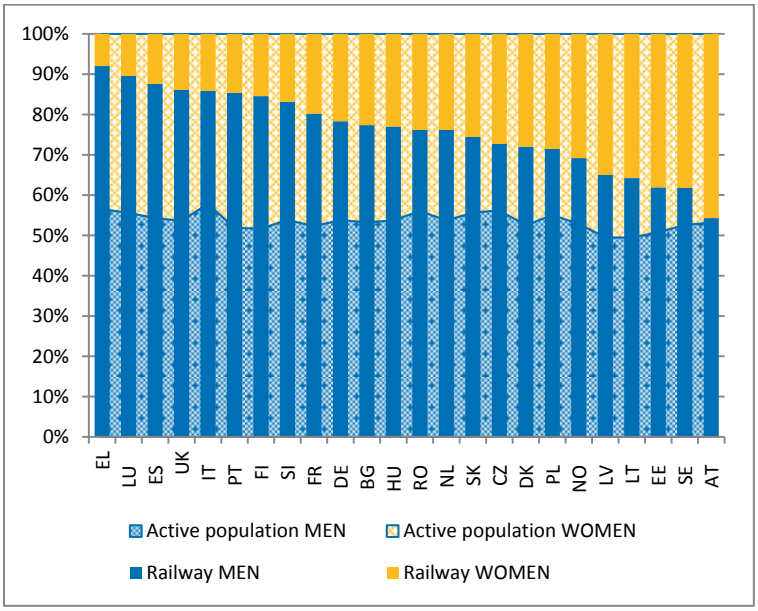
Source: RMMS. Data 2014 not available for EL, data 2011 not available for HR and EE. BE and IE: data 2013 for 2014. EE 2014: Estonian Railways, Edelaraudtee. ES 2014: Adif + Adif AV. FR: RFF and SNCF Réseau. NL 2014: ProRail, Keyrail. NO 2011 and 2014: including temporary workers. SI 2014: SŽ-Infrastructure company.

There is a gradual move, especially by new entrants, towards creating multifunctional positions (except in the case of drivers) leading to new types of jobs, requiring relatively higher qualifications and continuous in-job training109.

4.9.2. Socio-demographic structure of the rail labour market

Structure by gender

Figure 73 – Gender structure of railway staff *(2012)*



Source: UIC, Eurostat

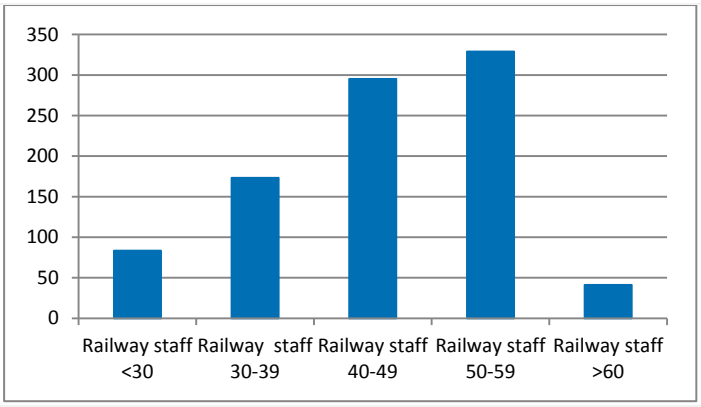
Figure 73 shows that women are underrepresented in the railway sector. The proportion of rail female workers is typically lower than the corresponding proportion of females in active population. The proportion of women is higher (but still less than 50%) in Sweden, Estonia and Austria[110].

The highest proportions of female employment in the railway sector are found in the human resource departments and the finance/controlling departments, whereas in professions such as maintenance personnel of rolling stock, shunters and drivers the proportion of women is very low[111].

Structure by age

Figure 74 demonstrates that workforce in the rail sector is ageing. The structure per age tends towards older workers, with proportion of workers older than 40 years typically higher than 50%. The age pyramid of the railway labour force demonstrates that a large contingent of workers is expected to leave the railways soon [112].

Figure 74 – Age pyramid of workers in rail
(thousand employees, 2012)



Source: UIC 2012

The proportion of workers older than 50 years was in 2012 particularly high in Spain, Greece, Finland and Italy[113].The proportion of railway staff younger than 30 years is typically lower than the correspondent proportion on total active population.

110 UIC (2012)

111 "Women In Rail "Study on the situation of women in the rail sector and on the implementation of the European social partners' Joint Recommendations", 2012

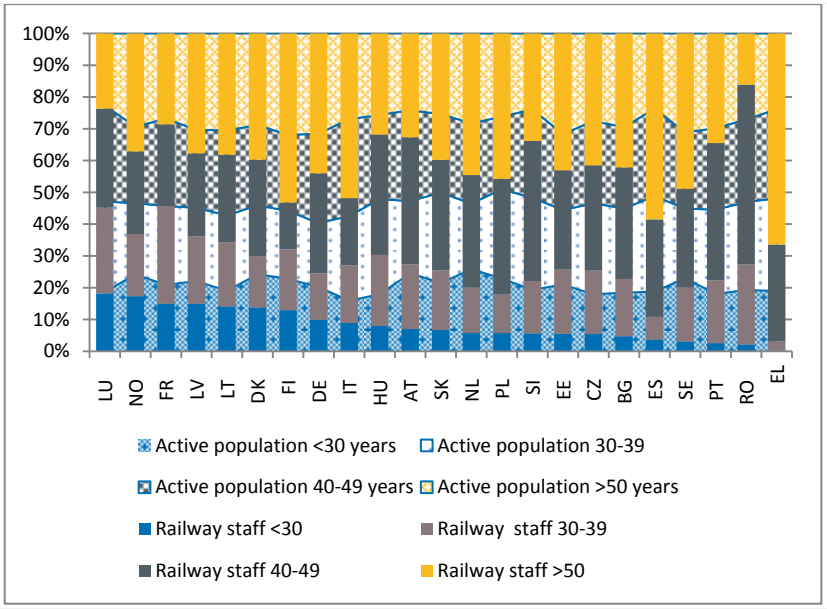
112 Panteia – Background information for the study "Analysis of the trends and prospects of jobs and working conditions in transport", November 2013, unpublished

113 UIC (2012)

The percentage of people under the age of 30 is the lowest in Greece, Spain and Portugal, but this age group is underrepresented also in Romania and Sweden.

After long recruitment freezes, rail companies in many countries have recently begun to recruit again, also due to the ageing workforce profile[114]. Job opportunities have been created for young people, including throughout apprenticeship schemes[115].

Figure 75 – Railway staff structure per age



Source: UIC 2012 and Eurostat

The ageing of staff increases the need for developing lifelong learning programmes for different age groups, on the one hand, and increasing recruitment efforts, on the other. It is also important to avoid a loss of knowledge and competencies[112116] when generations change, in particular for key occupations with skill shortages like drivers, engineers and other technical professions. Actions to deal with skill shortages will have to take into account the perceived attractiveness of the sector, which varies greatly depending on country, respective socio-economic context and the nature of the enterprise. Secure employment, good remuneration, good career development opportunities under good working conditions and positive corporate climate are today the most common elements referred to in countries where the sector is considered attractive[117114].

Box 22 – Training in the rail sector

The European railway sector is facing significant challenges including changing legal framework, new technologies and competitive pressures, which have an impact on competences and skills required from the railway's workforce.

Railway undertakings have own training facilities or they buy training services on the market, either from other railway undertakings or from independent rail training centres. In-house vocational education and training also plays an important role in accompanying younger people into rail careers.

The UIC introduced the Expertise Development Platform, an open meeting for members, which takes place twice a year. The core objective of the Platform is to enhance the workforce development through sharing best practice in rail training across the sector. The Platform includes a Core Group to provide strategic direction and working groups on topical issues, such as rail trainers' development, benchmark train drivers' training programmes and customer service training. A World Congress on Rail Training has been organised every two years since 2011.

114 "Promoting employment and quality of work in the European rail sector", EVA Academy, ETF, CER (2016).

115 "The economic footprint of railway transport in Europe", ECORYS on behalf of CER (2014)

116 Panteia (2013)

117 EVA Academy, ETF, CER (2016).

4.10. Harmonisation

During the past 25 years the Commission has been very active in pursuing a restructuring of the European rail transport market and the reinforcement of the position of rail compared with other transport modes. The Commission's efforts have focussed on three main areas:

- opening the rail transport market to competition;
- improving the interoperability and safety of national networks; and
- developing rail transport infrastructure,

with an ultimate goal to create a Single European Railway Area. To this end, the Commission has engaged in a gradual harmonisation of market access, interoperability and safety rules of the rail sector and the elimination of redundant and obsolete national rules.

4.10.1. EU legislation

The legislative action of the Commission has been particularly active over the last 15 years with the adoption of **three rail packages**:

- First Railway Package ("rail infrastructure package"), 2001: enabled rail operators to have access to the trans-European network on a non-discriminatory basis for the purpose of operating international freight services. The First Package was recasted in 2012 by Directive 2012/34/EU;
- Second Railway Package, 2004: fully opened the rail freight market to competition as from 1 January 2007, created the European Railway Agency, introduced common procedures for accident investigation and established Safety Authorities in each Member State;
- Third Railway Package, 2007: introduced open access rights for international rail passenger services including cabotage by 2010, introduced a European train driver licence and it strengthened the rail passengers' rights[118].

In addition, **the Fourth Railway Package** is in the final stages of adoption. **The technical pillar**, focusing on interoperability, safety and a renewed role for the Agency entered into force on 15 June 2016. The technical pillar includes:

- Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways and repealing Regulation (EC) No 881/2004[119];
- Directive (EU) 2016/797 of the European Parliament and of the Council of 11 May 2016 on the interoperability of the rail system within the European Union[120];
- Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety[121].

Regarding **the market pillar**, a final trilogue has been successfully concluded, paving the way for the adoption of this last part of the Fourth Package by the end of 2016. The market pillar includes:

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118 For further information, see DG MOVE website: http://ec.europa.eu/transport/modes/rail/packages/2007_en.htm

119 Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways, OJ L 138, 26.5.2016, p.1

120 Directive (EU) 2016/797 of the European Parliament and of the Council of 11 May 2016 on the interoperability of the rail system within the European Union, OJ L 138, 26.5.2016, p. 44

121 Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety, OJ L 138, 26.5.2016, p.102

- a proposal to amend the Regulation 1370/2007 ("PSO Regulation") introducing the principle of competitive tendering for public service contracts;
- a proposal to amend the Directive 2012/34/EU ("Governance Directive" or "Recast Directive") regarding the opening of the market of domestic passenger transport services by rail and the governance of the railway infrastructure;
- a proposal to repeal Regulation (EEC) No 1192/69 on common rules for the normalisation of the accounts exempting certain payments to railway companies from state aid rules.

The Fourth Railway Package will conclude the opening and structural reforms of the railway market.

4.10.2. Transposition

Rail Directives can only have their intended effects if they are completely and correctly transposed into Member States' national law by the foreseen deadlines. Therefore the Commission services are monitoring the progress of Member States in terms of **transposition deficit** (the gap between the number of rail Directives adopted at EU level and those transposed by Member States) and **compliance deficit** (the number of incorrectly transposed Directives). It also works together with the Member States and stakeholders to facilitate and support their efforts for effective implementation of the legislation for a Single European Rail Area.

To calculate the percentage of directives that constitute the transposition deficit of each Member State, the Commission services include:

- Directives for which no transposition measures have been communicated after expiry of the transposition deadline;
- Directives declared as partially transposed by Member States after notification of some transposition measures by the end of the transposition deadline;
- Directives declared as completely transposed by Member States, but for which the Commission has opened an infringement procedure for non-communication and the Member State has not notified new transposition measures after the latest procedural step taken by the Commission.

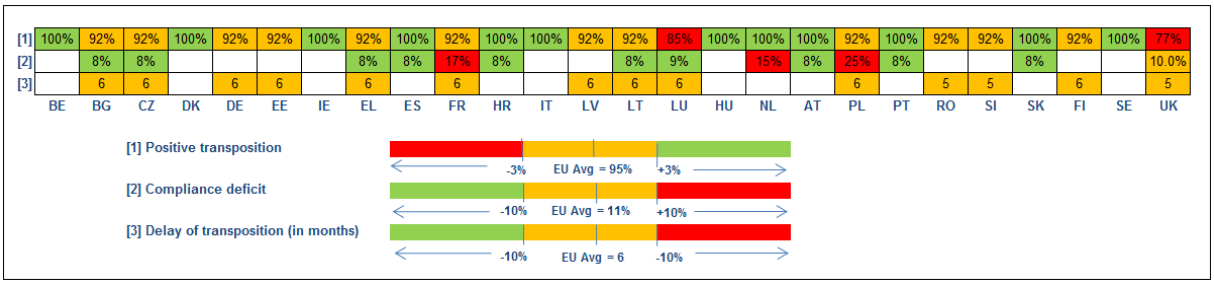
The transposition deficit does not include those Directives declared as completely transposed by a Member State, but for which transposition measures are still under examination by the Commission (i.e. there has been no procedural step taken after the latest notification).

The compliance deficit measures the number of Directives transposed where infringement proceedings for non-conformity have been initiated by the Commission, as a percentage of the number of rail Directives notified to the Commission as either "fully transposed" or "requiring no further transposition measures"[122].

The transposition delay measures the time in months elapsed between the deadlines for transposition provided in the Directives and the status of 'non-transposed' (see above) registered on 10 December 2015.

[122] When interpreting the statistics on compliance deficit, it should be kept in mind that ultimately only the Court of Justice can rule that a Directive has not been transposed correctly

Figure 76 – Transposition monitoring: market, interoperability and safety Directives



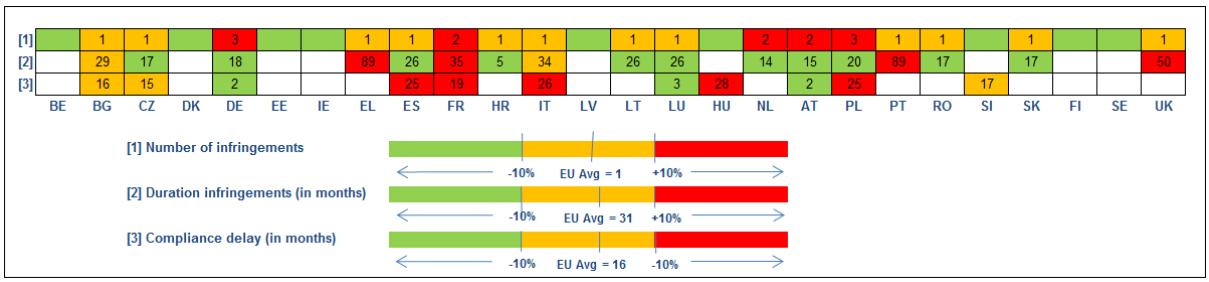
Source: Single Market Scoreboard database (data extraction March 2016)
Note: calculation made on transposition notifications sent to the Commission by 10 December 2015 for Directives with a transposition deadline on or before 31 October 2015

4.10.3. Infringements

Infringement proceedings may be started when the Commission considers that e.g. an EU Directive has not been transposed timely and correctly into national law, or Single Market rules (either in the Treaty on the Functioning of the European Union or in secondary legislation) have been incorrectly applied. Infringement proceedings only start when a letter of formal notice is sent to the Member State in question.

This section does not include cases for late transposition (known as non-communication cases) in order to avoid such cases being counted twice as they are already treated in the transposition section. The number of infringement proceedings shows the number of cases with the status "open" on 1 December 2015. The compliance delay shows the number of months elapsed between the ruling of the Court and the resolution of the case (date of the Commission's decision of closure).

Figure 77 – Monitoring of infringement proceedings: market, interoperability and safety Directives



Source: Single Market Scoreboard database (data extraction March 2016)
Note: Calculation made on the number of infringement cases with the status "open" on 1 December 2015

Box 23 – Further harmonisation

Harmonisation and standardisation of various aspects of rail operations across the borders is crucial for a true Single European Rail Area. The following texts outline additional legal and voluntary actions seeking to overcome the fragmentation of rail networks and services.

International train paths

The Recast Directive requires the Member States to ensure that infrastructure managers cooperate on application of charging schemes to the operation of train services which cross several national networks and establish appropriate cross-border procedures. The aim is to guarantee optimal competitiveness of international rail services and ensure the efficient use of the railway networks. They should also cooperate to enable mark-ups and performance schemes (Article 37). In addition, infrastructure managers shall cooperate in the allocation of infrastructure capacity on more than one network, establishing appropriate procedures and organising train paths crossing more than one network accordingly (Article 40).

The Member States have taken steps to ensure that their main infrastructure managers comply with these requirements within the framework of the RFC, being supported by RailNetEurope[123]. In accordance with the Article 14.1 of the Regulation (EU) No 913/2010, the Executive boards of the RFC have to define a framework for capacity allocation concerning their respective corridor. Several frameworks for specific corridors were adopted in 2012. In 2014 and 2015, however, given the overlap of corridors and taking into account the need for a network approach, required by the railway undertakings, the Member States have agreed on a common Framework for Capacity Allocation for the 9 rail freight corridors (including a harmonised set of KPIs for capacity allocation). According to Article 14, infrastructure managers jointly organise international pre-arranged train paths for freight trains running on the corridor.

Network statements

Members of RailNetEurope have voluntarily agreed on a common structure and implementation guide for drafting infrastructure managers' Network Statements, according to Article 27 of the Recast Directive.

Cooperation between national regulatory bodies

Furthermore, Article 55 of the Recast Directive requires that regulatory bodies cooperate for the purpose of coordinating their decision-making across the EU. They should, in particular, develop common principles and practices for making the decisions. An increase in complaints with a cross-border dimension, requiring stronger cooperation between regulatory bodies, is expected as a result of the establishment of the RFCs and further development of the Single European Railway Area. Regulatory bodies have already concluded for each RFC a cooperation agreement. These agreements have been harmonised and the rules are similar for each corridor.

National rules

Interoperability and safety are significantly affected today by the existence of a large number of national rules. The current distinction of national rules into two categories (a) national technical rules in the meaning of Article 17 of Directive 2008/56/EU and (b) national safety rules in the meaning of Article 8 of Directive 2004/49/EC disappears under the Fourth Railway Package.

National technical rules (including those covering maintenance) have been progressively replaced by technical specifications for interoperability (TSIs). The Agency estimated that the number of national technical rules for new vehicles made redundant by the scope extension of TSIs is more than 9000[124].

National safety rules (including those covering operations and staff competencies) will be replaced by TSIs, Common Safety Methods, Common Safety Targets and safety management systems.

The Agency has prepared a programme plan with three main milestones:

- cleaning up of technical rules for vehicle authorisation by the end of 2016;
- cleaning up of redundant national safety rules, as identified in the report of the Task Force on national

123 Association set up by a majority of European Rail Infrastructure Managers and Allocation Bodies to enable fast and easy access to European rail, as well as to increase the quality and efficiency of international rail traffic (http://www.rne.eu/)

124 considering only rules not linked to interfaces with fixed installations

safety rules, by the end of 2016;
- harmonisation of operational rules by 2019.

The Commissioner Violeta Bulc wrote to the Member States on 26 April 2016 to ask their commitment with a first objective of a reduction of 50 % of redundant or obsolete national rules by the end of 2016.

Licences

The Implementing Regulation (EU) 2015/171 of 4 February 2015 focused on certain aspects of the procedure of licensing railway undertakings and, in particular, on a common template for the licence document. Licences issued in accordance with chapter III of the Recast Directive shall use the standard format set out in Annex I and II to the Implementing Regulation.

Harmonisation in the framework of the Rail Freight Corridors

The RFC, as governance structures dedicated to cross-border rail freight (involving Ministries, infrastructure managers, railway undertakings and terminals), are often the forum where (cross-border) rail freight issues of different nature are brought up and discussed. It leads to harmonisation or helps identifying the need for harmonisation within a corridor, between the corridors or at European level. Experience has shown that harmonisation at the RFC level has in certain cases positively influenced the convergence and evolution of national rules and procedures.

In practice, working groups are usually set up, composed of experts (of the relevant departments of the infrastructure managers or other organisations like the ministries, railway undertakings, National Safety Authorities and Regulatory Bodies, the Agency, the Commission, etc.) to tackle particular issues. In some RFCs working groups have been set up to tackle issues highly relevant for rail freight but not directly within the scope of the Regulation, for instance ERTMS operational rules.

4.11. Digitalisation

Digitalisation offers important opportunities to revitalise the railway sector; it has across-the-board potential to increase safety levels, reliability, improve performance and efficiency of the rail system, provide better services and fundamentally change the way companies interact with customers or organise their operations. The disruptive benefits of digitalisation are also affecting other sectors and modes of transport and significant changes are expected to occur in customer's behaviour patterns. In this regard, it is urgent that the rail sector promotes speedy implementation of existing initiatives as well as cooperates in underlying commercial questions that prevent creation of new services for the end-users.

Initiatives that are already underway include the following:

- **Automatic Train Operation (ATO)** in parallel with ERTMS deployment will reduce operating costs for railway undertakings and maintenance costs for infrastructure managers as well as improve network capacity and punctuality;

- The Agency is currently developing a **system of common occurrence** reporting which will allow both the reporting of urgent safety defects and the gathering of incident data. This will allow the sector to develop a risk model at a European level and therefore support better safety decisions and risk management. It should move the sector to a system of predict and prevent rather than the current system which relies on lagging indicators. The Agency, in collaboration with the European Aviation Safety Agency, is exploring the benefits a big data approach could bring;

- While **the TAF TSI** (technical specification for interoperability relating to telematics applications for freight services) provides the basis for standardised exchange of information between the actors, its successful implementation is still to be achieved. It will be fully operational by 2021. Further developments of the TAF TSI could enhance *inter alia* the response to dangerous goods incidents by providing information quickly to the emergency services. With regards to implementation of **TAP-TSI** (technical specifications for interoperability on telematics applications for passengers), the late establishment of its governance entity is delaying some functions that this entity is supposed to undertake;

- At the same time online and mobile apps and sale channels profoundly change the **way how customers expect to interact with the transport system**. This raises customer expectations to be able to purchase Mobility as a Service, using multiple modes of transport in a seamless journey, with bookings and payments managed collectively for all legs of the trip. Multi-modal journey planners are increasingly used by passengers and the unavailability of timetable data for rail does not encourage its use. Moreover, the Commission would like to see more progress on through ticketing across the modes. While digital technology can certainly facilitate operations, it does not solve underlying commercial issues. In order to survive in this environment, it will be crucial for rail operators to address jointly these issues, improve access to their data and cooperate with other operators to develop offers for through ticketing;

- **The One Stop Shop as a digital single entry point** in Europe for applications for vehicle authorisations and safety certifications is an innovative tool introduced by the Fourth Railway Package. It aims at simplifying the procedures and at ensuring level playing field and equal treatment for applicants across Europe.

5. Funding and efficiency of the railways

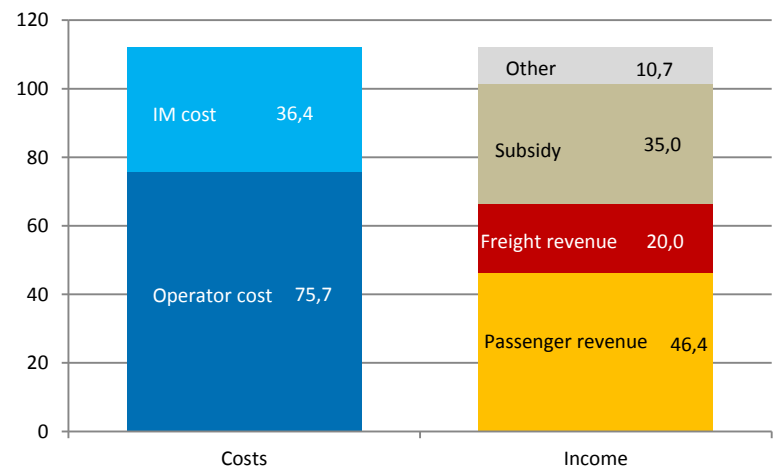
Given the monopolistic or semi-monopolistic nature of railways, there is a broad acceptance that closer monitoring and managing of the performance of the sector would lead to efficiency improvements. In order to guide the future policies and decide on adequate level of funding, it is important to identify the critical success factors enabling an improvement in the performance of rail.

This chapter provides a high level overview of the funding of railways and its performance in terms of some core indicators, based on the Commission 2015 Study on the *Cost and Contribution of the Rail Sector*[125]. The study provided a "broad brush" analysis of the trends in overall performance of different national rail systems between 2003 and 2012[126]. It also included a scenario analysis assessing the potential societal benefits of a better performing rail sector.

Finally, it looks at the existing measures and sector initiatives for managing the performance of the railways.

5.1. Funding of railways

Figure 78 – Cost and contribution of rail sector *(billion EUR, 2012 in 2010 prices)*



Source: Study on the *Cost and Contribution of the Rail Sector*

The overall cost of rail operations and infrastructure management in the EU in 2012 was around 110 billion EUR, 60% of which was covered by passenger and freight revenue, 30% by public subsidy to rail operators and infrastructure managers and the remainder by other sources of income.

On average, the split between infrastructure and operator costs is approximately 30%:70%. This is largely a function of the dominance of passenger railways in a number of larger, higher income Member States. In those countries where freight traffic plays a more significant role, the proportion of total costs accounted for by the infrastructure manager is greater.

On the income side of the equation, roughly 60% of costs are covered by fare-box and freight revenue (40% passenger and 20% freight) and a further 30% by subsidy. The remaining 10% (around EUR 10.7 billion) is a residual balancing item that is likely to include freight income not captured at the Member State level (data was not available for all Member States) and other sources of income such as property rents and retail revenue.

125 *The Cost and Contribution of the Rail Sector*, Steer Davies Gleave (2015) http://ec.europa.eu/transport/modes/rail/studies/doc/2015-09-study-on-the-cost-and-contribution-of-the-rail-sector.pdf

126 Therefore data and time series in this chapter mostly run until 2012 only and not until 2014 as in the other chapters

The Issue Paper *Solid Infrastructure Financing for an Efficient Rail System*[127], distributed after the workshop organised by SNCF Group in 2015, noted that while almost everywhere the rail sector relies on public investment, the way funds are channelled, differs. European countries have two principle funding models. Some countries (e.g. the United Kingdom, Switzerland, the Netherlands, Sweden) allot subsidies primarily to infrastructure managers and keep access charges low. Others (e.g. France, Belgium, Germany) primarily subsidise transport services through PSO contracts. This forces their infrastructure managers to adopt higher access charges through mark-ups.

For instance, Sweden allots 78% of public subsidies to its infrastructure manager Trafikverket, whereas Belgium channels only 17% of public grants to Infrabel. As a result, according to the RMMS, the track access charges in Belgium for suburban trains were projected to be six and for intercity trains four times higher than in Sweden in 2016. The charges applicable to freight trains in Belgium are significantly lower than charges for passenger trains (though still higher than in Sweden), given that freight operations do not get public subsidies.

5.2. Performance in terms of main inputs and outputs

Rolling stock fleet sizes (vehicles) for both passenger and freight appear to have been in decline since 2009. This may be due to changes in the characteristics of rolling stock such as increasing seat densities and larger freight wagons, or economic effects such as asset disposal or stabling during the economic crisis. There has also been a decrease in employment in the rail sector. However, this trend could be attributed to structural changes in the sector (particularly outsourcing).

Figure 79 – Trends in input indicators *(2007=100)*

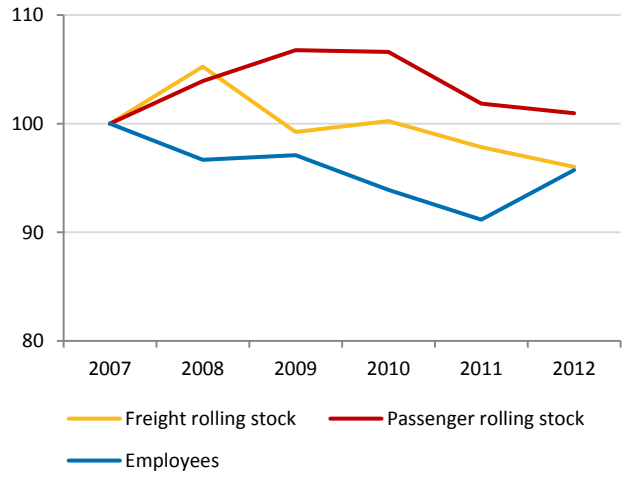
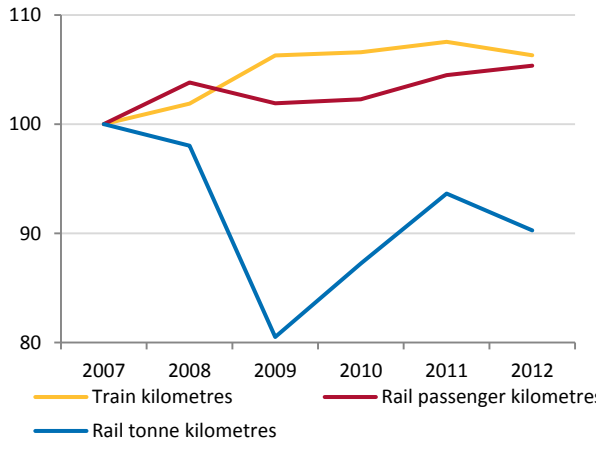


Figure 80 – Trends in output indicators *(2007=100)*

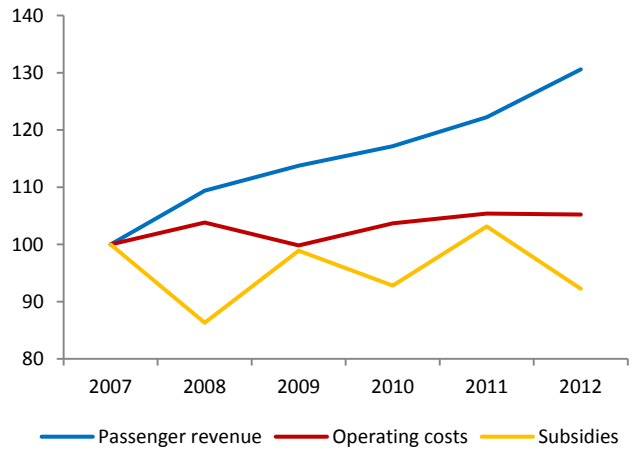


Source: Study on the *Cost and Contribution of the Rail Sector, various sources*

As already indicated in section 2.1, rail passenger outputs and total train-km (including both passenger and freight train movements) have grown, while rail freight outputs, while recovering since the depth of the recession in 2009, have still declined overall.

[127] http://www.inno-v.nl/wp-content/uploads/2015/03/24022015-Issue-Paper-pour-envoi.pdf

Figure 81 – Trends in financial indicators *(2007=100, adjusted for HICP)*

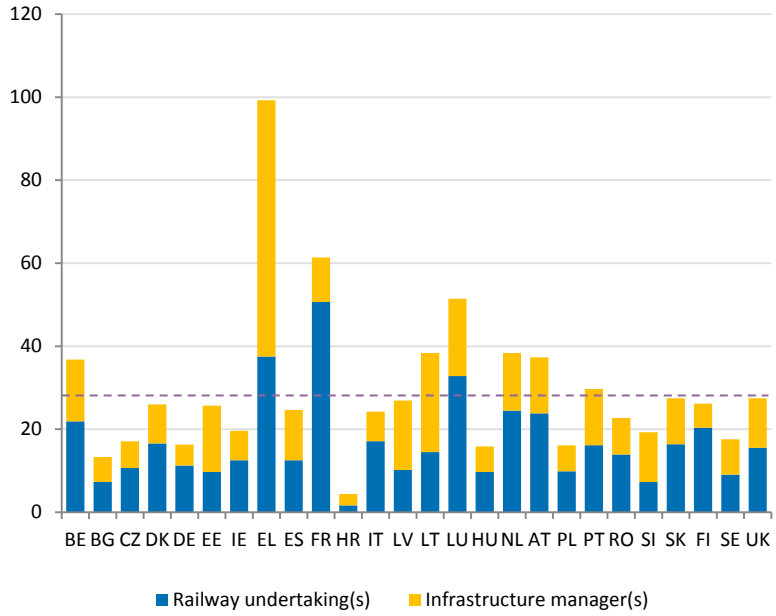


Source: Study on the *Cost and Contribution of the Rail Sector*

Figure 81 presents EU-wide trends in passenger revenue, total operating costs and subsidies, adjusted to reflect 2007 prices by using the European Central Bank's Harmonised Index of Consumer Prices (HICP). Operating costs cover both passenger and freight operations and are inclusive of financing and depreciation costs but, to avoid double accounting, are net of track access revenues[128]. Passenger revenue has increased significantly, while total operating costs have remained broadly static in real terms. It is not, however, possible to draw definitive conclusions regarding unit costs due to the mixed fortunes of passenger (increase) and freight (decrease) traffic over the period. Data regarding the quantity of public subsidy is volatile at an EU-wide level and there is no discernible long-term trend. In broad terms, therefore, the burden of funding Europe's railways has remained relatively static between 2007 and 2012, but with considerable year-on-year variation.

Finally, Figure 82 describes total operating costs per train-km by Member State. While there are a few notable outliers (in particular Greece and Croatia), the spread of operating costs lies broadly in the range of 20 – 40 EUR per train-km. Towards the upper end of this range lie high-income Western European Member States including Belgium, the Netherlands and Austria with France and Luxembourg higher still. A number of Central European Member States lie towards the lower end of the range including the Czech Republic, Hungary and Poland.

Figure 82 – Operating costs per train-km by Member State *(EUR per train-km, 2012)*



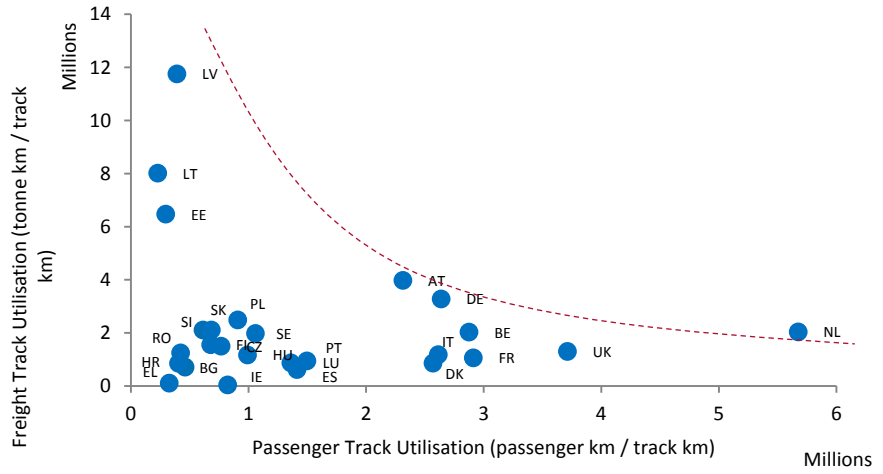
Source: Study on the *Cost and Contribution of the Rail Sector*

Further analysis of primary (track utilisation and train utilisation) KPIs led to the conclusion that the range of factors which affect the relative efficiency of rail networks in different Member States are many and/or complex. Some conclusions drawn are outlined below:

[128] It was not possible to include freight revenue within this analysis due to lack of a comprehensive dataset for all Member States

– There is a generally established trade-off between freight and passenger track utilisation and (see Figure 83 below);

Figure 83 – Passenger track utilisation and freight track utilisation *(2012)* – absolute figures



Source: Study on the *Cost and Contribution of the Rail Sector*

– Changes in track and train utilisation varied considerably between Member States. For example, the former grew by 30% in the Netherlands over the five years between 2007 and 2012, while in Greece it fell by 64%;
– In passenger rail, relatively few countries achieve high levels of both track and train utilisation. Denmark, Germany, the Netherlands and the United Kingdom appear to be leveraging their capital assets most efficiently overall, although Sweden achieves high levels of train utilisation;
– In freight markets, the Member States that border the North Sea and/or serve the Alpine region achieve higher capital utilisation. Countries on the periphery, notably Bulgaria and Greece, report much lower levels of both train and track utilisation.

Box 24 – Global efficiency gaps

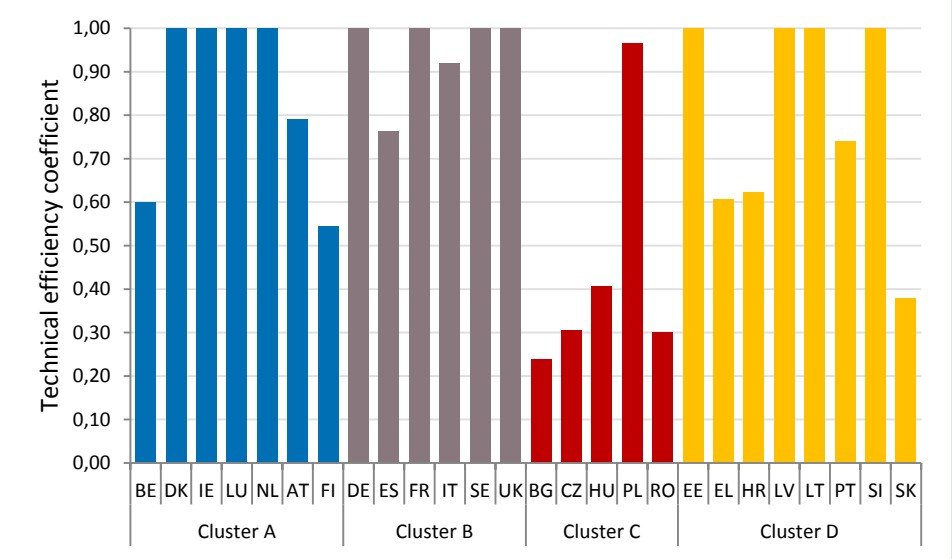
In the context of the Study on the *Cost and Contribution of the Rail Sector*, Steer Davies Gleave was also asked to conduct an efficiency gap analysis to assess the comparative efficiency of national rail systems in 4 clusters. Clustering was necessary to compare, to the extent possible, like-for-like and thus control the impact of exogenous factors (such as geopolitical conditions, characteristics of network etc) that are beyond the ability of railway managers and policy-makers to influence.

The total capital productivity was assessed using Data Envelopment Analysis, which *included* both track and train (both freight and passenger) related inputs, but *excluded* (very conservatively) labour productivity and financial efficiency. The results by cluster are shown below and indicate how efficient Member States have been in combining track infrastructure and rolling stock assets to deliver outputs.

With the exception of Poland, Member States in cluster C appear to perform particularly poorly against this specification of inputs and outputs.

The basic premise of this scenario is that all Member States currently operating away from the efficient frontier (technical efficiency coefficient less than 1) move gradually towards the frontier. It was further assumed that the savings gained are directly translated into additional railway outputs, as measured by p-km and freight t-km.

Total capital productivity technical efficiency scores *(2012)*



Static input-output analysis was then used to estimate the impact of changes in productivity in the rail sector on the wider economy as shown in the table below.

Estimates of the impact of economic impact of improvements in total capital productivity *(to 2030)*

Impact	Value
Direct GVA (million EUR, present value)	32 300
Indirect GVA (million EUR, present value)	31 400
Direct employment	1 630
Indirect employment	1 620
External benefits (million EUR, present value)	75
Increase in p km in 2030 (million)	200 000
Increase in t km in 2030 (million)	260 000

Source: Study on the *Cost and Contribution of the Rail Sector*, Net Present Values expressed in million euros (2010 prices, 2010PV) for the period 2015-2030. Employment is expressed in full-time equivalent (FTE) units. Figures may not tally due to rounding

The conclusions was that some Member States, notably Bulgaria, the Czech Republic, Hungary and Romania have substantial scope for improving the total capital productivity of their railways.

If all Member States were to achieve the levels of capital productivity equivalent to the highest performing peers in their cluster, **the net present value of the resulting increase in direct Gross Value Added (GVA) between 2015 and 2030 could be EUR 32 billion**. When including indirect GVA generated by upstream sectors, the benefits would rise to 64 billion EUR. The increase in rail activity resulting from reinvesting the operating surpluses can **generate 1 600 direct jobs** and a broadly equivalent number of indirect jobs over the period 2015-2030.

If, in addition to capital productivity also labour productivity and financial efficiency were targeted, the savings could be considerably higher.

5.3. The challenge of performance management

It is evident that the railway business is complex and multidimensional and direct unconditional comparison between national systems is mostly meaningless. In addition, the variables influencing the different areas of rail performance are often beyond the control of a railway operator or infrastructure manager, depending e.g. on geo-political factors, political priorities or past investment. For instance the performance in terms of cost per km of a specific railway undertaking depends on many factors such as the scale of operations, mix between passenger/freight/high-speed/conventional/long distance/commuter traffic as well as wage levels, maintenance backlogs and existing industrial agreements[129]. In addition, prices for passenger operations are often regulated or administered and public policy plays a key role in setting investment priorities and specifying passenger sector outputs[130]. Nevertheless, even if the outputs are determined, the question remains on how it could be ensured that these were produced at minimum cost.

Box 25 – Performance management in the existing EU law

KPIs as a regulatory tool for performance management are sometimes perceived of being new topic for railways. Actually, performance related elements are already part of European railway legislation.

Technical regulation, focussing on interoperability and safety includes for example the following performance related elements:

- The Agency has to monitor progress on the safety and interoperability of the Union rail system (Article 35 of the Agency Regulation[131]);
- Common safety indicators and targets have been gradually introduced in EU safety regulation to ensure that safety is maintained at a high level (Articles 5-7 of the Safety Directive[132]);
- The Core Network Corridors need to comply with certain infrastructure standards according to the agreed performance targets and timelines. There are also provisions for monitoring activities in the multimodal corridors (Article 39 of the TEN-T Guidelines[133]).

As regards **EU market regulation**, performance elements are brought in as to (a) incentivise cooperation between the market participants (railway undertakings, infrastructure managers, customers, public authorities) and (b) smoothen cross-border operations:

- The Recast Directive includes provisions on:
  - performance schemes encouraging railway undertakings and infrastructure managers to minimise disruptions and improve the reliability and punctuality of services (Article 35, Annex VI);
  - contractual agreements between the infrastructure managers and authorities for infrastructure funding; these agreements have to include performance indicators (Article 30, Annex V)[134].
- The Fourth Railway Package, when adopted, introduces certain further elements:
  - infrastructure managers shall cooperate across the borders to monitor and benchmark performance and to contribute to rail market monitoring (Article 7f of the amended Recast Directive);
  - for directly awarded PSO contracts, performance requirements have to be defined in the contracts; including punctuality of services, frequency of train operations, quality of rolling stock and transport capacity for passengers (Article 5 of the amended Regulation 1370/2007).
- The Passenger Rights Regulation[135] requires rail undertakings to establish and monitor quality management standards.
- Rail Freight Corridor Regulation[136] requires management boards to monitor and publish performance of rail freight services on Corridors.

129 European Transport Regulation Observer, May 2016, http://cadmus.eui.eu/bitstream/handle/1814/41844/FSR_Observer-2016-2.pdf?sequence=1&isAllowed=y

130 A.S.J. Smith and C. Nash — Discussion Paper 2014-22 — © OECD/ITF 2014 5

131 Regulation (EU) 2016/796

132 Directive (EU) 2016/798

133 Regulation (EU) No 1315/2013

134 See section 4.3.2 of this report

135 Regulation (EC) No 1371/2007

The way forward for performance enhancement

Aiming at the development of a comprehensive performance culture in the sector, the different rail stakeholders have been working on this topic for many years. Several transnational working groups and fora, including for instance UIC, RailNetEurope, the TEN-T core network and Rail Freight Corridors, PRIME and RU Dialogue, are currently engaged in discussions on performance enhancement.

Box 26 – PRIME and its work on KPIs and best practice benchmarking

PRIME (Platform for Rail Infrastructure Managers in Europe) and the Commission services seek together to enhance the performance of rail networks across Europe. PRIME promotes a competitive and resource efficient transport system and its members share the aspiration for a better performance and international cooperation of rail sector.

The PRIME KPI subgroup was established in spring 2014 with the objective of agreeing on a holistic set of KPIs allowing to benchmark the performance and best practices across all business domains of infrastructure management, including e.g. safety and environmental performance, punctuality, track utilisation, capacity, security, cost efficiency and financial performance. Under industry leadership (subgroup is chaired by Trafikeverket, Sweden) and with the participation of DG MOVE and the Agency, the subgroup agreed to work together to select KPIs, develop robust definitions, make respective adjustments in national practices and set up a system for data collection and comparison. The purpose of the exercise is not ranking of infrastructure managers by individual KPIs, but rather developing a comprehensive overview of how different infrastructure managers function and where could be scope for mutual learning.

The experience during the two years of work has shown that agreeing on common comprehensive, yet compact set of KPIs is easier said than done. There has been lots of iteration during the process (define, test, redefine, add, cut …). The balance between simplicity (not too many) and usefulness (enough to identify the drivers behind the observed trends) has been hard to achieve. Another challenge has been reaching comparability. For instance, while everyone agreed that punctuality indicator is of key importance, hardly any two infrastructure managers measured it in the same way.

Despite the difficulties, PRIME is about to set up a data collection platform and start to analyse the first set of data.

The Fourth Railway Package foresees the establishment of the European Network of Infrastructure Managers, which is anticipated to be created on the basis of PRIME. Tasks of the new formal network include monitoring and benchmarking performance, exchanging best practices and contributing to the rail market monitoring activities. This development will give further impetus to the work of the PRIME KPI subgroup.

The 12th European Rail Forum in May 2016, bringing together rail stakeholders from Europe and beyond, discussed how to define, measure and improve the performance of the European railway system[137]. There was a broad consensus that European railways have issues with cost, quality of services and market share (i.e. in principle modal share of rail). There are many areas that can be looked at in order to measure progress and it is important to differentiate between measures and mechanisms applied according to the context. For instance, KPIs need to be defined differently for monopoly situations (e.g. infrastructure management) and public service contracts, while in competitive part of the sector (open market competition), feedback from end customer can be crucial. The suggestion was that KPIs and targets would have to be developed by the sector and monitored by a public authority.

136 Regulation (EU) No 913/2010

137 http://cadmus.eui.eu/handle/1814/41844

The Commission is participating in discussions and supports the sector-driven bottom-up approach. It is important to acknowledge that performance management is a process that takes time to implement as it goes through the different stages:

1. Focusing: identifying topics, actors and indicators;
2. Monitoring: collecting data, agreeing on definitions, achieving comparability, improving transparency;
3. Benchmarking: making comparisons, learning from results;
4. Target setting: to be developed in cooperation with the sector and in a stepwise manner.

The Commission is also acting as an intermediary between the various initiatives with the aim to harmonise indicators and to eliminate overlaps in data collection. It is also working closely with national rail regulatory bodies, which according to the Recast Directive have a task to monitor the developments in rail market.

6. Conclusions

Over the past two decades, the European legislator has considerably developed the EU rail *acquis* encouraging *competitiveness* and *market opening*. The overarching idea has been that greater competition makes for a more efficient and customer-responsive industry. In parallel measures have been taken to improve the *interoperability* and *safety* of national networks and to encourage the development of an integrated rail system leading to a Single European Rail Area.

Despite several positive developments presented in this document, such as increased passenger volumes and investment in infrastructure as well as gradual (although uneven) opening of national rail markets, it is clear that at the current pace it will not be possible to reach the objectives set for rail sector in the 2011 White Paper. Overall, rail freight is still not on the right track and a Single European Railway Area is still a long way from being achieved.

In this context the focus of the Commission in the coming years will be on the implementation of existing legislation designed to bring about the desired performance improvements. The transposition and implementation of the Recast Directive is in its final stages, while the preparations for implementation of the technical pillar of the Fourth Package have been launched. The Commission services work closely with the Agency, Member States, national regulatory bodies and stakeholders through forums such as the European Network of Rail Regulatory Bodies, PRIME and RU Dialogue to ensure that the Union legislation is implemented in the most efficient way and is understood by the sector.

The Commission services continue preparations for the implementing act on access to services and service facilities (Article 13 of the Recast Directive), the delegated act on scheduling rules (Annex VII of the Recast Directive), and have launched the revision of the Technical Specification of Interoperability on Noise, Rail Passenger Rights Regulation and the Combined Transport Directive. In addition, the ongoing evaluations of the Rail Freight Corridor Regulation and Train Drivers Directive may lead to updates of these acts in the coming years.

There are also other ongoing actions addressing the challenges faced by the sector, including implementation of the TEN-T Guidelines and deployment of ERMTS, securing funding and financing for rail infrastructure projects, embracing opportunities provided by digital technologies and launching projects under Shift2Rail Joint Undertaking. Furthermore, Commission services continue to engage with the sector in the areas of rail security, multimodality and a level playing field across the modes, including effective application of user pays/polluter pays principles.

Finally, this report has highlighted several gaps and shortcomings in rail market data which the Commission services plan to address in cooperation with various stakeholders. In particular by:

- implementing the new RMMS Regulation (including developing common definitions for service facilities) in cooperation with the Member States and national rail regulatory bodies;
- improving data availability on rail freight performance in cooperation with sector organisations and the governing bodies of the Rail Freight Corridors,
- enhancing data availability on the state of infrastructure and its capabilities in the TENtec database,
- conducting a new Eurobarometer survey on rail customer satisfaction,
- enhancing availability and content of licensing data in ERADIS database in cooperation with Member States authorities and the Agency,
- agreeing on harmonised performance measures (including reliability and punctuality) based on the respective work of PRIME and RU Dialogue.