

**DIRECTORATE FOR FINANCIAL AND ENTERPRISE AFFAIRS  
COMPETITION COMMITTEE**

**Working Party No. 2 on Competition and Regulation**

**RECENT DEVELOPMENTS IN RAIL TRANSPORTATION SERVICES**

-- Issues Paper by the Secretariat --

17 June 2013

*The attached document is submitted to Working Party No. 2 of the Competition Committee FOR DISCUSSION under item V of the agenda at its forthcoming meeting on 17 June 2013.*

Please contact Ms Cristiana Vitale if you have any questions regarding this document [email: [cristiana.vitale@oecd.org](mailto:cristiana.vitale@oecd.org), tel. + 33 1 45 24 85 30].

**JT03338861**

Complete document available on OLIS in its original format

*This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.*

## RECENT DEVELOPMENTS IN RAIL TRANSPORTATION SERVICES

### *Issues Paper*\*

#### 1. Introduction<sup>1</sup>

1. Railway reforms are still very much in progress in many countries. One of the major objectives driving these reforms has been to ensure that end-user prices are at an efficient level (considering the level of costs and the price of substitute services), productive efficiency is high (and therefore subsidies are low), and investment and innovation guarantee a satisfactory level of service quality, safety and variety.<sup>2</sup>

2. A clear model for achieving this objective has not been found yet. In particular the appropriate role of intra-modal and inter-modal competition<sup>3</sup> remains a live question. This is due to a number of factors. First, fixed costs are sufficiently high and marginal costs sufficiently low that railways constitute a commonly cited example of “natural monopoly”. Second, railways provide both market-based and subsidised (socially important) services, and the argument is regularly made that competition harms the ability for profitable services to cross-subsidise social services, thereby avoiding the need for explicit public support. Third, in the railway industry multiple services are provided over a common infrastructure and using other common inputs, which generates considerable joint and common costs that have to be more or less arbitrarily allocated to the different services. Fourth, high and regular investments are necessary to ensure quality and safety on the infrastructure, but privatisation and competition may affect the incentives and the ability to guarantee the necessary level of investments. Fifth, coordination at various levels of the supply chain is important to guarantee a safe, efficient and smoothly functioning network, but this coordination is much more difficult if the infrastructure and the downstream operations are separated to ensure non-discrimination, increase transparency and foster competition.

3. Different countries have adopted a different combination of structure, balance between private and public ownership and regulation to achieve the objective mentioned at the start, with different degrees of success. Some have relied more heavily on inter-modal competition, while for others intra-modal competition has been essential. The kind of intra-modal competition also varies between countries. Regulation has been used to support or integrate competition in different manners.

4. Providing conclusive assessments of the relative merits of the different approaches is difficult. Indeed not all the approaches chosen have been fully implemented (as in a number of EU member states). Further the outcome is determined not only by the structure, ownership and regulation of the railway

---

\* This Issues Paper was prepared by Mr. Lou Thompson (Thompson, Galenson and Associates), consultant to the OECD Secretariat.

<sup>1</sup> The overall quantitative support for the analysis presented in this paper is too voluminous to be appended in its entirety. The reader is referred to the Excel file that may be found at [www.tgaassoc.com](http://www.tgaassoc.com) (Index 139, “Data for OECD Competition Report June 2013”). Appendix 1 only includes summary tables.

<sup>2</sup> See OECD (2012), page 5 Box 1.

<sup>3</sup> Intra-modal competition is competition from other rail operators. Inter-modal competition is competition from other transport modes.

system, but also by the installed base of track<sup>4</sup> and the geography of the country (e.g. distances to be covered, population density, location of ports and waterways), as well as the regulation and the degree of public policy interventions in other transport modes (e.g. road pricing, taxes on fuel, environmental taxation). Nevertheless, many changes and reforms have happened since 2004, in particular in Europe. Outlining some of these changes and their impact on the performance of the railway sector is the objective of this paper.

5. The discussion below approaches the subject in three parts:

- a synthesis of the different approaches;
- an overview of the developments after 2004; and,
- an overview of the results and of the problems that have emerged as rail restructuring has proceeded.

## 2. **Description of the different approaches taken to establish rail structure and implement restructuring**

6. By 2004, experience with rail reforms had shown that the actual implementation of competitive objectives rests on a complex interaction among structure, regulation and ownership. When these three elements are not mutually consistent, the objective of an economically efficient, financially stable and market-based competitive railway sector (and, as a result, transport sector) is often frustrated.

7. Table A below provides an overall picture of the interrelations among structure, regulation and ownership and their effect on competition.<sup>5</sup>

---

<sup>4</sup> In many countries the network was built so as to avoid duplicating the infrastructure, which resulted in having a single route between two points. However, there are some notable exceptions, like the US and Canada, where more than one line connects two destinations.

<sup>5</sup> In an ideal world, structure and ownership would be selected so as to achieve the necessary degree of inter-modal and intra-modal competition, given the nature of existing transport infrastructures, and then the appropriate regulatory system would be designed. In practice, structure, regulation, ownership and competition are often determined separately, sometimes with different policy objectives in mind. The result can be highly inefficient.

**Table A: Railway structures and their interactions with regulation, ownership and competition**

<b>Structure</b>	<b>Regulation</b>	<b>Ownership</b>	<b>Competition</b>	<b>Current Examples</b>
<b>Monolith*</b>	End charges to users	Infrastructure and operator: public	Inter-modal	China, India, Latin American concessions
<b>Tenant</b>	End charges to users and limited oversight of trackage charges	Infrastructure: private operators: private and/or public	Inter-modal and intra-modal (side-by-side, end-to-end, tenants with tenants and tenants with the owner)	US, Canada, Japan
<b>Limited Neutral Access</b>	End charges to users only, internal charges are mutually agreed	Infrastructure and operators: private or private/public	Inter-modal and intra-modal (operators with access compete with each other if they provide same services, and they compete for capacity if they are passenger operators versus freight operators)	Mexico City (Ferrovalle), Conrail joint-use areas, port terminals
<b>Vertical separation/Open access</b>	Terms of user access	Infrastructure and operators: public and/or private	Inter-modal and intra-modal (tenants with tenants and tenants with the owner, and through exclusive franchises for socially supported services)	EU model and actual experience in various member states

\* Private, exclusive mining railroads are not included in this discussion.

## **2.1 Structure**

8. Most railways were at first monoliths, where a single owner is in control of all of the assets and is providing all the services to freight and passenger customers. Over time variations to this model, which is still adopted in some countries,<sup>6</sup> have started to develop.

9. One variant, which is common in North America and to some extent in Japan,<sup>7</sup> is to have some services provided separately by tenant operators on the lines of the owner railway. Tenancy can be a shared use of the same infrastructure by non-competing users, or it can involve competitive access by one freight or passenger carrier on the lines of another, usually called trackage rights or haulage rights. Hence, tenancies can be freight-on-freight (as in US and Mexico trackage rights), freight-on-passenger (like the

<sup>6</sup> For example this model is still in place in Turkey and India, as we shall discuss below.

<sup>7</sup> Amtrak operates as a tenant on nearly 40,000 km of freight lines in the US and VIA operates as a tenant on about 10,000 km of freight-owned lines in Canada. The Japan Rail Freight company operates as a tenant on the narrow gauge lines of the passenger companies.

Japan Rail Freight Company and freight railroads on Amtrak's Northeast Corridor in the US), passenger-on-freight (like Amtrak in the US and VIA in Canada on the freight railroads) and passenger-on-passenger (like US commuter trains on Amtrak's Northeast Corridor).

10. Trackage rights have sometimes been imposed as remedies for allowing a merger, in order to limit reductions in prior side-by-side competition,<sup>8</sup> but have more frequently been negotiated between railways when it has been in their mutual interest to do so. Trackage rights are also required in certain markets under the terms of the Mexican concession agreements. Tenants generally pay only the marginal cost<sup>9</sup> of their occupancy, though this can sometimes include the investment costs of added capacity, because the general assumption is that they are minority users of line capacity. Tenants typically receive lower access priority.<sup>10</sup>

11. Some jurisdictions, like the EU, have opted for vertical separation of the old monolith and open access to the infrastructure, in effect making all operators tenants on the lines of a separate infrastructure manager. Vertical separation can simply consist of a requirement that the company that manages the infrastructure keeps separate accounts for its infrastructure business and its downstream operations, and that it offer non-discriminatory access and access charges to qualified operators. Accounting separation should permit verification of the financial stability of the infrastructure manager and the setting of access charges that are related to the costs effectively incurred. However, vertical separation can go further and involve institutional separation, either with an "independent" infrastructure manager, that controls the network, and independent operators for freight, intercity, urban and regional passenger services within an overall holding company (as in Germany), or by completely severing the network provider from all operators (as in the UK). With vertical separation, access charges become difficult to set, because the requirement for non-discrimination can clash with the need to recover the fixed and variable costs of the network.<sup>11</sup>

12. In some systems part of the infrastructure is collectively owned by a number of vertically integrated railways, which have full and neutral rights of access to it. Access charges are usually determined by allocating operating and maintenance costs among users on a relatively simple basis, such as wagonloads or trainloads handled.

## 2.2 *Ownership*

13. Different degrees of involvement of the private and public sector have been explored with varying success around the world.

14. The monoliths still in place are all state-owned, as in China, India or Turkey. Indeed with this kind of structure the opportunity for private involvement is limited because there is no obvious reason to create a private monopoly in place of a public one.

15. Systems characterised by tenancy agreements can be publicly or privately owned. The US system was originally mostly privately owned and operated, though there were periods of public intervention,

---

<sup>8</sup> See the competition section below for a definition of side-by-side competition.

<sup>9</sup> These are often also referred to as "variable costs" or "avoidable costs".

<sup>10</sup> The owning carrier typically considers its own traffic patterns and services first, and then gives the tenant access on a lower priority that does not conflict with its needs. In the US, by law, Amtrak is supposed to have highest priority on freight tracks. In practice, Amtrak's trains are often delayed by freight traffic.

<sup>11</sup> When the rail network is run by an entity that is separate from the operator(s) providing services on it, the latter has to pay an "access charge" to gain access to it.

especially during large rail bankruptcies. This changed with the creation of Amtrak as a public company that assumed the financial burden of passenger service losses, stopping cross-subsidisation from freight operators. Canada, instead, had a publicly owned railway Canadian National, along with a privately owned railway Canadian Pacific. Canadian National was privatised in 1995. Similarly to the US, Canada created a public company (VIA) that provides passenger services through tenancy agreements. As a result, in both countries the infrastructure is now wholly privately owned by private freight operators but provides access to public passenger operators.

16. Vertical separation of previously publicly owned monolithic systems, as in EU member states, has created opportunities for a greater involvement of the private sector through the award of management contracts, franchises, or concessions, or even through the privatisation of some parts of the system.

#### **Box 1: the UK experience**

The most prominent experience with privatisation of infrastructure and franchising to private companies of rail services is the one of the UK, which contains a number of significant lessons for other countries inside, and outside, the EU.

Beginning in the mid-1990s, the UK took the vertical separation idea and pushed it far beyond any point that the EU Commission had mandated. The old vertically integrated British Railways (BR) was entirely broken apart, with the infrastructure privatised (Railtrack), 25 geographically exclusive, commercial (“net cost”)<sup>12</sup> passenger franchises awarded, the freight business sold in its entirety to three private companies,<sup>13</sup> and three privately owned rolling stock leasing companies created. All this was to be overseen by government departments and new regulators. Reacting to political imperatives, the government forced the entire process of total vertical separation and privatisation to be planned and implemented within about two years.

The results were predictably mixed. Railtrack failed and was brought back into a quasi-public status (Network Rail). Many of the original passenger franchises failed, arguably due to irrational or strategic bidding, and had to be restructured into gross cost franchises or handled through temporary management contracts. A significant accident (Hatfield) disrupted the entire system and forced the Department for Transport (DfT) to take a more direct role in overseeing and funding the system, in particular investments in infrastructure. At the same time, the downward trend in passenger demand that had persisted since the late 1940s was sharply reversed, and demand levels eventually exceeded those of 60 years ago.<sup>14</sup> The average age of the rolling stock was cut nearly in half, and accident rates on the system continued to fall faster than they had been under BR. In real terms, average passenger tariffs have increased only slightly over the period of franchising.

In recent years, the system’s trajectory of increased demand, growing congestion and significant cost increases led to a series of deep re-examinations. The first step, the McNulty report published in 2011, generally concluded that, while the concept of franchising should be retained, the UK system was 20 to 40 % more costly than comparable EU systems and that a reconsideration of the total separation of infrastructure from the operators should be entertained. Then the failure in November of 2012 of the retendering of the Inter City West Coast (ICWC) franchise, which had been announced in August

<sup>12</sup> The terms “net cost” and “gross cost” are commonly used, but not precisely defined. In general, “net cost” means that the operator takes a greater degree of commercial risk in pricing, demand forecasting and investment, whereas “gross cost” franchise operators function more like management contractors at the direction of the owner.

<sup>13</sup> However, the Deutsche Bahn freight operator acquired the largest UK freight company (EWS). The Deutsche Bahn holding company is still owned by the German government; hence the status of EWS as a private operator is questionable.

<sup>14</sup> Indeed, since infrastructure separation and franchising were introduced, passenger traffic in the UK has grown faster than in any of the major EU countries, to the point where system congestion required massive investment in new capacity.

of 2012, touched off two inquiries and resulting reports: “The Report of the Laidlaw Inquiry”, which investigated what had gone wrong in the franchise award; and “The Brown Review of the Rail Franchising Program”, which reassessed the entire franchising programme in light of the experience to date and the lessons from the ICWC franchising failure in the Laidlaw Report.

In broad summary, the Laidlaw Inquiry concluded that the DfT had failed in its design of the tender for the new franchise and had, as a result, improperly awarded the franchise. The inquiry concluded that provisions setting out the obligations of the franchise in the event of default were improperly defined and assessed in the bid evaluation.<sup>15</sup> It recommended that the terms of the tenders for future franchises be reviewed in detail, and that DfT be provided with adequate skills and resources to implement the process more effectively in the future.

The results of the Brown Review are more complex, but start from the observation that passenger traffic in the UK has grown faster than in any other major EU system, the system has become the second safest in the EU and customer satisfaction levels appear to be higher than in most major EU railways.<sup>16</sup> The basic conclusion was that “...it is inconceivable that these gains could have been achieved, and changes successfully adapted to, if the franchising system was fundamentally broken”.<sup>17</sup> From this perspective, Brown had a series of recommendations that would:

1. refine the bidding process to ensure that the government’s objectives are clear and that the process is not overly complex;
2. improve the DfT’s capability to formulate and evaluate franchise proposals;
3. set the franchise terms flexibly according to individual requirements;
4. allocate risks to the party best suited to bear them – specifically avoid allocation of large macroeconomic risks to bidders unsuited to bear them;
5. allow the bidding process and the eventual franchise terms to evolve in accord with comments and experience;
6. greatly strengthen the DfT’s capability to oversee franchise performance; and
7. restart the franchising process.

The DfT is now considering the results of these two inquiries.

### 2.3 *Competition*

17. Providers of rail services can face competition from other providers of the same service – referred to as intra-modal competition – but can also face competition from other transport modes - referred to as inter modal competition. The degree of both kinds of competition that providers face depends on a combination of factors, ranging from the installed base of track, to the geographical structure of the country and the size and location of the other transport infrastructures in place.

<sup>15</sup> “In particular, it is important for readers to be aware that passenger rail franchisees are set up as special purpose companies with little recourse to their owning groups and are typically thinly capitalised. The DfT is exposed to a risk of franchisee insolvency leading to premature termination of the franchise. The DfT’s determination of whether (and to what extent) to require bidders to obtain commitments from owning groups for a subordinated loan facility (“SLF”) is one of the ways in which the DfT seeks to address this risk.” Laidlaw (2012), page 4.

<sup>16</sup> See Brown Report (2012), page 18.

<sup>17</sup> Ibid, page 18.

### 2.3.1 *Inter-modal competition*

18. Air, water and road (trucks and cars) transport are all potential alternatives to the use of the railway. The extent of substitutability between these modes of transport, and hence the level of inter-modal competition railway services face, depends on the geographic, demographic and economic features of different countries and the availability of these different modes. It also varies considerably between freight and passenger services.

19. In freight markets, railways typically move large lots, ranging from a wagonload weighing 50 tonnes to entire trainloads (unit or block trains) of 20,000 net tonnes or more. Rail freight services are typically relatively slow, with unpredictable arrival times due to marshalling and changes of locomotives and crews. This makes rail suitable for movements of large quantities of lower valued cargo over longer distances at low tariffs.<sup>18</sup> By comparison, inland water transport tends toward even larger lots moving at a slower pace with lower tariffs, whereas trucks move shipments that are at most half a rail freight wagonload, but move them significantly faster and more dependably, and charge much higher tariffs. Air cargo moves smaller lots faster and at even higher tariffs. The competitive interfaces among the freight modes are determined by the availability of these alternatives (e.g. water transport is not an option in an area without rivers or sea), as well as by the shipper's logistics cost, which is in turn determined by cargo value, minimum shipment size, average speed of the alternative services, and tariffs.

20. Rail passenger services can roughly be divided among: commuters, regional low-density, conventional intercity and high-speed. Competitive modes are autos, buses and airlines, each with a different combination of frequency of service, speed, reliability, comfort, and fares. Generally, rail can offer faster and better service in suburban markets where road congestion is significant and parking at destination is costly. High-speed rail (HSR) services occupy a natural market starting at distances (~150 km) where their speed dominates the ready availability and flexibility of autos, but below distances (~800 km), where airplanes' higher speed eventually takes over. In addition, rail services can generate significant social benefits, such as lower highway or air congestion, reduced emissions of pollutants and greenhouse gases, higher land use density, easier access to city centres and lower accident rates. As a result, because market forces will normally not internalise those benefits, governments can intervene either directly through financial support, or indirectly through regulation, to influence the pattern of services that the market would otherwise provide.

21. It is important to highlight that substitutes for the rail mode – in particular road transport, but also airlines – often do not face efficient usage and capacity charges for a number of policy and political reasons and this affects, and distorts, inter-modal competition. The distortion can be either positive or negative for railways depending on the specific circumstances.

### 2.3.2 *Intra-modal competition*

22. Intra-modal competition is most important for restraining market power when a set of rail services has unique advantages compared to alternative modes of transport. Intra-modal competition can take a number of forms depending on the structure of the railway system and the nature of the infrastructure. The most important ones are:

- side-by-side competition;
- end-to-end competition;
- competition between tenants and owner or among tenants; and

---

<sup>18</sup> The attractiveness of rail as a solution for freight movement varies according to the type of freight.

- competition for the market.

23. Side-by-side, or parallel, competition is a form of “competition in the market” that takes place where competing vertically integrated railroads have their own infrastructure to serve a given market pair. This form of competition is prevalent in North America, where all major market areas are served by competing carriers, but it is absent in Europe.<sup>19</sup>

24. End-to-end competition is also a form of “competition in the market” that happens between vertically integrated railroads, but it concerns market pairs where their networks do not completely overlap, but compete in providing one leg of a multi-modal journey. This form of competition tends to be more effective for freight than for rail passenger services, as passengers tend to be more time-sensitive.

25. Competition can also take place on the same railroad between different service providers, either all tenants or tenant(s) and owner. This kind of competition can happen in a vertically integrated railroad, where tenants enter a market where the owner of the railroad already provides services (as in the case in the US where 27% of the line kilometres have more than one freight operator), or in vertically separated systems, where the owner of the infrastructure either is not involved in the provision of freight and passenger services or is separated from its downstream operation (as it happens in some EU countries<sup>20</sup>).

26. Competition can also be for the market, rather than in the market, when providers of rail services bid to obtain an exclusive franchise on a specific destination pair. Tenders are especially common where train services are subsidised (e.g. commuter services in the Netherlands, Sweden and Germany) because, when properly designed and managed, competition between bidders can significantly reduce the amount of the financial support needed.<sup>21</sup>

#### **Box 2: the Swedish experience**

Sweden is an interesting example of a country that has followed the path of vertical separation and has, thus, managed to introduce intra-modal competition for the provision of most services.

After years of struggling with railway finances, in 1988 Sweden separated its railway infrastructure from the incumbent operator (SJ), four years before the EU Commission began the process across the EU. The purpose of the change was primarily to clarify the accounts of the railway and to separate socially important services from commercial ones, so that public support could be limited to public objectives. In addition, the separation permitted the state to finance infrastructure directly through the infrastructure manager (Banverket), and to impose access charges that would put railways on an equal footing with other modes, including environmental impacts. Intra-modal competition, either in or for markets, was not an objective at the outset, and SJ was left in control of the scheduling and dispatching on the network.

In 1996, control of scheduling and access was shifted to Banverket from SJ, and open access for freight was imposed. SJ continued to operate all passenger services, with support for local and regional services negotiated with local authorities. By 1998, local authorities started to put more and more local services up for competitive franchises and, over the next few years, SJ lost many of the competitions because of its high costs and rigid management, though

<sup>19</sup> See maps of US and Canadian railroads (Index 140, “US and Canadian Railway Maps”) on [www.tgaassoc.com](http://www.tgaassoc.com)

<sup>20</sup> For example, it has been estimated that there is a choice of operators for roughly 10 to 15% of UK passenger services, though the primary operator usually provides superior trip time or frequency.

<sup>21</sup> The EU (see the 2013 Communication on the Fourth Railway Package) argues that evidence from tender competitions run in Germany, Sweden and the Netherlands have led to saving in public funds of as much as 20-30%.

in some cases SJ was penalised for unfairly low bids that generated losses. SJ managed to retain a monopoly on “profitable” intercity passenger services. Beginning in 2006, the SJ monopoly over intercity passenger services was eroded, at first with entry in the provision of overnight and weekend trains, then international trains and, in December 2011, the network was fully opened to competing passenger operators.<sup>22</sup>

In 2011 Sweden received the highest score in a study performed by Kirchner (2011), which tries to assess the degree of liberalisation of the railway industry achieved by EU member states via a number of indices.<sup>23</sup> Currently, rail infrastructure is managed by the state agency (Trafikverket) that manages all transport infrastructures. Access charges for freight are low and simple. The state-owned freight operator (Green Cargo) still provides the majority of freight service, but faces increasing competition, both inter-modal and intra-modal. All local and regional passenger services are subjected to gross-cost franchised competition and local authorities work together to provide jointly needed assets, such as rolling stock. Unprofitable intercity services are typically net-cost franchises competitively awarded by a state agency (Rikstrafiken, now part of Trafikverket). However, “profitable” intercity passenger services are still for the most part (around 90%) provided by SJ.

## 2.4 Regulation<sup>24</sup>

27. The ability of competition to restrain tariffs, ensure a good level of service quality, and provide incentives towards productive efficiency and an adequate level of investment has considerable impact on the type and amount of regulation needed in a railway system.

28. Vertically integrated monopoly railways only face inter-modal competition, which may not be sufficient to constrain prices for end users, either freight or passengers. When this is the case some form of regulation is desirable to limit monopolistic pricing and to provide incentives towards cost efficiency. At the outset of the concessioning process, most Latin American countries did not find it necessary to regulate rail freight tariffs or intercity passenger tariffs because of intense competition from other modes, though there was oversight of commuter services. Subsequently, some forms of freight tariff regulation have been added in Brazil and Argentina.

29. Where tenants are present intra-modal competition can provide an additional constraint if the tenants, or the tenants and the owner, compete for the same customers. In the US a combination of effective inter-modal and intra-modal competition has allowed market forces to operate in the freight market since the early 1980s. Similarly neither Amtrak nor VIA has regulated tariffs for their passenger services and, after airline deregulation, the intercity passenger market has been fully competitive.<sup>25</sup> As for trackage rights, in the US these have to be based on avoidable costs and in the event Amtrak believes that a

<sup>22</sup> As in Italy this happened before the deadline set by the EU commission to all member states.

<sup>23</sup> The study is discussed at greater length later in this paper. The values of the indices are shown in Table 2 in Appendix 1. Sweden had the highest overall score in 2011 for both passengers and freight.

<sup>24</sup> By regulation here we refer only to economic regulation, even though other forms of regulation can also change the competitive balance among transport modes and affect inter-modal competition. The most important types of regulation, in addition to the economic one, are safety regulation, which entails the specification by an independent agency of designs, equipment, assets or methods of operation that will improve the safety performance of an operator, and environmental regulation, which governs the impacts of operators on the environment (pollution, CO2 emissions, noise, etc). See OECD (2011) for a thorough discussion of the various meanings of regulation and of the role of the regulator.

<sup>25</sup> So long as the US regulator could require freight companies to bury passenger deficits within freight profits, regulation of end-user charges prevailed. When Amtrak was separated and the deficits were made transparent and paid by the federal government, Congress deregulated passenger tariffs and cut services (by more than half from the level before Amtrak).

charge is excessive it can appeal to the regulator.<sup>26</sup> In Canada, instead, the law does not specify how trackage charges should be set and these charges have always been higher than in the US. It is not clear whether VIA has effective recourse.

30. EU countries have generally not found it necessary to regulate rail freight tariffs or intercity passenger tariffs because of intense competition from other modes, though there is oversight of commuter services, many of which are subsidised. Instead, regulation has mostly focused on access charges to ensure non-discrimination.<sup>27</sup>

31. Vertical separation was introduced with the aim of allowing competition to develop and limit non-discrimination, but has not always succeeded in achieving these objectives. First, if a good level of institutional separation is not achieved, the deliberate favouring by the infrastructure manager of a sister company or a national operator can happen. Further, a more serious problem of discrimination is inherent in the economic nature of railways because they have high fixed infrastructure costs and low short-run marginal operating costs. The most efficient charging approach that permits recovery of fixed costs – which consists of allowing access charges to rise above short-run marginal cost in inverse proportion to the elasticity of demand for the services provided, referred to by economists as “Ramsey-Boiteux pricing” – inevitably opens the door to discrimination of various kinds.

32. The EU Commission has attempted to resolve the latter dilemma by recommending that all infrastructure managers establish short-run marginal cost access charges, with the state owner providing full support for fixed costs and investments.<sup>28</sup> At the same time, the EU Commission has recognised that some members would not agree to pay full financial support from public coffers for budgetary reasons and has allowed the infrastructure managers to charge “mark-ups” over short-run marginal cost in order to generate a contribution from users to fixed costs, so long as the mark-ups were not unduly inefficient or discriminatory.<sup>29</sup> The emerging result has been a wide range of national targets for recovery of fixed costs through access charges and a disparate approach to formulating the structure and level of access charges across the EU. Some of the charges have been found to be illegal on grounds of intentional discrimination, while others reflect valid national objectives, but still restrict competitive entry. Whatever the motivation, users crossing national network boundaries face a patchwork of different access charging regimes that renders competition, especially at international level, more difficult.

---

<sup>26</sup> Amtrak’s original charges were based on the belief that ample capacity existed on the lines of the freight railroads. Since the foundation of Amtrak, freight traffic density has quadrupled, and congestion has occurred, so the impact of Amtrak’s trains on infrastructure costs is no longer limited to maintenance, but has significant investment implications.

<sup>27</sup> EU access charges are also supposed to encourage efficient operations and infrastructure use; however, this objective has been difficult both to define and to implement, especially since infrastructure managers are required to recover fixed costs and cannot set charges equal to marginal costs (i.e. the most efficient level).

<sup>28</sup> See, EU Commission (1996), page 18. “The central theory of the Commission’s Green paper ‘Towards Fair and Efficient Pricing in Transport’ is that, as far as possible, charges should reflect both direct and external **marginal** costs, should recover these costs and should be linked to the costs caused by users.” [emphasis added].

<sup>29</sup> It is difficult in railway accounting to define “marginal cost,” either short-run or long-run. In the US variable costs or avoidable costs tends to consider only the short-run impact on costs but can, depending on the specific issue, approximate long-run marginal costs and therefore include a measure of added capacity investment. In the EU the lack of a clear definition from the Commission has allowed each country to develop its own definition and measurement.

### 3. Recent developments

33. Much has happened in the railway field since 2004. These developments are presented below under the heading of the different structural models discussed above. Specific developments in individual countries were discussed by the OECD as part of its review of structural separation in 2011,<sup>30 31</sup> hence this paper will not discuss those. It will review changes in some countries that were not covered by the review (such as non-OECD members) and then it will focus on recent general trends in EU and North America. Because the most important changes since 2004 have probably happened within the EU, a large share of this section is devoted to them and to a critical assessment of the costs and benefits of vertical separation (the structural model favoured by the EU).

#### 3.1 *Vertically integrated railways*

34. It may be useful to start by reviewing the changes in the monolithic railways - Russia, China, Turkey, India and the Latin American concessions - because they furnish a useful bit of perspective on where reforms start, as originally most railways were vertically integrated, and the directions they can take initially.

35. In 2002, the Russian railway initiated a reform programme with a number of elements:

- the Ministry was split, with transport policy and planning transferred to a rail agency within the Ministry of Transport and rail activities lodged in a new, joint stock holding company (OAO RZD);
- infrastructure was to be separated from operations with freight access charges tied to the existing commodity-based tariff system;
- the national freight carrier was to retain ownership of locomotives and control over freight movements;
- freight wagons were to be sold to private operators,<sup>32</sup> who would perform the marketing of freight and organise shipments;
- intercity passenger services were to be transferred to a separate company (owned by the holding company) similar to North American Amtrak and VIA; and
- commuter operations were gradually to be transferred to local authorities, though the railway stood willing to provide operations under a reimbursable contract.<sup>33</sup>

---

<sup>30</sup> See OECD (2011).

<sup>31</sup> The OECD (2011) review describes the experiences of the following countries: Australia, Austria, Canada, Denmark, Finland, France, Germany, Hungary, Italy, Japan, Korea, Mexico, Netherlands, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, UK and US. It also covers developments in the EU some of which are also examined here.

<sup>32</sup> In the Russian structure, there is a distinction between a “carrier,” which owns the locomotives, hauls wagons and holds a common carrier obligation, versus “operators,” who own wagons and market rail freight services to shippers. There is a legal possibility that new carriers could be formed, but OAO RZD has resisted the idea. Shippers can be operators, but not carriers.

<sup>33</sup> See Thompson (2007), Drew and Ludewig (2011) and Pittman (2012) for a more detailed discussion of the Russian restructuring and its results.

36. These reforms have proceeded more or less as planned and on schedule, though some observers have concluded that the retention of locomotives within the infrastructure manager and control of freight services, along with a single (relatively simple) freight tariff schedule, has acted to substantially limit the development of competition in the freight market, especially because inter-modal competition in Russia is restricted mostly to the European part of the country. There has so far been little or no effect on intra-modal competition, either in or for the market, in rail passenger services.

37. The Ministry of Railways (MOR) in China resisted reforms for many years, basically arguing that the railway was so central to the economy and rail traffic was so intense<sup>34</sup> that reforms would be disruptive and potentially risky for the economy. In addition, the Ministry undertook a dramatic, \$220 billion programme of HSR construction, which, MOR argued, required unified government management. Eventually, MOR lost some of its support, in part as a result of the perception of both corruption and monopolistic abuse by the railway. In early 2013, the Government split the railway between a policy and planning function, transferred to the Ministry of Transport, and a separated nationally-owned railway company in charge of the railway system. Though this is a first step in reform, done primarily for political reasons, it is not clear whether following steps along the lines of any of the structures that allow intra-modal competition will take place.

38. The Turkish State Railway is an example of even greater integration (both vertical and horizontal in this case), in that the railway company not only has a monopoly over the rail infrastructure and operation, but also controls the port system and uses port profits to support rail losses.<sup>35</sup> The government has long considered hiving off the port system from the railway and adopting an open access approach, but no real change has been committed.

39. Indian Railways is the main remaining example of a ministry that controls a monolithic railway system operating all freight, all intercity passenger services, and all significant commuter services. It even constructs and operates some of the major urban metro systems. Because Indian Railways is deeply enmeshed in the national economy and is particularly important for moving masses of people cheaply (and with cross subsidy from its freight traffic) significant reform movements have thus far been unsuccessful.

40. The Latin American railway concessions<sup>36</sup> are, for the most part, vertically integrated, although as discussed, certain parts of the Mexican system have tenancy competition (trackage rights by one concession on the lines of the other) and the Mexico City area (Ferrovalle) has a jointly owned, neutral access rail network for freight and suburban passenger operators. In broad terms, the Latin American freight concessions have experienced solid traffic growth, rapid increases in productivity and lower tariffs to customers, with the Brazilian and Mexican freight concessions doing relatively better than in other countries (Argentina, Chile, and Bolivia among others). Suburban passenger concessions in Buenos Aires have not done as well, principally because of political and economic turmoil in the country. Suburban concessions in Rio de Janeiro and Mexico City have survived relatively well, though demand has not met the expected levels.

---

<sup>34</sup> In China traffic density (traffic units/km) is triple that of the US system.

<sup>35</sup> See Thompson (2009). Note that South Africa is in a similar situation with a state-owned company that controls the railway system and also controls ports and pipelines.

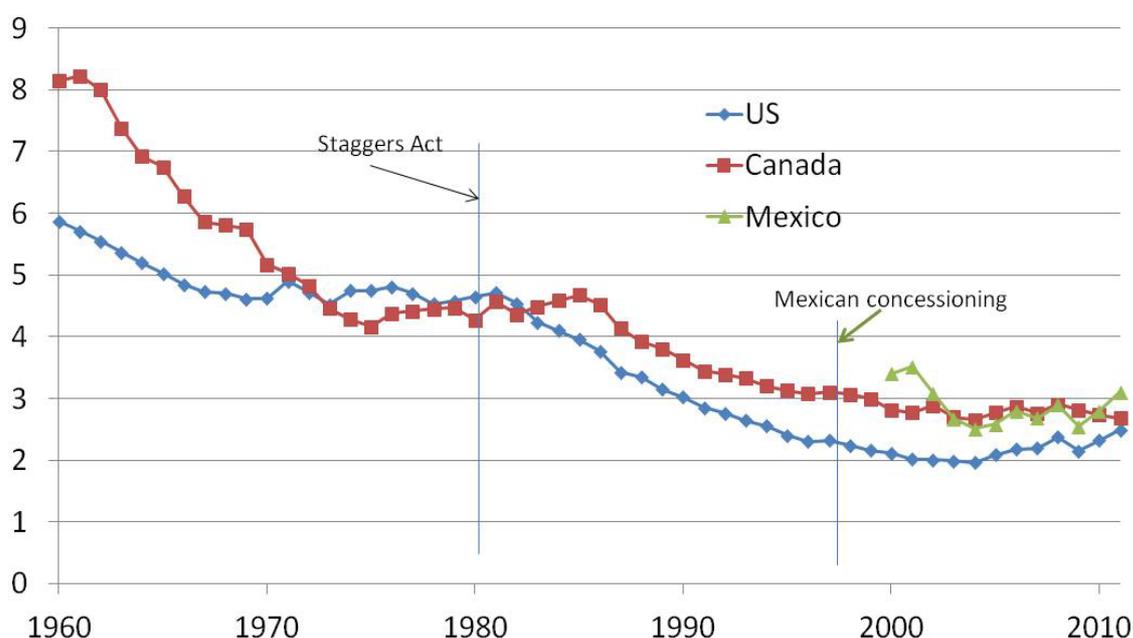
<sup>36</sup> Thompson and Kohon (2012) discuss these railways in detail. See also Thompson, et al (2001), and Drew and Ludewig (2011).

### 3.2 Tenancy railways: US and Canada (and Mexico after concessioning)

41. In the countries where vertical integration is mitigated by the existence of tenancy agreements the most significant rail reforms were implemented well before 2004. No major changes have happened since then and the regulatory framework has been stable.

42. In fact, in the US 2004 seems to have seen the levelling off of the impact of the Staggers Act in reducing rail freight rates, as Figure 1 shows.

**Figure 1: Average Freight Revenue (constant 2010 US cents/tonne-km)**



43. Post 2004, US rail freight rates in real terms have trended slightly upward (about 25% above 2004 levels through 2011, but still about half the level before deregulation) while Canadian freight rates, which generally track US rates, but are slightly higher because of a different commodity mix,<sup>37</sup> remained stable. Average Mexican rail freight rates are shown as well: they have tended to track US and Canadian rates because of the increasing integration of the Mexican system and its economy with that of these two countries. Immediately prior to concessioning, nearly 60% of Mexican rail tonnage was purely domestic, by 2010 that number had fallen to around 46%, though imports grew much faster than exports.

44. The rising trend mentioned earlier for the percentage of US lines with multiple operators has continued slowly after 2004 (from 24% to slightly over 28% in 2008 before falling slightly to 27% in 2011). What is not known is the actual competitive significance of these multiple operations, because trackage rights are sometimes commodity or capacity restricted.

45. McCullough and Thompson (2012) show that the competition fostered by the Staggers Act has generated manifest benefits to shippers and railways in the US and, because of the system

<sup>37</sup> US railroads carry more coal at low tariffs than do Canadian railroads.

interconnectivity, also for Canadian and Mexican shippers.<sup>38</sup> With this progress acknowledged, there have always been shippers and interest groups who feel they have suffered from the enhanced rate-making flexibility granted by the Staggers Act, or who believe that appeals to the regulator would be more beneficial than direct negotiation with the railroads. In addition, the rate increases since 2004, albeit largely caused by system congestion and energy cost increases, have generated additional political pressures for regulatory changes, including more regulatory intervention in rate-setting.

46. Objectively, however, the achievements of the US Class I freight railroads<sup>39</sup> after deregulation are clear:

- average freight rates in real terms are down by more than half;
- the industry is financially stable (mostly “revenue sufficient” in regulatory terms) and able to finance expansion to meet market demands;
- productivity has improved significantly; and,
- accident rates have fallen by more than two-thirds.

47. In a recent review of the performance of the US system, Christensen Associates concluded that “[b]ecause the railroad industry has remained approximately revenue sufficient in recent years ... providing significant rate relief to some shippers will likely result in rate increases for other shippers or threaten railroad financial viability” (Christensen (2010), page ii). In other words, the US rail freight system has reached a reasonably efficient state (a kind of Ramsey-Boiteux equilibrium), taking intra-modal and inter-modal competition fully into account.

48. Canada has two major railroads Canadian National and Canadian Pacific. Canadian law includes several provisions under which one railway can gain access to the facilities of another, but so far neither of the large railways has aggressively pursued the opportunity, possibly for fear of retaliation.

49. In Mexico, the trackage rights that each concession was supposed to grant to the other were specified in the concession bidding. Negotiations between concessions to determine the conditions, including the access charges, have been protracted, and it is not clear whether effective competitive access has yet occurred.

### ***3.3 Vertical separation and open Access: the EU approach***

50. Though the general direction of rail restructuring in the EU was established as early as in 1991, the pace of implementation has been slow and has accelerated only after 2004.

51. A good summary of the EU Commission’s overall concerns and initiatives post-2004 can be found in Directive 2012/34/EU aimed at “Establishing a Single European Railway Area”, and the EU Commission’s 2012 Communication on the Fourth Railway Package. A number of themes run through these documents, but they can roughly be summarised as saying that modest progress has been made in

---

<sup>38</sup> This is true not just in overall average terms; it seems also to have been true for major commodity groups, such as coal, where the ability under the Act to sign contract tariffs has had an especially strong upward impact on productivity and downward impact on tariffs.

<sup>39</sup> In 2009, a freight railroad was defined as Class I if it had revenues greater than US\$380 million. Seven railroads met this standard. These generated 93% of all rail freight revenues. There were 556 Class II and Class III railroads, accounting for the remaining 7% of revenues.

stabilising the position of the EU railways in the transport market but that many of the objectives of the rail reform have been frustrated by slow or incomplete implementation.

52. The EU Commission is now proposing a number of changes meant to speed up and deepen this implementation that focus on:

- institutional rather than just accounting separation of infrastructure from operations;
- full opening of the market for domestic passenger services;<sup>40</sup>
- encouraging competition in the market for those services that can be offered through open access and requiring competition for the market (through franchising) for socially supported services; and,
- further strengthening of interoperability and safety oversight.

53. An indication of the pressure for the implementation of the regulations has been the legal proceedings initiated by the EU Commission. For example, the EU Commission issued a series of letters of formal notice to 24 countries in June 2008,<sup>41</sup> many of which received multiple notices. Though issues differed across countries, they fell into three general categories:

- 1) the infrastructure manager did not have adequate independence, it did not face incentives to improve its performance, or it imposed access charges that were not clearly related to marginal cost;
- 2) the regulator was insufficiently independent and/or had inadequate authority to enforce regulations; and
- 3) the incumbent railway operator was not sufficiently independent and/or did not publish independent income statements and balance sheets.

54. In 2010, the EU Commission found it necessary to refer 13 Member States to the Court of Justice for continuing failures in the implementation of the directives. Twelve of these countries were already included in the 2008 notices,<sup>42</sup> while Spain was added. The problems noted were basically the same: lack of independence of the infrastructure manager and distorted access charges, lack of regulatory independence and power, and lack of clear separation between infrastructure managers and railway undertakings. Though no decisions have so far been rendered in these cases, the Court of Justice's Advocate General found in the first five cases<sup>43</sup> that the EU Directives had been violated in a number of respects and that this have had a deleterious impact on access to the networks and, thus, on competition. Although the reduction from 2008 to 2012 in the number of member states in apparent violation (from 24 to 13) may indicate progress, it is important to note that the remaining 13 member states referred to the

---

<sup>40</sup> Markets for freight services were already fully opened to competition in January 2007 and those for international passenger transport services in January 2010.

<sup>41</sup> See IP/08/1031, June 26, 2008.

<sup>42</sup> These countries are: Austria, Czech Republic, Germany, Greece, France, Hungary, Ireland, Italy, Luxembourg, Poland, Portugal, and Slovenia.

<sup>43</sup> These cases were against Poland, Czech Republic, France, Slovenia and Luxembourg. See cases C-512/10, C-545/10, C-625/10, C-627/10 and C-412/11 and Press release No 169/12, Luxembourg, 13 December 2012.

Courts represent approximately 70% of the rail passenger and freight traffic in the EU. The overall impact on competition may be even higher where the non-compliant railway (e.g. Austria or Germany) carries a significant amount of transit traffic between two compliant states.

55. The most thorough, quantitative attempt to measure rail system liberalisation in the EU has been a series of studies conducted in 2002, 2004, 2007 and 2011 by Kirchner.<sup>44</sup> In these studies, Kirchner has developed an index of the performance of the rail sector of each country according to the legal system (LEX), the degree of access actually permitted to the system (ACCESS) and the level of competition (COM) within the rail system that has occurred.

56. Kirchner's analytical approach is complex and providing a detailed description goes beyond the scope of this paper. However it is useful to briefly describe how the three indexes have been built. In general terms, the LEX index measures the extent to which the EU directives have been transposed into the legal system of the country. If a country has rewritten its laws to completely incorporate the EU requirements, it receives a score of 1000 points on the LEX index. The ACCESS index attempts to measure the degree to which a member has actually implemented, through regulation and enforcement, the EU requirements as expressed in national law. A perfect record would earn a score of 1000. There are, for example, countries that have a very high LEX index and a much lower ACCESS one because, though the law is fully compliant, the agency required to enforce the new laws has not yet been established. The LEX and ACCESS scores are then weighted to yield an overall index for each of the 25 member states having a railway,<sup>45</sup> as well as for Switzerland and Norway because these two countries have organised their systems in a manner consistent with the EU approach. The COM factor is a weighted average measure of the change in modal split for passenger and freight, the number of non-incumbent operators and the share of the rail market held by non-incumbent operators. The COM index is reported separately.

57. Kirchner's results are summarised in Table 1 in Appendix 1, which displays the results of the four studies.<sup>46</sup> Though the measurements include qualitative judgments and are undoubtedly less precise than the numbers would indicate, they do support several conclusions that seem reasonably robust. First, there has indeed been forward movement in the overall index: almost every country in almost every period has shown progress; averages for the EU 15<sup>47</sup> and the EU 10<sup>48</sup> increased in every study; and, the number of countries considered "advanced" steadily grew, though "on schedule" countries fell slightly because there were also a few backsliders.<sup>49</sup> Second, progress has been markedly greater in freight than in passenger services. The reason for this disparity is not entirely clear and may be due to a number of factors, including the fact that the regulations in the passenger area are more politically important and thus inherently harder and slower to change. Third, there is no significant difference between the EU 15 and the EU 10 in the

<sup>44</sup> "Rail Liberalization Index," published in 2002, 2004, 2007 and 2011.

<sup>45</sup> Cyprus and Malta are not included, despite being EU member states, because they do not have railways.

<sup>46</sup> The 2002 results were not computed on the same basis as the later studies, so the comparison should be seen as approximate. Overall results for the EU 15, EU 10 and EU 25 are simple linear averages and should also be seen as indicative but not exact.

<sup>47</sup> The EU 15 grouping includes the western European countries that joined the EU between 1952 and 1995: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain, Sweden and the UK.

<sup>48</sup> The EU 10 grouping includes the eastern European countries that joined the EU in 2004 and 2007: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

<sup>49</sup> In Kirchner's evaluation system, complete compliance in a category would earn a ranking of 1000 points. A rating above 800 points is considered "advanced." A rating between 600 and 800 points is considered "on schedule." A rating between 300 and 600 points is considered "delayed," and a rating below 300 points is considered "pending departure."

overall measures of liberalisation, which is counter intuitive given that the EU 10 had much farther to go at the outset. Fourth, and perhaps most significant, progress on the procedural aspects (LEX and ACCESS) has been much faster and deeper than those in the actual implementation of competition (COM), an imbalance that is typical of the challenge of implementing laws and regulations, especially when underlying public awareness and support are weak.

58. According to Kirchner's results, the average LEX index for the EU 25 in 2011 was 800, indicating that these countries, overall, are "advanced" in implementing the legal reforms. The average for the ACCESS index was 683, well above the lower "on schedule" threshold. By contrast, the average COM index was only 429, well below even the midpoint in the "delayed" range. Again accepting that these measures are reasonably representative of reality, they would support an argument that the ultimate objective of reform – enhanced competition among rail service suppliers – has significantly lagged behind its formal implementing system.

59. Table 2 in Appendix 1 summarises Kirchner's data concerning the development of competition by non-incumbent operators. It shows:

- the number of non-incumbent operators (those not directly owned by the entity owning the infrastructure manager);
- the freight market share of the non-incumbent operators;
- the passenger market share of the non-incumbent operators;
- the market share of rail freight in the country in 2001 and 2008; and
- the market share of rail passenger service in the country in 2001 and 2008.

60. These data clearly show, on the one hand, that there has been an increase in the role played by non-incumbent operators, though this appears to be greater in freight than in passenger services; but, on the other hand, that these are not yet large players in most countries, especially in the provision of passenger services.

61. It is worth emphasising that Kirchner's studies focus on intra-rail competition and do not consider how inter-modal competition, which is also important, has been developing.<sup>50</sup> However it is possible to give a picture of how rail stands compared to other transport modes using some figures collected by the EU Commission.

62. The rail market share of passenger-kilometres has been stuck at 7% for the EU 15 since the mid-1980s, while it has fallen from over 30% in the mid-1980s to 7% in 2011 for the EU 10. These numbers have to be viewed with some reservations since the denominator – total passenger travel including autos – is at best an approximation. With this acknowledged, there is no basis to argue that rail restructuring in the EU has improved rail's passenger market share though, of course, it is always possible that rail's share would have been even lower without vertical separation. These numbers are presented in Table 3 in Appendix 1.

63. The picture for rail's position in the freight market supports roughly the same conclusion. The freight market share for the EU 15 railways has fallen continuously from about 25% in 1980s to about 13%

---

<sup>50</sup> Several possible measures could fill this gap in these indicators and render them more useful, including: measures of rail market share; measures of the percentage of traffic that is international as opposed to domestic; and, a reliable measure of length of haul (as an increase in this measure could indicate movement beyond national boundaries and a strengthening of rail's competitive position).

in 2011. The EU 10 freight share of about 23% is still higher than the EU 15, but the collapse has been much deeper since they started from over 70% in the 1980s. The EU 10 freight share may remain somewhat higher, partly because Estonia, Latvia, Lithuania and Poland retain broad-gauge connections with the Russian and Ukrainian systems. These figures are presented in Table 4 in Appendix 1.

64. Two further measures complement this picture: percentage of rail tonnage handled that moved in international trade and the average length of haul (ton-km divided by tons handled). The percentage of international rail tonnage for the EU 15 railways fell from 51.5% in 2001 to 42.6% in 2010, indicating, at least in this period, that rail freight flows among the EU 15 did not increase in line with structural changes in competitive access. This appears to be in contrast with the EU 10, where the international tonnage percentage did increase over the period, but this increase may be misleading because it is largely caused by a more rapid decrease in domestic tonnage than in total tonnage handled. Although the average length of haul did increase for both groups, the change is slight and, at around 260 km, is far below the level at which rail freight normally competes effectively with trucking.<sup>51</sup> See Table 5 in Appendix 1.

65. Beginning in 2003, Eurostat has provided data from which an Origin to Destination matrix for rail shipments could be constructed. Unfortunately, not every EU member state has provided data in every year, so a complete matrix cannot be developed. If the critical blanks are filled in by approximate interpolation (by the author), the results would support the conclusion reached above: international freight flows within the EU have not yet increased and, with few exceptions average length of haul has not increased and is shorter than desired if rail is to compete with trucks.

66. Taking all of these measures together, a reasonable conclusion is that the EU railways have made progress in implementing the legal and procedural aspects of the EU Commission's Directives, but have not made comparable progress in bringing significantly more competition on the rail network, especially in passenger services. In addition, there is little reason to conclude that the underlying objective, creating a common railway area in which more rail traffic moves across borders, has yet been achieved.

---

<sup>51</sup> The average rail freight length of haul in 2010 in other relevant countries was: China 840 km; Canada 1097 km; Russia 1441 km; and, US 1524 km.

### Box 3: The Italian experience

The Italian experience shows that the implementation of vertical separation requires considerable political will for it to be effective and start generating any benefits.

Italy started reforms in railway sector at a slow pace. Ferrovie dello Stato (FS) was a state-owned monolith until the year 2000. European Directives were transposed in national laws and regulation with long delays and their formal adoption took even longer.

However, around the year 2000, the situation started changing: Ferrovie dello Stato (FS) was transformed into a holding company, comprising an infrastructure manager (Rete Ferroviaria Italiana) and an operator responsible for freight and passenger services (Trenitalia). Further, a law was issued<sup>52</sup> that granted all EU railways operators open access to the Italian railway infrastructure, thus depriving FS (or better its subsidiary Trenitalia) of the monopoly it had so far enjoyed on both freight and passenger services. This law went much further than the targets set by the EU commission, and in 2013 Italy is still one of the few member states with a railway system that is completely open to competition.<sup>53</sup> In 2012 another law passed, which established an independent transport regulator, but the agency has not been set up yet.

Despite this progress, Trenitalia still largely dominates the Italian railway and intra-modal competition is extremely limited. The market share of new entrants in freight is 15%; and entry in the domestic passenger market has so far had limited success. Arenaways, the incumbent's first competitor on the passenger rail transport market, started operating on the profitable route between Milan and Turin in 2008, but by 2011 it had gone bankrupt. AGCM was involved and it found FS guilty of two exclusionary practices against the new entrant. FS was, thus, fined for abuse of dominant position.<sup>54</sup> Local authorities are still resisting the introduction of tenders for the allocation of regional and commuter subsidised services.

A year ago Italo (owned by Nuovo Trasporto Viaggiatori) started operating passenger services on the first completed segment of the HSR network linking Naples to Milan. Italo is the first new entrant in the provision of HRS services in the EU. Entry is too recent to derive any conclusions on its effects and its success. It is worth mentioning that before launching its passenger services, the company brought a case to the AGCM against FS alleging that the company was favouring its subsidiary Trenitalia in the provision of access to its infrastructure, but the case was closed as no evidence of an abuse was found.

### 3.4 *A critical assessment of the effects of vertical separation*

67. The widespread introduction of vertical separation in Europe has prompted the development of a body of research on the effect on costs of breaking down a vertically integrated railway system. These are worth discussing as they raise a number of issues that countries that are following this path will face (and some already are).

68. From the point of view of technical efficiency, vertical separation clearly generates a number of costs. Some costs, like the transaction costs in terms of negotiation and enforcement of contracts between the operators and the infrastructure manager, would be avoided by a vertically integrated railway; other costs, such as the sub-optimum design and maintenance at the wheel/rail interface caused by a misalignment between the incentives of the operators and of the infrastructure manager, may potentially be

<sup>52</sup> Law 388/2000.

<sup>53</sup> The EU has required member states to open the market for freight services and the market for international passenger services, but not yet the market for domestic passenger services.

<sup>54</sup> The fine, however, was limited to €300,000.

higher for separated railways. Recent academic studies aimed at measuring these costs are indicative, but not yet conclusive, reflecting the complexity of the issue.

69. One approach to measuring these costs developed by Ivaldi and McCullough (2004) reached the conclusion that an integrated freight railroad could have a 20 to 40% cost advantage over a vertically separated railroad. This result, however, is limited to the technology and operating conditions prevailing in the US.

70. An alternative approach, which looks at the EU experience, developed by van de Velde et al. (2012) concluded that the added costs of separation are lower for low-density railways and higher for high-density railways, and that the costs of misaligned incentives due to vertical separation are likely to be higher than the direct increases in operating costs. The authors also claim that the complete imposition of vertical separation throughout the EU might add as much as €5.8 billion/year to the operating costs of the networks “for no accompanying benefits”.<sup>55</sup> Hence, they argue that “[c]ountries should be free to choose the structural option that best suits their circumstances – thus allowing competition between different organisational models – subject to providing for non-discriminatory access for competitors. This should include both the possibility of switching from a holding model to vertical separation, and the possibility of switching from vertical separation to a holding model.”<sup>56</sup> In the terminology of this paper, this could be read as arguing that the tenancy approach might be preferable to full vertical separation in some cases, depending on total traffic density and on the degree to which the tenants would compete for capacity and would compete in the provision of the same services.

71. A study commissioned in the UK (McNulty (2011)) to assess the cost efficiency of the British railway system concluded that Network Rail is less efficient than many other EU infrastructure managers by as much as 20 to 40%, but this finding was only partly related to added costs due to vertical separation.

72. Though most studies have found that vertical separation causes an increase in costs, there have been fewer studies of the benefits that have been, or might be, achieved from separation. But there is evidence that the costs to public authorities of providing regional and interregional services fell by 20 to 50% when the services were tendered,<sup>57</sup> a form of competition that is only possible when vertical separation is introduced. Such a reduction might well be greater than the related 5% cost increases due to separation assessed by van de Velde (see above).<sup>58</sup>

73. One of the benefits of tenancy separation (in the US), and of tendering out socially supported passenger services in the EU, has been a clarification of the costs and revenues generated by different services. This allows government support, where necessary, to be targeted, justified and limited, while the commercial services no longer have to carry a burden of cross-support.<sup>59</sup> More broadly, it has been argued that separating the freight services from the passenger ones and franchising the passenger services to private operators permits more focus and commercial “flair” on the part of the operators than would ever be possible in a vertically integrated public entity.

---

<sup>55</sup> Van de Velde et al (2012), page 4.

<sup>56</sup> Van de Velde et al. (2012) page 6.

<sup>57</sup> See ECMT (2007).

<sup>58</sup> The €5.8 billion calculated by van de Velde, et al, is, according to the author’s rough calculation, somewhat less than 5% of the total operating costs of the EU 25 railways, so the benefit of competition might well be worth the added costs.

<sup>59</sup> This benefit was emphasised by the EU Commission in the proposed Directive 2013/0029 (COD), page 3.

74. To some extent this is also a discussion of the advantages of the private sector over the public sector in the commercial delivery of services to customers rather than of separation *per se*; but, as noted, vertical separation, at least on a tenancy basis, is a critical part of any programme to improve market focus, while at the same time limiting and targeting public subsidies. It is also worth noting that the competition for the market that was enabled by the break-up of old vertically integrated systems was the basis for the successful reforming of the Latin American railways, of which the Mexican experience is one example.

#### Box 4: The French experience

The French experience shows some of the problems that many member states have faced and are facing in implementing vertical separation.

The French National Railway (SNCF) is the largest passenger railway (by passenger-km) and the third largest freight railway (by tonne-km) in the EU. Its high-speed services are second only to Japan in passenger traffic and, validly, claim to be among the most technically sophisticated in the world. Technological prowess is balanced by institutional resistance: France has “almost always [been] one of the last countries to incorporate the Community texts into national law ... and generally battled in the corridors in Brussels to reduce the scope and push back the deadlines.”<sup>60</sup>

France adopted a unique approach to infrastructure separation, creating in 1997 an infrastructure agency, Réseau Ferré de France (RFF), that served as a planner and oversight agency for the network, but that was required to contract with SNCF for actual management of the network, including scheduling and dispatching. Though RFF attempted to assert its independence, the imbalance of employees (1250 for RFF, 51,000 for SNCF in infrastructure alone and 152,000 in total) ensured domination by SNCF. Resistance to change, particularly to a greater separation of RFF, was attributed to labour union opposition to any breakup of SNCF that might promote the possibility of an increase in the role of the private sector.<sup>61</sup> RFF’s actual independence was further limited by the large debt (€28 billion) it inherited and by RFF’s high dependence on government for investment.

In late 2009, a new rail regulatory authority (ARAF) was created, whose responsibility was to promote access to RFF’s network and to recommend changes in RFF’s access charges if they were found to be inconsistent with economic efficiency or discriminatory. In 2010, a separate controller of traffic (DGF) was created to ensure clearly separate and independent control over access to the network, which reports to RFF but is operated by SNCF.

The ability of the RFF and DGF to act independently has been questioned in the decision by the Autorité de la Concurrence to impose a €60 million fine on SNCF for “several practices that hindered or delayed the entrance of new operators in the railway freight sector”.<sup>62</sup> The offenses apparently included RFF allowing SNCF to obtain commercial information about its potential competitors. As mentioned, in late 2012 France was found to be non-compliant with EU regulations in the EU Advocate’s recommendations.

Indeed the Kirchner COM index ranks France at 21st in 2009 and the rating, which scores 334, is barely above the “delayed” category, which Kirchner explains is because “... the national rail passenger transport market is still completely closed ... [and] ... SNCF discriminates against external [non-incumbent] operators”. The situation is only slightly better in freight services, where there are now around 16 independent operators with a 17% market share.

SNCF never accepted the independence of RFF and has battled for reintegration, arguing that the added costs of separation were not justified. In late 2012, the government announced that the infrastructure and operations would be reintegrated, apparently under a holding structure similar to that of Deutsche Bahn. RFF and the infrastructure divisions of SNCF will merge to form a unified infrastructure manager that will be placed under the holding company along with the operations of SNCF. The regulator’s role will continue as an overseer of the new company, but its authority to enforce its recommendations is not well established.

<sup>60</sup> Emile Quinet in Drew and Ludewig (2011), page 81.

<sup>61</sup> Ibid, page 80.

<sup>62</sup> See ERFA press release from 19 Dec 2012.

## 4. Overview of the outcomes

### 4.1 *Monolithic railways*

75. As discussed above, most of the old monoliths are changing, though the impact so far has been felt more in the structure than in the level of competition. Russian Railways is now horizontally separated, and the passenger carrier is a tenant on the infrastructure of the parent corporation. Freight wagon ownership is now largely private. Freight traffic has grown strongly, though it is still not back to Soviet Union levels. Passenger traffic has stabilised and is slowly growing.

76. Change in China is still nascent, and the publicly owned railway continues to occupy a dominant position in transport though, for both passengers and freight, inter-modal competition is growing rapidly. In any event, the planned changes do not envision intra-modal competition in either passenger or freight traffic.

77. In India, driven by rapid economic growth in general and by a lack of highway and air infrastructure, both freight and passenger rail traffic have grown strongly. India plans to invest in all forms of transport, which will create inter-modal competition for rail, but there are no plans to implement any form of intra-modal rail competition.

78. In Turkey the government has considered separating the existing state-owned monolith to introduce some competition, but so far there are no clear plans to undertake such a change. The government has acknowledged that, if Turkey were to join the EU, these reforms will need to be implemented.

### 4.2 *Tenancy railways*

79. The North American approach to freight transport competition in which the private freight railroads face a mix of inter-modal and intra-modal competition (based both on side-by-side and trackage rights competition) has been generally successful in promoting efficient operations and generating roughly adequate finance to cover costs, while charging low tariffs without any significant public support. The performance of the system in the period from deregulation to 2004 and then subsequently, yielded large benefits to railways, shippers and the public, though the growing network congestion up to 2008 has indicated that tariffs would need to rise in order to finance new capacity, and this has led to protests from some shippers. The US Congress continues to consider changes in regulation that would limit railroad ratemaking flexibility, even though the indication is that the financial health of the system might be compromised. At the same time, problems with federal and state budgets are throwing into doubt the past sources of public finance for highways, waterways and airports, opening the prospect of renewed system congestion for all freight modes when the economies return to economic growth.

80. Intercity rail passenger services are provided by Amtrak in the US and VIA in Canada (there is no significant intercity service in Mexico). Both carriers depend heavily on public support, which far outweighs their actual role in the transportation system. Indeed because of the countries' large size and relatively low population density, in North America rail cannot easily compete with other means of transport as far as passengers are concerned. Despite this, there are proposals to invest heavily in improved intercity service in the US, and California has actually started construction of an HSR line from San Francisco to Los Angeles. Implementation of these proposals, and completion of the California system, will require development of a new Federal funding program that currently has unclear prospects because of budget limitations.

### 4.3 *Neutral access railways*

81. Neutral access railways have been relatively limited solutions to specific problems, typically related to ensuring common and neutral access to a freight traffic generating area. The main application has been in the joint terminal companies in North America, including Mexico City, but there are similar port access companies in the EU. Public information on the performance of these kinds of railways is usually limited, but there have certainly been no apparent failures, and the operation of the Mexico City terminal company has been stable, in line with the freight and passenger concessions that own it.

### 4.4 *Vertical separation and open access: the EU*

82. Although progress has clearly been made in formulating and implementing the EU Commission's Directives aimed at creating an open access rail market across the boundaries of the Union, the current status of the system lags significantly in developing effective competition between commercially driven enterprises in national or international freight markets and, even more so, in passenger markets. It is too early to determine if the reason lies in the slow and incomplete introduction of vertical separation and the still large involvement of the state in the sector, or whether this type of structure presents some problems, such as how to set access charges, that are difficult to address. A few observations can be made at this point, though only time will provide better answers.

83. As already discussed one of the major difficulties inherent with implementing vertical separation is how to achieve full cost recovery, while providing incentives for the efficient use of the infrastructure and ensuring non-discriminatory access. Different approaches have been used in the EU, all with their advantages and disadvantages. Some countries have imposed high financial targets on access charges (i.e. a higher degree of recovery of fixed costs), which ensure recovery of the costs, but limit the competitive position of rail operators in both domestic and international traffic.<sup>63</sup> In other countries infrastructure managers receive public funding to cover fixed costs (as encouraged by the EU Commission), but this implies that these entities cannot become truly independent and free from political pressure. This has led to a patchwork of inconsistent and conflicting access charging regimes that almost certainly impedes international competition<sup>64</sup>.

84. Vertical separation allows introduction of competition for the market for socially supported commuter or regional services, but since many European incumbent operators are still publicly owned, they retain considerable power to limit the introduction of tenders, or to raise barriers to entry for potential competitors. Hence, tenders have so far been used only in a few countries and with mixed success. Tenders for relatively small, local systems operated largely for social purposes (as in Sweden and the Netherlands) have been relatively successful. Tenders for intercity services with largely commercial objectives, as in the UK, have faced more problems, with some franchises evolving away from net cost to gross cost as a better understanding of objectives and risks was developed.

85. High-speed passenger services are being developed in many countries and between major European cities, such as Paris, Brussels, Frankfurt, London and Amsterdam. Thus far, however, the skills and resources needed to operate HSR trains are so demanding that in general only consortia including incumbent operators have been able to do so, and this again is giving them an advantage that makes

---

<sup>63</sup> For example in the EU 10 countries access charges place most of the financial burden on freight operators, which clearly constrains their ability to compete with other modes of transport, and this limit necessarily spills over onto international traffic.

<sup>64</sup> Further access charge structures that favour passenger flows over freight flows will also affect competition in the domestic freight market, though the effect will be inter-modal and not intra-modal.

subsequent competitive entry difficult. In Italy a private operator has recently started providing domestic HSR services (see Box B), but it is too soon to say whether it will be successful.

86. The lack of complete and consistent cross-sectional and time series data on EU railways makes it difficult to perform any detailed quantitative analysis of this industry, but from those that are available it is at least possible to derive some conclusions that support some of the observations made above. Table 6 in Appendix 1 proposes a rough comparison of the tariffs charged by different railways, as collected by the Union Internationale des Chemins de Fer. Some caution is needed in interpreting these figures because comparisons across currencies are always approximate, and because the data used are not necessarily all prepared to the same auditing standards. Also, it should not be inferred that costs for providing these services bear any necessary relationship to the revenues derived from them and, of course, overall average revenues cover a wide range of revenues for specific commodities or services.

87. The first conclusions that can be drawn from these figures is that well over half the traffic on the EU 15 (i.e. western EU countries) railways is passengers, whereas this share drops to only about 25% of the traffic on the EU 10 (eastern EU countries) railways. Given that studies have argued that it is inherently more costly to produce a passenger-km than a tonne-km, it is likely that the main target for competition for the EU 15 might be on the passenger side, whereas freight might be more important for the EU 10. A second conclusion is that the EU 10 railways appear to charge far less than the EU 15 (or most railways outside the EU) for passenger services, indicating that the former countries may be generating losses on these services and shifting infrastructure costs to freight. This fact, together with the known propensity of these countries to impose higher access charges on freight operators, suggests that these railways may be limiting the competitiveness of freight services to support passenger services.

88. A different comparison between freight tariffs is also significant. Average freight tariffs in the US (0.017 €/tonne-km) and Canada (0.023 €/tonne-km) are much lower than those in the EU 10 (0.031 €/tonne-km) and the EU 15<sup>65</sup> (0.047 €/tonne-km). As discussed above, however, it is entirely possible that a major portion of the differences among the US, Canada, the EU 10 and the EU 15 can be attributed to factors, such as passenger service schedule priority, freight versus passenger dominance, low axle loads, or short trains, that cannot be readily overcome through enhanced competition among freight operators. Of course better service or greater commercial orientation by the freight operators might well increase their share in the transportation market, but achieving them would require a change in their structure and an effort to resolve issues of priority with passengers. It might also require an increased focus on the physical characteristics of the International Corridors for Rail Freight supported by the EU Commission to ensure consistency in technology and permitting the highest feasible freight train loadings, as well as simplified and more harmonized access charges.

89. Data on passenger volumes, passenger-km and average trip lengths (which can be found in Table 7 in Appendix 1) underline another point. Not only are passenger services a major user of the EU rail networks, but short haul commuter services play a very significant role in many systems. Hence, franchised competition for the markets might be as significant in reducing costs and improving services as competition in the market for long haul services.

---

<sup>65</sup> There are no data available for UK freight tariffs as the UK operators are private and do not report to the Union Internationale des Chemins de Fer. Thus, this number strictly speaking should say EU 14. It is unlikely that inclusion of the UK data, if it were available, would change the average or the conclusion that EU10 and EU15 freight tariffs are significantly higher than in the US and Canada.

## 5. Conclusions

90. This paper outlines some of the changes and reforms that have taken place in the railway industry around the world since 2004, and briefly discusses the problems they have encountered and their impact on the performance of rail services.

91. Different countries have adopted a different combination of structure, balance between private and public ownership and regulation to ensure that end-user prices are at an efficient level, productive efficiency is high and subsidies low, and investment and innovation guarantee a satisfactory level of service quality, safety and consumer/shipper choice. Providing an assessment of the relative merits of the different approaches is not the objective of this paper, but a few interesting conclusions can be drawn from the facts and data examined in it.

92. The North American approach to freight transport, based on a mix of inter-modal and intra-modal competition between vertically integrated privately owned railways, has been generally successful. However, as congestion on the network has been increasing, tariffs may need to rise in order to finance new capacity. By contrast, North American passenger services are largely provided by publicly owned companies: Amtrak in the US and VIA in Canada. There are no significant intercity services in Mexico. So far end user prices have not been regulated, but both carriers depend heavily on public funding, which has been disproportionate to their actual role in the passenger transportation system (as the countries' large size and relatively low population density mean that long-haul, intercity rail does not easily compete with other means of transport).

93. Turkey, China and India still have vertically integrated state-owned railways, and no major reforms are being planned. Russia, however, has started moving away from this model by creating a joint stock holding company responsible for all rail activities and by separating the infrastructure from the operations, but the results of these changes remain to be seen.

94. In the EU the Commission has continued along the path of liberalisation, vertical separation between infrastructure and operations, and horizontal separation of freight, regional passenger and intercity passenger services it started in 1991. Individual member countries are implementing the required reforms and, after a slow start, there has finally been progress on the legal and institutional side since 2004. The development of actual intra-modal competition in EU member states has, however, lagged behind. Hence, to date at least, the expected favourable impacts of separation and competition, such as traffic growth, higher market share compared to other transport modes, increase in cross-border traffic or lower end-user charges do not appear to have emerged to any great degree (though a lack of specific data makes it difficult to measure these impacts with precision).

95. The slow progress in competition among operators, especially for passenger services, may be due to the incomplete separation between infrastructure managers and operators and to the continuing strong presence of the state in the sector, which leads to discrimination in favour of incumbents. It may also be due to the complex patchwork of access charge regimes. Nevertheless, actual results may still be better than those that would have occurred if the old system structure had not changed.

96. Competition for exclusive franchises for subsidised commuter and low-density regional services has made better progress, though only in some countries. Sweden is a good example of relatively successful tenders for smaller franchises, while the UK has experienced a number of problems, but is learning from past successes and failures. Nevertheless the experiences of the last few years have shown

that franchising is complex and some issues, such as risk transfer and incompatibility between franchise length and asset life, require careful attention and resolution.

97. The debate on vertical separation, its problems, its costs and its benefits is still ongoing and new studies continue to focus on estimating the added costs that this type of approach engenders. So far, less attention seems to have been paid to evaluating the benefits, which might well outweigh the costs, at least in some cases. Hence, a clear conclusion has not yet been reached on whether complete vertical separation is better than other structural approaches, at least for countries like EU member states where side-by-side competition will not be possible.

## BIBLIOGRAPHY

- Brown, Richard, (2012) “The Brown Review of the Rail Franchising Programme,” CM 8526, Presented to Parliament by the Secretary of State for Transport in January 2013.
- Christensen Associates, (2010) “An Update to the Study of Competition in the US Freight Railroad Industry, Final Report,” prepared for the Surface Transportation Board.
- Drew, Jeremy and Johannes Ludewig editors (2011), “Reforming Railways: Learning from Experience”, Eurail Press.
- Drew, Jeremy and Chris Nash, (2011), “Vertical separation of railway infrastructure - does it always make sense?” Institute for Transport Studies, University of Leeds, Working Paper 594.
- European Commission, (1996), “White Paper: A Strategy for Revitalizing the Community’s Railways,” COM(96) 421 final.
- European Commission, (2011), “White Paper: Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system.”
- European Commission, (2012), Directive 2012/34/EU, “Establishing a Single European Railway Area (recast)”.
- European Commission, (2013), “The Fourth Railway Package – Completing the Single European Railway Area to Foster European Competitiveness and Growth,” COM(2013) 25 final.
- ECMT, (2007), “Competitive Tendering of Rail Services,” October 2007.
- Ivaldi, Marc and Gerard J. McCullough, (2004), “Subadditivity Tests for Network Separation with an Application to US Railroads,” [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=528542](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=528542)
- Kirchner, Christian, (2011), “Rail Liberalization Index 2011,” IBM Global Business Services, Brussels. Prior issues of this index were prepared in 2002, 2004 and 2007.
- Knieps, Günter, (2013), “Competition and the Railroads: A European perspective,” *Journal of Competition Law and Economics*, doi:10.1093/joclec/nhs040
- Laidlaw, Sam, (2012), “Report of the Laidlaw Inquiry, Inquiry into the lessons learned for the Department for Transport from the InterCity West Coast Competition,” The Stationery Office, London. 6 December 2012.
- Marquette Law Review, (2012), “125 Years since the Interstate Commerce Act: A Symposium in the Form of a Final Convocation,” Volume 95, Number 4.
- McCullough Gerard J., and Louis S. Thompson, (2012) “A Further Look at the Staggers Act: Mining the Available Data”. Elsevier, *Research in Transportation Business and Management*, 10.1016/j.rtbm.2012.11.009.

- McNulty, Roy, (2011), “Realizing the Potential of GB Rail, Report of the Rail Value for Money Study, Summary Report,” Department for Transport and ORR
- OECD, (2005) “Structural Reform in the Rail Industry: Should Train Operations be separated from the Provision of the Track Infrastructure?”, OECD Working Party No. 2 on Competition and Regulation, <http://www.oecd.org/daf/competition/sectors/35911008.pdf>
- OECD, (2011), “Better Economic Regulation: The Role of the Regulator.” OECD ITF Round Tables, No. 150, <http://dx.doi.org/10.1787/9789282103272-en>
- OECD, (2012), “Report on experiences with Structural Separation,” OECD Competition Committee,
- Pittman, Russell, (2012), “The Freight Railways of the Former Soviet Union, Twenty Years On: Reforms Lose Steam,” Elsevier, <http://dx.doi.org/10.1016/j.rtbm.2012.11.010>
- Rail Delivery Group, (2012) “The Brown Review: priorities of the Rail Delivery Group,” PowerPoint presentation
- Thompson, Louis S., Karim-Jacques Budin and Antonio Estache, (2001), Private Investment in Railways: Experience From South and North America, Africa and New Zealand, PTRC Conference, Cambridge.
- Thompson, Louis S., (2007), “Regulatory Reform of Railways in Russia: An Update as of April 2007,” ECMT, 2007
- Thompson, Louis S., (2007) “Railway Accounts for Effective Regulation” ECMT, May 2007
- Thompson, Louis S., (2008) “Railway Access Charges in the EU: Current Status and Developments since 2004,” International Transport Forum, December 2008.
- Thompson, Louis S., (2009), “Railway and Ports Organization in the Republic of South Africa and Turkey: The Integrator's Paradise?” Discussion Paper No. 2009-5 prepared for the OECD/ITF Round Table of 5-6 February, 2009 on Integration and Competition Between Transport and Logistics Businesses.
- Thompson, Louis S. and Jorge C. Kohon, (2013) “Developments in Rail Organization in the Americas, 1990 to present and future directions”, Journal of Rail Transport Planning & Management, <http://dx.doi.org/10.1016/j.jrpth.2013.02.001>
- Van de Velde, D., Chris Nash, Andrew Smith, F. Mizutani, S. Uranishi, Mark Lijesen and F. Zschoche, (2012), “EVES-Rail – Economic effects of Vertical Separation in the railway sector”; Summary Report for CER and Infrastructure companies; by Inno-V (Amsterdam) in cooperation with University of Leeds – ITS, Kobe University, VU Amsterdam University and civity management consultants.
- Vassallo, Jose Manuel and Mark Fagan, (2005), “Nature or Nurture: Why do Railroads Carry Greater Freight Share in the United States than in Europe,” Harvard University Research Working Paper Series WP05-15.

## ANNEX 1.

Table 1: Rail Liberalisation Index for EU Railways

	>800	Advanced	600 to 800	On Schedule	300 to 600	Delayed	<300	Pending Departure		No data										
Country	Overall Liberalization*				2007		2011		LEX				ACCESS				COM			
	2002	2004	2007	2011	Frnt.	Pass.	Frnt.	Pass.	2002	2004	2007	2011	2002	2004	2007	2011	2002	2004	2007	2011
UK	805	781	827	865	848	798	862	852	960	940	969	980	740	715	791	837	780	580	793	866
DE	760	728	826	842	844	809	875	814	840	750	905	935	840	720	807	819	520	505	555	615
SE	760	729	825	872	908	742	896	855	800	680	857	960	760	760	817	850	720	510	633	577
NL	720	695	809	817	887	732	884	779	760	670	865	887	820	710	795	799	460	455	509	680
AT	430	579	788	806	852	727	873	761	680	530	819	895	410	600	781	784	240	232	349	575
DK	720	693	788	825	811	757	851	808	860	790	821	925	770	650	780	800	480	390	498	655
CH	650	677	757	741	848	662	850	680	600	605	670	678	770	710	778	756	440	495	459	509
PL		549	739	737	786	692	826	699		600	783	803		530	728	720		175	490	518
CZ		549	738	738	798	679	783	705		530	839	786		560	713	726		215	279	422
RO			722	726	797	650	834	650			822	783			697	711			440	487
PT	380	668	707	737	797	619	847	676	700	820	829	884	290	605	676	701	220	190	200	434
SK		458	700	738	756	643	793	702		535	853	857		430	662	708		260	381	381
NO	390	589	698	729	836	574	861	652	580	570	777	769	410	595	679	719	140	135	274	482
EE		257	691	729	727	667	781	701		380	728	840		205	680	702		245	704	629
LT		222	684	592	744	624	703	530		260	820	730		210	650	558		165	184	120
IT	560	688	676	737	734	617	809	706	660	740	819	795	680	670	640	722	240	225	293	470
SI		326	665	672	743	585	799	590		550	622	655		230	675	676		120	153	337
BG			652	718	761	557	806	668			722	839			635	688			241	421
LV		516	650	587	733	576	747	500		580	683	780		485	642	539		225	313	411
BE	395	461	649	753	780	518	881	663	380	425	740	820	500	475	626	737	180	180	201	424
HU		366	637	658	740	533	780	592		485	731	822		320	613	616		125	275	522
FI	410	542	636	672	732	540	753	661	620	640	732	729	440	505	612	657	160	140	145	156
ES	195	148	630	583	785	486	770	485	300	250	711	701	180	105	610	554	140	110	151	333
LU	280	467	581	585	688	474	742	508	520	530	551	669	220	440	588	564	152	120	115	104
FR	340	305	574	612	727	431	772	521	340	360	595	650	430	280	568	602	152	130	178	334
GR	210	162	559	592	690	429	698	559	260	305	619	859	240	100	544	525	100	100	133	136
IE	295	149	333	467	458	206	603	399	520	180	332	414	280	130	338	481	100	100	115	120
Sample	17	25	27	27	27	27	27	27	17	25	27	27	17	25	27	27	17	25	27	27
EU 15	484	520	681	718	769	592	808	670	613	574	744	807	507	498	665	695	310	264	325	432
EU 10	-	405	688	690	759	621	785	634	-	490	760	790	-	371	670	664	-	191	346	425
EU 25		480	683	706	765	604	799	655		545	751	800		454	667	683		239	333	429

\* The overall Liberalization Index is a weighted average of the Lex (20%) and ACCESS (80%) indices

Source: Rail Liberalization Index report of indicated year

Note: 2002 Indices were visually estimated from graphs. Numbers shown were then calculated by multiplying the original numbers by 4, 2 and 4 respectively.

Table 2: Summary of Data on Role of External RU's and Rail Role in National Transport

Country	No. of External Rus			Mkt Share of External RU's (%)		Rail Frt Mkt Share		Rail Pass. Mkt Share	
	Frt	Pass	Total	Frt*	Pass**	2001	2008	2001	2008
AT			18	17	10	29.6	27.4	9.7	11.1
BE			6	10	0	10.4	12.8	6.2	7.2
BG	6		6	29	0	36.7	20.5	6.5	4.1
CH	7	14	21	32 AVG		41.5	38.9	13.3	16.0
CZ	40	6	46	18	1	30.1	23.3	8.3	7.1
DE			247	25	12	18.6	22.2	7.6	8.6
DK	2	2	4	100	9	8.2	8.7	9.0	9.4
EE	3	3	6	56	55.3	68.6	44.7	1.9	2.1
ES	5	0	5	5	0	6.8	4.1	5.1	5.5
FI	0	0	0	0	0	24.4	26.5	4.8	5.4
FR			16	16.6	NA	19.0	15.9	8.5	10.1
GB	5	23	28	100	100	10.6	13.4	5.3	6.8
GR	0	0	0	0	0	2.3	2.7	1.9	1.3
HU	0		20	90	0	13.3	12.3	28.1	20.6
IE	0	0	0	0	0	4.0	0.6	3.2	3.4
IT	16	14	30	20	0	10.6	11.7	5.4	5.7
LT	0	0	0	0	0	48.3	41.9	2.5	1.0
LU	0	0	0	0	0	6.5	2.5	5.1	4.3
LV			2	20	0	72.6	61.3	8.0	5.3
NL	26	5	31	100	12	3.4	4.9	9.4	9.7
NO			9	?	13	16.0	15.0	5.0	5.1
PL			?	30	5		30.0	6.9	6.2
PT	1	1	2	?	9.3	6.7	6.1	4.4	4.1
RO	20	4	24	50	2	43.1	19.0	15.5	7.6
SE	4	5	9	56	10***	38.0	35.3	8.0	9.3
SI	2	0	2	7	0	27.0	17.8	2.9	2.9
SK			27	4	0	42.4	23.4	8.0	6.5

\*% of tonne-km

\*\* % of passenger-km

\*\*\* Mostly based on regional transport. Share in intercity transport is still zero.

Source: Kirchner (2011)

**Table 3: Rail Passenger-km as Percent of Total Surface Passenger-km**

	1970	1975	1980	1985	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>EU15</b>	10.4	9.5	8.5	8.2	7.1	6.7	7.0	6.9	6.8	6.7	6.8	7.1	7.4	7.4	7.8	7.6	5.9
<b>EU10</b>	50.1	40.1	35.8	32.6	29.1	16.2	12.3	11.6	10.3	10.3	9.9	9.0	8.6	8.3	7.8	7.3	7.0
<b>EU25</b>	14.4	13.0	11.5	11.2	9.6	7.6	7.5	7.4	7.1	7.1	7.1	7.3	7.5	7.5	7.8	7.6	6.0
<b>Australia</b>	11.1	6.6	5.5	4.8	4.6	4.2	4.3	4.5	4.4	4.3	4.1	4.1	4.3	4.5	4.8	5.1	
<b>Canada</b>						0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
<b>CH</b>	17.2	14.4	13.1	12.5	13.8	12.9	13.1	13.6	14.3	14.5	14.7	15.6	15.9	16.4	16.5	17.0	17.4
<b>China</b>	69.7	66.5	60.6	54.5	49.9	43.5	40.5	39.8	38.9	38.4	39.5	39.5	39.5	38.5	38.4	36.8	
<b>India</b>							94.3	14.8	15.5	15.0	14.2	12.6					
<b>Japan</b>	50.4	47.3	42.2	40.3	31.2	30.4	28.8	28.8	28.6	28.7	28.9	29.5	30.1	30.6	30.9		
<b>Korea</b>								18.1	17.5	15.5	21.5	21.4	21.5	21.4	21.2		
<b>Mexico</b>	6.6	3.8	3.3	2.8	1.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	
<b>NO</b>	8.1	6.9	7.2	5.8	4.9	5.2	5.7	5.5	4.9	4.8	5.0	5.2	5.3	5.4	5.5	5.4	4.6
<b>RUSSIA</b>	65.6	58.5	52.0	50.6	51.1	50.5	49.1	47.9	47.3	48.8	49.4	54.8	56.7	53.8	53.7	51.8	-
<b>Turkey</b>	11.9	6.5	7.6	6.6	4.5	3.6	3.0	3.2	3.1	3.5	2.9	2.7	2.7	2.6	2.4	2.5	0.7
<b>US</b>	0.4	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	

Source: See Index 139 in Publications at [www.tgaassoc.com](http://www.tgaassoc.com)

**Table 4: Rail Freight Tonne-km as Percent of Total Surface Freight Tonne-km**

	1970	1975	1980	1985	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>EU15</b>	32.0	23.4	21.5	20.4	20.2	15.4	15.6	14.9	14.4	14.4	14.3	13.7	14.3	14.2	14.2	11.6	12.8
<b>EU10</b>	77.3	72.9	65.9	65.8	59.8	45.5	40.0	36.9	35.0	34.3	31.9	29.0	27.5	26.0	24.9	22.2	23.3
<b>EU25</b>	46.6	40.6	36.7	35.6	30.9	21.7	20.1	19.0	18.5	18.5	18.1	17.1	17.4	17.0	16.8	14.3	15.6
<b>Australia</b>	59.6	64.8	56.2	51.3	51.9	49.7	49.7	49.6	50.7	51.4	51.7	52.4	52.2	52.9	53.5		
<b>Canada</b>							73.7	75.3	75.2	75.7	71.6	74.5	75.3	77.4	71.7	68.3	
<b>CH</b>	53.0	46.6	49.0	44.2	41.2	39.6	44.3	43.4	42.0	40.8	42.2	42.0	42.7	40.8	41.0	38.2	39.4
<b>China</b>	76.5	58.2	47.5	44.2	58.8	54.5	50.6	54.8	54.2	54.8	52.0	49.8	47.6	45.2	32.5	30.6	
<b>India</b>							84.4	36.7	36.8	36.5	36.6	30.0	36.4				
<b>Japan</b>	31.7	26.6	17.3	9.6	9.0	7.9	6.6	6.6	6.6	6.6	6.4	6.4	6.3	6.2	6.0	5.7	6.2
<b>Korea</b>								10.4	10.5	10.1	9.5	9.1	8.8	9.4	9.9		
<b>Mexico</b>	34.5	38.5	33.4	31.2	25.1	18.8	19.9	19.5	21.1	21.7	21.4	26.1	26.0	25.8	24.7	24.6	26.3
<b>NO</b>	31.2	24.8	24.0	21.6	13.7	9.9	9.7	10.2	8.9	8.1	9.3	9.7	10.4	10.7	11.1	12.3	11.7
<b>Russia</b>	76.2	69.3	59.8	59.8	59.0	57.0	58.6	58.0	56.8	57.0	56.4	56.4	57.5	59.3	60.3	57.9	59.4
<b>Turkey</b>	22.5	18.0	8.9	9.1	5.7	6.8	4.3	3.7	3.5	4.8	5.2	5.0	4.9	4.8	4.6	4.4	4.7
<b>US</b>	39.5	36.5	38.7	36.7	37.5	40.2	41.5	42.1	41.5	42.1	43.5	43.9	45.2	45.2	44.6		

Source: See Index 139 in Publications at [www.tgaassoc.com](http://www.tgaassoc.com)

Table 5: Freight Traffic Changes in EU Railways 2001, 2003 and 2010

	Railway	Percent International Tons			Avg Lgth of Haul (km)		
		2001	2003	2010	2001	2003	2010
<b>AT</b>	ÖBB	75.4	76.3	65.0	202.9	206.7	196.4
<b>BE</b>	SNCB/NMBS	83.7	68.3	61.3	63.7	130.9	148.9
<b>BG</b>	BDZ	14.5	20.4	30.5	254.3	262.7	218.2
<b>CZ</b>	CD	59.3	62.2	60.6	189.4	183.1	180.9
<b>DE</b>	DB AG	34.9	36.5	36.5	268.8	276.0	313.4
<b>EE</b>	EVR	100.0	90.8	85.7		218.2	211.1
<b>ES</b>	RENFE	19.0	18.8	15.6	463.0	447.5	461.8
<b>FI</b>	VR	42.4	42.6	35.0	236.5	231.0	272.4
<b>FR</b>	SNCF	45.1	43.2	18.7	399.1	388.1	354.5
<b>GR</b>	OSE	87.2	70.6	86.4		175.9	184.6
<b>HU</b>	MÁV Rt.	62.6	69.6	74.3	170.5	177.3	200.2
<b>IT</b>	FS	61.7	62.6	53.8	279.4	273.2	284.2
<b>LT</b>	LG	78.3	87.5	70.6	265.3	263.7	279.5
<b>LU</b>	CFL Cargo	89.8	84.4	75.3	34.4	35.5	31.4
<b>LV</b>	LDZ	93.1	95.2	97.4	374.3	364.1	268.0
<b>PL</b>	PKP	41.1	46.5	36.3	287.5	293.0	268.1
<b>PT</b>	CP CARGA	10.4	10.4	5.1	235.2		209.5
<b>RO</b>	CFR Marfa	18.0	25.3	12.1	221.7	213.2	182.8
<b>SI</b>	SZ	90.6	92.0	77.4	191.7	190.9	210.4
<b>SK</b>	ZSSK Cargo	78.9	83.5	88.6	203.9	200.2	198.6
<b>CH</b>	SBB CFF FFS		58.1	53.4		169.7	163.3
<b>HR</b>	HZ	78.7	68.7	83.6	191.9	212.1	214.5
<b>TK</b>	TCDD	6.6	11.1	11.6		549.6	470.6
<b>EU15</b>		51.6	48.2	42.6	252.7	270.1	278.3
<b>EU10</b>		50.0	46.6	60.7	163.7	201.8	232.1
<b>EU25</b>		50.8	47.4	50.5	208.1	235.9	258.1

Source: See Index 139 in Publications at [www.tgaassoc.com](http://www.tgaassoc.com)

Table 6: Rough Comparisons of International Railway Tariffs (2010 data)

		Passenger revenue (000,000 €)	Passenger-km	Rev/pass- km	Freight revenue (000,000 €)	Tonne-km	Rev/tonne- km
AT	ÖBB	1,629	10,186	0.160	1,925	26,045	0.074
BE	SNCB/NMBS	1,393	10,493	0.133	267	6,542	0.041
DE	DB AG*	13,357	77,221	0.173	4,584	105,800	0.043
DK	DSB	1,192	7,405	0.161			
ES	RENFE	1,705	20,977	0.081	231	7,419	0.031
FI	VR	422	3,959	0.107	331	9,750	0.034
FR	SNCF	12,513	84,860	0.147	1,134	22,840	0.050
IE	CIE	164	1,677	0.098	5	92	0.055
IT	FS	5,048	43,349	0.116	892	13,405	0.067
LU	CFL	203	347	0.584			
NL	NS	2,835	15,352	0.185			
PT	CP	210	3,718	0.057			
PT	CP Carga				59	1,932	0.030
SE	GREEN CARGO				557	17,100	0.033
SE	SJ	667	6,774	0.098			
UK	ATOC	7,609	54,100	0.141			
	<b>EU 15 Average**</b>	41,337	340,418	0.121	9,985	210,925	0.047
BG	BDZ	41	2,105	0.020	74	2,352	0.032
BG	BRC				14	630	0.022
CZ	CD	262	6,553	0.040	558	13,564	0.041
EE	EVR				44	6,261	0.007
HU	FLOYD				5	102	0.049
HU	GySEV/RÖEE	16	186	0.089	43	740	0.057
HU	MAV	246	5,259	0.047			
LT	LG	22	373	0.060	346	13,431	0.026
LV	LDZ	15	83	0.182	250	13,175	0.019
PL	PKP	656	15,715	0.042	1,164	34,327	0.034
RO	CFR Calatori	466	5,248	0.089			
RO	CFR Marfa				237	5,611	0.042
RO	CTV				13	614	0.022
RO	GFR				124	2,984	0.041
RO	TFG				14	319	0.044
RO	SERVTRANS				35	1,152	0.030
SI	SZ	79	813	0.097	118	3,617	0.033
SK	ZSSK	85	2,291	0.037			
SK	ZSSK Cargo				328	8,180	0.040
	<b>EU 10 Average</b>	1,890	38,626	0.049	3,364	107,059	0.031
CH	BLS	129	834	0.154			
CH	BLS Cargo	-			126	952	0.132
CH	SBB CFF FFS	2,321	16,868	0.138	652	7,778	0.084
NO	NSB	526	2,750	0.191			
RU	RZD	1,066			23,277	2,011,308	0.012
TR	TCDD	99	5,491	0.018	230	11,300	0.020
CA	Total Canada	207			6,905	299,731	0.023
US	AAR Class I	-			42,637	2,468,738	0.017
US	AMTRAK	1,303	10,197	0.128			

\* Data taken from DB Annual Report for rail freight only (excludes trucking)

\*\* Data not available for Greece and freight data not available for UK

Source: UIC International Railway Statistics 2010, Tables 51, 61 and 72

Table 7: Commercial Passenger Traffic on the National Territory

	Railway	PASSENGERS (000)					Passenger-Km (000,000)					Average Trip Length (Km)			
		Commuter	Intercity Internat.	Intercity Dom.	Total	Percent Commuter	Commuter	Intercity Internat.	Intercity Dom.	Total	Percent Commuter	Commuter	Intercity Internat.	Intercity Dom.	Total
BE	SNCB/NMBS	144,334	15,949	60,096	220,379	65.5	5,684	1,488	3,321	10,493	54.2	39.4	93.3	55.3	47.6
DE	DB AG	1,226,432	13,910	656,235	1,896,577	64.7	17,916	4,931	54,374	77,221	23.2	14.6	354.5	82.9	40.7
DK	DSB		35,355	162,880	198,234			1,512	5,893	7,405	-		42.8	36.2	37.4
ES	RENFE		712	453,035	453,747			557	20,420	20,977	-		782.3	45.1	46.2
FI	VR		346	68,604	68,950			90	3,869	3,959	-		260.1	56.4	57.4
FR	SNCF	690,081	21,690	365,657	1,077,429	64.0	14,631	6,805	63,424	84,860	17.2	21.2	313.7	173.5	78.8
GB	ATOC	586,294		744,887	1,331,180	44.0	15,067	...	38,249	53,316	28.3	25.7		51.3	40.1
IE	CIE			38,226	38,226				1,677	1,677	-			43.9	43.9
NL	NS	...	...	...	324,005		1,890	176	13,286	15,352	12.3				47.4
PT	CP	79,837	140	50,105	130,082	61.4	1,291	103	2,325	3,718	34.7	16.2	737.1	46.4	28.6
BG	BDZ	-	446	29,670	30,116	-	-	60	2,045	2,105	-		135.0	68.9	69.9
CZ	CD	76,375	2,338	83,977	162,690	46.9	2,172	326	4,055	6,553	33.1	28.4	139.4	48.3	40.3
EE	EVR		98	4,707	4,805			18	230	248	-		183.7	48.9	51.6
HU	MAV	56,377	1,988	46,388	104,753	53.8	1,547	338	3,374	5,259	29.4	27.4	170.0	72.7	50.2
LT	LG	844	881	2,638	4,363	19.3	23	147	203	373	6.2	27.3	166.9	77.0	85.5
LU	CFL	-	5,374	12,621	17,995			101	246	347	-		18.8	19.5	19.3
LV	LDZ	-	320	18	338			79	4	83	-		246.9	222.2	245.6
PL	PKP	94,135	1,695	92,852	188,682	49.9	4,818	516	10,381	15,715	30.7	51.2	304.4	111.8	83.3
RO	CFR Calatori	20,710	442	36,518	57,670	35.9	602	129	4,517	5,248	11.5	29.1	291.9	123.7	91.0
SI	SZ	6,574	926	8,720	16,220	40.5	196	134	483	813	24.1	29.9	144.5	55.4	50.1
SK	ZSSK		2,858	42,146	45,004			188	2,104	2,291	-		65.7	49.9	50.9
NO	NSB				50,476			72	2,678	2,750	-				54.5
JP	CJRC	266,035		249,030	515,065	51.7	6,851	-	45,891	52,742	13.0	25.8		184.3	102.4
JP	EJR	3,794,950		2,260,612	6,055,562	62.7	73,737	-	51,795	125,532	58.7	19.4		22.9	20.7
JP	HRC	74,308		52,669	126,977	58.5	1,426	-	2,823	4,249	33.6	19.2		53.6	33.5
JP	KRC	196,514		101,340	297,854	66.0	3,937	-	4,138	8,075	48.8	20.0		40.8	27.1
JP	ShRC	28,641		16,469	45,110	63.5	598	-	781	1,379	43.4	20.9		47.4	30.6
JP	WJRC	1,133,071		645,345	1,778,416	63.7	23,411	-	29,203	52,614	44.5	20.7		45.3	29.6
KR	KORAIL	9,887		1,051,054	1,060,941	0.9	603	-	32,409	33,012	1.8	61.0		30.8	31.1

Source: UIC, International Railway Statistics, 2010, Table 51