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Railway Reform in the ECE region



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RAILWAY REFORM IN THE ECE REGION

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Disclaimer:

Views expressed in this document are of the consultant and of the participants of the Workshop on Railway Reform in the ECE region held in conjunction with the seventy-first session of the Working Party on Rail Transport. They should not be considered as the views of UNECE or as binding on any United Nations entity.

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EXECUTIVE SUMMARY

INTRODUCTION

As part of the ongoing work of the Working Party on Rail Transport (SC.2), the seventy-first session of SC.2 hosted the Workshop on Railway Reform across the ECE region attended by member States, intergovernmental organizations (IGOs), non-governmental organizations (NGOs) and the private sector. As an output to this workshop, this study has been prepared to summarise railway reform across the region.

HISTORY OF RAILWAY REFORM

When looking to the **European Union Member States** (EU Member States), the paper outlines the evolution of EU rail legislation with respect to three major areas, namely separation of infrastructure management and service operations; market opening and liberalization of the rail services; and promotion of interoperability and technical harmonization to encourage the development of an integrated rail system leading to a single European rail area. The EU approach to reform has been based on the idea that greater competition makes for a more efficient and customer-responsive industry.

In the early stages of reform, rail proved to be reluctant to pursue liberalization, especially when compared to other modes of transport. Directive 91/440/EC — that is the first important measure of the European Commission concerning the rail sector — had little impact, as was shown by the small number of new operators or services being added to the market. In the following years, the four regulatory “**Railway Packages**” that had been approved in 2001, 2004, 2007 and 2016, were aimed at countering this lack of progress. The packages consecutively brought together previous Directives, updated them, and facilitated market development.

The **Fourth Railway Package** — which includes a “Technical Pillar” for rail safety and interoperability, and a “Market pillar” for the governance of railways and the opening of the passenger market — was proposed by the European Commission in 2013, and was originally intended to remove all remaining legal, institutional and technical obstacles to create a single European Railway Area.

When initially presented, the **Market Pillar** set out far-reaching measures to enable new entrants to access the market. However, the Market Pillar’s revised texts — following negotiations in the Council of Ministers and the European Parliament with a view to their formal adoption in late 2016 — incorporate significant changes from the Commission’s original proposals, which many commentators believe are not as ambitious as the Commission’s texts. Following the entry into force of the **Technical Pillar** in 2016, the European Railway Agency has been replaced by the European Union Agency for Railways, which has been entrusted with a stronger role regarding vehicle authorization and safety certification, issuing single authorizations and certificates for the whole of the EU.

When looking to the **extra-EU UNECE countries**, the paper finds that railway reform is being undertaken according to different models and is proceeding at different paces. Three broad groups of countries can be identified. The first group includes Central and Northern European countries, i.e.

Norway and Switzerland. The second group includes countries officially or potentially candidate to join the EU in south-east Europe. Those under the Stabilization and Association Process which precedes accession to the EU are developing their railway structural policy according to the principles of the EU railway packages. The third group of countries includes the republics of the former Soviet Union. These, in turn, can be separated according to the progress of reforms. Kazakhstan and the Russian Federation have made certain progress in reforms developing the “Russian-specific” reform model. In Ukraine and Uzbekistan, reforms are widely discussed, and some legal acts are adopted, although practical steps seem to be moderate. In Armenia, Azerbaijan, Belarus, Georgia, Kyrgyzstan, Republic of Moldova, Tajikistan and Turkmenistan, reforms have not been yet planned.

RAILWAY REFORM IMPLEMENTATION

The paper first discusses the topic of **transposition of EU legislation and implementation of legislative requirements**. Most of the EU legal instruments were adopted in the form of a Directive, meaning that their implementation into national legal systems is required for them to be fully binding. Moreover, EU Member States need to not only transpose the Directives into national law, but also implement the requirements. By mid-2015, most EU Member States either did not transpose or transposed incorrectly a significant share of the total rail acquis. This has created obstacles towards achieving the objectives underpinning EU railway reform, as well as opened the door for diverging arrangements and provisions to develop between EU Members States. The period of structural changes in the EU railway sector should be concluded with the adoption of the Fourth Railway Package, and the focus in the coming years will be on the implementation of existing legislation and the putting in place of secondary legislation.

Secondly, the paper discusses the **role of rail regulators**. This section describes the different approaches that EU Member States chose while creating their respective regulatory bodies, in relation to their structures and powers. This section also sets out the specific experience of a number of extra-EU countries with respect to the evolution of the role of transport ministries and the establishment of rail regulators. The Italian experience of an independent and multimodal regulator is presented as a good practice.

The paper then discusses the issue of implementation of requirements relating to **separation of infrastructure management and service operations** within the member State. This section describes the various separation arrangements existing in the UNECE countries, ranging from full vertical integration, through organizational separation (also referred to as “holding model”), to full institutional separation. This section finds that, despite the formal transposition of regulation on separation of the rail incumbent, the actual organization of the rail industry still largely relies on state-controlled companies.

The paper outlines the specific experience with respect to separation in a number of UNECE countries. In the United Kingdom of Great Britain and Northern Ireland — where full institutional and ownership separation was first achieved — proposals for bringing train operations and infrastructure management closer together are being taken forward through greater joint working and alignment of track and train operations by creating shared targets between infrastructure managers and train operators at a route level. This builds on work to establish alliances, whilst still maintaining a central role for the independent regulator to ensure fair access to the track. This experience suggests that further initiatives aiming at reforming the railways in the ECE region take into full consideration the relevance of coordination between infrastructure management and rail operations when considering vertical separation.

The paper then discusses the issue of implementation of requirements relating to **market opening**. This section discusses the experience from UNECE countries with respect to market access models, including tender concession model for sub-networks — i.e. *competition for the market* — and the open-access model — i.e. *competition in the market*. The paper outlines the specific experience with respect to market access arrangements in a number of UNECE countries.

When looking to the European Union, the paper finds that effective competition in the passenger market is still very limited.¹ **Competition for the market** is subject to public competition in eleven EU Member States, and with mixed success. Even where public tenders have been held, direct awards have often been necessary due to a lack of participation by non-incumbent operators, who have been discouraged by de-facto barriers to entry.² **Competition in the market** is practiced in fifteen EU Member States, but only in six do multiple operators compete in the rail market. The paper also sets out the experience of **new entrants** in the freight and passenger markets. In this regard, the paper finds that the rail sector remains heavily concentrated, and characterized by a low number of newcomers and the persistence of large market shares of incumbent operators.

The analysis continues by looking at the issue of the implementation of requirements relating to **interoperability and technical harmonization**. This section discusses the role of the European Union Agency for Railways and the status of adoption and implementation of Technical Specifications for Interoperability (TSIs). The full potential of interoperability will be achieved when all interoperability-relevant technical aspects are harmonised in TSIs, all national technical rules covering aspects harmonised in the TSIs are withdrawn and all physical assets and procedures comply with the target systems defined by the TSIs. The withdrawal of national technical rules is a long-term goal and numerous exceptions still exist.

The paper then discusses the **effects of reform on railway performance** — including cost and efficiency measures, prices, customer satisfaction and service quality. The available evidence from countries that have introduced competitive tendering for awarding public service contracts suggests the possibility for operating cost savings. The available evidence on the effects of open access competition is limited so far, suggesting a mixed picture of the possible effects.

With respect to **modal share of rail transport**, this section suggests that regulatory reforms in the EU might have contributed to stabilise the modal share of rail passenger transport, and possibly even stimulated modest improvements. While there is little evidence that railway reform *per se* has not lead to a sustained increase in the market share of rail in passenger or freight, it is also true that many of the markets have not been reformed for enough time to allow for long-term shifts to appear. There are examples where this reform has had an impact, which should not be ignored and point to the potential of further benefits to the sector in the long-term in relation to reduced costs, increased competitiveness and increased market share going forward.

¹ It must be noted that, until the implementation of the Fourth Railway Package (2019), EU Member States are not required to fully open up their rail passenger markets to competition, and few EU Member States have chosen to do so in the absence of EU rules.

² The expression “de-facto barriers to entry” does not refer to abuses of the incumbents, but to barriers such as a low level of compensation of public service contract, or the absence of measures facilitating access to rolling stock.

CONCLUSIONS

This study shows that railway reform across the ECE region has taken different forms in terms of institutional structure, market participants and development of the sector. Each of the models adopted have been very successful in some areas and less so in others but these degrees of success have not been consistent across similar reform approaches. It is clear, therefore, that there is no standard model to railway reform and no *one-size-fits-all solution* that can be applied across the ECE region and that each country needs to ensure that the model that it adopts is consistent with its national environment and requirements whilst ensuring that the sector is in a sound financial position to be able to transition successfully through reform and improve the competitiveness of rail.

LIST OF ABBREVIATIONS

Table 1 List of abbreviations

Acronym	Description
ADY	Azerbaijan Railways (Azərbaycan Dəmir Yolları)
ARAFER	Autorité de régulation des activités ferroviaires et routières
ART	Autorità di Regolazione dei Trasporti (Italian Transport Regulatory Authority)
BDZ	Balgarski Darzhavni Zheleznitsi (Bulgarian RU)
BLS	Bern-Lötschberg-Simplon railway (Swiss RU)
BR	Belarusian Railway (Belaruskaya Chugunka)
CAREC	Central Asian Regional Economic Cooperation
ČD	Czech Railways (České Dráhy)
CER	Community of European Railway and Infrastructure Companies
CFL	Société nationale des Chemins de Fer Luxembourgeois (Luxembourgish RU)
CJSC	South Caucasus Railway (Armenia)
DB	German Railways (Deutsche Bahn)
DCF	Direction de la Circulation Ferroviaire (France)
DDGM	Railway Authority of Turkey
DG MARKT	Directorate-General Internal Market, Industry, Entrepreneurship and SMEs
EBRD	European Bank for Reconstruction and Development
EC	European Commission
ECE	Economic Commission for Europe
ECMT	European Conference of Ministers of Transport
EEC	European Economic Community
EIL	Eurostar International Limited (RU)
ERA	European Union Agency for Railways (formerly the European Railway Agency)
ERTMS	European Rail Traffic Management System
ETCS	European Train Control System
EU	European Union
FPC	Federal Passenger Company (Russia)
FRTA	Federal Railway Transport Agency (Russia)
FSI	Gruppo Ferrovie dello Stato Italiane — Italian Railway Holding Group (Italy)
FYROM	The former Yugoslav Republic of Macedonia
HKX	Hamburg-Köln-Express (RU)
IBRD	International Bank for Reconstruction and Development
IM	Infrastructure manager
IRG-Rail	Independent Regulators' Group — Rail
KTZ	Kazakhstan Temir Zholy
MoU	Memorandum of Understanding
MPS	Russian Railway Ministry (Ministerstvo Putei Soobschenija)
MŹ	FYR Macedonian Railways (Makedonski Železnici)

Acronym	Description
NEB	National Enforcement Body
NPA	Not primarily abstractive test (Great Britain only)
NPM	New Public Management
NRIC	Natsionalna Kompaniya Zhelezopatna Infrastruktura (Bulgarian IM)
NS	Dutch Railways (Nederlandse Spoorwegen)
NSA	National Safety Authority
NSB	Norwegian State Railways (Norges Statsbaner)
NTV	Nuovo Trasporto Viaggiatori (Italian RU)
ÖBB	Österreichische Bundesbahnen (Austrian RU)
OECD	Organisation for Economic Co-operation and Development
ORR	Office for Rail and Road
OSJD	Organization for Cooperation of Railways (Organizatsija Sotrudnichjestva Jeljeznych Dorog)
PMR	OECD's indicators of Product Market Regulation
PKP	Polish Railways (Polskie Koleje Państwowe)
PPP	Public-private partnership
PR	Przewozy Regionalne (Polish RU)
PRM	Person with reduced mobility
PSO	Public sector obligation
RENFE	Red Nacional de los Ferrocarriles Españoles (Spanish RU)
RFF	Réseau Ferré de France (French IM)
RFI	Rete Ferroviaria Italiana (Italian IM, integrated in FSI)
RM	Railways of Moldova (CaleaFerată din Moldova)
ROSCO	Rolling stock leasing company
RSC	Regional Suburban Company (Russia)
RU	Railway undertaking
RZD	Russian Railways (Rossiyskiye Zheleznye Dorogi)
SBB CFF FFS	Swiss Federal Railways (German: Schweizerische Bundesbahnen; French: Chemins de Fer Fédéraux suisses; Italian: Ferrovie Federali Svizzere)
SEETO	South-East Europe Transport Observatory
SJ	Swedish State Railways (Statens Järnvägar)
SME	Small-medium enterprise
SNCB	Société Nationale des Chemins de fer Belges (Belgian RU)
SNCF	Société Nationale des Chemins de fer Français (French RU)
SNCFT	Société Nationale des Chemins de Fer Tunisiens
SOB	Südostbahn (Swiss RU)
TCDD	Railways of the Republic of Turkey (Türkiye Cumhuriyeti Devlet Demiryolları)
ТСГ	Railways of Montenegro (ТелјезницеCrne Gore)
TGV	Train à Grande Vitesse (high-speed train)
TI	Trenitalia (Italian RU)
TOC	Train operating company (Great Britain only)
TSI	Technical Specifications for Interoperability
UIC	International Union of Railways (Union Internationale des Chemins de fer)

Acronym	Description
UK	The United Kingdom of Great Britain and Northern Ireland ³
UNECE	United Nations Economic Commission for Europe
UNMIK	United Nations Interim Administration Mission in Kosovo
UTK	Urząd Transportu Kolejowego (Polish NEB)
UTU	Uzbekiston Temir Ullari (Uzbekistan Railways)
UZ	Ukrainian Railways (Ukrzaliznytsia)
ZSSK	Slovak Railways (Železničná Spoločnosť Slovensko)

³ Some areas of the text will refer to Great Britain as opposed to the United Kingdom of Great Britain and Northern Ireland to reflect the coverage of laws and regulations.

INTRODUCTION

As part of the ongoing work of the Working Party on Rail Transport (SC.2), the seventy-first session of SC.2 hosted the Workshop on Railway Reform across the ECE region attended by member States, IGOs, NGOs and the private sector. As an output to this workshop, this paper has been prepared to summarise railway reform across the region.

When looking at railway reform in the ECE region, the paper initially provides a summary of the **history of railway reform in the UNECE countries** since the beginning of the nineties. When looking to the **EU Member States**, the paper outlines the evolution of EU rail legislation through subsequent legislative packages, with respect to three major areas, namely separation of infrastructure management and service operations; market opening and liberalization of the rail services; and promotion of interoperability and technical harmonization.

For the **extra-EU UNECE countries**, the paper outlines the approach to railway reform adopted by three broad groups of countries, namely central and northern European countries — such as Norway and Switzerland; countries officially or potentially candidate to join the EU in South-East Europe; and the republics of the former Soviet Union.

The paper also provides an analysis of **implementation of railway reform in the UNECE countries**, with respect to the following topics:

- **Transposition of EU legislation and implementation of legislative requirements.** This section discusses the status of transposition and implementation of the EU rail packages by EU Member States and provides examples of delayed or incomplete transposition.
- **The role of rail regulators.** This section describes the different approaches that EU Member State chose while creating their respective regulatory bodies, in relation to their structures and powers. This section also sets out the specific experience of a number of extra-EU countries with respect to the evolution of the role of transport ministries and the establishment of rail regulators.
- **Separation of infrastructure management and service operations** within the rail incumbent. This section describes the various separation arrangements existing in the UNECE countries, ranging from full vertical integration, through organizational separation (also referred to as “holding model”), to full institutional separation. This section outlines the specific experience with respect to separation of the incumbent in a number of UNECE countries.
- **Market opening.** This section discusses the experience of UNECE countries with respect to market access models, tender concession model for sub-networks — i.e. *competition for the market* — and the open-access model — i.e. *competition in the market*. This section outlines the specific experience with respect to market access arrangements in a number of UNECE countries.
- **Interoperability and technical harmonization.** This section discusses the role of the European Union Agency for Railways and the status of adoption and implementation of Technical Specification for Interoperability.

- **The effects of reform on railway performance** — including cost and efficiency measures, prices, customer satisfaction and service quality, and modal share of rail transport. This section discusses the available evidence from countries that have introduced competitive tendering for awarding public service contracts of passenger services, as well as open access competition.

Finally, the **conclusions** to this paper provide a summary of the main findings and recommendations.

HISTORY OF RAILWAY REFORM

BACKGROUND AND INTRODUCTION

Historically,⁴ most European railways were managed as vertically integrated state-owned monopolies, which were responsible for the direct provision of public services, ownership of infrastructure and utilities and often, other non-rail activities (Community of European Railway and Infrastructure Companies — CER, 2011). A decline in rail market shares⁵ and financial difficulties — leading to growing public funding requirements — called for change. From the beginning of the 1990s, a profound restructuring process has taken place, with the aim to promote gradual market opening through non-discriminatory access and interoperability standards and the goal of reversing the industry's negative traffic trends and, in some cases, inefficient operations.

This stream of reforms can be seen in a wider context — i.e. the international trend of so-called New Public Management (NPM) reforms, which started in the 1980s and were accepted as the “gold standard for administrative reform” in the 1990s (Farazmand and Pinkowski, 2006). NPM reforms involved many sectors sharing the features of a natural monopoly — e.g. electricity, natural gas, telecommunications, water and transport — where private sector managerial tools and principles were introduced with a goal of ensuring macroeconomic stability, cutting deficit spending and reducing the scope and cost of government intervention.

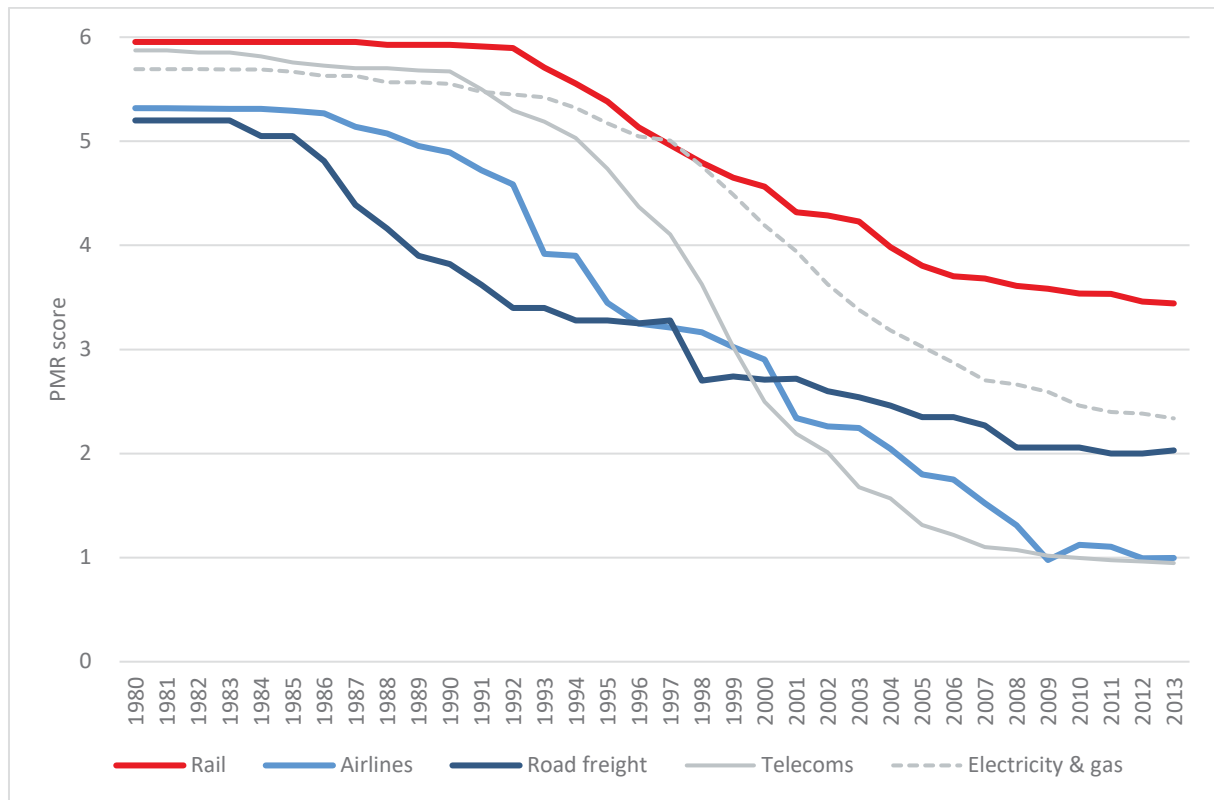
Changes in the structure, regulation and performance of European network industries are included in the indicators of the Product Market Regulation (PMR) prepared by the OECD, which measure the degree of vertical integration, public ownership, access openness and market concentration in regulated markets. PMR indicators range from a minimum of 0 (a condition of full deregulation) to a maximum of 6 (most restrictive conditions for competition). The following figure shows the trend of PMR indicators for rail, airlines and road freight — and other non-transport network industries for comparison — computed as averages over a sample of UNECE countries for which data over the period between 1980 and 2013 are available.⁶

⁴ i.e. in the post-war period.

⁵ A significant reduction in rail modal shares was recorded both in the passenger and freight markets in Europe over the 1970s and 1980s. For the EU15 countries, the modal share for rail passenger transport was 10.4% in 1970 and had reduced to 6.7% in 1990 (Bruinsma et al., 2008). With respect to freight transport, the decline was even more significant with rail having a 21.2% modal share in 1970 and 11.1% in 1990 (ECMT, 2003).

⁶ Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom of Great Britain and Northern Ireland.

Figure 1 PMR indicators, 1980-2013



Source: OECD.

Regulatory reform in the transport sector began with road freight, which was extensively liberalized in most countries by the mid-1990s. Regulations in air transport were also lifted relatively early on as domestic air markets were liberalized, “open skies” and regional air agreements became more common and several governments reduced their ownership in airlines (Conway and Nicoletti, 2006). Reform in the railway sector began later and proceeded at a slower pace.⁷ Nevertheless, over the past 25 years, substantial legislative initiatives have been put forward in the ECE region to reform railways.

The history of railway reform in the EU and in the non-EU UNECE member States is described below.

⁷ Early reforms in road freight and air transport partly reflect the fact that these transport industries are the least affected by natural monopoly elements and universal service requirements. Liberalization and privatization are therefore relatively easier to implement and their benefits more certain than in the railways industry, where reforms were much less extensive and more recent.

HISTORY OF RAILWAY REFORM IN THE EUROPEAN UNION

Over the past decades, the EU legislator has developed the EU rail acquis to encourage competitiveness and market opening. The EU approach to reform has been based on the idea that greater competition makes for a more efficient and customer-responsive industry. This approach derives from the Treaty of Maastricht, which aims to create a single transport market in the EU.⁸ Measures have also 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, as outlined in the 2011 Transport White Paper (European Commission, 2016).

EU railway reform has three main goals: a) separation of infrastructure management and service operations;⁹ b) market opening and liberalization of the rail services; c) creation of a common transport market through the promotion of interoperability and technical harmonization.

Separation refers to the creation of several more-or-less independent units out of an integrated railway that previously combined train operation and infrastructure management within a single line of command (Van de Velde, 2015). **Vertical separation** implies unbundling potentially competitive activities (e.g. rail service operations) from those activities that are characterized by natural monopoly (e.g. infrastructure management), and has been pursued to facilitate non-discriminatory access for non-incumbent operators and new entrants to the rail network. Different levels of vertical separation may exist:

- **Accounting separation** requires that distinct accounts are prepared in case rail service operations and infrastructure management are organized within the same entity.
- **Organizational separation** requires that rail service operations and infrastructure management are placed in separate subsidiaries within one holding company, with independent decision-making procedures in addition to separate accounts.
- **Institutional separation** requires that rail service operations and infrastructure management are organized in distinct companies — though both entities could still have the same owner, e.g. the State.

Horizontal separation involves splitting the incumbent rail operator into specialized operators by market type or technology, e.g. freight versus passenger operators.

Market opening has the goal of extending access rights to the railway infrastructure to non-incumbent entities as well as to essential service facilities (e.g. terminals and maintenance depots). Alongside measures to liberalize the market, the EU spurred the strengthening of national rail regulators as well as the creation of an EU regulatory agency — the European Railway Agency, now replaced by the European Union Agency for Railways.

The success of liberalization in the EU partly depends on the removal of physical and technical barriers between EU Member States to allow trains to travel across national borders. These barriers constitute a strong competitive disadvantage, for example for international rail freight vis-à-vis road traffic. The EU has sought to remove these barriers by pursuing a policy of **interoperability and technical**

⁸ Article 129b of the “Treaty of Maastricht on European Union” (1992): “[...] the Community shall contribute to the establishment and development of trans-European networks in the areas of transport, telecommunications and energy infrastructures.”.

⁹ Sometimes also referred to as “unbundling”.

harmonization through subsequent legislative provisions, as well as the creation of Technical Standards for Interoperability (TSIs), intended to accelerate industry standardisation following slow progress by voluntary industry working groups.¹⁰ Interoperability also include harmonization of regulatory provisions on safety and passenger rights.

The following table summarizes the evolution of EU rail legislation since 1991. This includes a series of EU Directives and Regulations, i.e. Directive 91/440/EC and the four so-called Railway Packages (2001, 2004, 2007 and 2016), and subsequent measures.

Table 2 Overview of EU rail legislation since 1991

Package	DIR/REG	Subject
Initial reform attempts	DIR 91/440/EEC	<ul style="list-style-type: none"> ● Account separation ● Limited access rights to the international market
	DIR 95/18/EC	<ul style="list-style-type: none"> ● Licencing of rail operators
	DIR 95/19/EC	<ul style="list-style-type: none"> ● Allocation of railway infrastructure capacity ● Infrastructure charging
	DIR 96/48/EC	<ul style="list-style-type: none"> ● Interoperability of the trans-EU high-speed rail network
First Railway Package	DIR 2001/12/EC	<ul style="list-style-type: none"> ● Organizational separation (“holding company” model) ● Access rights for international freight services
	DIR 2001/13/EC	<ul style="list-style-type: none"> ● Common criteria for licencing of rail operators
	DIR 2001/14/EC	<ul style="list-style-type: none"> ● Allocation of capacity independent of rail operators ● Establishment of national regulatory bodies
	DIR 2001/16/EC	<ul style="list-style-type: none"> ● Interoperability on the trans-EU conventional rail network
Second Railway Package	REG 881/2004/EC	<ul style="list-style-type: none"> ● Establishment of the European Railway Agency
	DIR 2004/49/EC	<ul style="list-style-type: none"> ● Railway Safety Directive on a common approach to safety
	DIR 2004/50/EC	<ul style="list-style-type: none"> ● Common approach to interoperability on the EU rail network
	DIR 2004/51/EC	<ul style="list-style-type: none"> ● Complete opening of the EU rail freight network (from 2006)
Third Railway Package	DIR 2007/58/EC	<ul style="list-style-type: none"> ● Opening of international passenger rail services (from 2010)
	DIR 2007/59/EC	<ul style="list-style-type: none"> ● Certification of train drivers and crews
	REG 1370/2007/EC	<ul style="list-style-type: none"> ● Public Service Contracts Regulation
	REG 1371/2007/EC	<ul style="list-style-type: none"> ● Regulation on rail passenger rights and obligations
Intermediate steps	DIR 2008/57/EC	<ul style="list-style-type: none"> ● Recast of the Interoperability Directive
	DIR 2008/110/EC	<ul style="list-style-type: none"> ● Amended Railway Safety Directive
	REG 1335/2008/EC	<ul style="list-style-type: none"> ● Amended European Railway Agency Regulation
	DIR 2012/34/EU	<ul style="list-style-type: none"> ● Recast of the First Railway Package
Fourth Railway Package, Technical Pillar	REG 2016/796/EU	<ul style="list-style-type: none"> ● Establishment of the European Union Agency for Railways
	DIR 2016/797/EU	<ul style="list-style-type: none"> ● Recast of the Interoperability Directive
	DIR 2016/798/EU	<ul style="list-style-type: none"> ● Recast of the Safety Directive
Fourth Railway Package, Market Pillar	REG 2016/2337/EU	<ul style="list-style-type: none"> ● Common rules for rail operators’ accounts
	REG 2016/2338/EU	<ul style="list-style-type: none"> ● Competitive tendering for public service rail contracts
	DIR 2016/2370/EU	<ul style="list-style-type: none"> ● Full opening of the domestic passenger market

Legend: ● Separation ● Market opening and liberalization ● Interoperability and technical harmonization

Source: author’s elaboration.

¹⁰ TSIs only apply to new or upgraded infrastructure. This reduces financial impact of TSI but significantly lengthens the timescales for achieving full interoperability (Steer Davies Gleave, 2014).

Initial reform attempts

In 1985, the European Court of Justice (judgment in Case 13/83) urged the Council to act on transport policy and support the liberalization of European transport markets. While the liberalization of the road sector started in 1985, right after European Court of Justice's decision, the first important measure of the European Commission concerning the rail sector only arrived in 1991 with Directive 91/440/EC (Esposito et al., 2016).

This Directive provided the starting point for the introduction of **vertical separation** between infrastructure management and rail service operations. The Directive required only account separation to be implemented, rather than organizational or institutional separation, which were both set as optional.

Directive 91/440/EC also provided for rules with respect to **market opening**, providing certain access rights for operators wishing to offer international services, with the aim to increase access competition in the market (Steer Davies Gleave, 2014). Access rights to rail infrastructure in one member State were extended to:

- Rail operators in other EU Member States wishing to provide international combined transport services, i.e. intermodal freight transport; and
- Associations of railway operators wishing to provide international transport services (including passenger services) between the countries in which they are established.

Subsequently, the EU published Directive 95/18/EC on the licencing of rail operators and Directive 95/19/EC on the allocation of railway infrastructure capacity and infrastructure charging.

Reform in the **interoperability** of railway systems started in the mid-1990s. Directive 96/48/EC was an initial measure on the interoperability of the trans-European high-speed rail system, which had the goal to promote interoperability at the various design stages of the high-speed rail network, including for example construction, gradual introduction into service and operation.

The First Railway Package

Compared to other modes of transport, rail proved to be reluctant to pursue liberalization. By 1996, only nine member States had transposed Directive 91/440/EC into national law. Five member States had partially implemented it, while one State (Greece) had not notified any national changes (Esposito et al., 2016). The Directive had little impact, as was shown by the small number of new operators or services being added to the market (Steer Davies Gleave, 2014). In the following years, the four regulatory "Railway Packages" that were approved in 2001, 2004, 2007 and 2016, were aimed at countering this lack of progress. The First Railway Package was approved in 2001 and encompassed four Directives that were scheduled for implementation by 2003.

Directive 2001/12/EC (amending Directive 91/440/EEC) provided for a further step towards vertical **separation**, by requiring organizational separation between infrastructure management and rail service operations. Other functions, including rail capacity allocation, infrastructure charging and licencing, were required to be separated from transport operations to enable new rail operators fair access to the rail market. Directive 2001/12/EC also contained further requirements on accounting horizontal separation, aimed at avoiding cross-financing. Railway operators were required to set up separate balance sheets, and profit and loss accounts for passenger and freight operations, as well as separate accounting for public service aspects and other passenger operations. Operators were also

forbidden from transferring funds received under public service contracts to activities related to the provision of other transport services.

The First Railway Package also put in motion a first **opening of the market**, with Directive 2001/12/EC providing for the gradual extension of access rights for rail freight operators:

- By 2003, any railway operator licenced within the European Community would have the right to obtain access on an equal and non-discriminatory basis to the national sections of the Trans European Rail Freight Network (TERFN).
- From 2008, the entire European Rail Network was to be opened to competition for international freight services (though no provisions were set for cabotage, i.e. transport between two points in the same country by a foreign operator).

Directive 2001/13/EC (amending Directive 95/18/EC) stipulated the common criteria for granting a licence to EU rail operators. Directive 2001/14/EC provided rules on capacity allocation on railway infrastructure, making the allocation of capacity independent of rail operators, and requiring the establishment of national regulatory bodies — independent from any infrastructure manager, charging body, allocation body, or railway operator — to oversee the railway market.

Arrangements for **interoperability** that were similar to those set out in Directive 96/48/EC for the trans-European high-speed rail system were extended to the trans-European conventional rail network by Directive 2001/16/EC. Both these Directives focus on technical aspects — e.g. safety, control systems, signalling, freight wagons and training for staff engaged in international rail operations — and were intended to ensure smooth and safe cross-border rail traffic.

The Second Railway Package

In 2003, the European Commission conducted an assessment of the transposition of the First Railway Package into national legal systems. Although the implementation process was not fully completed, the results demonstrated the positive effects of introducing more competition in the rail market (Esposito et al., 2016). These findings encouraged the proposal of new sets of legal instruments. The Second Railway Package, which focused on further liberalising freight services and promoting harmonization of technical and safety standards, was approved in 2004 and encompassed three Directives scheduled to be implemented by 2006 as well as a Regulation.

Directive 2004/51/EC (amending Directive 91/440/EEC) represented a further step toward **market opening** in that it removed all access barriers to domestic markets for freight operators holding an EU licence. The Directive required the entire European rail network to be open to freight traffic (including cabotage) from January 2007.

Further steps toward **interoperability** were enabled by Directive 2004/49/EC (amending Directive 95/18/EC and Directive 2001/14/EC), that aimed to promote harmonization in the railway safety regulatory framework, and by Directive 2004/50/EC (amending Directive 96/48/EC and Directive 2001/16/EC), that aimed to clarify interoperability requirements and extend the scope of Directive 2001/16/EC to cover the whole European rail network.

The European Railway Agency was established by Regulation 881/2004/EC to manage and coordinate the technical development of the interoperability and safety requirements.

Directive 2004/49/EC (amending Directive 95/18/EC and Directive 2001/14/EC) focused on safety issues, setting Common Safety Methods and Targets and requiring the creation of National Safety

Authorities, which would be in charge of granting safety certificates to rail operators and carrying out safety audits.

The Third Railway Package

The Third Railway Package, composed of two Directives and two Regulations, was approved in 2007. It provided for the full opening of international passenger rail services, as well as regulation of rail driver licencing, rail services under Public Service Obligation and rail passengers' rights and obligations.

Directive 2007/58/EC (amending Directive 91/440/EEC and Directive 2001/14/EC) provided for the full **market opening** of international passenger rail services (including cabotage) starting from 2010. However, several exemptions were introduced in the Directive, including the possibility to limit access rights in case of routes covered by public service contracts (Holvad, 2017).

The Third Railway Package enabled further steps of **technical harmonization**. Directive 2007/59/EC established the European licencing system for train drivers, laying down the minimum requirements for medical fitness, basic education and general professional skills.

Regulation 1371/2007 defined a number of measures to protect and extend passengers' rights when travelling by rail. The Regulation required rail operators to:

- Provide non-discriminatory access to trains and assistance for disabled persons and persons with reduced mobility (PRM);
- Compensate passengers in the event of death or injury, or damage to luggage;
- Provide assistance and compensation in case of delay or journey cancellation;
- Set up a complaint handling mechanism for the rights introduced by the Regulation; and
- Publish information on schedules, fare conditions and accessibility of their services.

Regulation 1371/2007 also obliged member States to establish National Enforcement Bodies (NEBs) to enforce the provisions of the Regulation (Steer Davies Gleave, 2012).

Recast of the First Railway Package and the Fourth Railway Package

A next step in the area of separation and the establishment of a single European railway area was introduced in the so-called Recast of the First Railway Package through Directive 2012/34/EU. This Directive allowed the legislator to simplify, clarify and consolidate the existing provisions on the funding and management of infrastructure, access to rail-related facilities (depots, maintenance, etc.) and the role and independence of regulatory bodies (Casullo, 2016).

A recasting of the First Railway Package was intended to be an exercise in legislative simplification and consolidation, and provided for the merger of the three Directives in force and the amendments (UNECE, 2012). The aim was also to modernise the legislation and tackle key problem areas and shortcomings, which had been identified over the past decade, including:

- Enhancing transparency of rail market access conditions (e.g. by requiring more detailed network statements and providing better access to rail-related services).
- Strengthening the independence of national regulatory bodies from any other public authority and extending their competences (e.g. to rail-related services).

- Clarifying the rules for funding and management of infrastructure (e.g. requiring multiannual contractual agreements between the State and the infrastructure manager and more precise access charging principles).

At the beginning of 2013, the European Commission proposed a Fourth Railway Package, originally intended to remove all remaining legal, institutional and technical obstacles to create a single European Railway Area. The Fourth Railway Package included a “Market pillar” for the governance of railways and the opening of the passenger market and a “Technical Pillar” for rail safety and interoperability.

When initially presented in 2013, the Market Pillar set out far-reaching measures to enable new entrants to **access the market**, including a requirement for member States to competitively tender all public service contracts, and a proposal to enforce full **separation** between railway undertakings and infrastructure managers.

These reforms, in their initial drafts, did not find unanimous acceptance among member States. After some debate,¹¹ the Market Pillar’s revised texts were formally adopted by the Council of Ministers in October 2016 and by the European Parliament in December 2016. These incorporate significant departures from the Commission’s 2013 proposals, which many commentators¹² believe are not as ambitious as the Commission’s texts.

In its final version, the Market Pillar includes three core legislative provisions:

- Regulation 2016/2337/EU (repealing Regulation 1192/69/EEC) to support common rules for railway undertakings’ accounts.
- Regulation 2016/2338/EU (amending Regulation 1370/2007/EC) on the award of public service contracts. The Regulation is intended to facilitate the opening of the market for domestic rail passenger services. Competitive tendering will become the norm for public service contracts by December 2023, with exceptions permitted under specific circumstances and direct award contracts required to include performance and quality targets.
- Directive 2016/2370/EU (amending Directive 2012/34/EU) on the Single European Railway Area. The Directive is intended to strengthen the independence and impartiality of infrastructure managers to facilitate the opening of the domestic passenger market and establish the rules for the practice of commercial rail passenger services. However, according to the Directive, vertical integration is permitted, provided certain legal, financial, and operational separations are put in place (Railway Gazette, 14 December 2016) and the Directive expressly acknowledges that the required separation of train path allocation and infrastructure access charging from train operations can be achieved within a vertically integrated structure (Horton and Turner, 2017). The Directive also establishes conditions whereby commercial passenger services will have to be opened to competition by 2020 on an open access basis.

EU Member States have until December 2018 to transpose the Directives into national legislation.

¹¹ A detailed description of the legislative procedure and political debate on the Fourth Railway Package is provided in Scordamaglia and Katsarova (2016).

¹² Including the European Rail Freight Association.

The three measures comprising the Technical Pillar were formally adopted by the Council of Ministers and the European Parliament in June 2016 (Railway Gazette, 14 December 2016). The three texts comprising the Technical Pillar provided for further steps with respect to **interoperability and technical harmonization**:

- Directive 2016/797/EU on the interoperability of the rail system within the EU (recast).
- Directive 2016/798/EU on railway safety (recast).
- Regulation 2016/796/EU (repealing Regulation 881/2004/EC) on the European Union Agency for Railways.

Member States have until June 2019 to transpose the Directives into domestic legislation.¹³

Following the entry into force of the Technical Pillar in June 2016, the European Union Agency for Railways (ERA) replaced the European Railway Agency. The Regulation introduces a stronger role for the Agency regarding vehicle authorization and safety certification. In that regard, in past years some stakeholders have alleged that safety certifications — so far, granted by National Safety Authorities pursuant to Directive 2004/49/EC — would constitute a barrier to entry into some national markets (Steer Davies Gleave, 2014). To counter this trend and provide greater certainty for those wishing to apply, the Regulation provides that, starting from 2019, these tasks will be shared between ERA and the relevant national safety authorities. In 2019, a single safety certificate and vehicle authorization valid across Europe will be introduced, which may only be issued by the ERA.

HISTORY OF RAIL REFORM IN OTHER UNECE COUNTRIES

In non-EU UNECE countries, railway reform is being undertaken according to different models and is proceeding at different paces. Three broad groups of countries can be identified:

- The first group includes **Central and Northern European countries**, i.e. Norway and Switzerland.
- The second group includes **countries officially or potentially candidate to join the EU in south-east Europe**. Those under the Stabilization and Association Process which precedes accession to the EU are developing their railway structural policy according to the principles of the EC railway packages (UNECE, 2017).
- The third group of countries includes the **republics of the former Soviet Union**: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. These, in turn, can be separated according to the progress of reforms:
 - Countries that have made certain progress in reforms developing the “Russian-specific” reform model: Kazakhstan and Russian Federation.
 - Countries where reforms are widely discussed and some legal acts are adopted, although practical steps seem to be moderate: Ukraine and Uzbekistan.

¹³ However, member States may delay implementation by one year if they provide justification to the European Commission and the European Union Agency for Railways.

- Countries where reforms have not yet been planned: Armenia, Azerbaijan, Belarus, Georgia, Kyrgyzstan, Republic of Moldova, Tajikistan, Turkmenistan (UNECE, 2017).

Switzerland

Switzerland has conducted a major railway reform over the last two decades, in part inspired by the EU rail reform, but also largely specific. The Swiss railway reform can be divided into three stages: the “Revision of the federal law on railways” (Railways Act) in 1996, the “Railway Reform 1” in 1999 and the “Railway Reform 2” since 2005.

In the first stage (1996), a new governance of the regional passenger transport¹⁴ provided for:

- Cantonal authorities and the Swiss Confederation order jointly regional transport services and their financing is defined through a key; and
- Public subsidies to be clearly defined by service contracts, to ensure that unplanned deficits would no longer be covered by the State.

In the second stage (1999), the so-called “Railway Reform 1”¹⁵ provided for the transposition of the principles of the Directive 91/440/EEC into the Swiss law, according to the Agreement on Land Transport with the EU (1999). The direct authority of the federal administration over SBB CFF FFS¹⁶ was abolished and the national railway company was submitted to a multi-annual contract (Desmaris, 2015).

In the third stage (since 2005), the Government presented a further rail package to the Parliament — the so-called “Railway Reform 2” — which aimed to transpose the content of the of the EU directive on the interoperability of the rail system as well as the EU-directive on railways safety into Swiss law, including measures on financing the rail infrastructure, establishment of a regulatory authority, as well as safety. As the Parliament rejected the bill, the Government decided to split up the package into separate bills which was adopted and entered into force starting from 2010 (CER, 2011).

These reform waves resulted in a “hybrid system” combining liberalization and integration (e.g. a vertically integrated framework for the rail incumbent SBB CFF FFS, with separation of essential functions) and only partly aligned to European law and goals (implementation arrangements are discussed in greater detail in the following Chapter).

Norway

In Norway, infrastructure was separated from operations in 1996. In recent years, the railway sector has faced a number of difficulties, including low investment in infrastructure and a lack of infrastructure capacity, absence of market-led incentives resulting in a lack of efficiency, as well as overlapping of responsibility and the need for better coordination among public bodies (Taule Fjordbakk, 2016).

In June 2015, the Parliament of Norway resolved to reform the railway sector, with effects from January 2017. The reform — which, according to official sources, intended to combine elements from

¹⁴ LCdF 24 March 1995.

¹⁵ LCdf, 20 March 1998.

¹⁶ Swiss Federal Railways (German: Schweizerische Bundesbahnen (SBB), French: Chemins de Fer Fédéraux suisses (CFF), Italian: Ferrovie Federali Svizzere (FFS)).

the German, Swedish and British railway reforms — included three main pillars: reforming the infrastructure manager Jernbaneverket, reforming the rail operator NSB (Norges Statsbaner, i.e. Norwegian State Railways) and introducing competition for the market, as well as in infrastructure maintenance and rolling stock maintenance (Taule Fjordbakk, 2016).

Jernbaneverket has been split into two entities: a new infrastructure manager (Bane Nor) and a separate Railway Directorate. While the former focuses solely on building, developing and maintaining the infrastructure, the latter is to coordinate developments in the sector, including planning of infrastructure investment and tendering of operations contracts for the country's railway network, which will be divided into separate biddable packages.

NSB has been streamlined into an operating company, separating its rolling stock, real estate and passenger ticketing divisions into separate state-owned companies. Accordingly, in the future NSB, as well as third-party operators, will lease trains from Materiellselskapet and award maintenance contracts to Mantena, while ticketing will go through a single channel operated by Entur (International Railway Journal, 17 January 2017).

SEETO countries

In 2004, the Governments of Albania, Bosnia and Herzegovina, Croatia,¹⁷ the former Yugoslav Republic of Macedonia, Montenegro, Serbia, the United Nations Interim Administration Mission in Kosovo (UNMIK) and the European Commission signed a Memorandum of Understanding (MoU) for the development of the Core Regional Transport Network. The MoU provided for the establishment of the South-East Europe Transport Observatory (SEETO) as a regional transport organization in the South East European Railway Transport Area.

An Addendum to the MoU was signed in 2007, with the aim to enhance regional cooperation in the area and to serve as a guide for rail reform. The Addendum focused on improving rail market access, opening the national market, facilitating border-crossings and ensuring a high level of technical interoperability between the partners. According to the Addendum, the seven signatory countries agreed to gradually restructure their railway sector to align their domestic rail legislation with EU rail law. SEETO countries committed to adopting and implementing domestic legislation which would focus on: unbundling, management independence and market orientation of railway undertakings; fair conditions for access; safety and interoperability; financial stability and transparent involvement of governments; border-crossings issues; and social issues. The Addendum also allowed for the European Commission to organize peer reviews to assess reform progress.

In 2008, SEETO countries adopted a Timetable for the Implementation of the Addendum. The timetable recognized that in previous years, legislation in line with the EU rail policy had been adopted in SEETO countries, but had never become operational. The timetable thus underlined the need for effective implementation of adopted laws. Deadlines for implementation of the reform process were set for 2010, but have been missed in most cases (Monsalve, 2011).

According to the contribution from the International Transport Forum to the works of the UNECE Workshop on Railway Reform held in November 2017, SEETO countries have recently made considerable progress in advancing structural rail reforms in line with EU acquis. Comprehensive rail reforms were adopted in Serbia in 2016 and Albania in 2017, which completed previous reforms in the

¹⁷ Croatia joined the EU in July 2013.

other SEETO countries. The implementation progress is discussed in greater detail later in the document.

Turkey

Historically, the State Railways of the Republic of Turkey (Türkiye Cumhuriyeti Devlet Demiryolları, TCDD) operated rail services as a State enterprise under the Ministry of Transport with monopoly powers and vertical integrated structure. TCDD owned and operated affiliated companies that were responsible for the manufacture of locomotives, passenger coaches and freight wagons, and several ports with rail access. Revenues from the port activities — the only part of TCDD that operated profitably — cross subsidized rail operations (Monsalve, 2011).

In 2005, the EU formally agreed to start accession negotiations with Turkey. The Turkish Government planned to restructure the railway sector, which remained one of the few sectors which had not undergone reforms, with a desire to keep the country in step with the EU rail policy. The EU, in close cooperation with the World Bank, began providing technical assistance to the Turkish government for the preparation of railway reform, aiming to reduce financial losses of TCDD and meeting the EU accession requirements (Koning, 2012).

The first law dealing with unbundling of the railway came in 2011¹⁸ and established a Directorate-General of Railway Regulation (DGRR), tasked with the responsibilities of the regulatory body, safety authority and contract manager for public service contracts. Several further regulations have since been passed which cover railway infrastructure access, determination of access charges, capacity management, vehicle authorization and safety (Railway Gazette, 2 May 2016).

A formal decree to liberalise the rail sector¹⁹ was issued in 2013, with the aim of ending the monopoly of TCDD and introducing competition into the market (Thomas, 2015). The law envisaged vertical separation of the rail industry by establishing a subsidiary within TCDD (named TCDD Taşımacılık, i.e. TCDD Transport), as owner of the rolling stock and operator of passenger and freight services and opening the railway infrastructure (retained by TCDD) to other private operators. The Law also provided for new rules on public service obligations and state subsidies to the rail industry. Other legislative provisions were subsequently published according to EU Directives by the Directorate-General of Railway Regulation.

Unbundling was achieved in June 2016 (Rail Turkey, 4 June 2016), while the first Network Statement was published by TCDD in November 2016, initiating liberalization in the Turkish railway sector. In January 2017, TCDD in its role as infrastructure manager and the newly established rail operator TCDD Transport signed an agreement on rail access. The budgetary deficits of TCDD and TCDD Transport will be met by the Turkish Government until May 2018 — after this date, only investments for high speed trains, construction of new lines and modernization of existing lines, will be publicly funded, while public service contracts will be subject to competitive award (Rail Turkey, 4 June 2016).

¹⁸ Decree on the Administrative Structure and Duties of the Ministry of Transport, Maritime Affairs and Communication (Decree Law no. 655/2011).

¹⁹ Law no. 6461/2013 on the Liberalization of Railway Transport of Turkey.

Russian Federation

In the Russian Federation, for nearly a decade the railway sector was not affected by the socioeconomic reforms that had started in 1992. In this period, the Railway Ministry (Ministerstvo Putei Soobschenija — MPS) remained a state monopolist amidst the developing market economy, combining the roles of policymaker, regulator and service provider. At the end of the 1990s, however, the Government recognized that the sector — with huge investment needs and negative gains in passenger services — was no longer sustainable and that introducing competition in the market was needed to attract private capital, drive cost reduction and improve profitability.

Accordingly, a reform process was initiated, which is summarized in the following table.

Table 3 Russian railway reform

Stage	Description	Steps
Pre-2001	Preliminary restructuring	Creation of the Russian Federation's MPS from the larger Soviet MPS
		Issue of the "Vision for Railway Reform" (1995) and related legislation and decrees (1995-1998)
		Diversion of some social services and beginning reduction of staffing levels
		Privatisation of some railway supply industries and introduction of competitive bidding into procurement processes of MPS
2001-2003 First stage	Legal and institutional framework	Adoption of the law and regulations to separate policy/regulatory functions and commercial/business functions
		Evaluation of assets, company auditing and account consolidation
2003-2005 Second stage	Separation of functions	Establishment of the government agencies Roszheldor responsible for railway sector policy and Rostransnadzor responsible for transport safety monitoring
		Establishment of the Federal Energy Commission (later renamed as Federal Services for Tariffs) to regulate rail tariffs
		Creation of RZD taking over assets of MPS (including ownership of infrastructure, signalling, dispatching system and locomotives) and operating responsibilities
		Creation of 27 RZD subsidiaries, including those for: general freight services; transit freight services; intermodal freight services; refrigerated freight services; wagon repair; production and repair of track maintenance equipment
		Issue of a Decree on non-discriminatory access to the railway infrastructure
		Encouraging private investment in freight wagons by providing for separation of the wagon component in the rail tariffs
		Starting to phase out cross-subsidisation of passenger operations by freight operations
2006-2010 Third stage	Development of competition	Introduction of International Financial Reporting Standards for accounting and increase of financial transparency by disclosing audited statements
		Further creation of RZD subsidiaries, including: further freight subsidiaries (e.g. Freight One and TransContainer); long distance passenger services (Federal Passenger Company); commuter passenger services; locomotive and rolling stock repair services; construction services; research and development
		Start selling RZD's shares in subsidiaries
		Establishment of the first public-private partnerships (PPPs)
		Issuing of RZD international bonds
		Revision of the tariff policy
		Revision of subsidy policy for long distance passenger and commuter services

Stage	Description	Steps
After 2010	Continuing the reforms	Further sale of equity stakes in RZD and its subsidiaries, including full privatisation of Freight One and Freight Two (later renamed as Federal Freight)
		Further revision of tariff policy, including separation of infrastructure and locomotive component and tariff harmonization
		Diversion of regional passenger companies from RZD
		Public debate on creating private carriers that operate both their own wagons and locomotives

Source: author's elaboration on EBRD Evaluation Department (2014).

Railway reform in the Russian Federation started in 1998 with the separation of social services and the privatization of some rail supply industries (Asian Development Bank, 2017). Rail reform gathered pace in 2001, when the 10-year “Programme for Structural Reform in Railway Transport”²⁰ was issued with the declared objectives of:

- Enhancing rail transport performance, availability, safety and quality;
- Introducing competition and facilitating private investment in the industry;
- Reducing the economic costs of transportation and public support to the sector; and
- Increasing rail passenger supply to meet growing demand.

The programme envisaged three stages. The first stage (2001-2003) involved establishing the legal framework and basic institutions for a more competitive rail sector (CER, 2011). Legislation passed in this stage was aimed at separating policymaking and regulatory functions from business management and operations. To this end, the 100 per cent state-owned company Russian Railways (Rossiyskiye Zheleznnye Dorogi, RZD) was established in 2003.²¹ Policymaking powers were transferred from MPS to the Federal Railway Transport Agency (FRTA) into the Ministry of Transport, while RZD inherited all rail assets. At the same time, numerous non-core structures — including social services (e.g. hospitals and schools) and construction activities — were divested and significant staff reduction took place (OECD, 2013).

The second stage of reform (2003-2006) was focused on RZD corporate restructuring, with the main goal of removing internal cross-subsidizing of passenger operations at the expense of freight operation. During this period, business lines and activities within RZD were separated. More than 40 subsidiaries were established in container transport (e.g. TransContainer), reefer services (e.g. Refservice), transport of vehicles (e.g. RealTransAuto), rolling stock maintenance, production of spare parts, etc. (Kolik, 2016). Moreover, a considerable number of legal acts were adopted to prepare the transition from a state-owned railway monopoly to a competitive railway industry — e.g. the principle of non-discriminatory access to the infrastructure was declared.

The new legal provisions encouraged private investment in freight wagons. As a consequence, the segment of so-called “wagon operators” — i.e. freight forwarders that either own or rent wagons and handle rail logistic operations (OECD, 2013) — began growing rapidly, to eventually become one of the principal components of the Russian railway market model (CER, 2011).

²⁰ Russian Federation Government Decree no. 384 of 18 May 2001, amended on 22 July 2009.

²¹ Russian Federation Government Decree no. 585 of 18 October 2003.

The third stage of reform (2006-2010) was intended to spur a period of attraction of private capital to the industry and development of competition. To that end, the freight market was gradually liberalised. Ownership of most of the RZD freight carriages was transferred to two major companies, at first created as subsidiaries of RZD: Freight One, established in 2007 and Freight Two, established in 2010 (renamed as Federal Freight in 2013). The remaining carriages were sold on a competitive basis to private operating companies (OECD, 2016).

Liberalization involved the passenger market as well. The Federal Passenger Company (FPC) was established in 2009 as a subsidiary of RZD in the long-distance passenger segment.

When the 10-year period of the 2001 Programme had elapsed, the Government prolonged the reform. The “Target Model of the railway freight market until 2015” was the document defining further actions for five years, including provisions to improve the technological management of freight operations to increase productivity (Kolik, 2016). In February 2014, the Russian Government published the “Action Plan for Developing Competition in Railway Transport”, with the main objective of developing competition in the passenger rail market (OECD, 2016).

Kazakhstan

On independence in 1991, the Kazakh railway network was under the control of three separate regional railway departments.²² Railway reform started in 1997, when these were merged into an integrated national state-owned railway organization, forming Kazakhstan Temir Zholy (KTZ). The railway sector was characterised by physically threadbare assets, obsolete technologies and a non-competitive framework (Egis International/Dornier Consulting, 2013).

In 2001 the Kazakh Government approved a major restructuring programme.²³ Reforms were undertaken in three stages. While the first and second stage (between 2001 and 2006) envisaged a transformation of the industry based on the Russian model, the direction of the reforms was later changed. With the third stage of reform, the Kazakh model assumed a shape closer to the EU railway industry structure. The two initial stages of reform entailed the establishment of two companies, in charge respectively of traction services and wagon fleet operator. The third stage of reform allowed for separation of policy and regulatory functions from commercial functions, as well as separation of infrastructure management, passenger operation and freight services into separate joint-stock subsidiaries within the KTZ holding company, with the cargo and passenger companies operating their own locomotives and wagon fleets (UNECE, 2017 and Egis International/Dornier Consulting, 2013).

The reform entailed other major developments, including the introduction of modernized accounting and information management methods, as well as privatization or diversion of non-core assets (including track maintenance and rolling stock maintenance) and social assets (including schools, hospitals and housing) which have been transferred to the relevant local authorities. As rail reform in Kazakhstan has continued, the Government has assigned additional assets to KTZ, including eleven airports and three international trade zones (Asian Development Bank, 2017).

²² Almaty, West Kazakhstan and Tselinia railway administrations.

²³ The “Act on railway transport”, which fits into a wave of legal acts to reform the Kazakh transport sector.

Ukraine

Ukrainian Railways (Ukrzaliznytsia, UZ) is fully a state-owned company that was established in 1991 when Ukraine became an independent state. In 2006, the Ukrainian Government approved the “Concept of the State Programme for Reform of Railway Transport”, in which the reform approach was very similar to that implemented in the Russian Federation (UNECE, 2017). The programme, though postponed in 2009 and 2011 (completion is currently planned for 2019), provided for three stages of reform:

- Stage 1 (2010-2012): separation of the Government’s regulatory function from the operational function of UZ, as well as the merger of the current six regional railways and other numerous UZ subsidiaries into one vertically integrated state-owned joint-stock company. A legislative platform necessary to reform the railway sector (the “Establishment Law”) was adopted by the Parliament, entered into force in March 2012, and required the Government to adopt a resolution on the establishment of the new national railway company by June 2012. This was eventually adopted in June 2014 and led to the transformation of the company out of a state agency into a state-owned public joint stock company (2015).
- Stage 2 (2013-2015): introduction of competition into the market for rolling stock operation. It also included the establishment of a management system, the revision of tariff policy, the establishment of central and regional transportation management centres, the introduction of mechanisms of financial support to passenger transport, the creation of the legal and organizational conditions for the entry of private passenger transport operators into the market, the establishment of regional passenger operators to be owned by local authorities and the new national railway company. Stage 2 has not yet started.
- Stage 3 (2016-2019): the longer term objectives for the railway industry in Ukraine, include the introduction of a financial mechanism to eliminate cross-subsidies of passenger transportation losses from freight transportation revenues, the promotion of competition in the market for rolling stock operations and the development of logistics facilities and terminals (Grushevskaa et al., 2016).

In November 2016, a common project with the EU was launched to provide support to the Ministry of Infrastructure in the reform of the railway sector, which is in line with the provisions of the EU-Ukraine Association Agreement. The project should contribute to strengthening the capacity of the Ministry of Infrastructure in developing policies for the creation of a competitive railway market, establishment of safety requirements in the rail sector in line with the European norms and standards and integration of the Ukrainian railway system into the Trans-European transport network.

Uzbekistan

In Uzbekistan, a railway reform committee was established in 1997 and a reform plan was published by the Government (with support from the Asian Development Bank). The plan provided for the outsourcing of non-core activities and the phasing out of internal cross subsidizing, though did not envisage any measures aimed at developing competition.

In 2001, the reform was implemented, and provided for vertical separation of the industry based on the Russian reform model. The national state railway operator, Uzbekiston Temir Ullari (Uzbekistan Railways) was transformed into a joint-stock company with 100 per cent of state ownership and several divisions of the company were converted into joint-stock companies, including companies for container transportation, refrigerated goods transportation, passenger transportation and wagon repair (UNECE, 2017).

Other former republics of the Soviet Union

In 2007, the Government of **Armenia** tendered for the modernization and operation of Armenian Railways. Russian Railways was the only bidder and established South Caucasus Railway (CJSC) as a wholly owned subsidiary to run the Armenian Railways. CJSC officially began its modernization and operation programme in 2008 in a thirty-year (extendable) concession. As a consequence, the future structure and operations of the Armenian railway sector is likely to be based on the Russian Railways (UNECE, 2017).

Azerbaijan Railways (Azərbaycan Dəmir Yolları) is the national state-owned rail transport operator in **Azerbaijan** that operates as a fully integrated state monopoly. Whilst freight tariffs have been liberalized, passenger tariffs continue to be determined by the government. No information on any planned structural reforms is currently available (UNECE, 2017).

In **Belarus**, Belaruskaya Chugunka (Belarusian Railway — BR) is the vertically integrated state-owned railway company, which is subordinate to the Ministry of Transport and Communications. Current policy documents do not envisage any substantial reforms in the railway industry. The State programme for developing rail transport for 2011-2015 provided only for modernization of the sector within the existing model. In 2013, the Belarusian scientific community developed a reform model that envisaged a holding model; five companies were to be subordinated to a general directorate — a freight company, a passenger company, a locomotive company, an infrastructure maintenance company and an engineering company (design work). This reform radically differs from the Russian model and also differs from some of the basic principles of the EU railway model (UNECE, 2017).

Georgian Railways (Sakartvelos Rkinigza) is the national fully state-owned railway company of **Georgia**. In recent years there have been several attempts to reform the railway industry by privatizing the company — for example in 2008, a concession tender was announced and five international entities expressed their intention to purchase 100 per cent of shares and invest in the company's development; however, the procedure was suspended by the Government without any explanations. No information about any planned reforms is available (UNECE, 2017).

In the **Republic of Moldova**, Calea Ferată din Moldova (Railways of Moldova, RM) is the state-owned vertically integrated railway operator. Structural reforms have not occurred in the industry since the Republic of Moldova became an independent State. Currently EBRD provides a loan to RM to support reform in the railway sector — based on the principles of the EU railway model — to improve safety and efficiency, and to strengthen the institutional capacities in the areas of procurement and corporate governance (UNECE, 2017).

In **Kyrgyzstan**, **Tajikistan** and **Turkmenistan**, the state-owned companies are dependent on the relevant Transport Ministries and the only operators in the industry. No information about structural reforms is available (UNECE, 2017).

RAIL REFORM IMPLEMENTATION

TRANSPOSITION OF EU LEGISLATION

Despite long-standing efforts at the EU level to promote a single and competitive European rail market, mitigated results have been achieved by EU Member States. To that regard, it must be underlined that most of the EU legal instruments were adopted in the form of a Directive, meaning that their implementation into the national legal systems is required for them to be fully binding. Moreover, member States need not only to transpose the Directives into national law, but also implement the requirements.

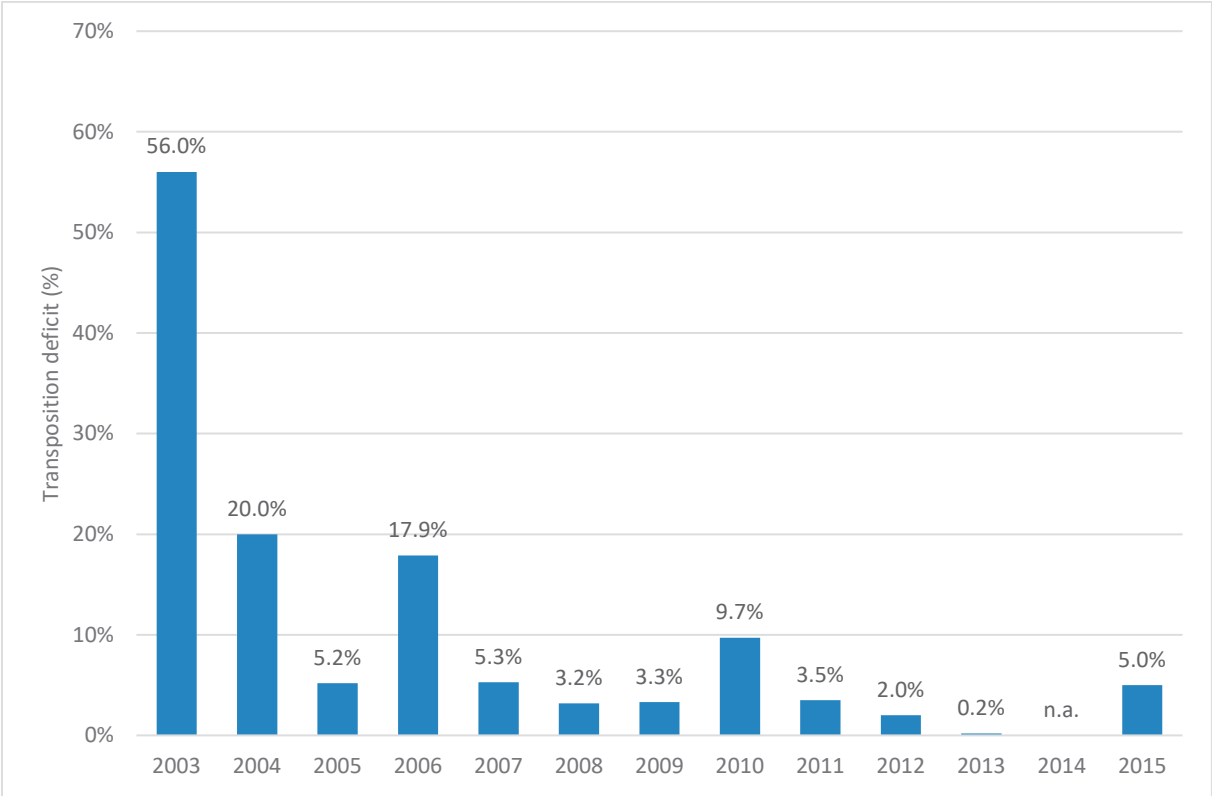
There are a number of examples of delayed or incomplete transposition. In 2007, a European Commission's Report on monitoring development of the EU rail market (European Commission, 2007) argued that formal transposition of the First Rail Package had been delayed and thus not led to new entrants in the rail sector in a number of EU Member States. A second Report (European Commission, 2009) found that while all member States had transposed the directives contained in the First Rail Package, there had been incorrect transposition in 24 of the 27 of them. Most of these cases have been redressed through infringement proceedings, and in the worst case through court rulings.

An overall indication of the extent to which EU railway legislation is transposed is provided by two indicators published by the European Commission DG MARKT:²⁴

- The *transposition deficit*, measuring the percentage gap between the number of Directives adopted by the EU and those transposed in member States by a given date; and
- The *compliance deficit*, measuring the percentage of those Directives incorrectly transposed.

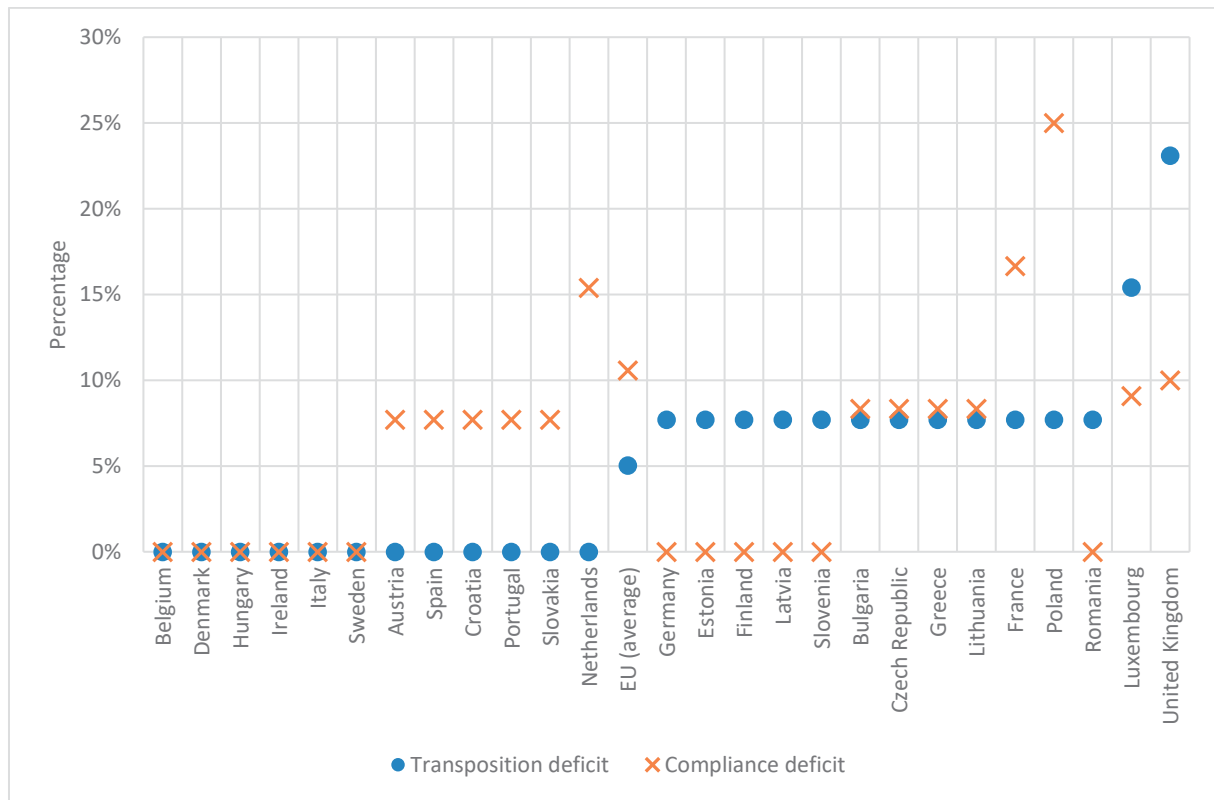
²⁴ Source: http://ec.europa.eu/internal_market/scoreboard/.

Figure 2 Rail Directives' transposition deficit, 2003-2015



Source: author's elaboration on European Commission (2014) and European Commission (2016).

Figure 3 Rail Directives' transposition deficit and compliance deficit, 2015



Source: author's elaboration on European Commission (2016).

Figure 2 above shows the evolution of the rail-specific **transposition deficit** indicator between 2003 and 2015. The figure shows that the gap in transposition of rail Directives has been diminishing over time, though always exceeded the target of 1 per cent set by the European Council in 2007, except for 2013 (Council of the European Union, 2007). Peaks in the deficit are recorded in years immediately following deadlines for transposition of Rail Package Directives.

Figure 3 above shows the **transposition deficit** and **compliance deficit** indicators in 2015, by EU Member State. According to the European Commission, on average, the transposition deficit is equal to 5 per cent while the compliance deficit is equal to 11 per cent. Only 6 EU countries are fully compliant with the transposition requirements, while the others either did not transpose or transposed incorrectly a significant share of the total. This has created obstacles towards achieving the objectives underpinning EU railway reform, as well as opened the door for diverging arrangements and provisions to develop between the EU Member States (Holvad, 2017).

In a recent report (European Commission, 2016), the European Commission commented on the current implementation status of the EU legal framework, as well as on the need for further legislation. The Commission noted that the period of structural changes in the railway sector should be concluded with the adoption and implementation of the Fourth Railway Package. The Commission acknowledged that positive developments have been achieved, including increased passenger volumes and investment in infrastructure, as well as gradual opening of national rail markets. Nevertheless, the Commission also stressed that the current implementation rate will mean that the objectives set for the rail sector in the 2011 Transport White Paper will not be achieved. It furthermore underlined that market opening has achieved uneven progress, and a single European railway area is still a long way

from being achieved. The Commission concluded that the focus in the coming years will be on the implementation of existing legislation.

During the Workshop on “Railway reform across the ECE region”, held during the seventy-first session of the UNECE Working Party on Rail Transport (Geneva, 27-29 November 2017), the Community of European Railway and Infrastructure Companies (CER) expressed a desire for a period of stability in the EU regulatory framework, as well as an increased focus by EU member States on transposition and implementation of the existing legislation.

EU legislation is required to be transposed also in the SEETO countries according to the 2004 Memorandum of Understanding mentioned in the previous chapter. The table below shows the degree of formal transposition of the First, Second, and Third Railway Packages in SEETO countries. Formal transposition of EU legislation — achieved by most of SEETO countries — does not generally correspond to actual reform implementation, and different levels of progress have been achieved in that regard. Evidence of implementation in EU member States and SEETO countries are discussed later in this Chapter.

Table 4 Transposition of EU Railway Packages in the SEETO countries

Country	First Railway Package	Second Railway Package	Third Railway Package
Albania	X	X	X
Bosnia and Herzegovina	✓ (2007)	X	X
Montenegro	✓ (2013)	✓ (2013)	✓ (2013)
Serbia	✓ (2013)	✓ (2013)	✓ (2013)
The former Yugoslav Republic of Macedonia	✓ (2004)	✓ (2004)	✓ (2010)

Source: Bošković and Bugarinović (2015). Note: Information was not provided by UNMIK.

THE ROLE OF RAIL REGULATORS WITHIN THE EU

According to the EU Directives outlined previously in this report, the establishment of a number of institutions is needed to deal with the various issues of railway market regulation. These are:

- The regulatory body (in charge of economic regulation);
- The safety authority (in charge of safety regulation);
- The accident investigation body;
- The licensing body;
- The notifying body; and
- The designated body.

It is often said that amongst these, the role of the **regulatory body** is of the greatest importance.

National regulatory bodies officially became a requirement within Directives 2001/12/EC and 2001/14/EC. Subsequent EU directives and regulations have gradually extended their area of authority. From overseeing discrimination in freight transport (2007), this has been extended to international passenger transport including cabotage (2010), as well as to rail-related services (2012). In the Recast of the First Railway Package (2012), the European Commission expressed concern about the regulators' lack of independence and stressed the need to strengthen them as well as clarifying their powers, staffing and resources. According to the Recast (2012), regulatory bodies are required to be independent from any infrastructure manager, charging body, allocation body, or applicant. The regulatory body's main aim is to ensure non-discriminatory access to railway infrastructure. Its main tasks are defined as following:

- To act as an appeal body in relation to decisions taken by an infrastructure manager or a railway undertaking regarding discriminatory access conditions.
- To ensure that the charges set by the infrastructure manager are non-discriminatory by supervising negotiations between an applicant and an infrastructure manager on the level of the charges.
- To monitor the competition in the rail services market, taking decisions based on complaints or on its own initiative on appropriate measures to correct undesirable developments.

The European Commission, in 2012, also expressed concern about coordination between and harmonization among the different national regulators. Collaboration among regulators dates to 2010, when the regulatory bodies of the UK, the Netherlands, Austria, Switzerland, and Germany launched the so-called Independent Regulators' Group — Rail (IRG-Rail). With the Recast, the Commission launched its own European Network of Rail Regulatory Bodies (ENRRB), with the Commission as a member, and with Switzerland, Norway and the former Yugoslav Republic of Macedonia as observers. Its purpose is to cooperate on market monitoring and investigation, especially on cross-border matters (Finger and Messulam, 2015).

EU countries chose a different approach while creating their respective regulatory bodies, in relation to their structures and powers. Regulatory bodies can be classified according to their structure. The following table classifies EU member States' regulatory body as either:

- Standalone regulatory bodies, that are regulatory bodies in the railway sector that focus solely on the railways; or
- Regulatory bodies integrated into a wider transport regulatory organization; or
- Regulatory bodies integrated into a wider organization responsible for all types of regulated industries.²⁵

²⁵ In some cases (e.g. Netherlands, Spain) the regulatory body and competition authority are within the same entity.

Table 5 Regulatory Bodies in the EU (2017)

	Standalone rail regulatory bodies	Integrated regulatory bodies — wider transport regulatory organization	Integrated regulatory bodies — wider organization responsible for all types of regulated industries
Member States	Austria, Bulgaria, Denmark, Greece, Latvia, Poland, Romania, Slovakia	Belgium, Czech Republic, Finland, France, Hungary, Ireland, Italy, Portugal, Sweden, UK	Croatia, Estonia, Germany, Lithuania, Luxembourg, Netherlands, Slovenia, Spain
Advantages	The core competencies and experience of the staff within the team are rail specific. The regulatory body is tasked with supporting the development of only the rail sector	Issues of competition and discrimination extending beyond the rail sector can be considered in a wider context. Lessons from the liberalization and regulation of different transport modes can be more easily transferred	The transfer of experience and learning across sectors is facilitated
Disadvantages	Wider transport issues might be ignored	Risk that rail issues are sidelined to take account of wider transport issues. Risk that problems specific to the rail mode receive insufficient attention	Risk that the governance and constitution of the regulatory body do not conflict with the requirements of Directive 2001/14/EC. Risk that the necessary skills and resources are not available

Source: Steer Davies Gleave (2011), European Commission's website, and regulatory bodies' websites.

In a number of cases — e.g. in Poland and the United Kingdom — the regulatory body has the dual function of market regulator and safety authority.

The following paragraphs set out the specific experience in a number of EU Member States and extra-EU countries.

In the mid-1990s, **Great Britain** opted for an independent and powerful rail regulator — the Office for Rail and Road (ORR) (formerly Office of Rail Regulation and initially Office of the Rail Regulator), with statutory duties towards freight transport, performed in three key ways:

- Regulating Network Rail's management of the national rail network;
- Licensing operators of railway assets; and
- Approving track, station, and light maintenance depot access.

ORR carries out periodic reviews of Network Rail's financial structure. This process establishes track access charges for each type of freight locomotive and wagon for different commodity types, together with a range of other charges bound by the total revenue requirement of the infrastructure manager. ORR is also responsible for regulating safety. In 2015²⁶ ORR was appointed as Monitor for Highways England (the UK strategic highways authority) to ensure that the latter delivers its programme of investment and other performance commitments.

²⁶ Infrastructure Act 2015.

In 2010, **France** created an independent sector regulator — Autorité de Régulation des Activités Ferroviaires (ARAF), known as Autorité de régulation des activités ferroviaires et routières (ARAFER) since 2016. Its duties are more limited than those of the ORR but they were extended with the rail reform law of 2014. ARAFER has a form of *a posteriori* intervention, i.e. it does not set access charges, but each year it approves (or rejects) the track access charges proposed by the infrastructure manager.

In **Germany**, since 2006 the regulation of the rail sector is the responsibility of an independent regulator covering a number of network industries — the Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway (Bundesnetzagentur, BNetzA). Its main tasks include: monitoring the non-discriminatory access of rail operators to the infrastructure, controlling the timetabling process, as well as the level of access charges. The regulatory remit of the BNetzA comprises preventive as well as ex-post measures. BnetzA is in charge of examining the network statement and initiating investigations following complaints (if necessary, BnetzA is also able to take action *ex officio*).

Although the railway liberalization process in **Italy** was one of the earliest in Europe, the responsibility for regulation of the railway companies remained for a long time with the Government. From 2004 to 2014, an independent office of the Ministry for Transportation — Ufficio per la Regolazione dei Servizi Ferroviari (URSF) — played the role of the regulatory body. The Italian rail regulator was only made truly independent from government through the creation of ART (Transport Regulation Authority) in 2013 (becoming operational in 2014).

ART is a body fully independent from government and regulated businesses, and answerable to Parliament. ART is a multimodal regulatory body, being responsible for overseeing all transport sectors including railways, airports, ports/maritime, motorways, taxis, and public local transport. Nevertheless, ART's services and offices are structured based on functions — e.g. institutional and international affairs; economic affairs; access to infrastructures; transport services and retail markets; passengers' rights; supervision and sanctions — rather than transport sectors.

ART's main mission is the ex-ante economic regulation in transport, covering both access to infrastructure and services. ART's mandate includes:

- Ensuring the equitable and non-discriminatory access of businesses to rail, toll highways, airports, ports as well as local and regional transport and in relation to the mobility of passengers and freight connected to stations, airports and ports;
- Setting the criteria on which basis to fix tariffs in all transport modes and industries;
- Contributing to defining public sector obligations;
- Setting quality standards in areas where public sector obligations apply; and
- Defining minimum passenger's rights and entitlements that may be claimed by passengers vis-a-vis transport operators (Cambini and Perrotti, 2015).

The set of powers conferred upon ART to carry out these responsibilities includes:

- The power to issue sanctions in case of lack of implementation, or faulty implementation, of a decision of the Authority, as well in case of refusal to provide, or the faulty provision of, information requested by the Authority;
- Special sanctioning powers entrusted to ART in application of European legislation on passengers' rights;

- The power to signal to the competent authorities the opportunity to terminate contracts, concessions and other forms of agreements;
- The power to set and demand the application of criteria for the corporate separation and accounting separation of regulated businesses;
- The carrying out of investigations and on-site inspections; and
- The treatment of passengers' claims and complaints (Cambini and Perrotti, 2015).

The regulation of the railway sector has been one of ART's primary commitments since its entry into operation. Since 2014, ART has intervened on a number of occasions in the Italian rail market, as detailed in the table below.

Table 6 Activity of the Italian Transport Regulation Authority in regulating the rail market

Area	Action
Access to infrastructure	Regulatory measures on access charges
	Regulatory activities on shunting services in the rail freight transport
	Regulatory measures on access to stations
	Regulatory measures on capacity allocation
Regulation of services	Regulatory measures relating to notices and conventions concerning tendering procedures
	Development of a methodology to determine the scope and perimeter of public sector obligations in rail transport
	Proceedings aimed at setting minimum quality standards in rail transport
	Definition of rights of pass holders in high speed rail and PSO services (under way)
	Competition-by-comparison approach to measure efficiency of regional rail transport services
Passenger's rights	Monitoring of execution
	Infringement proceedings
	New web site application
	Evidence-based participation in revision of EU Regulation

Source: ART (2017).

The process of establishment of the railway market institutions in the **SEETO countries** has not been coordinated and has followed different timelines. In Serbia, Bosnia and Herzegovina, Montenegro and the former Yugoslav Republic of Macedonia, the process is progressing slowly and with interruptions, while in Albania it is still at the very beginning. With respect to the issue of independence, different forms of regulatory bodies are present, including:

- As part of the Ministry responsible for transport;
- As a government agency (or a separate organ or special authority commission); and
- As a public agency directly controlled by the parliament (e.g. in the former Yugoslav Republic of Macedonia).

With respect to financing, regulatory bodies are traditionally funded from general tax revenues in SEETO countries, except for the former Yugoslav Republic of Macedonia, where income is obtained from levies on customers. According to Bošković and Bugarinović (2015), most of the regulatory bodies lack sufficient resources, both regarding the number of employees and their expertise.

The “Federal Law on Railway Transport and Federal Charter of Railway Transport” (2002) provided the legal basis for reorganizing the rail sector in **the Russian Federation**. Based on this legislation, the Railway Ministry (MPS) was separated into two parts: the policy/regulatory arm and the operational part. A number of agencies were created to regulate the railway sector:

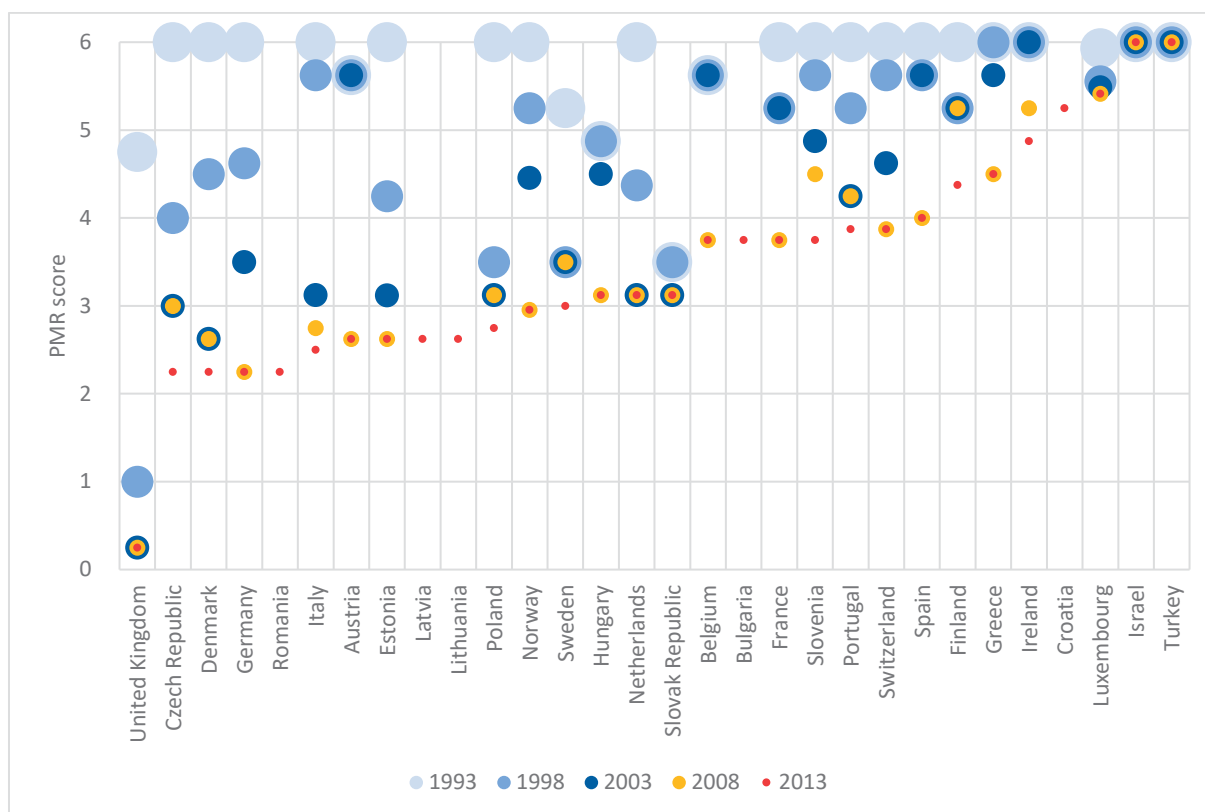
- The Federal Railway Transport Agency (Roszheldor), an agency of the Ministry of Transport, is responsible for the policy and some regulatory functions, advancing railway reforms, preparing laws and licensing federal-level railway activities.
- The Register of Federal railway equipment (a part of Roszheldor) is responsible for approving and certifying new rail technologies and manufacturing technologies and creating private test centres.
- Rostransnadzor, reporting directly to the Prime Minister, is responsible for transport safety monitoring.
- The Federal Service for Tariffs (FST) regulates the tariffs of natural monopolies, including the railways.
- The Federal Antimonopoly Service (FAS) the federal-level executive governmental organ that controls the execution of the antitrust law regulating natural monopolies, including the railways, e.g. in areas related to the development of rules for non-discriminatory access to railway infrastructure (Murray, 2014).

RAIL REFORM IMPLEMENTATION INDEXES

As explained above, the impact of EU reform diverges based on the different level of engagement by member States. The OECD indicators of PMR (Product Market Regulation (PMR) summarize regulatory provisions in seven sectors (telecoms, electricity, gas, post, rail, air passenger transport, and road freight) and can be useful to measure the eventual impact of regulatory provisions in EU Member States. The PMR indicators are also available for a number of non-EU countries belonging to the ECE region — namely, Norway, Switzerland, Israel and Turkey.

The following figure shows the level of PMR indicators for rail transport — ranging from 0 to 6, from the least to most restrictive competition framework in 1993, 1998, 2003, 2008, and 2013, for a selection of available UNECE countries.

Figure 4 PMR indicator for rail, 1993, 1998, 2003, 2008 and 2013



Source: author's elaboration on OECD's PMR database.

In 2013, most of countries scored in a range between 2 and 4, indicating a framework just partially liberalized overall. Only one country (the United Kingdom of Great Britain and Northern Ireland) scored close to 0, indicating a fully liberalized market. Five countries — Finland, Greece, Ireland, Croatia and Luxembourg — recorded a score higher than 4 but lower than 6, meaning (in case of EU Member States) a delayed reform implementation status. Two countries — Israel and Turkey — scored 6, indicating a fully integrated industry and closed market in that year.²⁷

²⁷ There have been a number of developments since 2013. In Turkey for example, a decree to liberalise the rail sector was issued in 2013, with the aim of introducing competition into the market. Unbundling was achieved in June 2016 (Rail Turkey, 4 June 2016); the first Network Statement was published by the infrastructure manager in November 2016; more recently, private operators commenced to enter the market, with Osman Logistics becoming the first private train operator of Turkey in October 2017 (Rail Turkey, 16 October 2017).

PMR indicators for rail transport can be divided into four sub-categories:

- “Vertical integration” scores are based on the degree of separation between operation of infrastructure management.²⁸
- “Public ownership” scores are estimated based on the percentage shares owned by the government in the largest passenger company, freight company and operator of the railroad infrastructure.²⁹
- “Entry” distinguishes between free entry (subject to access charges), franchising to several firms and franchising to a single firm.³⁰
- “Market structure” scores are estimated based on the presence of rail operators competing in the passenger and freight markets.³¹

The following paragraphs will discuss rail reform with respect to separation of the rail incumbent, market access and interoperability and technical harmonization.

SEPARATION OF THE RAIL INCUMBENT

The following figure shows the level of “Vertical integration” and “Public ownership” PMR indicators in 2013, for a sample of UNECE countries.

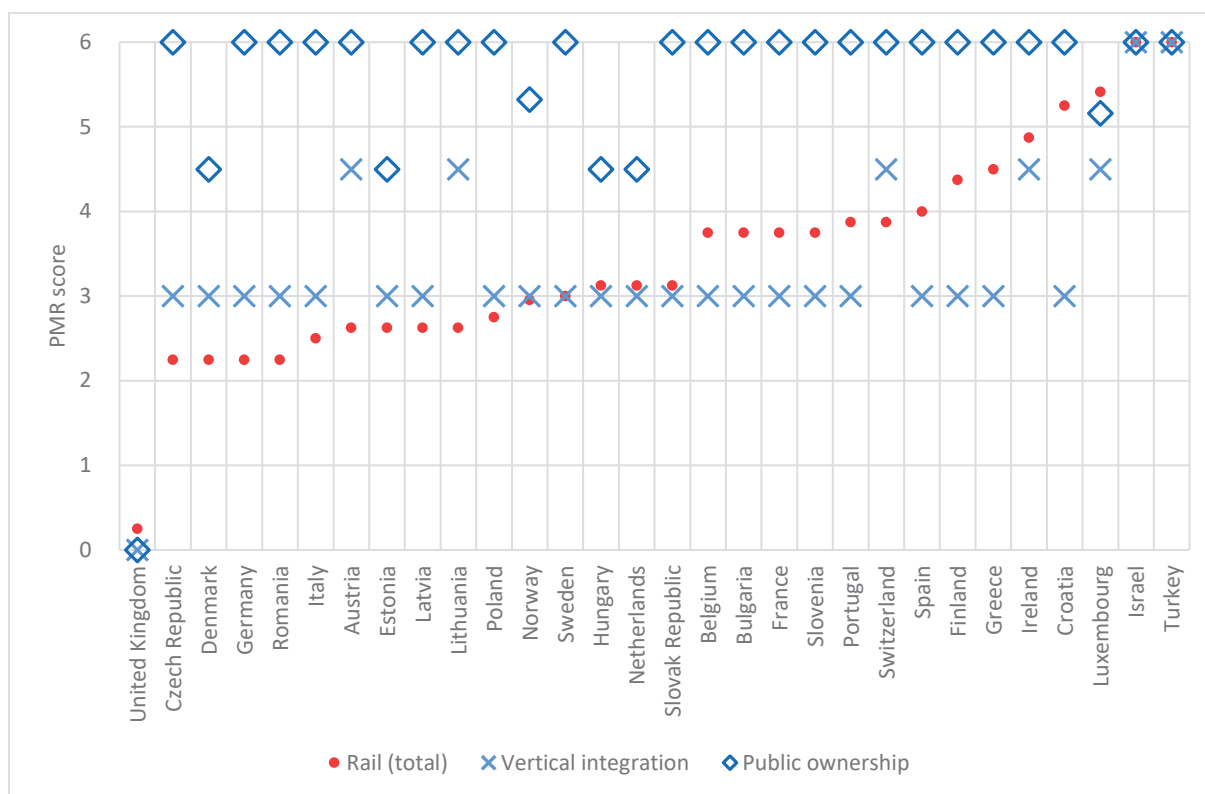
²⁸ Ownership separation = 0 points; legal/organizational separation = 3 points; accounting separation = 4.5 points; no separation = 6 points (Koske et al., 2015).

²⁹ No public ownership = 0 points; between 0 and 100% = % of shares owned by the government/100 * 6; 100% = 6 points (Koske et al., 2015).

³⁰ Free entry = 0 points; entry franchised to several firms that compete in the same geographic area = 2 points; entry franchised to several firms, each having exclusive rights to a geographic area = 4 points; entry franchised to a single firm = 6 points. For EU countries, 6 points are given to the mere application of the Directive 91/440/EEC, which OECD consider not very demanding in terms of opening up rail markets to competition (Koske et al., 2015).

³¹ More than 2 operators = 0 points; 2 operators = 3 points; no competition, i.e. single operator = 6 points (Koske et al., 2015).

Figure 5 PMR indicators for rail, “Vertical integration” and “Public ownership”, 2013



Source: author's elaboration on OECD's PMR database.

The “Vertical integration” indicator is equal to 3 in most of countries, indicating organizational separation between rail operators and the infrastructure manager.³² In the United Kingdom of Great Britain and Northern Ireland, the indicator is equal to 0, indicating ownership separation. In five countries — Austria, Ireland, Lithuania, Luxembourg and Switzerland— the indicator is equal to 4.5, meaning accounting separation. In two countries — Israel and Turkey — the indicator is equal to 6, indicating a fully integrated framework.³³

The “Public ownership” indicator is equal to 6 in most of countries, meaning that the largest passenger operator, the largest freight operator, as well as the largest firm managing the railway infrastructure, all are 100 per cent state-owned. Six countries — Denmark, Estonia, Hungary, Luxembourg, Netherlands and Norway — score in a range between 4.5 and 5.3, meaning partial to full private ownership of at least one in the three largest firms. In the United Kingdom of Great Britain and Northern Ireland, the indicator is equal to 0, meaning that all three largest firms are 100 per cent privately owned³⁴ (countries' scores are provided in the Appendix).

³² In EU Member States, this correspond to the correct transposition of Directive 2001/12/EC.

³³ For a definition of accounting separation, organizational separation, and ownership separation, please see the previous Chapter.

³⁴ From its formation in 2002 until 2014, Network Rail was classified as a private company in the UK National Accounts statistics. Following a change in its statistical approach, the Office for National Statistics reclassified the company as a public-sector organisation from September 2014. Consequently, Network Rail is now under ultimate government control (National Audit Office, 2015). Therefore, an update of the PMR indicators would lead to a higher score for “Public ownership” in the UK.

The gap between the “Vertical integration” and “Public ownership” indicators demonstrates that, despite the formal transposition of unbundling regulation, the actual organization of the rail industry still largely relies on state-controlled companies, with public authorities being at the same time owner, planner, client and, eventually, regulator (Esposito et al., 2016).

Separation arrangements in EU Member States

The separation requirement between infrastructure manager and rail operators has been interpreted differently in EU countries, resulting in various arrangements ranging from full institutional separation to organizational separation (also referred to as “holding model”). According to CER (2017), separation arrangements in the EU can be classified as in the following table.

Table 7 Degree of separation in the EU Member States (CER)

Degree of separation	Description	EU Member States
Organizational separation (“holding model”)	Integrated system	Austria, Germany, Hungary, Ireland and Northern Ireland, Italy, Latvia, Lithuania, Slovenia
	Integrated system with enhanced independency of the IM	France, Poland
Institutional separation	Separated IM	Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Great Britain, Greece, Netherlands, Romania, Slovakia, Spain
	Separated multimodal IM	Finland, Portugal, Sweden

Source: CER (2017).

In **Sweden**, an early reform of the railway sector proved to be most influential in terms of setting the scene for EU rail reform. Vertical separation of infrastructure management and rail operations was introduced three years before Directive 91/440/EEC, with the 1988 Transport Policy Act reforming the Swedish railway company Statens Järnvägar (SJ). The government took responsibility for track investment and maintenance through a new government agency (Banverket) whose functions were modelled on those of the already existing National Road Administration (Vägverket), while SJ was restructured into a train-operating company obliged to pay access charges to run on the network. In 2001, horizontal separation was introduced by splitting SJ into a passenger and freight companies — the former retaining the brand SJ, while the latter being named as Green Cargo (Alexandersson, 2013). At the same time, Jernhusen was created as the company responsible for the railway stations. In 2010, Banverket and Vägverket were merged into the new Swedish Transport Administration (Trafikverket) responsible for managing both the road and rail networks (Van De Velde, 2015), while responsibility for rail infrastructure construction and maintenance was given to the newly established state-owned agency Infranord (Alexandersson, 2013).

In the **United Kingdom of Great Britain and Northern Ireland**, the reform of British Rail started three years after the adoption of Directive 91/440/EEC and was completed by 1997, leading to full institutional and ownership separation — an unbundling arrangement well beyond the European requirements at the time. British Rail was split into numerous companies, and passenger operations were competitively tendered to approximately 25 train operating companies (TOCs). The rolling stock was transferred to competing rolling stock leasing companies (ROSCOs), while the infrastructure was transferred to Railtrack. Following poor performance, financial difficulties, and a major rail accident (at Hatfield in 2000), in 2001 Railtrack was put into administration and the infrastructure was transferred

to Network Rail. As of November 2017, the UK railway industry structure is composed of three infrastructure managers (Network Rail, HS1, and HS2),³⁵ 16 franchised operators, 4 open-access operators, one international passenger operator, and 5 freight operators — of which, 2 international operators (Rail Delivery Group, 2017).

In 2012, the United Kingdom of Great Britain and Northern Ireland provided an example of ownership separation coupled with closer cooperation between rail operation and infrastructure management. The so-called “deep alliance” between South West Trains (the railway undertaking) and Network Rail on the Wessex franchise, set with the aim to stimulate the realisation of cross-industry cost savings, provided for the establishment of one management team subject to the oversight of a governance board with equal representation from both alliance parties (Van de Velde, 2015).

Following this example, proposals recently announced by the Transport Minister (December 2016) for a new entity to be responsible for track and infrastructure, as well as the operation of train services, on a new rail line from Oxford to Cambridge signal a possible move away from the principles of separation (Horton and Turner, 2017). The Minister pointed to the technical and operational difficulties which he considered can arise from full separation, and outlined proposals for new franchises to have more integrated operating teams between train services and infrastructure. According to Rail Delivery Group (2017), the importance of an independent regulator to secure access to track remains a central feature of the UK rail policy. Once withdrawal from the EU is complete, the UK may have freedom to choose a different structure for its railways, depending on any deal it agrees with the EU.

The contribution from the UK's Rail Delivery Group — which represents the UK rail industry — to the Workshop on “Railway reform across the ECE region”, held during the seventy-first session of the UNECE Working Party on Rail Transport (Geneva, 27-29 November 2017), confirmed the desire for strengthened coordination between infrastructure managers and rail operators — still within a competitive environment. Network Rail's Transformation Plan includes the splitting of the company into 9 route businesses operating within a national framework, as well as alignment of track and train operations by creating shared targets between Network Rail and train operators at a route level (Rail Delivery Group, 2017).³⁶

In the **Netherlands**, railway reform began in 1995 with the reorganization of the state-owned railway company Nederlandse Spoorwegen (NS) through the organizational separation of commercial activities (passenger transport, freight operations, railway stations, and real estate) from infrastructure management, within a holding company. Although infrastructure planning, infrastructure maintenance, and traffic control remained within the NS holding, these functions were directly controlled and funded by the Ministry of Transport (Van de Velde, 2015). Complete institutional separation was introduced in 2003, leading to the creation of ProRail as the infrastructure manager. Both NS and ProRail were organized according to private law, but ownership was retained by the Dutch government. Vertical separation is currently perceived by some as having been implemented too

³⁵ High Speed One Ltd (HS1 Ltd) is the company which awarded the 30-year concession to own and operate the high-speed railway between London and the United Kingdom end of the Channel Tunnel. High Speed Two Ltd (HS2 Ltd) is the company responsible for developing and promoting the UK's new high-speed rail network from London to Manchester and Leeds.

³⁶ The option of regional re-integration of franchises with the corresponding IM regions is one of the Options suggested by McNulty (2011).

strictly, as such, a recent official policy review indicated the need for more coordination between NS and ProRail (Van de Velde, 2015) and potentially bringing them closer to government control.

In **Germany**, Deutsche Bahn (DB) resulted from the merger of the West and East German state-owned railway companies (1994) following reunification. Since then, Germany has opted for the so-called *holding model*, that is, organizational separation, where DB Netze is responsible for infrastructure management and other DB subsidiaries are responsible for passenger and freight transport operations. Since 2008, Deutsche Bahn has directly managed the units of DB Netze — DB Netze Track, DB Netze Energy, and DB Netze Stations — while a subsidiary called DB Mobility Logistics (DB ML) has managed the other business units — covering long-distance passenger transport (DB Long-Distance), regional transport (DB Regional), foreign passenger operations (DB Arriva), freight transport (DB Cargo), and logistics services (DB Schenker). The management board meetings of DB and DB ML are normally held together to ensure an integrated group management approach.

In **France**, the 1997 railway reform provided for the split of the state-owned company Société Nationale des Chemins de Fer Français (SNCF) into a new SNCF as the rail operator and Réseau Ferré de France (RFF) as the infrastructure manager. The reform required RFF to contract infrastructure maintenance activities and traffic control back to SNCF. SNCF Infra and Direction de la Circulation Ferroviaire (DCF) were created within the SNCF structure as, respectively, the infrastructure maintenance unit and traffic control unit. In 2009 DCF was placed under the control of RFF while remaining within the SNCF structure.

The resulting complex delineation of the infrastructure management responsibilities between RFF and SNCF proved to be problematic, as well as far from free of discriminatory practices, and eventually led to the French government to adopt a reform plan in 2013, approved by the French Parliament in August 2014, to reintegrate SNCF and RFF within a holding structure by July 2015. To ensure greater coordination, RFF merged with SNCF Infra and DCF and became SNCF Réseau, while the operational assets of SNCF became SNCF Mobilités. Both companies were placed under the control of the holding Groupe SNCF.

The pre-2015 French model — separation of key powers of infrastructure operation — is also applied in **Hungary** (Laurino et al., 2015).

In **Italy**, in 1985 the Government converted Ferrovie dello Stato (FS) — today renamed Ferrovie dello Stato Italiane (FSI) — into an autonomous undertaking. In 1992, it changed into to a joint-stock company (still wholly state-owned). In 1998, the Italian government decided to vertically separate the infrastructure and services of FSI. The management of passenger service was given to Trenitalia, while the management of the railway lines was assigned to the infrastructure manager - Rete Ferroviaria Italiana (RFI). RFI remains fully controlled by FS Holding, which also owns Trenitalia and remains 100 per cent state-owned.

In **Poland**, the liberalization process started in 1997 with the Railway Transport Act, which provided for separate accounting of rail operators and infrastructure management. Following the requirements of the First Railway Package, in 2000 the Polish government passed the Railway Restructuring and Privatization Law, establishing Polskie Koleje Państwowe (PKP) as a fully state-owned joint stock holding company in January 2001. In October 2001, 24 subsidiaries were established, including PLK (infrastructure manager), PKP Cargo (freight services), PKP InterCity (long distance and international passenger transport), PKP Energetyka (energy and traction services), and PKP Informatyka (telecommunications).

In **Romania**, in 1998 the monopolistic state-owned rail company was unbundled into five separated companies — the infrastructure manager, freight operator, passenger operator, a company in charge of managing ancillary assets and human resources, and a company in charge of accounting, financial, and legal services for the newly created companies. In 2002, the latter was wound-up and the remaining companies began managing their own accounting and legal services (Bošković and Bugarinović, 2015).

In **Bulgaria**, in 2002 the state-owned rail company (Balgarski Darzhavni Zheleznitsi, BDZ) was separated into infrastructure manager (Natsionalna Kompaniya Zhelezopatna Infrastruktura, NRIC), and rail transport operator (retaining the BDZ brand). In 2007, BDZ was converted into a holding company with three subsidiaries — freight transport (BDZ Cargo), passenger transport (BDZ Passenger Services), and rail traction (BDZ Traction) (Bošković and Bugarinović, 2015).

In 2006, **Croatia** created a holding structure with four companies responsible for infrastructure, freight transport, passenger transport, and traction. In 2012, traction was incorporated within the companies for transport of goods and passengers.

Separation arrangements in Non-EU countries

In **Switzerland**, unbundling did not take place, with SBB CFF FFS remaining a state-owned vertically integrated company. In 2005, the Parliament rejected a reform intending to create a separate path allocation body. Following this decision, in 2006 the major normal-gauge rail companies (SBB CFF FFS, BLS, and SOB) outsourced the allocation of their train paths to a joint independent body (Trasse Schweiz). Currently, SBB CFF FFS remains responsible for the preparation of the timetable, while Trasse Schweiz is responsible for capacity allocation. The determination of track access charges was transferred to a federal government agency. These arrangements result in a vertically integrated framework with separation of essential functions (Van de Velde, 2015).

In **SEETO countries**, vertical and horizontal separation is progressing and, according to the contribution of the International Transport Forum to the works of the UNECE Workshop on Railway Reform held in November 2017, currently (2017) infrastructure managers, passenger rail operators and freight operators are independent as far as accounting rules are concerned — though implementation of deeper stages of separation is not homogeneous between countries.

In **Albania**, a new railway code has been prepared to regulate railway transport and separating train operations from infrastructure management, though this has not yet been adopted — thus, unbundling has not started yet (European Commission, 2016 b). **Bosnia and Herzegovina** has partly aligned its legislation with the EU *acquis* on rail transport. The separation of train operations from infrastructure management has progressed, however, the independence of the infrastructure managers³⁷ has yet to be fully achieved (European Commission, 2016 c). In **the former Yugoslav Republic of Macedonia**, FYR Macedonian Railways (Makedonski Železnici; MŤ) was reorganized into two separate joint stock companies in 2007 — the infrastructure manager (Macedonian Railways

³⁷ When Bosnia and Herzegovina became independent in 1991, a new state railway company was formed and soon divided into three regional state owned companies reflecting the ethnic divisions of the country. In 2001, the railway companies in the Croat and Bosnian parts of the country were merged to create Željeznice Federacije Bosne i Hercegovine (JFBH). However, the railway in the RS, Željeznice Republike Srpske (TRS), remained separate. Accordingly, the railway sector includes two railway companies, and a state level coordinating body, Bosne i Hercegovine i Bosanskohercegovačke Željeznice Javna Korporacije, ZBHŤJK (UNECE, 2017).

Infrastructure, MТ-I) and the rail transport operator (Macedonian Railways Transport, MТ-T), the latter provides both freight and passengers services (UNECE, 2017).

Montenegro has made the most progress in the process of unbundling of the railway industry. In 2002, the Montenegrin rail company *ТелџницеCrne Gore* (ТCG) was transformed into a joint stock company with mixed capital. ТCG was vertically separated in 2008³⁸ by dividing infrastructure management (ТICG) from transport operation (ТPCG). The following year, the transport operator was further restructured, by spinning off the freight division (Montecargo) as a fully independent joint stock company (UNECE, 2017, and Bošković and Bugarinović, 2015).

According to the European Commission (2016 f and 2017 c), railway reform has progressed steadily in **Serbia** on the commitments made under the connectivity agenda. In October 2015, the Serbian government adopted a comprehensive restructuring plan for the Serbian Railways until 2020, focusing on assets, network and staff reorganisation. Major steps were taken towards implementing this plan. The state railways have been restructured into a holding company with infrastructure management, passenger and freight operations assigned to three separate daughter companies.

In **Turkey**, vertical separation of the rail industry was introduced pursuant to the “Law on the Liberalization of Railway Transport” (2013). This established a subsidiary within TCDD (TCDD Transport) as owner of the rolling stock and operator of passenger and freight services. Unbundling became operational from 2016.

In the **Russian Federation**, the management and operations of railways has been separated from the policy functions through the creation of the state-owned RZD. RZD remains a vertically integrated company, both managing infrastructure and operating freight and passenger train services. Subsidiary companies were set up and RZD property was transferred to them in preparation for a sale to the private sector. Of note is the privatization of the subsidiaries in the wagon operation sector (Freight One and Federal Freight), but long-term plans foresee an increasing role of the private sector also in passenger transport.

In **Kazakhstan**, KTZ acts as a holding company, with wholly owned subsidiary joint-stock companies providing key functions, including passenger services, freight services, infrastructure maintenance, rolling stock maintenance, traction, rolling stock provision, and telecommunications. The state retains ownership of the railway's infrastructure and rolling stock (Egis International/Dornier Consulting, 2013).

According to a publication by UNECE (2017), to date railway reforms in **Ukraine** have yet to be completed. According to the contribution of the Ukrainian delegation to the Workshop on “Railway reform across the ECE region”, transition from the past region-based structure to a vertically-integrated holding company is progressing. Once the reform process will be completed, the railway system will include:

- A new business model, providing for a holding company with vertical separation of business functions into five divisions and a number of subsidiaries, as detailed in the table below;
- New budgeting principles following from cross-finance among the holding's subsidiaries;
- A new tariff system, providing for the separation of the infrastructure and locomotive tariff component.

³⁸ Pursuant to the Law on Railways, adopted in 2004 (UNECE, 2017).

Table 8 Ukrainian Railways' prospective business model

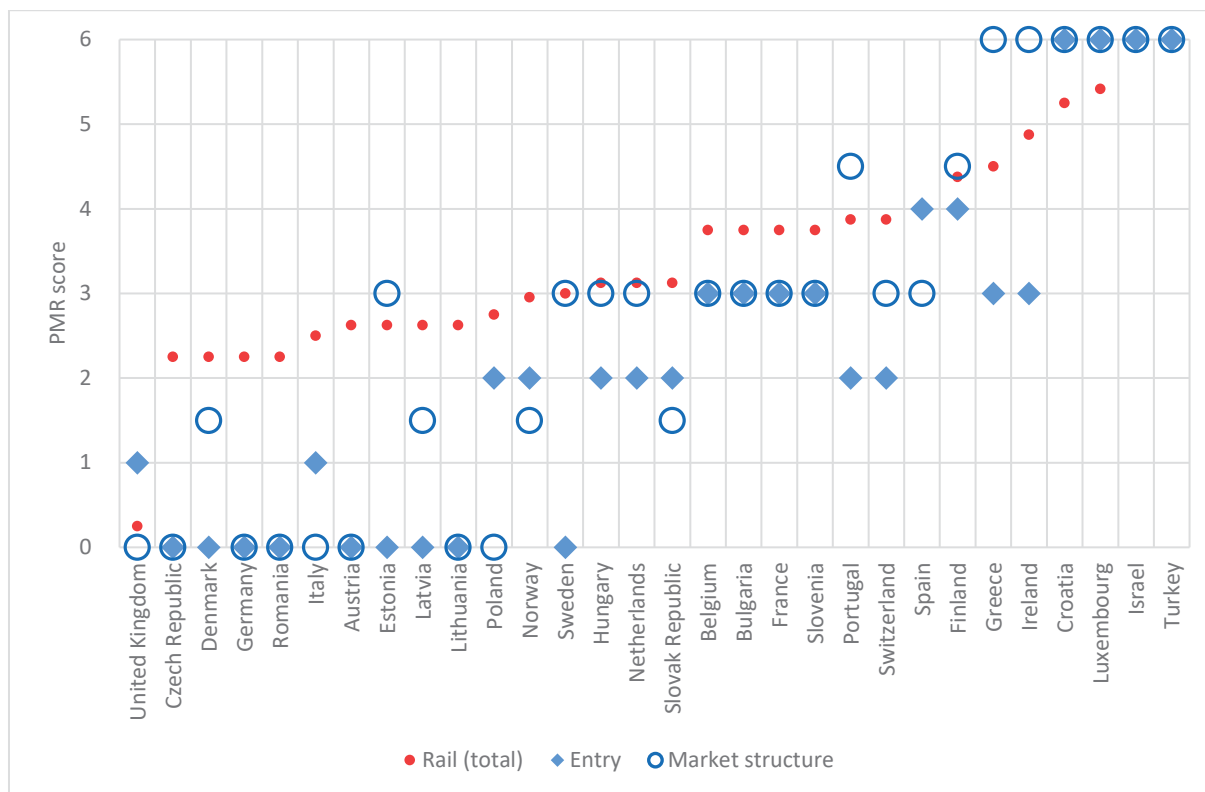
Division	Subsidiary	Function
Freight and logistics	UZ Cargo	Freight car operator
	UZ Forwarding	Freight forwarder
	UZ International	Freight forwarder outside of Ukraine
	UZ Intermodal	Operator of intermodal services
	UZ Terminals	Terminal operator
	UZ Sidings	Focusing on access to railroads
Passenger transport	Passenger company	Passenger transport services
	Passenger service company	Providing removable inventory to trains, catering, etc.
	High-speed company	Intercity and Intercity+ passenger transport services
	6 regional suburban companies	Regional and suburban passenger transport
	Station company	Management of stations
Infrastructure	UZ Rail tracks	Maintenance and modernization of tracks
	UZ Automation and Communication	Maintenance and modernization of communication equipment; operation of a communication centre
	UZ Power Supply	Maintenance and modernization of the power supply industry; supply of energy services
	UZ Traffic Control	Centralized traffic management Management of regional traffic management centres
	UZ Diagnostics	Diagnostics and monitoring of the infrastructure, power supply and structures
Locomotion services	n.a.	n.a.
Production	Passenger cars repairing company	Passenger cars maintenance
	Locomotives repairing company	Locomotives maintenance
	Freight cars repairing company	Freight cars manufacturing and maintenance

Source: Ukrainian Railways (2017).

MARKET OPENING

Different governance arrangements and competition models in UNECE member States result in an extremely diversified landscape. This is evident from the following figure, which shows the level of “Entry” and “Market structure” PMR indicators in 2013, for a subset of UNECE countries.

Figure 6 PMR indicators for rail, “Entry” and “Market structure”, 2013



Source: author’s elaboration on OECD’s PMR database.

The “Entry” indicator is equal to 0 in nine EU countries, meaning free entry both in the passenger and freight market. Four countries — Croatia, Israel, Luxembourg and Turkey — score 6, meaning that entry into the market is franchised to a single company both in the passenger and freight market. The remaining countries score in a range of between 1 and 4, showing a mixed entry framework (countries’ entry arrangements and PMR scores are provided in the Appendix).

The “Market structure” indicator is equal to 0 in eight countries, indicating the presence of more than two operators competing in the market both with respect to passenger and freight operations. Six countries — Croatia, Greece, Ireland, Israel, Luxembourg and Turkey score 6, meaning absence of competition either in the passenger and freight markets. The remaining countries score in a range of between 1.5 and 4.5, showing different levels of competition in the passenger and freight markets (countries’ number of market players and PMR scores are provided in the Appendix).

In eleven countries, the “Market structure” indicator is higher than the “Entry” indicator, suggesting that, notwithstanding the existing legal provisions with respect to market entry, the actual degree of competition has still some way to go.

Access models

Among the different access models, three are the most common:

- (a) The concession of the network to a monopolistic operator;
- (b) The tender concession model for sub-networks, i.e. *competition for the market*; and
- (c) The open-access model, i.e. *competition in the market*.

As for freight services, open access now exists in all EU countries.

As for passenger services, access for domestic services is allowed on a competitive basis only in some European countries. The table below — which refers only to domestic passenger rail services — shows EU Member States³⁹ where *competition for the market* exists — i.e. where competitive public tenders take place.

Table 9 Market opening for domestic services in the EU (2014)

Country	Competitive tenders		Open access	
	Long-distance	Regional/suburban	De jure	De facto
Austria	X	X	✓	✓
Belgium	X	X	X	X
Bulgaria	X	X	✓	X
Croatia	n.a.	n.a.	✓	X
Czech Republic	X	Mix	✓	✓
Denmark	Mix	Mix	✓	X
Estonia	Mix	X	✓	X
Finland	X	X	X	X
France	X	X	X	X
Germany	X	Mix	✓	✓
Greece	X	X	X	X
Hungary	X	X	X	X
Ireland	X	X	X	X
Italy	X	Mix	✓	✓
Latvia	X	X	✓	X
Lithuania	X	X	✓	X
Luxembourg	X	X	X	X
Netherlands	X	Mix	X	X
Poland	X	Mix	✓	X
Portugal	X	Mix	X	X
Romania	X	X	✓	X
Slovakia	X	Mix	✓	X
Slovenia	X	X	✓	X
Spain	X	X	X	X
Sweden	✓	✓	✓	✓
United Kingdom	✓	✓	✓	✓

Source: author's elaboration on Casullo, 2016.

³⁹ Except for Cyprus and Malta where the rail sector does not exist.

Tendering authorities typically have extensive design and decision responsibilities as they determine the obligations in the tender documents. Since many EU incumbent operators are still publicly owned, they retain considerable power to limit the introduction of tenders, or to raise barriers against potential competitors wishing to enter the market (Bergantino, 2015). Concessions granting exclusive rights to operate rail services are subject to public competition only in 11 member States — with mixed success. In fact, even where public tenders have been held, direct awards have often been necessary due to a lack of participation by non-incumbent operators, who have been discouraged by de-facto barriers to entry, including unclear access rules, as well as the size of the necessary investment in rolling stock and staff (Casullo, 2016).

The table also shows in which member States *competition in the market* exists *de jure* (i.e. where the law allows open access operations), and in that case, where it exists also *de facto* (i.e. where new entrants have actually entered the market following regulatory changes). Fifteen countries allow open access operations, but only in six (Austria, Czech Republic, Germany, Italy, Sweden, Great Britain) do multiple operators compete in the rail market. Therefore, effective competition in the passenger market is still very limited in the EU.⁴⁰

New entrants in the freight and passenger markets

Some EU countries, such as the Netherlands, Sweden, Germany, and Great Britain, liberalized the freight market in the mid-1990s and new market players moved in shortly after (information regarding the dates of legal liberalization and entry of the first competitor in the freight market are provided in the Appendix). In other countries, liberalization was introduced in the 2000s after the publication of the EU Railway Packages.

Nevertheless, the sector remains heavily concentrated, and characterized by a low number of newcomers and the persistence of large market shares of incumbent operators. Moreover, a high number of new participants leave the market after failing to sustain their activity — e.g. in Sweden, eight companies (including Ikea Rail) left the market between 2000 and 2004 shortly after liberalization (1996) and entry into the market (Crozet 2016).

In the passenger market, new entrants are often **subsidiaries of existing rail incumbents**. Usually, they either take the form of direct subsidiaries, takeovers of existing companies, or capital participation by incumbents in new companies. In the latter case, new entrants often originate from partnerships between rail incumbents and private companies involved in mobility-related activities in neighbouring markets (e.g. coach transport, airlines, building, engineering, etc.). Only rarely have new operators completely external to the transport sector entered the market (Bergantino, 2015).

A typical way for incumbents to enter non-domestic markets is through **takeovers**. In the passenger market, in 2010, DB planned to enter other member States' markets through the acquisition of Arriva, a rail and bus operator established in Sweden and UK. In 2011, Ferrovie dello Stato Italiane created Netinera, now the third rail operator in Germany, by acquiring Arriva's German activities.⁴¹ SNCF, directly or through its controlled company Keolis, entered many EU markets by acquiring shares in local undertakings or participating in the creation of new ones — e.g. in Austria, where it owns 26 per cent of WESTbahn Management GmbH; in Italy, where it owns 20 per cent of Nuovo Trasporto

⁴⁰ Until the implementation of the Fourth Railway Package (2019), full market opening is still not required under EU rules.

⁴¹ DB was required to sell Arriva's German activities by a prescription of the European Commission.

Viaggiatori (NTV); in Germany, where it is present through Keolis Deutschland; in the UK, when it controls the Southern and south-eastern rail franchises.

In many instances, high administrative, technical, and financial barriers to entry have led rail operators to cooperate to gain access to the market. Cooperation has taken many forms, from operational and technical agreements, to joint ventures, formal commercial alliances, and partial acquisitions. A specific example of strategic cooperation is made by **joint ventures for entry into international markets**, of which the following cases may be mentioned (Bergantino, 2015):

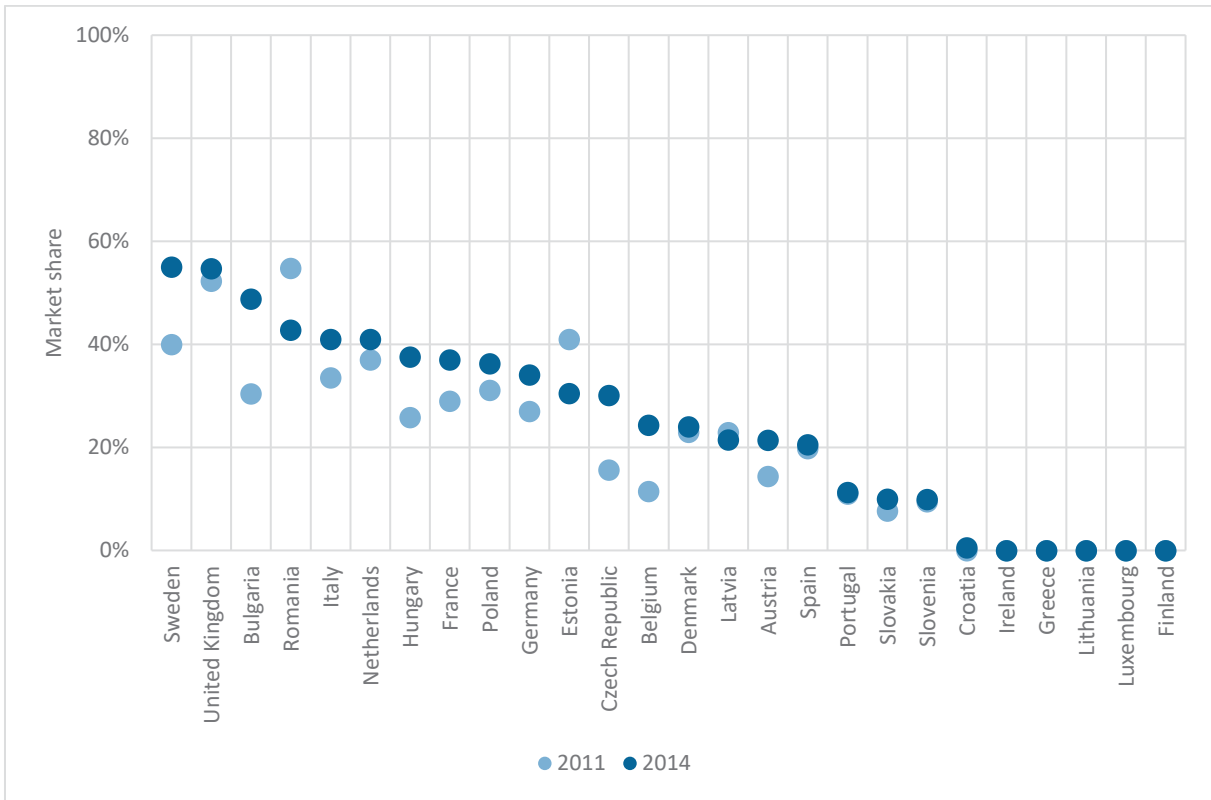
- Eurostar, a railway service connecting France, Belgium, and the UK, jointly operated by SNCF, SNCB, and Eurostar UK between 1994 and 2010.⁴²
- Thalys, a high-speed operator founded in 1995 by SNCF, SNCB, and DB, to supply train services between France, Belgium, Germany, and the UK.
- TEE Rail Alliance, a cooperation started in 2000 between DB, SBB, and ÖBB, to operate services across the Swiss, German, and Austrian borders.
- Rhealys, a consortium created in 2000 by DB, SNCF, SBB CFF FFS, and CFL, to operate services between southwest Germany, Luxembourg, Switzerland, and Paris.
- Elipsos, a Spanish company created in 2001 by RENFE and SNCF, to manage Trenhotel night train services between France and Spain.
- The Railteam Alliance, a strategic alliance founded in 2007 by DB, SNCF, SNCB, Eurostar, NS International, ÖBB, SBB CFF FFS, and in association with Thalys and TGV Lyria, to supply long-distance passenger transport on the international high-speed infrastructure in northern European countries.
- Alleo, a railway company created in 2007 by DB and SNCF to supply high-speed services between France and Germany.
- DB-ÖBB EuroCity, a cooperation started in 2009 between DB and ÖBB, and in association with Trenord, to operate services between Italy, Germany, and Austria.

While the joint ventures listed above involved only incumbent operators, more recently also **newcomers** also began to be involved. In 2010, Trenitalia reacted to the acquisition by SNCF of a share in the capital of Trenitalia's competitor Nuovo Trasporto Viaggiatori (NTV) by closing Artesia, established in 1999 as a joint venture of the Italian and French incumbents, and creating a new joint venture with SNCF's competitor Veolia Transport — initially named Trenitalia Veolia Transdev, and later renamed Thello.

Although the number of newcomers — either wholly private, public, or in a public-private partnership — is increasing, effective competition in the market is still quite limited. The following figures show the market share of competitors in the freight and passenger market, in 2011 and 2014, in EU countries. The degree of market penetration by newcomers varies greatly, as well as on incumbents' strategies for defending their national markets.

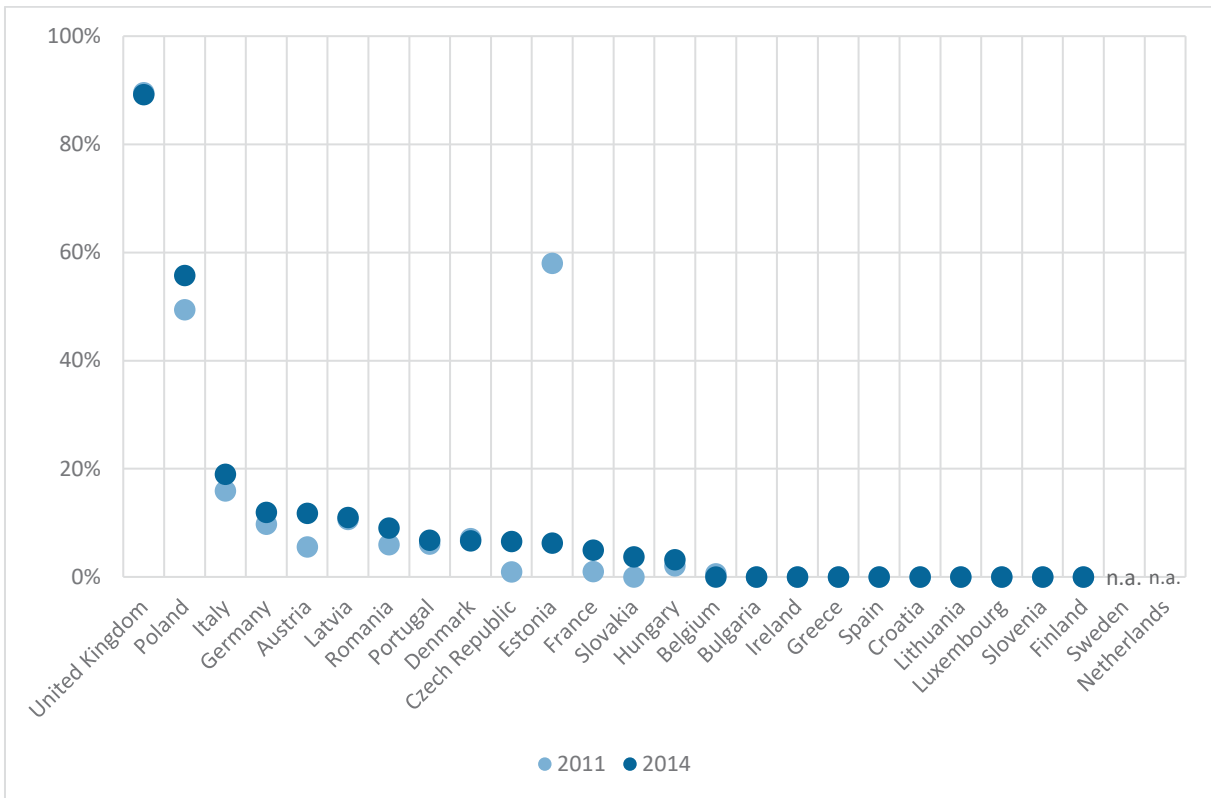
⁴² In 2010, Eurostar International Limited (EIL) was created to replace joint operations by SNCF, SNCB, and Eurostar UK. EIL is currently owned by SNCF, Caisse de Dépôt et Placement du Québec, Hermes Infrastructure, and SNCB.

Figure 7 Market share of competitors in the freight market, 2011 and 2014



Source: author's elaboration on data from European Commission (2016).

Figure 8 Market share of competitors in the passenger market, 2011 and 2014



Source: author's elaboration on data from European Commission (2016).

In the **freight market**, in all but nine member States (Croatia, Finland, Ireland, Greece, Lithuania, Luxembourg, Portugal, Slovakia and Slovenia), the market share of competitors is in a range of between 20 per cent and 55 per cent, with figures higher than 40 per cent in Sweden, the UK, Bulgaria, Romania, Italy, and the Netherlands. On the other hand, the market share of competitors in the passenger market is higher than 20 per cent only in two member States (Poland and UK). In 12 member States, this is higher than zero but lower than 20 per cent, while in 10 member States, this is equal to zero.

Moreover, data show that, while the market share of competitors grew in the freight market between 2011 and 2014, it remained rather unchanged in the **passenger market**. The market share of competitors in the freight market increased in 19 member States, decreased in 3 member States, and remained unchanged in 4 member States, with an average increase of 4.1 percentage points. In the passenger market, it increased in 11 member States, decreased in 4 member States, and remained unchanged in 9 member States, with an average increase of 1.5 percentage points.⁴³

Data show that in all EU countries except the UK, the incumbent remains dominant, and with large margins, notwithstanding new entry. The market share gained by new entrants is limited, and is growing slowly.

Market access arrangements in EU Member States

In the following paragraphs, selected specific experiences in EU Member States are discussed.

In **Sweden**, in addition to unbundling, the 1988 Transport Policy Act pursued decentralization of local and regional train services, responsibility for which was assigned to regional transport authorities, in return for receiving state subsidies and ownership of the rolling stock. While the 1988 reform did not include competition as a goal, the combination of unbundling and decentralisation made it possible for regional authorities to introduce competitive tendering for their train services, started in 1991 at the regional level and 1993 at the interregional level (Van de Velde, 2015 and Alexandersson, 2013).

Freight transport was liberalized in 1996. As for commercial passenger services — i.e. long-distance and high-speed services — market opening was introduced in 2009, with full market opening achieved in 2012 (Van de Velde, 2015). Currently, around 10 per cent of the intercity passenger market is provided by private companies (OECD, 2013).

In Great Britain, competition stood at the centre of the 1994 reform of British Rail. Freight operations were privatized and liberalized according to an open-access model. Passenger operations were competitively tendered to approximately 25 Train Operating Companies (TOCs), with contracts varying from an original length of mostly 7 years, to 21 years (Van de Velde, 2015). Open access is also allowed in passenger transport, though severely restricted, since operators are required to pass the Office of Rail and Road's "not primarily abstractive" (NPA) test — aiming to ensure that entry results in a positive net benefit for passengers — before being granted access rights. The NPA test is passed if the new services are deemed not to divert demand and revenue from the incumbents' franchises (Laurino et al., 2015).

In **Germany**, the provision of commercial passenger services is submitted to open-access competition since 1994, i.e. operators are expected to provide services based on their own commercial decisions. In 2002, the first EU competitive long-distance open-access passenger service, between Leipzig and Rostock, was launched by Connex, the German branch of the French private company Veolia, which

⁴³ Excluding Estonia from the sample, which recorded a drop of 52 percentage points.

was already present in the German regional franchised segment. In 2012, the Hamburg-Koln-Express (HKX) entered the long-distance sector offering competitive services (with respect to frequency, speed, quality, and fares) in north-west Germany.

In December 2016, Locomore — a partly crowd-funded open access passenger operator — launched a daily return service between Berlin and Stuttgart, with a focus on low fares and environmental sustainability. Swedish company Hector Rail was responsible for operations (Railway Gazette, 15 December 2016). However, ridership and revenue per passenger did not grow fast enough to be fully cost-effective. After exhausting its financial reserves and following unsuccessful negotiations with an investor, the company announced in May 2017 that it had filed for insolvency (Railway Gazette, 12 May 2017). In August 2017, Czech operator LEO Express acquired selected Locomore assets and relaunched the service, retaining the Locomore brand. Marketing, ticket distribution and customer services are undertaken by long-distance coach company FlixBus (Railway Gazette, 16 August 2017).

Overall, to date the opening of the German rail market has not led to a significant shift in market shares of long-distance transport, where only a few routes are operated by competitors. Deutsche Bahn still dominates the segment, with 99 per cent of the market in terms of passenger-km (Bergantino, 2015).

As for regional services, the 1996 regionalisation reform decentralized passenger services to the Länder, which have increasingly opened these subsidized services to competitive tendering. Since then, the German regional rail passenger sector has developed into a competitive market. Competitors of Deutsche Bahn have steadily increased their presence by winning contracts which were previously operated by Deutsche Bahn, and have achieved a market share of about one third in 2015 (Horton and Turner, 2017). Many of the incumbent railway companies from other member States are active in the German regional rail market, either directly or through subsidiaries — for example, as identified above, Netinera, owned by the Italian incumbent FSI, and Keolis, a SNCF subsidiary.

In the **Netherlands**, since 2005 ProRail has been the beneficiary of a directly awarded 10-year concession for infrastructure management of the entire rail network, while NS had the exclusive right to operate rail services on the core network. Both concessions require continuous performance improvements and include financial incentives. Regional services, previously operated by NS, have been transferred to regional authorities and submitted to competitive tendering. The freight transport subsidiary within NS holding was sold to DB in 2000 (Van de Velde, 2015).

In **France**, the 1997 railway reform provided for the liberalization of freight traffic. However, the introduction of competition in domestic passenger transport was not part of the reform, thus SNCF maintained its monopoly over national and regional passenger services. Implementation of the liberalisation legislation in the passenger market did not start before becoming mandatory for international travel pursuant to the Third Railway Package in 2007. This is currently the only market open to competition in France (Laurino et al., 2015). Nevertheless, contracting has been introduced for regional passenger services between SNCF and the French regions (Van de Velde, 2015). This situation will change with the implementation of the Fourth Railway Package — although the transition period means that new concessions will not come into existence for many years.

In **Italy**, regulation has closely followed the requirements of EU legislation in relation to rail competition. Open access for freight and long-distance trains has been allowed since 2001 (Law 388/2000), on the condition of reciprocity between the countries from which newcomers were seeking to enter (Steer Davies Gleave, 2012). Whilst the passenger market was opened well ahead of the deadlines set by the EU, several barriers to entry remain, and the share of new entrants was negligible until the arrival of NTV (Desmaris, 2016).

In the last few years there has been some tentative entry into the long-distance passenger market. Arenaways entered the long-distance market in 2010 offering a conventional service (as opposed to high-speed) between Turin and Milan. However, the company was forced to limit substantially its network (i.e. limiting stops at intermediate stations), as it was deemed to be diverting traffic from PSO routes managed by the incumbent, and eventually (2012) went bankrupt. The Italian Ministry of Transport used similar motivations to request a significant reorganization of services offered by DB-ÖBB in partnership with Trenord (recently partially acquired by Trenitalia) in the Italian territory, though this joint venture managed to remain on the market (Bergantino, 2015).

In 2012, the private company NTV entered the high-speed market offering passenger services in direct competition with the incumbent. NTV thus became the EU's first private open-access operator of high-speed trains. The entry of NTV in the high-speed network stimulated intra-modal competition in particular in relation to service quality, fares, and punctuality. Shortly after the entry of NTV, Trenitalia responded by re-launching its own high-speed offer — e.g. refurbishing its fleets, ordering new and additional trains (Desmaris, 2016). Outside the high-speed sector, Trenitalia still largely dominates the Italian market and competition is limited.

In **Poland**, the 1997 Railway Transport Act opened the rail market introducing a concession regime with respect to both rail operations and infrastructure management. Between 1998 and 2002, 20 concessions were granted, but only a few operators initiated services. The 2003 Railway Transport Act replaced the previous one, introducing a licensing regime. By 2005, the number of licensed operators grew to 92, of which 65 freight operators and 27 passenger operators. Responsibility for regional services was devolved to the provinces (Wronka, 2007).

The results of liberalization in the passenger market are limited. Newcomers' penetration into the long-distance market remains non-existent, with PKP covering 100 per cent of the market. In regional transport, regional services started to be subject to competitive award in 2007, when the first tender was won by a joint venture between Arriva and the Polish rail operator PCC Rail, now renamed Arriva RP following the takeover of both companies by Deutsche Bahn. Polish Regional Railways (Przewozy Regionalne, PR), owned by all the provinces, remains the main operator in regional transport (Bergantino, 2015).

In **Romania**, the first private rail freight and passenger operators entered the market, respectively, in 2001 and 2004. The market share of private freight operators reached about 50 per cent in 2012. Reduced market entry costs is one of the reasons explaining the rapid growth in private operations in the freight market (Trifon, 2012).

In the **Czech Republic**, the liberalization of the railway sector began in 1993. The first signals of potential competition appeared in 2007, when the Student Agency — a major Czech company in the long-distance bus market — began to investigate the possibility of entering the market for regional rail services, which the Czech government planned to tender. To that end, RegioJet was established in 2009 as a joint venture between Student Agency and Keolis (part of the SNCF group). However, in 2010 the Czech government decided to award all the contracts directly to the incumbent České Dráhy (ČD). RegioJet thus decided to compete with ČD on the long-distance connections, and in 2011 launched a service on the Prague-Ostrava corridor — i.e. the most lucrative inter-city route in the Czech Republic — which was expanded the same year into the international market (to **Slovakia**). In 2011, RegioJet also expanded into the Slovak domestic market by winning a tender for a regional concession, becoming the first operator to break the Slovak railways' (Železničná Spoločnosť Slovensko, ZSSK) monopoly on the regional market. In the following years, other open-access train operators (e.g. Leo Express) entered the Czech and Slovak markets (Bergantino, 2015).

Market access arrangements in non-EU countries

In the following paragraphs, selected specific experiences in non-EU countries are discussed.

In **Switzerland**, legal provisions on open-access competition in the freight market have been put forward since 1999, in line with the land transport agreements signed between the country and the EU. The freight market is currently completely liberalized.

As for the passenger market, the Swiss model differs from the standard promoted by the European Commission, in that, while the latter aims at reaching open competition in the market, the former is more oriented toward a special governance arrangement involving public authorities and railway companies. The Swiss railway sector has been described as a “hybrid system” combining liberalization and integration and only partly conforming to European law and goals (Desmaris, 2015). The rail incumbent SBB CFF FFS operates a 10-year passenger transport sector concession (2007-2017) awarded by federal authorities for the provision of commercial services. Regional (subsidised) services are provided both to SBB CFF FFS and various regional railways based on direct award — competitive tendering is not used.

In **Norway**, following the railway reform of 2015, two first train operating packages⁴⁴ will soon be put under competitive tendering. Prequalification began in mid-2016, and contracts will start in December 2018 and December 2019 (International Railway Journal, 17 January 2017).

In most **SEETO countries**, the preconditions for newcomers entering the railway market have not yet been met. One major reason is that restructuring of the incumbent is generally still at an early stage. In these countries where the incumbent is still a monopoly, it is not possible to consider the rail market open, although open access has been provided by the law through transposition of the relevant EU Rail Packages (Bošković and Bugarinović, 2015).

In **Montenegro**, a Law on Railways was adopted in 2004 and renewed in 2013 to set a new regulatory framework for managing the railway sector. The Railway Directorate (i.e. the newly-established regulatory body) issued a five-year business plan for 2013-2017. According to a recent assessment by the European Commission (2017 b), the alignment with EU Directives is almost complete, however, further efforts are needed to ensure rail market opening through strengthening the capacity and independence of the rail regulatory and safety authorities.

In 2007, the **Former Yugoslav Republic of Macedonia** adopted a railway reform program aimed at making the FYR Macedonian rail sector comply with EU directives. Almost all requirements of the First Railway Package have been implemented by this legislation, including provisions on access to railway infrastructure, the collection of track access charges, capacity allocation, network statement preparation, and functions of the regulatory body. However, according to a recent assessment by the European Commission (2016 e), the railway market remains closed to competition. Safety regulations contribute to this end, i.e. while the safety legislation is harmonized to the EU standards, the requirements for its implementation are not met yet.

⁴⁴ Package South (long-distance service from Oslo to Stavanger and various local and regional services along the route) and Package North (long-distance service from Oslo to Trondheim, and related regional diesel services, as well as diesel services in the north of the country as far as Bodø).

One relevant exception is **Serbia**, where the Law on Railway adopted in 2013 represented an important step in the direction of liberalization of the Serbian railway system (UNECE, 2017). According to a recent assessment by the European Commission (2017 c), railway reform has progressed steadily, and private operators' access to the rail infrastructure has become effective after the unbundling of the company. The Serbian infrastructure manager was required to open its network to competition in 2016. In the same year, the infrastructure manager published for the first time a network statement setting out track access charges and access conditions to the network. The first track access contract was signed with a private railway undertaking in June 2016. Public service obligation contracts have also been entered into (European Commission, 2016 f).

The market share of the incumbent operators — for both freight and passenger services — is generally 100 per cent in **SEETO countries**. All the incumbents are still state-owned, despite the intention of some governments to privatize them. The State being owner of all rail companies, as well as the planner, regulator, and major client, has strongly slowed down the liberalization process (Bošković and Bugarinović, 2015). One relevant example is **Montenegro**, where attempts to privatise the freight transport operator (Montecargo) and rolling stock maintenance company failed one first time in 2010, then again in 2017.⁴⁵

In **Turkey**, rail companies — including infrastructure manager, railway operators, as well as forwarders and agencies — are required to be granted a licence by the Railway Authority of Turkey (DDGM) to be able to access the market starting from September 2017 (Rail Turkey, 23 June 2017). The first private companies have completed the application process for an operating license and are expected begin operating freight services in the near future (Rail Turkey 14 July 2017 and 4 August 2017). Network statements — one of the prerequisites for market liberalization, including technical specifications of each section of the railway network, as well as criteria for market access and capacity allocation — have been published by TCDD since 2016 (the 2017 Network Statement). The 2018 Network Statement was published in May 2017, and competition has started for the allocation of train paths. Recent industry news suggest that newcomers are preparing to enter the market.⁴⁶ In October 2017, Omsan Logistics — the logistics company of Oyak Group, one of the largest industrial groups in Turkey — signed a rolling stock rental contract with TCDD Transport and became the first private train operator in Turkey (Rail Turkey, 16 October 2017).

In the **Russian Federation**, investment in new rolling stock was no longer sustainable by the Railway Ministry (Ministerstvo Putei Soobschenija — MPS) in early 2000s, this led to an acute shortage of railcars in the freight market. To remedy this, MPS allowed shippers to buy rail wagons in exchange for a tariff discount, and a growing amount of freight began being transported in shipper-owned rolling stock. In the following years, significant investments were made in wagon operations by shippers as well as private financial companies (Kolik, 2016).

⁴⁵ Negotiations were completed in March 2017 to sell a 51% stake in Montenegro to the Polish group OT Logistics (Railway Gazette, 22 March 2017). However, in April 2017 the Council for Privatisation & Capital Projects announced the decision to cancel these plans (Railway Gazette, 28 April 2017).

⁴⁶ The Railway Transportation Association (DTD) — established in 2006 among 65 Turkish companies engaged in wagon production and maintenance, national and international railway transportation (including TCDD Transport), and port management — announced that his members are planning to become train operator in the next future and will need 320 locomotive drivers in very short term (Rail Turkey, 22 July 2017).

In the original rail reform concept, rail competition was to be between licensed rail carriers — i.e. companies providing wagons and locomotives, arranging loading and unloading, and assuming liability for cargo transported (Murray, 2014). The freight railway market has however evolved into the following structure:

- RZD owns the infrastructure, and continues to provide virtually all locomotives and traction service. RZD charges state-regulated tariffs — based on commodity class, weight, distance, and including an “infrastructure”, “locomotive” and “wagons” component.
- An estimated 1,400 to 1,700 private “wagon operators” (Kolik, 2016, and OECD, 2016) — i.e. freight forwarders that either own or rent⁴⁷ wagons — handle customer rail logistic operations (OECD, 2013). Wagon operators, however, are not carriers, in that they do not assume liability for transported cargo and do not own locomotives. Wagon operators charge to customers the “wagons” tariff component, as well as fees for additional services (CER, 2011).

In freight transport, therefore, wagon operation is the only segment in which private companies have entered the market. Independent freight carriers — which are envisaged legally — do not exist in practice. Therefore, there is still no competition in freight operations, where RZD is still the monopolist (Kolik, 2016). One reason that private rail carriers have not developed is that the structure of RZD has not changed significantly. For example, it has been working to broadly define the role of the infrastructure manager to include not only the provision of track, structures, signalling, and electric power, but also the provision of locomotives and train crews (CER, 2011).

Railway reform in the Russian Federation has also involved passenger transportation. In the long-haul passenger market, the Federal Passenger Company (FPC) was established in 2009, and currently owns the passenger wagon fleet, while traction and infrastructure services are bought from RZD. Several private carriers compete with FPC on the most popular routes⁴⁸ but represent a small share (about 5 per cent) of the market (Kolik, 2016). FPC’s economy-class services are subsidized by the central government and tariffs are regulated (this scheme had replaced the pre-reform internal freight-to-passenger cross-subsidies), while FPC’s higher-class tariffs are deregulated.

However, the largest share (about 90 per cent in terms of passenger-kilometres) of passenger traffic belongs to the suburban segment. Suburban rail transport was planned to be outsourced from RZD, and Regional Suburban Companies (RSCs) were to be established and owned, partly or entirely, by regional authorities. The central government recommended that regional authorities subsidize RSCs and regulate tariffs. This, however, became impractical in most of the regions as subsidies would have represented an unbearable burden for their budget. As a result, a framework has emerged in which:

- RDZ owns the assets and operates the services, but is formally overtaken by the regions in these responsibilities, and cannot benefit from federal subsidies, which have been terminated; and
- RSCs are administrative structures which, in most of the regions, only sell tickets (Kolik, 2016).

At the end of 2012 a new set of legislative provisions aimed at tackling these problems was drafted, but has not been adopted yet. According to Kolik (2016), the reform in the suburban segment has failed, because of poor economic support and the lack of an adequate legal basis.

⁴⁷ Rolling stock leasing companies have emerged as a business purchasing and leasing wagons (OECD, 2013).

⁴⁸ E.g. Moscow — St. Petersburg, Moscow — Nizhny Novgorod, Moscow — Ekaterinburg.

INTEROPERABILITY AND TECHNICAL HARMONIZATION

In the European Union, as mentioned previously, the creation of a Single European Railway Area is a long-term and ambitious project with the aim of removing all technical barriers to interoperability which remain as a result of legacy national systems. Whilst some of these cannot be altered until the infrastructure is upgraded, others relate to practices within single EU countries which could be surpassed. These barriers continue to hinder international traffic — e.g. locomotives must be equipped with multiple signalling systems and authorised in multiple EU Member States separately (Steer Davies Gleave, 2014).

The **Technical Specification for Interoperability (TSI)** are specifications drafted by ERA and adopted by the European Commission, to ensure the interoperability of the trans-European rail system. TSIs are intended to harmonise through law all aspects which are needed for interoperability. According to the “Report on the progress made towards achieving interoperability of the rail system” published by the European Commission in January 2013, secondary legislation on interoperability (TSIs and other legal measures) was complete by 2012, as far as the Trans-European Rail Network was concerned. The report underlined that the large majority of TSIs were expected to be extended to the whole rail system in the EU by 2015 (European Commission, 2013).

ERA currently plays a leading role in promoting interoperability and harmonising technical standards. Working with stakeholders from the rail sector as well as national authorities and the EU institutions, the Agency oversees the development of common technical specifications and common approaches to safety.

According to ERA (2016), the full potential of interoperability will be achieved when all interoperability-relevant technical aspects are harmonised in TSIs, all national technical rules covering aspects harmonised in the TSIs are withdrawn, and all physical assets (e.g. vehicles, fixed installations) and procedures (e.g. operating rules) comply with the target systems defined by the TSIs. However, the withdrawal of national technical rules is a long-term goal and numerous exceptions still exist.

ERA produces biennial reports on progress towards interoperability which provide the basis for the analysis of the trends of implementation of interoperability across the European Union. So far, four reports have been published covering 2009, 2011, 2013 and 2015. According to the last report (ERA, 2016), the Agency focused on three major areas of work in 2013/2014:

- Enhancement of TSIs and extension of their scope to the entire European Union railway system;
- Classification and analysis of pre-existing national rules; and
- Definition of possible improvements of Directive 2007/59/EC on the certification of train drivers to promote job mobility and increase railway competitiveness in the EU labour market.

The following table shows the number of “Open points”⁴⁹ and “Specific cases”⁵⁰ in 2015. According to ERA (2016), the Agency is working to gradually close the remaining “Open points”. EU Member States

⁴⁹ “Open points” are particular aspects where the necessary harmonization is not yet possible, and which may therefore be temporarily covered by national rules until harmonisation is achieved (ERA, 2016).

⁵⁰ “Specific cases” describe situations in which a member State temporarily or permanently needs to deviate from TSI requirements, thus referring to the relevant national rules (ERA, 2016).

are requested to progressively remove their temporary “Specific cases” and provide ERA with the specifications of their permanent “Specific cases” for inclusion in the TSIs.

There is a total of 40 remaining “Open points”, mostly relating to “Control command and signalling” (CCS TSI), “Locomotives and passenger rolling stock” (LOC&PAS TSI), “Infrastructure” (INF TSI), and “Telematics applications for passenger service” (TAP TSI). The United Kingdom of Great Britain and Northern Ireland is the EU country with the highest number of “Specific points” (58), followed by Finland (23), Poland and Spain (15), Ireland (14), and France (13).

Table 10 “Open points” and “Specific cases” in TSIs

	Total	LOC&PAS TSI	WAG TSI	CCS TSI	NOI TSI	INF TSI	ENE TSI	PRM TSI	SRT TSI	OPE TSI	TAP TSI	TAF TSI
Open points	40	9	3	11	0	9	1	0	1		6	
Austria	2					1		1				
Belgium	4	1		2		1						
Bulgaria	2					2						
Croatia	1	1										
Czech Republic	1	1										
Denmark	2					1		1				
Estonia	7	2				3	1	1				
Finland	23	8			1	13		1				
France	13	4		3		1	2	3				
Germany	4					1		3				
Greece	1					1						
Hungary	0											
Ireland	14	8	1			3		2				
Italy	8	3				3	1		1			
Latvia	6	2		1		1	1	1				
Lithuania	5	2		1			1	1				
Luxembourg	4			4								
Netherlands	0											
Poland	15	1		1		12	1					
Portugal	12	2	1			8		1				
Romania	0											
Slovakia	11					11						
Slovenia	1	1										
Spain	15	3				9	2	1				
Sweden	11	4	1	1	2	2	1					
United Kingdom	58	26	5	2	3	15	5	2				

Legend:

LOC&PAS TSI — Locomotives and passenger rolling stock

WAG TSI — Wagon

CCS TSI — Control command and signalling

NOI TSI — Noise

INF TSI — Infrastructure

ENE TSI — Energy

PRM TSI — Persons with reduced mobility

SRT TSI — Safety in railway tunnels

OPE TSI — Operation and traffic management

TAP TSI — Telematics applications for passenger service

TAF TSI — Telematics applications for freight service

Source: ERA, 2016.

One major step toward interoperability is the creation of a single signalling system across the EU through the creation of the **European Rail Traffic Management System (ERTMS)**, comprising the European Train Control System (ETCS) and a mobile communication system for the railways (GSM-R). The system requires the installation of specialised equipment both on and beside the track and on-board trains. While ERTMS installation is progressing well, some conflicts remain primarily because of the installation of incompatible versions. The European Commission has set up a number of ERTMS corridors to focus investment and deliver interoperability for all rolling stock deployed on them, and is considering options for legislation that would incentivise the uptake of ERTMS (Steer Davies Gleave, 2014).

In the **extra-EU UNECE countries**, promotion of common technical standards is pursued by international organizations including the South-east Europe Transport Observatory (SEETO), the Central Asian Regional Economic Cooperation (CAREC), the International Union of Railways (UIC), and the Organization for Cooperation of Railways (OSJD) (Asian Development Bank, 2017).

EFFECTS OF REFORM ON RAILWAY PERFORMANCE

Measuring the effect of railway reform on the industry's performance is a challenging task. A number of studies have attempted to do so, considering many types of performance indicators, including cost levels and efficiency measures, quality and customer satisfaction, as well as modal share of rail vis-à-vis other transport modes. This section provides a review of the available literature on this topic, which mostly deals with evidences from EU countries.

Rail reform implications on cost and efficiency measures

According to Holvad (2017), the available evidence from countries that have introduced **competitive tendering for awarding public service contracts** of passenger services suggests the possibility for operating cost savings. The paper reports evidence from Sweden, Germany, Denmark, and Great Britain.

The experience in Sweden — dating back to the early 1990s, when the incumbent operator still awarded the contract — suggests significant scope for operating cost savings (in the order of about 20 per cent) due to the use of competitive tendering rather than direct award. According to the author, further savings were achieved once non-incumbent operators started winning the contract. The experience in Germany — which, though being extensive, is limited in scope to public service contracts for suburban and regional services — confirms the scope for significant cost savings for the railway undertaking (about 25 per cent) as well as a reduction of public subsidies over the period 1996-2010. Evidence from Denmark — though being rather limited — suggests cost savings for the railway undertaking of about 15 per cent and additional savings for the Danish Government of about 10 per cent.⁵¹

⁵¹ This is the case of the first tender in Mid and West Jutland won by Arriva (2003).

Holvad (2017) indicates that in Great Britain, though the most drastic approach to competitive tendering was adopted, cost savings have not materialised at first, instead there have been cost increases (about 15 per cent between 1997 and 2006). The paper puts forward a number of possible explanations for this result, including significant organisational complexity due to the relative short duration of the contract, as well as the significantly bigger size of the franchise than elsewhere in Europe.

More recently however, positive outcomes have been recorded in the UK with respect to cost and efficiency measures. According to Rail Delivery Group (2017), the following results were achieved in recent years:

- While in 1997-1998, the railway ran at a £2 billion a year loss, in 2015-2016 revenues more than covered costs.
- Since 2010-2011, passenger train company costs per passenger-km have declined by 8.8 per cent in real terms.
- Network Rail's operating costs have fallen by 46 per cent since 2003-2004.
- Freight efficiency has improved as longer and heavier freight trains are now in operation — the number of trains has fallen by 44 per cent since 2002-2003 but tonnes per freight train have increased by 63 per cent (Rail Delivery Group, 2017).

So far, there are only limited studies into the effects of **open access competition**, suggesting a mixed picture of the possible effects. A recent econometric study by Casullo (2016) examined the extent to which open access competition is influencing efficiency measured in terms of operating expenses per train-km.⁵² The results suggest that, based on the available data, it is not possible to detect any improvement in efficiency. On the contrary, the introduction of open access competition in the passenger sector has reportedly led to higher operating costs for railway systems. According to the author, these findings can be possibly explained by a number of factors, including duplication of functions, increased coordination costs,⁵³ increased investment costs,⁵⁴ and growing capacity constraints.⁵⁵

Crozet (2016) introduces a distinction between productive efficiency — that is, a measure comparing outputs (e.g. train-km) with inputs (e.g. quantity of capital or labour) — and commercial efficiency — that is, a measure comparing supply indicators (e.g. train-km) with demand indicators (e.g. passengers-km or tons-km). The paper then proposes a combined measure of productive efficiency and commercial efficiency in a single composite indicator “apparent labour productivity” — that is, a measure to compare the sum of passenger-km and tonne-km with the workforce employed.

⁵² The paper analyses the effects of open access competition in Austria, the Czech Republic, and Italy, against a control group composed by countries where open access was not introduced, i.e. Finland, France, Ireland, Portugal, and Spain.

⁵³ Coordination costs are borne especially by the infrastructure manager during the process of track access applications, capacity allocation, and timetabling (*source*: Casullo, 2016).

⁵⁴ There is evidence that incumbent operators have accelerated planned investment, such as in rolling stock, in order to match the new entrant's quality improvements, thereby raising short-term costs in anticipation of market entry (*source*: Casullo, 2016).

⁵⁵ Also, the author acknowledges that these findings may be linked to a short time horizon, therefore a longer time period may allow capturing the dynamic effects of competition.

Comparing data from France, Germany, Switzerland, and Italy, Crozet (2016) concludes that increased performances in terms of higher efficiency⁵⁶ are to be attributed to organisational change within the industry. This, in turn, can result from a contract between the public authority and the historical operator (e.g. in Switzerland, where a specific productivity agreement was signed between the Confederation and the CFF in the early 1990s, causing apparent labour productivity to increase by 92 per cent between 1996 and 2013 even in the absence of any competitors for passenger traffic),⁵⁷ or be the consequence of increased competition (e.g. in Italy).

Crozet (2016) concludes on the necessity of further studies to compare costs and benefits at the social level (e.g. cost-benefit and cost-efficiency analysis) to properly assess the footprint of railway reform and industry change.

Investment in **upgrading the rail infrastructure** have generally positive impacts on rail efficiency. In Romania, about €5.2 billion have been allocated for rail transport projects over the program period 2014-2020 (cf. the Romanian General Transport Master Plan). Investment is being mainly directed to rehabilitating the railway network to enable higher commercial speeds, including removing speed restrictions along the major railway transport corridors of the country. Of the 4,014 km of rail network, 398 km have already been upgraded; upgrading works are in progress over 167 km, and in the design phase for the remaining of the network. Average commercial speed between Bucharest and Constanza — where the network has been rehabilitated — amounts to 110 km per hour, or an increase of 90 per cent on the average commercial speed enabled on connections between Bucharest and other major cities of Romania — where the network has not yet been rehabilitated (Ministerul Transporturilor, 2017).

Effects of rail reform on prices, customer satisfaction and quality

According to Esposito et al. (2016), market opening does not necessarily benefit railway service consumers (passenger and freight), since increased levels of separation of the incumbent, market access, and privatization are not necessarily associated with lower prices. On the contrary, the paper shows that lower service prices are associated with greater presence of the state in the sector, although not because of greater efficiencies but because of subsidized fares. The author suggests that increasing prices might be related to increased network investments, which companies facing increasing levels of competition would undertake to defend their market share and attract customers.

Moreover, based on the analysis of correlation between indicators of the level of market regulation and Eurobarometer data on perceived quality with rail services, Esposito et al. (2016) find no significant correlation between perceived quality and market opening policies.

Evidence reported by other authors, however, suggest a different outcome. According to Holvad (2017), customer satisfaction increased in Denmark following the introduction of competitive tendering, and successful aspects linked to demand, fares, and quality have been recorded in Great Britain following market opening, besides the negative effects on costs.

⁵⁶ Between 1996 and 2013, apparent labour productivity increased by 92% in Switzerland, 97% in Germany, and 22% in France (source: Crozet, 2016).

⁵⁷ For a thorough assessment of the Swiss experience, please see Desmaris (2015).

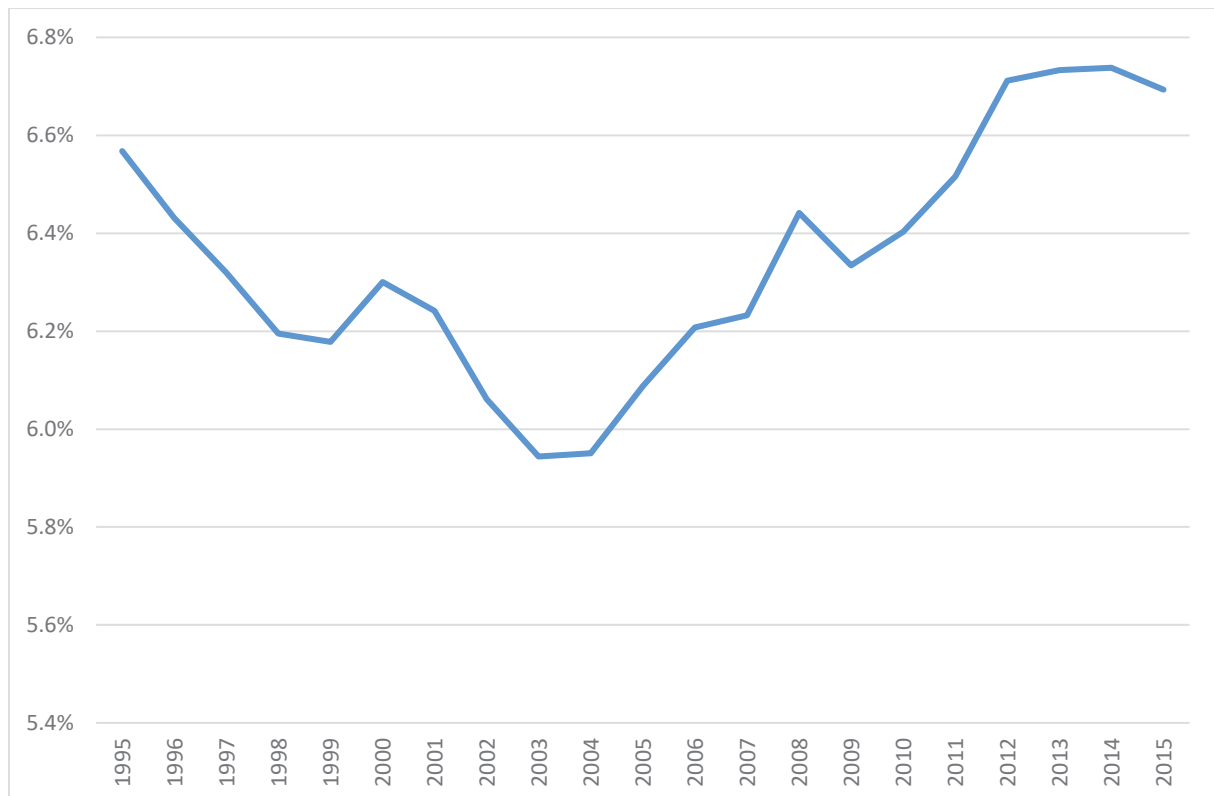
According to Desmaris (2016), the opening of the Italian high-speed rail market to competition has produced a number of positive effects, including more capacity, frequency and connections, lower prices, and better services, thus delivering high consumer benefits.

Modal share of passenger rail transport

It is difficult to demonstrate a direct link between railway reform and rail modal shares. The influence of regulatory reform on the modal share for passenger rail would be indirect through changes in cost performance (e.g. lower fares) and customer orientation (e.g. higher quality). A range of factors determines the modal share of rail, some of which are within the domain of public policy, while others are linked to railway industry practices as well as preferences and constraints faced by individuals (Holvad, 2017). Nevertheless, the competitiveness of rail vis-à-vis other modes as reflected in its modal share provides a broad measure of the overall health of the industry, and some general considerations might be derived by the analysis of its evolution through time.

The following figure shows the trend in passenger rail modal share for EU countries (EU28) covering the period 1995 to 2015. The passenger rail modal share has stayed throughout the period in the range between 5.7 per cent and 6.8 per cent. However, the trend suggests that in the first part of the period (from 1995 to 2003) there was a reduction in modal share which was reversed in the second part of the period (from 2004 to 2014). In 2015, a slight decrease in the modal share was recorded.

Figure 9 Market share of rail passenger transport, EU28, 1995-2015



Source: European Commission, Transport Statistical Pocketbook 2017.

According to these data, regulatory reforms of passenger rail in Europe might be said to have contributed to stabilise the modal share of rail passenger transport in Europe, and possibly even stimulated modest improvements. This view is shared by CER, according to which rail market shares would have probably decreased further to the low peak of 2003-2004, if it had not been for the progress of railway reform (CER, 2017). Once implemented, the rail passenger market opening called for under the Fourth Railway Package is expected to further impact the growth of rail market share within the EU Member States.

According to CER (2017), over the decade 2002-2012 a positive correlation can be traced between growth in rail modal share — both in the case of passenger and freight rail transport — and level of public financing to the rail industry (measured by the average amount of public financing per km of line over the decade 2002-2012).⁵⁸ On the contrary, CER (2017) stressed that it is not possible to detect a statistical correlation between growth in rail modal share and the degree of separation in the railway industry (i.e. organisational separation opposed to institutional separation) as well as the degree of openness of the rail market (measured by the share of rail freight new entrants in 2014). While this is true, a broader time period and a more refined analysis is needed for a definitive vision on this point.

⁵⁸ In the case of freight transport, CER (2017) also pointed out the existence of a negative correlation between rail performances and the level of infrastructure charging.

CONCLUSIONS

This study has shown that railway reform across the ECE region has taken different forms in terms of institutional structure, market participants and development of the sector. Each of the models adopted have been successful in some areas and less so in others but these degrees of success have not been consistent across similar reform approaches. It is clear, therefore, that there is no standard model to railway reform and no *one-size-fits-all solution* that can be applied across the ECE region and that each country needs to ensure that the model that it adopts is consistent with its national environment and requirements.

Participants at the Workshop on “Railway reform across the ECE region”, held during the seventy-first session of the UNECE Working Party on Rail Transport (Geneva, 27-29 November 2017), agreed with this proposition and noted that it was not possible to advocate one single approach. A governance model that proved to be successful in one country — notwithstanding the difficulties in measuring the success of a reform program — might not help achieving the same positive outcomes when applied to another context.

Moreover, participants of the workshop underlined the importance that further initiatives aiming at reforming the railways in the ECE region take into full consideration the relevance of coordination between infrastructure management and rail operations when considering vertical separation.

Furthermore, a significant step that needs to be taken before undertaking in any type of railway reform is ensuring that both the railway operating companies and the infrastructure managers are in a sound financial position. Reforming the sector and, potentially, opening it up to competition without ensuring the existing structures are in a fit financial state to be able to deal with the new market structure can be a recipe for disaster that would hinder the further development of rail going forward.

While there is little evidence that railway reform *per se* has not lead to a sustained increase in the market share of rail in passenger or freight, as shown in the previous chapter, it is also true that many of the markets have not been reformed for enough time to allow for long-term shifts to appear. There are, however, examples where this reform has had an impact as seen in the new entry into the high-speed passenger market in Italy significantly reducing fares and drawing passengers away from other transport modes — mainly aviation. These examples should not be ignored and point to the potential of further benefits to the sector in the long-term in relation to reduced costs, increased competitiveness and increased market share going forward. Also, once implemented, the rail passenger market opening called for under the Fourth Railway Package is expected to have an impact on the growth of rail's market share within the EU Member States.

ANNEXES

ANNEX 1. STATISTICAL DATABASE

The following tables detail country scores with respect to the four OECD's PMR indicators.

Table 11 PMR indicators for rail in selected UNECE countries, "Vertical integration", 2013

	No separation	Accounting separation	Legal separation	Ownership separation
Score	6 points	4.5 points	3 points	0 points
Austria		✓		
Belgium			✓	
Bulgaria			✓	
Croatia			✓	
Czech Republic			✓	
Denmark			✓	
Estonia			✓	
Finland			✓	
France			✓	
Germany			✓	
Greece			✓	
Hungary			✓	
Ireland		✓		
Israel	✓			
Italy			✓	
Latvia			✓	
Lithuania		✓		
Luxembourg		✓		
Netherlands			✓	
Norway			✓	
Poland			✓	
Portugal			✓	
Romania			✓	
Russian Federation		✓		
Slovakia			✓	
Slovenia			✓	
Spain			✓	
Sweden			✓	
Switzerland		✓		
Turkey	✓			
UK				✓

Source: OECD's PMR database.

Table 12 PMR indicators for rail in selected UNECE countries, "Public ownership", 2013

Percentage of shares owned by the government (either directly and indirectly) in the largest firm in passenger and freight markets, and in operation of the railroad infrastructure

Scores allocated in figures 4-6:

- 0% = 0 points
- between 0% and 100% = % of shares owned by government/100 * 6
- 100% = 6 points

	Passenger	Freight	IM
Austria	100%	100%	100%
Belgium	100%	100%	100%
Bulgaria	100%	100%	100%
Croatia	100%	100%	100%
Czech Republic	100%	100%	100%
Denmark	100%	0%	100%
Estonia	0%	100%	100%
Finland	100%	100%	100%
France	100%	100%	100%
Germany	100%	100%	100%
Greece	100%	100%	100%
Hungary	100%	0%	100%
Ireland	100%	100%	100%
Israel	100%	100%	100%
Italy	100%	100%	100%
Latvia	100%	100%	100%
Lithuania	100%	100%	100%
Luxembourg	94%	62%	94%
Netherlands	100%	0%	100%
Norway	100%	55%	100%
Poland	100%	100%	100%
Portugal	100%	100%	100%
Romania	100%	100%	100%
Russian Federation	100%	100%	100%
Slovakia	100%	100%	100%
Slovenia	100%	100%	100%
Spain	100%	100%	100%
Sweden	100%	100%	100%
Switzerland	100%	100%	100%
Turkey	100%	100%	100%
UK	0%	0%	0%

Source: OECD's PMR database.

Table 13 PMR indicators for rail in selected UNECE countries, “Entry”, 2013

Score	Passengers				Freight		
	Entry franchised to single firm	Entry franchised to several firms, each having exclusive rights to a geographic area	Entry franchised to several firms that compete in the same geographic area	Free entry (upon paying access fees)	Entry franchised to single firm	Entry franchised to several firms that compete in the same geographic area	Free entry (upon paying access fees)
	6 points	4 points	2 points	0 points	6 points	2 points	0 points
Austria				✓			✓
Belgium	✓						✓
Bulgaria	✓						✓
Croatia	✓				✓		
Czech Republic				✓			✓
Denmark				✓			✓
Estonia				✓			✓
Finland	✓					✓	
France	✓						✓
Germany				✓			✓
Greece	✓						✓
Hungary		✓					✓
Ireland	✓						✓
Israel	✓				✓		
Italy			✓				✓
Latvia				✓			✓
Lithuania				✓			✓
Luxembourg	✓				✓		
Netherlands		✓					✓
Norway	✓		✓				✓
Poland			✓			✓	
Portugal		✓					✓
Romania				✓			✓
Russia			✓			✓	
Slovakia			✓			✓	
Slovenia	✓						✓
Spain	✓					✓	
Sweden				✓			✓
Switzerland		✓					✓
Turkey	✓				✓		
UK			✓				✓

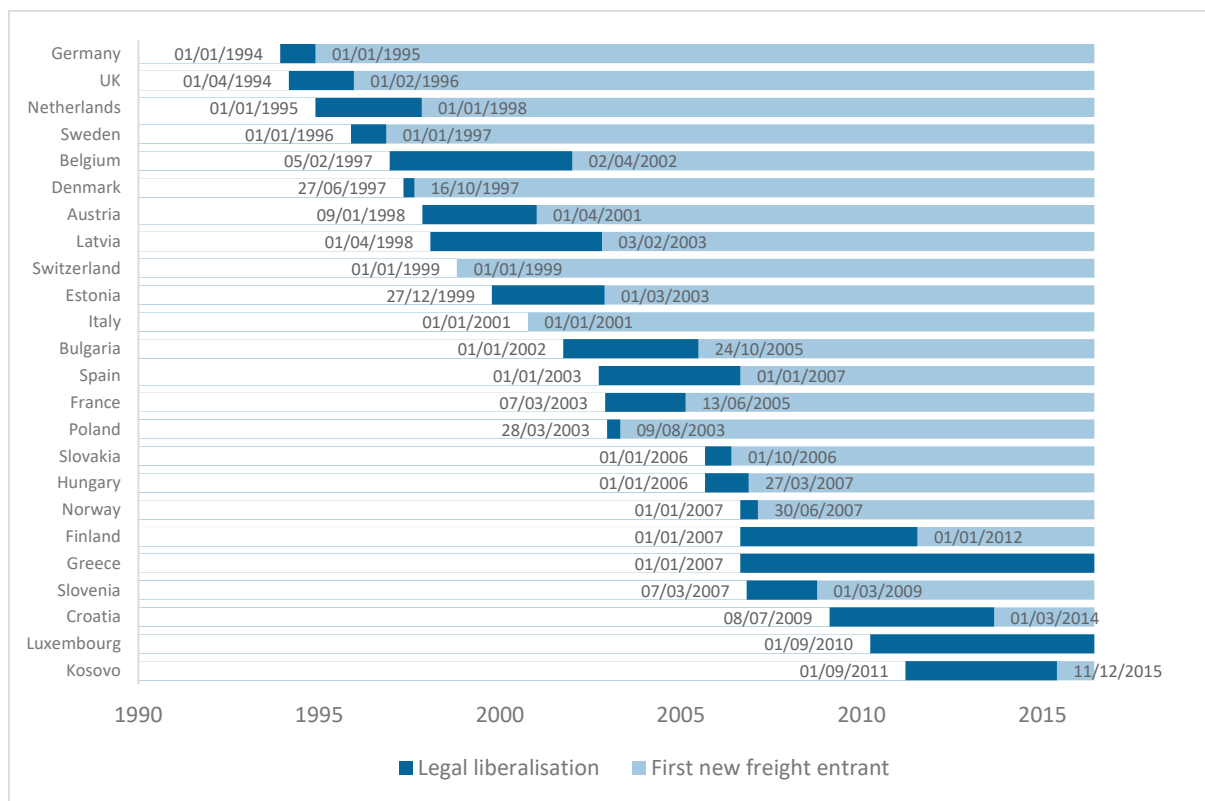
Source: OECD's PMR database and author's elaboration.

Table 14 PMR indicators for rail in selected UNECE countries, “Market structure”, 2013

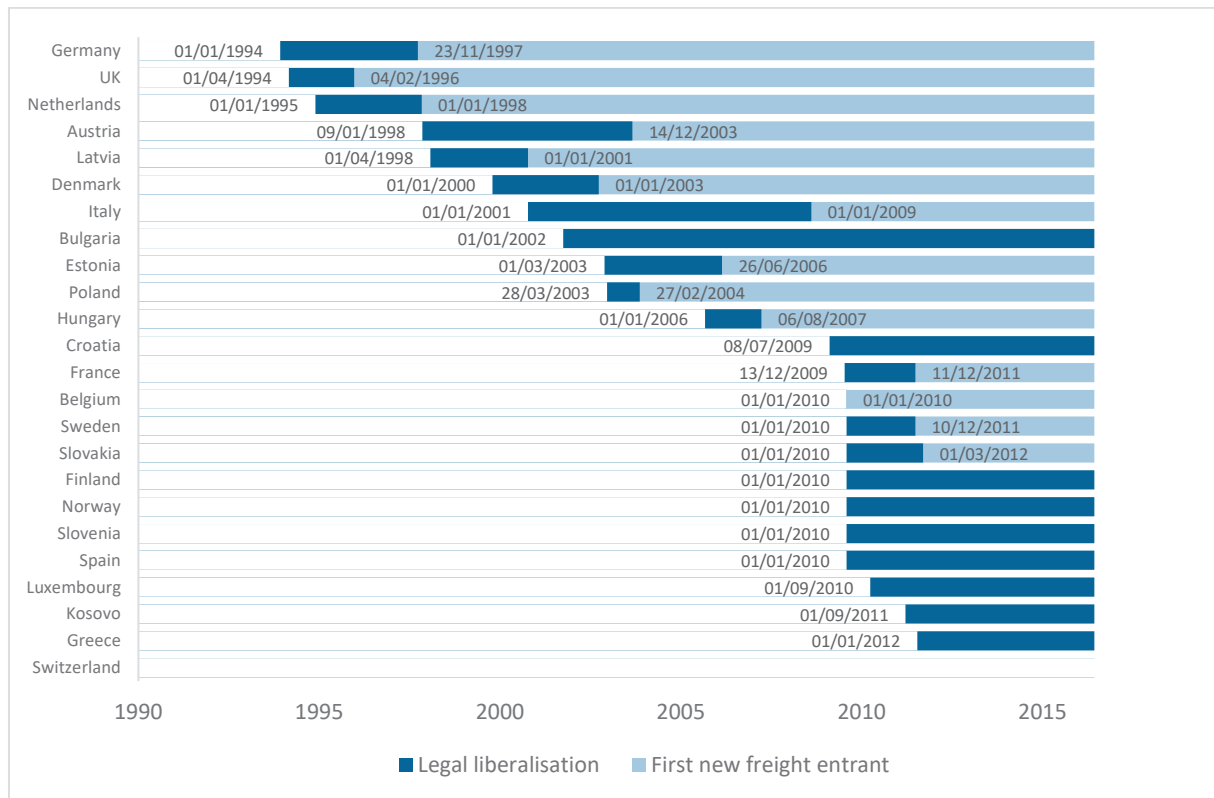
	Maximum number of operators competing in the same geographic area/rail district	
	Passengers	Freight
Austria	15	21
Belgium	1	12
Bulgaria	1	10
Croatia	1	1
Czech Republic	3	10
Denmark	2	3
Estonia	2	2
Finland	1	2
France	1	22
Germany	33	32
Greece	1	1
Hungary	1	18
Ireland	1	1
Israel	1	1
Italy	3	12
Latvia	2	3
Lithuania	5	35
Luxembourg	1	1
Netherlands	1	14
Norway	2	7
Poland	6	20
Portugal	1	2
Romania	4	20
Russian Federation	>2	>2
Slovakia	2	18
Slovenia	1	3
Spain	1	16
Sweden	1	5
Switzerland	1	8
Turkey	1	1
UK	5	4

Source: OECD's PMR database.

The following figures show dates of legal liberalization and entry of the first competitor into the EU Member States' freight and passenger markets. When no information on the exact date is available, 1 January is indicated.

Figure 10 Legal liberalisation and entry of the first competitor in the freight market

Source: author's elaboration on data from European Commission (2016).

Figure 11 Legal liberalisation and entry of the first competitor in the passenger market

Source: author's elaboration on data from European Commission (2016).

ANNEX 2. THE TUNISIAN RAILWAY REFORM⁵⁹

The Tunisian railway sector currently (2016) faces a number of challenges, including old age and heterogeneity of materials, a rail network composed by two gauges, and an inadequate institutional environment.

In past years, investment programs implemented by the Société Nationale des Chemins de Fer Tunisiens (SNCFT) have been oriented toward actions that just allowed for the maintaining of the status quo. Modernization projects enabling for the introduction of technical progress in the sector and ensuring a qualitative leap, have been very limited.

SNCFT has expressed its ambitions to go through a period of corporate restructuring to boost rail transport. In the view of SMCFT, corporate restructuring should be accompanied by the enactment of laws to encourage the use of railways, such as granting rail the exclusive right to transport hazardous or polluting products.

The National Master Plan for Transport would propose institutional reform consistent with the country's commitment to develop logistic areas and increase international integration of rail transport.

The investment policy adopted by the 2016-2020 Development Plan has the following goals:

- Lay the foundations for the modernization of the railway in Tunisia;
- Ensure the relaunch of the SNCFT's activity after the underperformance which followed the revolution period;
- Support economic growth and contribute to opening up the economic lagging regions.

⁵⁹ Source: UNECE, Working Party on Rail Transport, seventieth session (Geneva, 23 November 2016), "Perspectives de restructuration", presentation by Mr. Mohamed Yahia Zribi, Director of Department, SNCFT, Tunisia.

The rail-related projects included in the 2016-2020 Plan are detailed in the following table.

Table 15 2016-2020 Development Plan

Area	Actions
Safety	Equipment of 100 level crossings Fibre Optic Transmission Network Generalization of GSM-R
Development of the network	Extension of electrification towards Nabeul and Sousse (150 km) Extension of the Southern Suburb Line from Tunis to Soliman (8 km) Doubling of the track on the Moknine — Mahdia section (25 km) Renewal and reinforcement of the lines serving the Gafsa phosphatieras (406 km)
Regional integration	Upgrade of the line Tunis-Kasserine (315 km) Restoration of the line linking Kasserine and Sousse (195 km) Connection of the city of Kairouan to the railway network from Enfidha (50 km) Gabes — Mednine link (75 km)
Development of railway transport logistics	Commitment of studies for the creation of high-speed LGV lines with UIC standards to allow: <ul style="list-style-type: none"> • High-speed lines to cover a total length of 840 km • Connection of the main Maghreb cities (Casablanca, Algiers, Tunis, and Tripoli) • A speed of 250 km/h for passenger trains and 120 km/h for freight trains The expected travel times: <ul style="list-style-type: none"> • Casablanca — Algiers (1,200 km): 6 hours • Tunis — Algiers (1,000 km): 5 hours • Tunis — Tripoli (800 km): 4 hours
Investments in rolling stock	Acquisition of RFR (Réseau Ferroviaire Rapide) rolling stock: TND 400 billion Acquisition of equipment for the Inter - Urban Passenger Transport: TND 150 billion Acquisition of equipment for the transport of phosphate: <ul style="list-style-type: none"> • Locomotives: TND 150 billion • 400 Wagons: TND 120 billion Acquisition of equipment for the transport of Miscellaneous Goods: TND 110 billion Rehabilitation of equipment: TND 150 billion

Source: Zribi (2016).

With respect to freight transport, SNCFT intends to position itself in the supply chains based on a strategy focusing on two main areas:

- Development of public-private partnership;
- Progressive triggering of the international dimension for freight transport.

It is within this framework that SNCFT aims at the creation of logistic platforms in public-private partnership, in accordance with the national strategy in this field.

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