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Competition and Regulation in Rail Passenger Transport:  
The Effects of the Proposed Recast of EU Legislation

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## Glossary

CER	Community of European Railway and Infrastructure Companies (interest group)
CT	Competitive tendering
DB	Deutsche Bahn
DG	Directorate General (Departments at the European Commission)
EC	European Commission
EIM	European Rail Infrastructure Manager (interest group)
EP	European Parliament
EPTO	European Passenger Transport Operators (interest group)
ERA	European Railway Agency
EU	European Union
EU-27	All member states
EU-15	All member states until accessions in May 2004
EU-12	All new member states since enlargement in May 2004
IFER	Imposition forfaitaire sur les entreprises de réseaux (General tax on rolling stock in France)
IM	Infrastructure manager
MEP	Member of the European Parliament
Pkm	Passenger-kilometer (realized kilometers driven multiplied with the number of passengers)
PSO	Public service obligation
RFF	Réseau ferré de France (French railway infrastructure manager)
RRPT	Regional rail passenger transport
RU	Rail undertaking
SNCF	Société nationale des chemins de fer français
TFEU	Treaty on the Functioning of the European Union
Tkm	Train-kilometer (realized kilometers driven)
TOC	Train operation company
UE	Union Européennes
UITP	Union international des transports publics (International Association of Public Transport)
URSF	Ufficio per la Regolazione dei servizi ferroviari (Italian regulatory authority)

# 1 Introduction

Railways are a matter of European integration. They transport goods and citizens across borders, are environmentally friendly and promote European high-technology in the world. Yet, the rail transport experiences a severe decline in the four decades to 2000 as low customer satisfaction impacts the demand and cost inefficiencies require burdensome subsidies.

By separating the infrastructure from operations of historic incumbents and opening the rail network to new entrants, the railway reform counteracts inefficiencies through competition. The gradual adoption of different regulations and directives leads to an ambiguous regulatory framework, responsible for the variety of implementation in the EU member states today.

The Commission's answer to that is to recast the legislation in order to establish a single European railway area. Presented on September 17, 2010, the proposal is currently assessed by the Parliament and the Council, as well as by stakeholders in the industry.

Whereas there is wide agreement on the positive effects of rail freight liberalization, the optimal regulation of rail passenger transport is still controversially discussed. Strong economies of scale, scope and density drive companies to integrate vertically. The sector receives huge subsidies and requires strong coordination.

Leaving aside the general debate on pros and cons of railway privatization, I embed the railway reform in the theoretical context of competition in network industries. Using empirical evidence, I examine the outcome of the institutional framework to date. Most of all, I seek to shed some light on the prospective effects of the proposed recast. I want to evaluate the proposal's potential to increase the competition on the market, assess the strategic implications on the current competitive landscape and reveal possible shortfalls of the proposal.

Section 2 presents the economic principles of railway regulation by emphasizing the motives, the means and the limits of regulation. The theoretical framework helps to examine and to understand the European approach to railway regulation, presented in section 3. There, I also summarize empirical findings on the outcome to date and present the proposed act. Section 4 evaluates the effects of the proposed recast on competition, reveals its shortfalls and discusses options to complete the liberalization. Section 5 summarizes the major findings and concludes.

## 2 Economics of railway regulation

This section addresses fundamental questions of railway regulation. Why do governments liberalize and regulate the railway market? How do they introduce competition to the market? Does regulation implies negative effects on production and output?

I answer those questions using economic principles underlying the theory of network industries.<sup>1</sup> In sections 2.1 and 2.2 I refer to Höppner (2009, pp. 29-41 and pp. 235-258) if not otherwise specified.

### 2.1 Motives for a sector-specific regulation

Governments use regulatory policies in order to establish and maintain competition on markets which tend to cause welfare costs as a result of market failures. They generally prefer not to intervene in specific markets as the economic theory predicts open competition to be the best mean to promote welfare maximization. Thus, the state intervention in the railway market has to be justified by the existence of market failures and the constitutional obligation to shape the market in respect to the general public interest, against the economic logic and the social shortfalls of Pareto-optimal resource allocation.

#### 2.1.1 Market failures in network industries

Knieps (2001, p. 11) describes a market failure as a situation in which perfect competition is not given. Perfect competition is desirable since it is characterized by efficiency-increasing functions, as mentioned hereafter.<sup>2</sup>

First, on a market with perfect competition, the demand determines the production of firms. This promotes the efficient allocation of rare resources (*allocation function*). Further, prices reflect the optimal economic value of goods, as the customer can freely choose the a particular product at a certain price (*control function*). In order to attract customers and to improve profit margins, companies invest into research and development. New production processes may allow to produce more efficiently and new products permit to exploit new markets or to charge premium prices (*innovation and progress function*). Moreover, a great share of that benefit is transferred to the customer because the manufacturer is willing to market its product before other competitors catch up (*transfer*

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<sup>1</sup> Whenever I present economic theories, I do not use conditional clauses. Still, those principles are partly based on assumptions and subject to limitations.

<sup>2</sup> The academic literature provides different models of the functions of competition (Herdzina, 1999, p. 31). Therefore I use a conclusive summary, suitable for this purpose.

*function*). Finally, a company that does not produce efficiently will make losses and disappear from the market (*selection function*).

Accordingly, competition improves the efficiency of a market. Whenever a single company possesses a market-dominating position, it impedes competition and hence creates welfare costs because resources are not allocated efficiently. The quality of the products is suboptimal since *selective pressure* is not given. The prices for products are exaggerated as a result of a missing control function of competition.

Such market failures have different origins. Using the example of the railway market, I focus on *natural monopolies*, *external effects*, *opportunistic behavior*, *asymmetric information* and *ruinous competition*.

### ***The natural monopoly***

A natural monopoly defines a situation in which a single company is able to produce a certain product, satisfying a relevant demand, at lower costs than several companies in competition (Aberle, 2009). In the case of the railway industry, the product in question is the track access slot on the railroads. High economies of scale and scope in the industry explain the emergence of a natural monopolist. As a result of high fixed costs, it is more efficient to allocate those fixed costs to all customers, leading to a strong cost per unit degression. Such natural monopolies should be regulated, as the production can be provided by a single company at lowest costs. In that case competition wastes resources which can be allocated alternatively.

In the railway industry, the railroad network - being an essential part of the infrastructure - engenders such high fixed costs. Hence, the infrastructure operations (network planning, construction, maintenance, sales i.e. path allocation, train control) are considered to be a natural monopoly. New entrants into the market of railway path provision have to build new railroads and even a whole network, in order to satisfy the least demand. This is a waste of land and resources.

Accordingly, a monopolist provides the railroad path provision at lowest costs. Despite that, as a monopolist, he operates inefficiently and sells its product at comparable high costs since he is not subject to competitive threats. One concludes that the existence of natural monopolies requires regulation.

### ***External effects***

If a new entrant builds railroads alongside the lines of the incumbent monopolist, he causes external effects to the communities as those lines require a lot of space.

This is an example for an external effect, defined as an effect being positive or negative for others without having implications on the causal agent. Other external effects include the noise of the track using and costs of jams. Again, regulation is the answer to minimize external negative effects of the railway industry.

Besides those negative considerations, one may also think about positive network effects in railways. The more passengers use an infrastructure, the higher its value for the users. A unique network enables also the establishment of a single technological standard. Technical differences caused by parallel networks decrease the value for companies using the infrastructure significantly.

### ***Opportunistic behavior***

Another market characteristic leading to market failures is opportunistic behavior. It describes a behavior where a market participant hides relevant contract information in order to create a situation to his advantage. It appears on the vertical dimension of the railway industry, namely between the infrastructure manager (IM) and the train operating companies (TOC). On the one hand, the TOC depends on the IM as the railroads are essential to run the trains. On the other hand, the IM depends on the TOC in order to sell its product (rail network slot) to generate revenue. The IM makes large investments into railroads and supporting facilities and pays for regular maintenance ex-ante in order to offer its product. Railroads are highly specific and durable assets as they can not be used for other purposes than to run trains. That implies that the infrastructure is characterized by large sunk costs, i.e. costs that can not be recovered at a market exit, establishing a high barrier to exit. In contrast to that, the TOC can even choose to lease its rolling stock in order to minimize the fixed capital and to be flexible, making a market entry and exit very easy. This industry characteristic creates a one-sided bias regarding the contract bargaining power, favoring the TOC. The IM will therefore expect any contractual agreement for which the revenue covers the marginal costs and at least a minor part of the fixed costs. The TOC, being more flexible, could disrupt the negotiations at any point of time and even through contractual exit clauses. The contractual negotiations provoke numerous interactions as there is a high need for technical coordination, including track possession planning, train surveillance, train station management, ticket services and pricing issues. Moreover, the IM seeks to diminish the potential risk of opportunistic behavior by clarifying all possible contract problems ex-ante. Both the numerous interactions and the risk of incomplete contracts engender high transaction costs.

This one-sided threat results in hold-up problems and generally low motivation to enter a network industry on the infrastructure segment. This so-called *hold-up problem* describes a low investment level of the IM resulting from the high asset specificity and durability.

As a result, there is a strong tendency to integrate vertically if there is no regulation. Vertical integration prevents risks arising from opportunistic behavior, as it enables a long-term planning of the infrastructure usage. Again, this vertical integration favors the creation of a monopoly which is seen to be economically suboptimal in terms of productive efficiency. This constitutes another motive for the regulation of the railway industry, particularly for the regulation of track access charges in order to protect the IM from opportunistic behavior.

#### ***Asymmetric information***

In network industries, information concerning the network infrastructure are essential to enable new entrants to enter competition. Asymmetric information between potential competitors lead to an inefficient allocation of resources as they favor those companies which possess the information; which are not necessarily those which can operate most efficiently. Hence, discrimination is not desirable and must be addressed by market regulation.

In the railway industry, those information include, for example, basic instructions as a map of available lines, the state of electrification, the availability of support facilities as train stations, maintenance facilities or fuel stations. Any company that can not easily access those information or only with efforts at high costs is in practice excluded from the market.

#### ***Ruinous competition***

Sometimes companies engage into market expansion despite weak demand which leads to the survival of the one with the best financial reserves rather than the one with the best performance. This may be the result of very high fixed costs in the railway industry. This ruinous competition is another reason for the market failure of network industries and should thus be prohibited regulatory.

All those points lead to the conclusion that the railway industry is characterized by numerous factors which lead to a market failure of the railway market. This is not desirable as it implies high welfare costs for the community and suboptimal quality levels of the railway services. Therefore, the market failure calls for governmental intervention using market regulation.

### 2.1.2 General public interest

In respect to the political objective of social inclusion and coherence preservation, governments may decide to provide a certain good or service which would not be produced under perfect competition as the resources would be allocated to different productions more efficiently.<sup>3</sup>

In network industries, where the infrastructure and maintenance engenders high fixed costs, the companies would tend to act Pareto-efficient where the demand is high and geographically dense. Hence, secluded parts of the society would not have access to the service at all or at much higher costs if the fixed costs would be allocated to the customers of the specific regions.

The European Commission (hereafter referred to as "EC" or "the Commission") (2004, p.22) specifies in a white paper that "the concept of services of general economic interest [...] covers in particular certain services provided by the big network industries such as transport, postal services, energy and communications."

Another important aspect are environmental concerns which can justify governmental intervention. External costs of railway transportation are comparatively low (appendix 2). Regulation could favor the usage of rail transport in order to increase its modal share and to protect the environment and the community.

The above-mentioned characteristics of the industry show that the regulation of the railway market is inevitable if one considers the high welfare costs engendered by monopolistic competition. The rational firm acts opportunistic and tends to integrate vertically. Moreover, it would concentrate its business on profitable lines only and neglect secluded parts of the society. To cope with monopolistic inefficiency, the regulation must aim to introduce competition in the railway industry and to provide non-discriminatory access to the essential infrastructure.

## 2.2 Mean of regulation: regulated network-access

Introducing competition to a network industry requires to locate the segment of the industry which is *competitively viable* and therefore *contestable*. This segment has to be distinguished from the segment which can best be provided under monopolistic competition due to high economies of scale, being the infrastructure management. The introduction of competition therefore requires *regulated*

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<sup>3</sup> In Germany, for instance, the government is constitutionally bound to an obligation on protection and supply (Schutz- und Versorgungsfunktion des Staates). This includes the supply of public passenger transport.

*network-access* so that the monopolistic provider of the slots of the infrastructure operates in a non-discriminatory way.

Competition in railways was not always desirable. By the end of the 19th century, governments nationalize railways and this approach was useful for the following reasons (Soldner, 2008, pp. 105-106). First, a centralized management prevented the construction of parallel networks and by that a waste of land and resources. Second, governments considered general public interests and developed a widespread, extensive network including secluded parts. In a state monopoly, the government could use cross-subsidization to refinance loss-making lines. Third, a unique network guaranteed a technical standard and therefore ensured interoperability on the national level.

However, today there are more inefficiency threats than advantages arising from monopolistic competition. Technological progress has led to better technologies and lower costs which enable more than one company to operate profitable on particular steps of the value chain. The traditional assumption that network industries include the operations produced on the network is not valid anymore. One must therefore identify and delimit the contestable market segment from the essential infrastructural facilities.

### **2.2.1 The contestable market segment**

The potentially competitively viable market segment of the railway industry are the operations on the network including rail freight and rail passenger transport, the latter comprising both inter-city and regional passenger transport.

As for the infrastructure operations, economies of scale can be achieved for the operations. However, those economies of scale are limited and are not necessary to run passenger and freight operations more profitably than larger competitors. The railway sector is also characterized by economies of route density and economies of length of haul where average costs diminish with the number of passengers transported on a specific line and with an increased length of the line with fewer stops. Both are limited as well and therefore support the argument that rail operations are not part of the natural monopoly.

Moreover, the train operating company has very low barriers of entry and exit. The rolling stock can be leased or bought. It is easy to buy and sell locomotives and wagons on the market for used material.

### 2.2.2 The incontestable market segment

Freight and passenger rail transport need a railroad infrastructure and supporting facilities in order to operate. As stated above, the railway infrastructure can be best provided under monopolistic competition due to high economies of scale in general and specific and durable investments in particular.<sup>4</sup> The latter implies that the infrastructure is characterized by large sunk costs. As the introduction of competition in operations is desired, one must guarantee non-discriminatory access to the rail network and to all essential facilities. This implies strong legal regulation and steady control. As strong regulation represents a heavy intervention in ownership rights, one must strictly limit the regulated network-access to the *essential facilities*.

Essential facilities are the necessary input for the provision of railway services and characterized by the fact that there are no market alternatives and that they are difficult to duplicate.

In order to delimit essential infrastructural facilities from those which are fungible, Ott (2006) structures the infrastructure as follows:

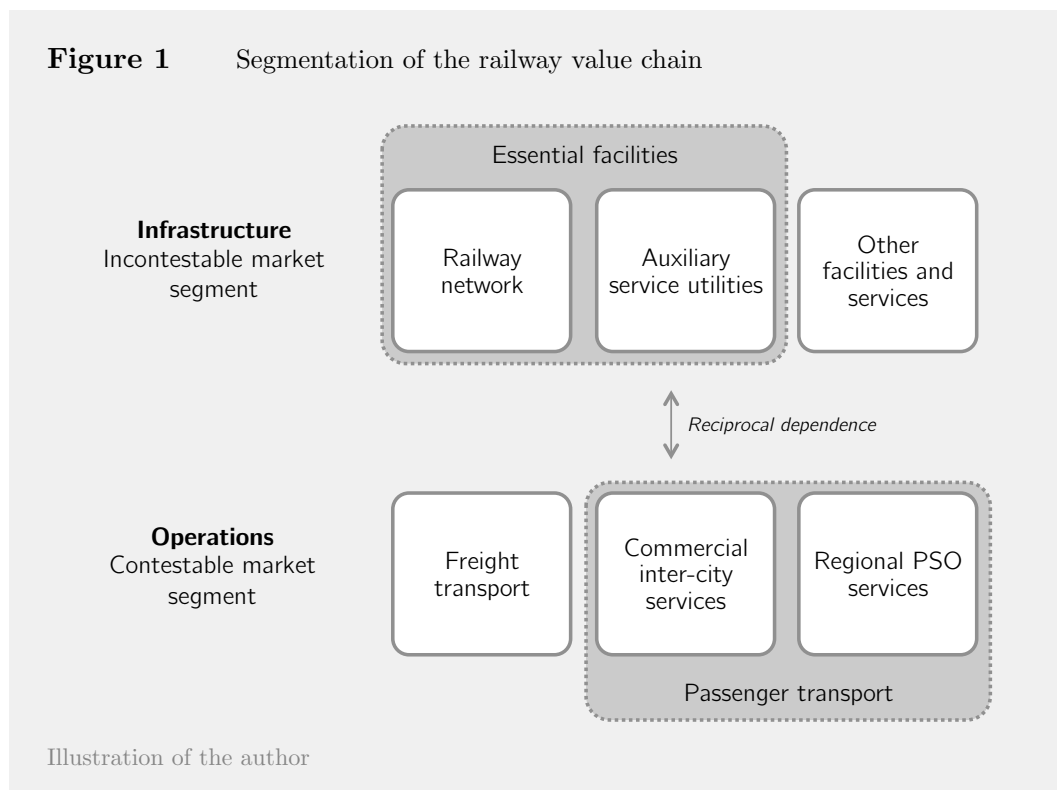
- i) railway network (railroads and signalling installations),
- ii) auxiliary service utilities (facilities for electricity and fuel supply, passenger, shunting and freight stations, sidings, train composition facility),
- iii) other facilities and services (preheating, inspection, maintenance, cleaning, supply of electricity and fuel, telecommunications network).

The *railway network* is characterized as a natural monopoly due to high economies of scale. Therefore, access to it has to be regulated. *Auxiliary service utilities* are not considered to have significant economies of scale. However, using the railway network only makes sense if one uses those service utilities as well. Both compose an inseparable entity. For example, running a passenger train without having access to train stations obviously makes no sense. *Other facilities and services* are considered to be duplicatable or to have alternatives (Zauner, 2006, pp. 106 et seq.). Hence, governments should desist from regulating them.

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<sup>4</sup> Theoretically, competition can be introduced to the infrastructure segment. One may imagine to tender and to award certain value-added steps of the infrastructure (network planning, construction, maintenance, sales i.e. path allocation, train control) for a defined period of time so that competitors make bids for the operations of the infrastructure. However, this approach risks to create severe under-investments by the end of the contract term as the IM would not be sure to win the contract again and as he would not know if he could appropriate the return of potential investments. Therefore, I do not pay closer attention to the potential competition on the infrastructure segment.

**Figure 1** Segmentation of the railway value chain



In order to establish a sustainable competition on the *market for network access*, the government must ensure the access at equal rights and costs for all companies willing to enter the market.

### 2.2.3 Vertical separation

A normative framework is not sufficient to counteract discrimination on the network. Equal access rights can only be achieved if decisions regarding track allocation are taken independently from all train operators.

This necessity opens possible regulatory alternatives in between two extremes. First, one may leave the infrastructure management vertically integrated with the incumbent operator, but make all essential decisions regarding access charging and path allocation by an independent regulatory authority. Second, one may totally separate the ownership of the essential infrastructural facilities and the operations of the vertically integrated historic incumbents. Such a vertical separation, also increasingly referred to as *vertical unbundling*, counteracts the risk of operator discrimination as well. The independent IM then tries to maximize its profits no matter the origin of the TOC. The first extreme should only be adopted if vertical unbundling would fail to work. The latter promises the best solution against discrimination. Yet, this requires a heavy intervention in terms of property rights and is therefore politically unlikely.

A compromise solution is to let both the essential infrastructural facilities and the train operations in the ownership of the same holding company but to create separate divisions with separate accounts, including balance sheets and profit and loss accounts. This *holding model* enables a greater cost revelation of the infrastructure manager and prevents opaque cross-subsidization within the two branches. Still, the holding company may force the IM to favor the own TOC if bottlenecks on the network occur and to discriminate competitors in order to maximize holding profits. Therefore, the holding model requires strong regulation and surveillance of the practices of the IM.

#### **2.2.4 Introducing competition on the operations segment**

As stated above, the operation of passenger railways is characterized by economies of scale. Regional rail passenger transport (RRPT) often struggles with low demand. Therefore, RRPT, including sub-urban and urban services, is typically loss-making whilst long-distance inter-city services can be run profitably (Di Pietrantonio and Pelkmans, 2004). However, in respect to the general public interest, governments subsidize RRPT and award the operations under public service obligations (PSO) to TOCs. The awarding procedure can be opened to *competition for the market* through competitive tendering. Commercial inter-city services can be opened to *competition on the market* through a standardized track allocation procedure. Here, state-subsidization is not necessary as companies will operate services for commercial interests.

##### ***Competitive tendering for regional rail passenger transport***

In a competitive tendering procedure, a regional authority is inviting TOCs to bid for a specified transport service for a limited period of time. The aim is to attract as much competing operators as possible, offering quality and efficiency improvements while minimizing the necessary subsidization.

The contractual conditions are crucial for the outcome of this *franchising model*. Quality and service expectations have to be carefully determined while leaving some commercial freedom to the bidding TOCs. Later on, those expectations serve as key performance indicators. Moreover, the duration of the contract is all-important for the behavior of the firm. Too short durations limit the investments of the firm as they will not appropriate their total return and too long durations lead to monopolistic behavior. Competitive tendering for limited durations creates competitive pressure without the adverse effects of competition on the market (Rong and Bouf, 2005). Long term contracts furthermore allow to do long term

financial planning and favor investment commitments on the infrastructure side (Seabright, 2003).

### ***Competition on the market***

Whenever the revenues for a specific service cover costs and offer a profit margin, open competition on the market can be introduced. New entrants can duplicate the service and use differentiation potentials in order to gain market shares. They can differ on quality, schedule, comfort and other aspects (Di Pietrantonio and Pelkmans, 2004). The independent planning of point-to-point services is based on managerial and entrepreneurial freedom with more flexibility (Seabright, 2003). Hence, TOCs can deliver a higher innovation potential.

In order to introduce and maintain sustainable competition on the market, the regulatory authority must fulfill three important requirements. First, it has to ensure realistic charging fees that reflect the real marginal and parts of the fixed costs of the infrastructure management. Second, it has to set up rules for the handling of conflicting bottlenecks whenever two TOCs apply for the same slot. Third, it has to ensure transparent information on the network through available network statements. Again, it is very important that barriers of entry and exit are low thanks to an existing market for rolling stock.

## **2.3 Negative effects of vertical separation and market liberalization**

The railway regulation counteracts not only to inefficiency but also leads to additional costs and potentially to qualitative deterioration as a result of coordination failures (Nash, 2010; Cantos, 2001). Negative repercussions include the appearance of “cherry picking” whenever new entrants try to duplicate the most profitable connections only, whether competing on the market or for the market (e.g. Nash, 2010; European Commission, 2010c).

### **2.3.1 Transaction costs**

As stated above, the management of the railway infrastructure engenders large sunk costs as the assets are highly specific and durable. In new institutional economics one assumes that highly specific assets favor vertical integration in order to minimize the risk of downstream market failures (Williamson, 1985). Any contract in a market is considered to be incomplete at some point, i.e. it does not cover all contingent violations of the contract.

*“Transaction costs economics subscribes to bounded rationality and urges that the crucial importance of bounded rationality for economic organization in the fact that all complex contracts are unavoidably incomplete.” (Williamson, 1998)*

In order to minimize the risk of contract violations, the firms must engage in contract negotiations which can generate excessive transaction costs. Those negotiations include long-term capacity allocation, security management, timetable coordination and investment planning (Wetzel and Growitsch, 2007). Merkert, Nash and Smith (2008) analyze the interactions at the linkage between the IM and the TOC and find that the coordination and contracting of track possession are the major sources of transaction costs in the market.<sup>5</sup>

### **2.3.2 Suboptimal investment levels**

In network industries with high sunk costs, institutional constraints determine investment decisions. As all contracts are incomplete at some point and as train operating companies possess strong bargaining power, the IM faces a strong risk to lose a part of the revenue derived from its investment to the TOC. This threat impedes the IM’s willingness to engage into large infrastructure investments as those assets are specific and durable. The same behavior is expected to occur on the upstream segment, where TOCs are reluctant to invest into new rolling stock.

In a vertically integrated company the risk of contract violation or of disuse of the particular infrastructural facility does not occur as the company adapts its infrastructure investments to the operational strategy. Doing both the infrastructure management and the operations, it internalizes the total return on investment (Ehrmann et al., 2009). Moreover, it invests in maintenance in order to prevent its own rolling stock from wear and tear (Wetzel and Growitsch, 2007). Reciprocally, it invests into the rolling stock in order to prevent its infrastructure from wear and tear.

A laboratory experiment shows that vertical and hybrid organizational structures lead to socially suboptimal investment levels (Ehrmann et al., 2009). In theory one considers the investments in a totally separated structure to be even lower than those in the hybrid model. However, this is not the case. Ehrmann et al. explain this result with the potential existence of social preferences.

The market liberalization also has positive impacts on the investments in the industry. Yvrande-Billon and Ménard (2005) argue that the railway reform in

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<sup>5</sup> Empirical evidence on transaction costs arising as a result of vertical separation is discussed in section 3.2.

Britain initiates strong innovation in the railway industry, especially in terms of interoperability. One observes the same effect on the European market, where the opening of international passenger lines leads to strong investments into state-of-the-art rolling stock, able to operate on different national networks.<sup>6</sup>

### 2.3.3 Losses of economies of scope

Vertically *and* horizontally integrated companies generate larger scope economies than the disintegrated ones. Economies of scope occur as a result of “a joint production of goods” (Wetzel and Growitsch, 2007). In the railway sector, economies of scope arise when the joint production of the infrastructure management, passenger transportation and freight transportation is done at a lower cost than if they are done separately.

The undisputed existence of transaction costs in the separated model leads to higher costs engendered by vertical unbundling. The underinvestment as stated above leads also to higher costs of the separated model as wear and tear generate high maintenance and replacement costs.<sup>7</sup>

Some authors also highlight scope economies due to savings in overhead costs including administration and marketing expenditures (e.g. Eisenkopf, 2002).

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<sup>6</sup> The joint-venture Eurostar as well as DB Fernverkehr AG recently ordered new Siemens Velaro-D high speed trains, capable of running on four different electricity networks, in order to extend their networks to more European markets (Wright, 2010).

<sup>7</sup> For more information on economies of scope in the railway industry I suggest Wetzel and Growitsch (2007).

## **3 The regulatory framework in the EU**

This section illustrates the European approach of railway reform, summarizes empirical evidence on its effects to date and presents the recently proposed recast of the railway legislation.

### **3.1 The current legislation**

#### **3.1.1 Historical background**

Rail passenger transport experiences a severe loss of modal share in the four decades to 2000. Back in 1970 still 10.2 percent of the population travel by train whereas only 6.2 percent use railways for passenger transport in 2000 (table 1 and figure 2).<sup>8</sup>

First, the rail loses customers to the airplane on medium and long distances as it allows to travel much faster. Especially on intraeuropean routes the airline industry attracts customers as changes are often not necessary. Second, the car becomes achievable for a wider public and offers a much greater convenience and independence compared to the rail passenger transport. Finally, the coach offers reasonable passenger transport much cheaper than railways. On top of that, Friebel et al. (2005) report a low level of customer satisfaction in European rail passenger transport for this period, adding to the extent of the modal shift.

Besides those exogenous challenges, the costs of the infrastructure expansion and maintenance as well as the costs for train operations exceed the revenues generated by passenger and freight transport. Hence, the governments heavily subsidize the railway industry by far. Appendix 1 shows that only 39 percent of the costs were covered by the earnings.

By 1980, almost all the European railway undertakings face a serious economic crisis (Denkhaus 1997). At that time already, there is a strong willingness to revitalize the European railway sector to make the rail passenger transport more attractive and to make it more efficient in order to cut subsidies. The EU understands railways as a mean of European integration, necessary to promote the Single Market and the border-crossing traveling of EU citizens. In addition to that, the railways produce by far less external costs than other means of transport (appendix 2). Those reasons lead to an early intervention of the EU, encouraging governments to reorganize the national railways.

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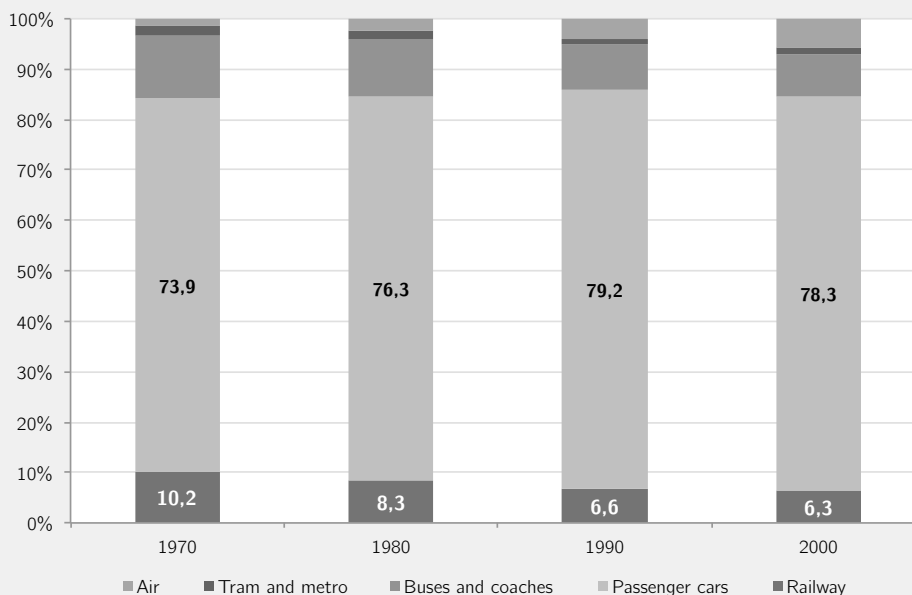
<sup>8</sup> The development of rail freight transport is comparable. It lost transport volume first of all to the road freight transport.

**Table 1** Passenger-kilometers by mean of transport in the EU-15

	Railway	Passenger Cars	Buses and coaches	Tram and metro	Air	Total
Passenger kilometers traveled (billions)						
1970	219	1582	269	39	33	2142
1980	248	2295	348	41	74	3006
1990	268	3199	369	48	157	4041
2000	303	3789	413	53	281	4839
2008	360	4099	436	65	_*	_*
Share of passenger kilometers (%)						
1970	10.2	73.9	12.6	1.8	1.5	100.0
1980	8.3	76.3	11.6	1.4	2.5	100.0
1990	6.6	79.2	9.1	1.2	3.9	100.0
2000	6.3	78.3	8.5	1.1	5.8	100.0

Source: Compiled from European Commission (2003) and (2010b);  
 \*\_passenger-km for the air transport for 2008 are not available for the EU15, only for EU27 and are thus not comparable

**Figure 2** Passenger modal split in the EU-15



Source: European Commission (2010b)

### 3.1.2 Gradual drafting and adoption of community law

The EU sees a common transport policy as a fundamental element of European integration as the articles 74-84 of the Treaty of Rome show. Mainly domestic, inefficient publicly held railway companies could impede this integration. Therefore, the Commission responded to the crisis of the railway industry initially in 1969-70 with stricter requirements regarding the financial accounts and the allocation of subsidies. The regulation 1192/69 expects the member states to hold clear and separate accounts for their railway businesses. The regulations 1191/69 and 1107/70 aim to limit public subsidies to specific conditions as well as to minimize the services run under social obligations.<sup>9</sup>

In the 1970s and '80s, the rail transport continues to lose market share to the air, car and bus transport - especially on international cross-border connections - despite those first measures. Nash (2004) identifies four critical problems which aggravate the situation at that time:

- i) The railway undertakings are virtually all nationally oriented. That hampers the negotiations between companies to establish border-crossing lines.
- ii) The dependency of railway companies from governmental support grows and the financing of services in the context of social obligations is still opaque and ex-post instead of ex-ante. Furthermore, the RUs bear a high historic debt burden which is totally unrelated to the revenue potential of their assets.
- iii) The infrastructure is not adequately developed to respond to the demand of passengers (for high speed passenger transport) and freight customers (combined transport, loading facilities and speed).
- iv) On the top of that, the problem of technical harmonization of the different national railway networks persists. The track gauge is basically the same except for the Iberian peninsula, the Irish island, the Baltics and Finland but signalling, security and traction techniques differ.

The Commission addresses those problems in its “Communication on a community railway policy” in 1989. Its first objective is to open the market to competition by opening the railway infrastructure to competitors. Separate divisions for infrastructure management and operations and a network access charging system aim to counteract discrimination. Second, the proposal foresees

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<sup>9</sup> A comprehensive summary of all EU directives and regulations regarding railway policy can be found in the annex (appendix 4).

public delegation contracts to replace social obligation agreements. Those contracts shall ensure a transparent allocation of costs ex-ante and accordingly enhance the pressure on financial efficiency. The third and fourth objectives are designed to advance technical harmonization and to promote high speed passenger transport and combined freight transport.

By 1991, much negotiation leads to a limited adoption of the proposed measures in the directive 91/440/EEC. It aims to minimize the potential for discrimination towards new entrants “by separating the management of railway operation and infrastructure from the provision of railway transport services, separation of accounts being *compulsory* and organizational or institutional separation being *optional*” (Art. 1). The directive furthermore ensures legal rights of access to the infrastructure for RUs wishing to operate international combined freight transport and international passenger transport. The latter case is restricted to operations by international groupings of RUs which plan to run cross-border lines in their respective countries.<sup>10</sup>

Four years later, the EU adopts the directives 95/18/EEC and 95/19/EEC to improve the outcome of the reform. The first requires the member states to set up licensing authorities in charge of evaluating companies wishing to operate international train services in respect to their financial, professional and security capacities. The second requires governments to define a body in charge of the path allocation and to set up rules for the path allocation and the access charges.

In 1996, the Commission publishes another white paper with new proposals to further reform the European railway market. By that date the regulation in place does not ensure the hoped-for competition in the market. Only further regulation and a wider market opening may achieve the goals of the EU transport policy. This white paper leads to a number of further propositions and, at the end, to the first “railway package”, a set of three critical directives to be published in February 2001.

Amending the directive 91/440/EEC, the directive 2001/12/EC - part of the package - requires the railway companies to further separate their accounts and to publish separate balance sheets as well as profit and loss statements. Furthermore, they now have to separate accounts for freight and passenger transport divisions within the train operations business. The directive also establishes an independent regulatory authority which has to be independent

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<sup>10</sup> This action should not be confused with a later market opening for international passenger transport in directive 2007/58/EC which allows *all* licenced operators to run such services.

from the infrastructure manager - who is in charge of path allocation and access charging - and from any train operating company. The regulator serves as an arbiter in case of disputes. The directive 2001/13/EC amends the directive 91/18/EC on the licensing of railway undertakings. It is now harmonized so that RUs licensed in one member state are allowed to operate international freight traffic on the trans-European network. The directive 2001/14/EC determines the rules for path allocation and the basis of calculation for access charges. This first railway package comprising those three directives is followed shortly after by the directive 2001/16/EC, extending the requirements on interoperability from high speed lines to conventional lines.

Three years later, the EU adopts a second railway package including three EC directives and one regulation. The most drastic change is an opening of the entire rail network for rail freight transport whether it is international or domestic traffic (directive 2004/51/EC). Besides that, the directive 2004/49/EC harmonizes the security standards at the European level and the directive 2004/50/EC amends and complements the directives on interoperability on high speed and conventional lines. The regulation (EC) No 881/2004 establishes the European Railway Agency (ERA) coordinating security and technical issues.

A last railway package brings important changes to the rail passenger transport. The directive 2007/58/EC allows all licensed rail operators to run international passenger transport for border-crossing connections including passenger cabotage from the first of January 2010. This is restricted to the condition that they have no negative impact on the financial stability of publicly subsidized regional passenger transport. This partial market liberalization is thought to increase the quality of rail services as new competitors should strengthen the pressure on the incumbent operators. Regarding domestic passenger transport, the regulation (EC) No 1370/2007 requires governments to run competitive tenders for publicly subsidized regional passenger transport. Though there are lots of exceptions and a clause on the priority of national law so that there is virtually no legal obligation to do so. The national authorities can opt for direct awarding procedures if it is reasonable (Pünder, 2010).<sup>11</sup> Another approach to increase the service quality is the regulation (EC) No 1371/2007 which determines the rights and obligations of rail passengers. Regarding the security, the EC decides to introduce a European

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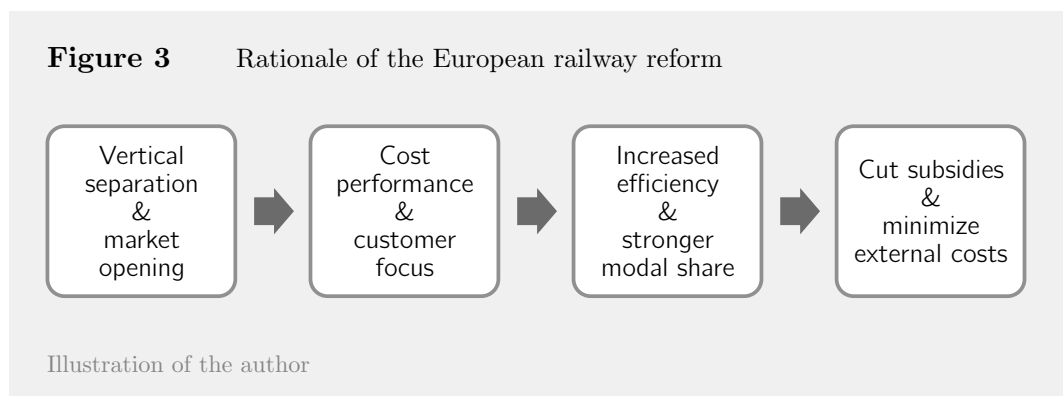
<sup>11</sup> This decision is regularly discussed as it contradicts the public procurement law of the primary legislation of the EU, whereupon public service concessions should be tendered publicly. Notwithstanding, this is due to the different territorial organization of railways in member states and specific issues related to investments in access charging (Pünder, 2010).

train drivers license so that they are allowed to run trains on the different domestic rail networks within the EU.

The three railway packages are large steps towards a single European railway area. First, the reform aims to create interoperability in order to facilitate the intra-European traffic which should consequently make the rail transport more attractive in the intramodal competition. Second, it tries to increase quality and to decrease costs through competitive pressure on the historic incumbent operators. Nash (2004) summarizes that the EU follows a

*“particular model of rail restructuring based on separation of infrastructure from operations and the introduction of competition between a variety of operators in the market in freight and international passenger transport and for the market for subsidized passenger services”.*<sup>12</sup>

Figure 3 illustrates the basic concept of the railway reform in the European Union.



The gradual adoption of legal acts results in an ambiguous regulatory framework, leaving scope for interpretation. As of today, there are three directives in force with following amendments, including nine directives, two regulations, one decision and two acts of accession (European Commission, 2010d). This ambiguity explains the variety of implementation across EU member states (Nash, 2010). The resulting disparities and the desire for more competition and further market liberalization drives the Commission to work on a recast in early 2008.

<sup>12</sup> For a summary of alternative models of rail restructuring I suggest Nash (2004).

### 3.1.3 Status quo of the reform progress in EU markets

As of today, the European legislation is comprising the following requirements regarding i) the vertical separation of the railways and ii) the market opening for competitors:

- i) The infrastructure management, the rail passenger operations and the rail freight operations must be separated at least into separate divisions with their own financial accounts including separate balance sheets and profit and loss statements.
- ii) In passenger railways, licensed railway operators are allowed to run international border-crossing connections. The rail freight traffic is totally open to domestic and international transport.

#### *Variety of implementation*

The member states generally fulfill the requirements regarding vertical separation (IBM, 2007). The legislation defines minimum requirements only. Therefore, we find countries in which the unbundling goes beyond accounting separation to total ownership separation. In respect to market opening all member states basically allow freight traffic and access for international passenger services. Here too, some countries liberalize their markets beyond EU requirements and open their market for domestic passenger transport. Some run competitive tenders for PSO services, some allow the introduction of commercial lines, some do both. In some cases (e.g. Germany) a regionalization of railway organization accompanies the liberalization of rail passenger services run under PSO. As a result of this decentralization, the regional authorities are now in charge of the service planning and the PSO contract negotiation. One may argue that this move improves the service quality of regional transport as the planning is customized to local needs. Table 2 summarizes the status quo for EU countries with railways, Norway and Switzerland.

**Table 2** Vertical separation and market opening - country comparison<sup>13</sup>

Country	Separation	Market Opening				
	Category as set by EC	Formal awarding procedure for PSOs	For commercial passenger services	No of valid railway licenses	Total market share of non-incumbents (in %)	Rail passenger market opening score
Austria	3	Direct negotiation and competitive tendering	Open access*	13	12.0	0.774
Belgium	3	Direct negotiation	Open access (domestic companies only)	1	-	-
Bulgaria	-	Direct negotiation	Open access	2	-	-
Czech Republic	1	Direct negotiation and competitive tendering	Open access (domestic companies only)	11	0	-
Denmark	1	Direct negotiation and competitive tendering	Open access for domestic operators*	12	9.0	0.828
Estonia	2	Competitive tendering	Open access	2	57.7	0.179
Finland	1	Direct negotiation	No access	1	0	1
France	2	Direct negotiation	No access	2	0	1
Germany	3	Direct negotiation and competitive tendering**	Open access for domestic operators*	302	10.1	0.792
Great Britain	1	Competitive tendering	Open access	45	100.0	0.001
Greece	1	Direct negotiation	No access	-	0	1
Hungary	2	Direct negotiation	Open access for domestic operators*	3	1.8	0.964
Ireland	4	Direct negotiation	No access	-	0	1
Italy	3	Direct negotiation and competitive tendering	Open access for domestic operators*	-	-	-
Latvia	2	Direct negotiation and competitive tendering	Open access*	3	9.1	0.824
Lithuania	1	Direct negotiation and competitive tendering	Open access	6	0	1
Luxembourg	2	Direct negotiation	Open access for domestic operators*	1	-	-
Netherlands	1	Direct negotiation and competitive tendering	No access until 2015	-	-	-
Norway	1	Direct negotiation and competitive tendering	Open access only on disused lines*	4	12.0	0.770
Poland	3	Direct negotiation and competitive tendering	Open access for domestic operators*	29	11.1	0.790
Portugal	1	Direct negotiation and competitive tendering	Limited open access (int'l groupings)	1	-	-

<sup>13</sup> For most countries the data is as of 2006. In the meantime, the market share hold by non-incumbents could increase substantially. E.g. the market share hold by non-incumbents in Germany was 12.1 % in 2009 (Deutsche Bahn AG, 2010).

Country	Separation	Market Opening				
	Category as set by EC	Formal awarding procedure for PSOs	For commercial passenger services	No of valid railway licenses	Total market share of non-incumbents (in %)	Rail passenger market opening score
Romania	1	Competitive tendering	Open access for domestic operators*	4	1.1	0.978
Slovakia	1	Direct negotiation	Open access for domestic operators*	4	0	1
Slovenia	2	Direct negotiation	No access	1	0	1
Spain	1	Direct negotiation	No access	-	0	1
Sweden	1	Competitive tendering	Open access for night trains and chartered trains only	8	-	-
Switzerland	n/a	Direct negotiation	Limited open access (only for irregular special services)	n/a	n/a	n/a

Source: Compiled from European Commission (2009) and CER (2009)

\* some restrictions for foreign operators

\*\* The Federal Court of Justice of Germany (Bundesgerichtshof) will announce on February 8, 2010, if competitive tendering is going to be mandatory in Germany as there has been an infringement by the incumbent DB in North-Rhine-Westphalia (Doll, 2011)

\*\*\* Categories regarding model of vertical separation as defined hereafter:

**Category 1:** Fully legally, organizationally and institutionally independent infrastructure manager undertaking capacity allocation

**Category 2:** Independent infrastructure manager allocating capacity having delegated certain infrastructure management functions (e.g. traffic management, maintenance) to one of the train operating companies/ Integrated infrastructure manager working alongside an independent body in charge of capacity allocation

**Category 3:** Legally (but not institutionally) independent infrastructure manager undertaking capacity allocation owned by a holding company which also owns one of the operators

**Category 4:** Infrastructure manager in charge of allocating capacity and railway undertaking still integrated

Vertical separation and the establishment of a regulatory authority are no guarantee for non-discriminatory path allocation and access charging. Therefore, the Commission assigns two consulting firms with the analysis of the current status of the reform implementation and the spotting of further potential for improvement. In the resulting “Study on Regulatory Options on Further Market Opening in Rail Passenger Transport” (European Commission, 2010c) they evaluate the independency of the infrastructure manager from the incumbent passenger RU in respect to the following five indicators:<sup>14</sup>

- i) common board members,
- ii) offices in separate buildings,
- iii) incumbent RU not involved in infrastructure management,
- iv) incumbent does not control any asset access,
- v) independent regulator.

They find that only 6 of the 31 analyzed states (appendix 5) fulfill all of those criteria of independence. Independence obviously facilitates the entry of competitors into the market. Besides those criteria it is essential to provide all necessary information regarding the network capacity and the prices for the network access in an official *network statement*. The ability to access those information is crucial for the creation of a market for commercial passenger transport. Opaque procedures favor the incumbent RU as it has more experience with the network and is still linked to the IM in most cases. This level of transparency has still to be reached in many member states.

In June 2008, the Commission sends infringement letters to 24 of 25 European countries with railways as they have not adopted and transposed all measures of the first railway package (Nash, 2010).<sup>15</sup> By June 24, 2010, the Commission decides to take legal action against 13 member states since they had still not adopted all acts.

#### ***Legal scope of interpretation***

Two recent events - one in France, another in Italy - are emblematic for the issues arising from inaccurate and ambiguous legal acts.

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<sup>14</sup> Those indicators have initially been developed by Steer Davis Gleave in a study for the Commission on the implementation of the first railway package (Steer Davis Gleave, 2005, p. 81 for more information).

<sup>15</sup> For detailed reasons for infringement letters for 21 of them, please consult European Commission (2009) annex 3.

As mentioned before, international passenger transport is now open to competition if it does not cause financial instability for services run under PSO.

IMs can easily use this vaguely defined exception to impede the market entry of competitors. The *DB Fernverkehr AG* (DBF) and *Österreichische Bundesbahnen* (ÖBB) offer a new EuroCity train going from Munich over Verona to Venice since December 12, 2010. They try to attract new customers by emphasizing high quality standards and reliable traveling. So far, the line has been run in cooperation with the Italian RU *Ferrovie Nord Milano S.p.A.* (FNM) which was less concerned about quality issues (Rossberg, 2011). The Italian regulatory authority *Ufficio per la Regolazione dei servizi ferroviari* (URSF) prohibits the Austrian-German joint venture to call regional stations between Verona and Venice since it would lead to perturbations in regional passenger transport, referring to the directive 2007/58/EC. It is strongly believed that this is a mean to protect the state-owned incumbent Trenitalia (Cramer and Lichtenberger, 2010). The Commission considers a court proceeding against URSF. In the meantime, the URSF allows the joint-venture to call at most train stations for a three months period (Cramer and Lichtenberger, 2010).

In 2010, France chooses another way to protect its domestic incumbent. While scraping the corporate tax on profits of domestic companies by the beginning of 2010, they levy a new general tax on rolling stock (*imposition forfaitaire sur les entreprises de réseaux, IFER*) to compensate the resulting losses. As a result, foreign TOCs have to pay the *IFER* but could not benefit from the abolition of the corporate tax. Cramer and Lichtenberger (2010), the spokespersons on transport for the Greens/EFA group in the European Parliament, calculated that this would, for instance, create a supplementary annual burden of 400,000 to 500,000 euros for the border crossing regional transport between Wissembourg and Lauterbourg in France and their respective destinations in Germany. France announced to exempt border-crossing services from the *IFER*.

Cramer and Lichtenberger therefore demand that the Commission does not forget to comply with its task to ensure the enforcement of the effective legislation while working on a further market opening. In response to the recast, the *Centrum für Europäische Politik* analyzes the current legislation in order to assess the impacts of the proposal. The Freiburg-based think tank confirms that the current legislation has a lot of legal gaps which necessarily have to be revised in order to achieve the objectives of the European transport policy (CEP, 2010). It

furthermore states that there are still technical incompatibilities in spite of explicit directives and the commonly developed ETCS<sup>16</sup> system.

### **3.2 Empirical evidence on the effects of the current legislation**

There is a growing strand of literature on the issue of railway regulation, especially on the European market. Nash (2004) classifies the literature regarding the effects of the railway reform into two broad categories, formal econometric studies and more pragmatic policy reviews. This section summarizes econometric findings and analyzes some simple regressions.<sup>17</sup>

One must evaluate the effects of the railway reform in respect to its objectives. Again, those are i) to augment the usage of railways to increase its modal share and ii) to increase its efficiency by decreasing the costs. The modal share of the rail passenger transport within the total land passenger transport can be measured easily in terms of passenger kilometers. Isolating the impact of the regulatory reform from other exogenous factors is more difficult. The measurement of effects on the efficiency of railways is even more complicated. Economists apply different econometric models and analysis in order to measure and compare the efficiency along time, country and mode and to define the determinants for successful railway regulation. There are not many data sets available as the regulations have been implemented only step by step over the last two decades. The time periods and samples are often too short to derive meaningful empirical evidence. Moreover, it is difficult to compare the data of different countries because the environmental circumstances differ and since the railway reform has been implemented differently across the EU as we have stated just above. Yet, the number of studies is steadily rising and the economics of railway regulation enjoy great popularity among economists and politics.

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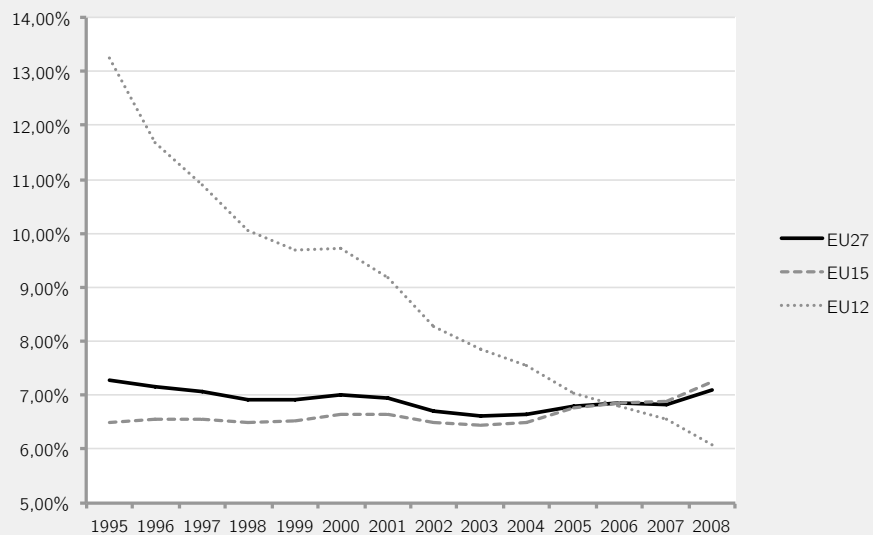
<sup>16</sup> The European Train Control System (ETCS) aims to standardize the European train safety management. It comprises the European Rail Traffic Management System (ERTMS) and the dedicated wireless communication network GSM-R.

<sup>17</sup> The empirical results mentioned hereafter are always subject to limitations and extensions. I do not highlight them in detail but rather concentrate on the main findings. Please study the respective articles and working papers for further information.

### 3.2.1 Usage and modal share

Using official data from the statistics of the European Commission (2010b) in figure 4, one sees that the decline of the modal share of passenger railways hits its low by the years 2003 to 2004 and that it is now slowly growing. Bearing in mind that the rail passenger traffic grows from 303 to 360 billion pkm per year between 2000 and 2008 (table 1) and that the usage of other means of transport grows also in absolute numbers, one states that the rail passenger transport is able to attract significantly more customers and to absorb a growing demand.

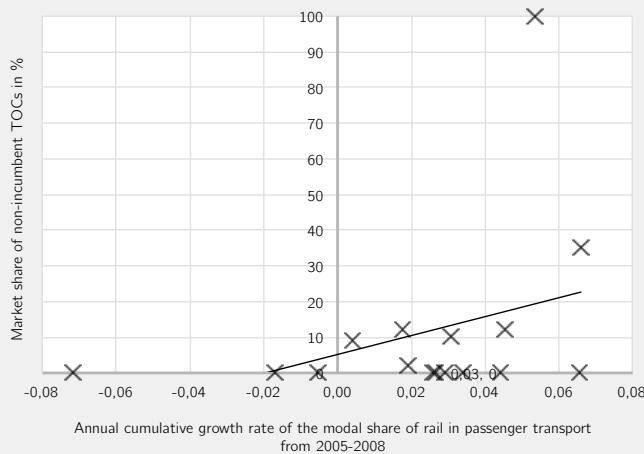
**Figure 4** Modal share of rail passenger transport in the EU-27, -15 and -12



Source: Data from European Commission (2010b)

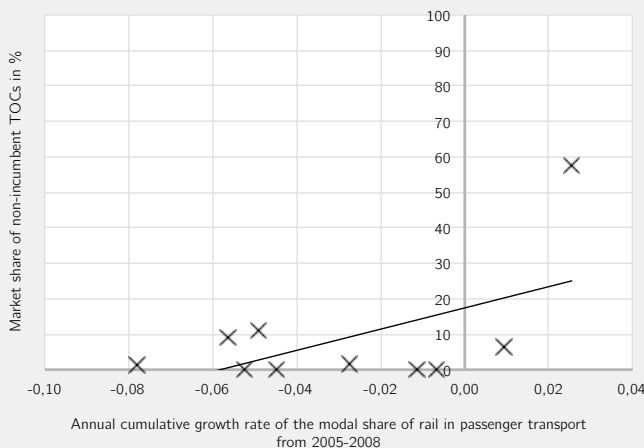
In order to evaluate the likeliness that the railway reform is the decisive factor for the growing modal share of railways, one makes a simple regression between the level of market liberalization and the annual growth rates of the modal share of rail passenger transport for the period of 2005 to 2008 (as shown in European Commission, 2010c). The market share of non-incumbent railway operators serves as the measure of market opening because it is considered to be the best indicator available. Figures 5 and 6 show the market share hold by non-incumbents on the vertical axis for the EU-15 and Norway and the EU-12 countries respectively. The horizontal axis shows the annual cumulative growth rate of the modal share from 2005 to 2008.

**Figure 5** Relation between market opening and growth of rail modal share between 2005-2008 in EU-15 countries and Norway



Source: Data from European Commission (2009), amended as described in European Commission (2010c, p. 69) and (2010b)

**Figure 6** Relation between market opening and growth of rail modal share between 2005-2008 in EU-12 countries with railroads



Source: Data from European Commission (2009), amended as described in European Commission (2010c, p. 69) and (2010b)

A correlation between the degree of market opening and the development of the rail passenger transport compared to other means of transport can be seen for the EU-15 and Norway. Those countries with a competitive setting do generally better than those where the incumbent is still operating alone. For the EU-12 countries a conclusion can not be drawn. The chart confirms the negative tendency from figure 4 and shows that their railway networks are in a desolate condition (except for Estonia and Slovakia). The inability of eastern European governments to ensure the financial equilibrium of their IMs may partly explain

this observation (Nash, 2010). As a result, the IM neglects its obligation to maintain the network and postpones basic renewal tasks. The trend lines in the charts and the conclusions drawn from the charts are indicative only.

More specific empirical evidence on the impact of the reform on the number of passengers exists for Great Britain, Germany, Sweden and the Netherlands. Those countries are open to competition for some time and consequently provide the largest data sets available.<sup>18</sup>

In Great Britain, the usage of the railways soars significantly following the reform of railways. However, Nash and Smith (2007) show that only a moderate share of growth is the result of the market liberalization and the separation and privatization of the infrastructure management. They find that the big part of it is related to a strong economic growth and other external factors such as car fuel costs or increasing car journey times.

For Germany, Brenck and Peter (2007) summarize that competitive tendering leads to numerous investments into the rolling stock. This results into a remarkable increase of the quality of services. Accordingly, a number of lines witnesses an increase of passenger numbers by more than 100 percent. Yet, the average growth of passenger-km on regional lines is about 53 percent for the decade following the market opening in 1994 (Desmaris, 2010).

The Swedish railways see a strong growth of passenger-km of 32 percent from 1995 to 2004. Nevertheless, the modal share increases by a minor single percent to 7 percent only. As in Germany, the market opening sets incentives for investments into new trains, leading to better quality standards and an overall more attractive service proposition to the customer which is in turn decisive for the growth of demand (Alexandersson and Hulten, 2007).

In the Netherlands, competitive tendering enables cost savings. The authorities use those savings to increase the supply and the frequency of passenger services. This leads to a stronger usage of trains but not as much as expected (Dijk, 2007). Still in the same period of time, people are increasingly using individual motorized transport.

In France, the government implements vertical separation of infrastructure and operations, but does not open the market to new entrants. Since the organizational decentralization, regional public authorities handle the contracting of services run under PSO (Desmaris, 2010). The demand for regional rail

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<sup>18</sup> A significant number of empirical studies was published in the context of the European Conference of Ministers of Transport, held in Paris in 2007.

passenger transport rises by 55 percent from 1997 to 2007. This results from renewed, more comfortable rolling stock and a higher frequency of lines procured from SNCF. Without opening its domestic passenger market, French railways achieve a higher usage rate. However, the market opening in the short or medium-term represents a non-neglectable competitive threat on SNCF. Therefore, they use the remaining time being monopolist to modernize themselves and to improve their service offer. Moreover, suboptimal service quality would lead to unsatisfied customers and authorities and by that accelerate the claim for market opening.

Lalive and Schmutzler (2007) examine the impact of competitive procurement of regional rail passenger transport in the case of the German state of Baden-Württemberg. They compare the *frequency of service*<sup>19</sup> of lines that have been procured using competitive tendering with a control group including lines that have been awarded directly to DB Regio, a subsidiary of the historic incumbent. They find that the frequency of service in the competitive group is significantly higher than the one for the control group. They admit that the measure of frequency is less satisfactory than the number of passenger kilometers. Nevertheless, they provide empirical evidence for the positive effects of competition on the provision of rail passenger transport.

### 3.2.2 Cost efficiency

To achieve *cost efficiency* means nothing else than to optimize the value creation in order to save money, for instance, by cutting costs of the different production factors. Vertical separation leads to more transparency and improved cost management. The market opening exposes incumbents to competitive pressure and hence forces them to use any possible potential for savings in order to operate competitively. Di Pietrantonio and Pelkmans (2004) expect firms to emphasize “proper outsourcing strategies, elimination of redundancies and innovative investments encouraging performance” in order to cope with the competitive challenge.

I distinguish two approaches to study the effects on cost efficiency. On the macro level, one may compare alterations of governmental subsidies. On the micro level, one may evaluate the impacts of the reform on the cost management within the firms. Both approaches deliver meaningful information on the policy’s ability to minimize the welfare costs of railways.

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<sup>19</sup> The frequency of service is the ratio between train-kilometers per year (tkm) and the length of a line (lkm). Hence, it illustrates the average number of trains per year on each kilometer of tracks (Lalive and Schmutzler, 2007).

**Macro level: Decreasing subsidies**

The railway reform in Great Britain is no success regarding the cost efficiency of the industry. First, it enables huge savings to the detriment of the infrastructure quality. Then, the Hatfield crash in 2000 reveals the disastrous state of the network and the government increases the governmental subsidization all over again.

For Germany, Holzey and Tegner (2004) analyze 37 tenders for the period of 1996 to 2003. They find that franchising leads to savings for the regional authorities of about 18% for less attractive regional rail lines and of up to 38 percent for attractive services.<sup>20</sup> They conclude that the federal states can save up to 1 billion euro per year by awarding all PSO services through competitive tendering.

Alexandersson and Hulten (2007) stress the fact that competition forces the railway operators to engage in an internal reorganization of routines and working schemes. Those savings have been passed on to the authorities which procure savings of about 20 percent as a result of the first round of competitive tendering in Sweden. The second round of tendering enables further 28 percent of cost savings.

The tendering of regional passenger transport in the Netherlands enables savings of 20 to 50 percent on some lines while maintaining the same level of service. The implicit competitive threat leads to cost savings of up to 10 percent on directly awarded lines.

The French model seems to be successful in terms of usage but not in terms of overall cost efficiency. Large investments and the establishment of new organizational capabilities within the regional authorities necessitate subsidization to augment by 14 percent in the five years following 1997 (Desmaris, 2010). This augmentation is mainly driven by rising operational costs (11 percent) which now stagnate. Desmaris also analyzes if SNCF - as the protected monopolist - captures the outcome of the reform in form of higher profits. He finds that this is not the case, but that customers and the French infrastructure manager RFF are benefiting from the reforms as customers are enjoying modern, comfortable rolling stock and as RFF can charge much higher track access fees, a mean to counteract the irredeemable historic debt burden of RFF.

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<sup>20</sup> Even though those results have been calculated on behalf of the interest group “Mehrbahnen”, trying to promote the total liberalization of European rail passenger markets, they are considered to be trustworthy by leading academics in the field (Brenck and Peter, 2007; Nash 2010).

***Micro level: Optimized cost management***

Economists use different methods to examine the outcome of institutional frameworks on the cost factors within the firm. In the railway industry the results are crucial as they support or question the justification of the market liberalization and regulation. The analysis is repeatedly said to be difficult (e.g. Asmild et al., 2008) since the available data is inconsistent and unsatisfactorily harmonized.

Empirical analysis show that the market opening has a positive impact on the efficiency of railway companies (e.g. Pavlyuk, 2008). Asmild et al. (2008) apply a multi-directional efficiency analysis in order to evaluate the impact of the regulatory framework on the two main cost drivers of train operating companies: material costs and staff costs. The effect on material costs is strong, whereas the effect on staff costs is weak (Asmild et al., 2008). This can be explained by the fact that companies are much more flexible regarding the choice of materials than regarding the payroll (employment contracts, strong unionization). More precisely, they state that accounting separation<sup>21</sup> has significant positive effects on material and staff costs. In contrast, the independence of the management and the market opening influence material costs only, having no significant impact on staff costs. Vertical separation must involve horizontal separation<sup>22</sup> of operations, run on the infrastructure, in order to deploy its full potential on cost efficiency (Cantos et al., 2008). This can furthermore be explained by managerial autonomy having a positive impact on efficiency (Oum and Yu, 1994; Gathon and Pestieau, 1995). Transaction costs related to vertical separation account for maximal 4.7 percent of operating costs and less than 1 percent of total costs (Merkert, 2010). The case of Great Britain shows a decline of transaction costs over time. This can be explained by learning effects, stronger relationships, and built trust (Merkert, 2010).

Nevertheless, the efficiency gains of RUs result from external factors, too. Wetzel (2008) finds, for instance, that a high percentage of electrified lines favors the efficiency of RUs. The percentage can be seen as an indicator of the quality and technical condition of the infrastructure. Furthermore, it states the firms average independence from diesel prices. Highly dense networks burden the efficiency of the firms as they demand higher maintenance and coordination costs (Wetzel, 2008). She also finds that the establishment of an independent regulatory body

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<sup>21</sup> This includes totally separated companies since they have separated accounts as well.

<sup>22</sup> Horizontal separation denotes the separation of services operated on the infrastructure such as freight services, commercial passenger services and regional services run under PSO.

positively influences the efficiency of firms. Cantos et al. (2008) state that the effects of regulatory reforms also depend on country-specific factors. Wetzel (2008) confirms that finding by giving the example of Eastern European RUs with significant weaker technical efficiencies. She explains those differences compared to Western Europe with a still lower economic and technological development.

In Great Britain, the cost efficiency of TOCs increases prior to the Hatfield crash in the year 2000 and then decreases until 2006. Affuso et al. (2008) find for the time prior to 2000 that operating costs decrease following major technical improvements. The age of the rolling stock and the state of the network operated have an important impact on the efficiency of RUs. Smith et al. (2010) explain the shrinking efficiency between 2000 and 2006 with higher wages and improved technical conditions, mainly safety-related. More sophisticated trains need more maintenance to be done. Moreover, prices for electricity and costs associated to security measures rise during the same period. Smith et al. (2010) find that a strong rise of diesel prices accounts for the rest of the loss of efficiency. However, they state a turning point in 2006 as the unit costs fell between 2006 and 2008. As wages and diesel prices stagnate, one may assume that internal optimization generates cost savings.

Contrary to the findings mentioned before, Wetzel and Growitsch (2007) support the theory of economies of scope in vertically integrated companies. Examining 54 railway companies from 27 countries for the period of 2000 to 2004, they find that integrated companies are more efficient and generate scope economies by joint production of infrastructure management and operations. This positive result is limited to RUs in countries with open markets. This observation is in line with the results mentioned before.

#### *Impact of sequencing on efficiency*

Friebel et al. (2005) find that the sequence of reforms influences the outcome of the reform. The simultaneous implementation of multiple measures in a packages has negative effects on the railway efficiency. In contrast, a gradual implementation of multiple measures has positive impacts on the efficiency. This result is coherent with the theory that governments can learn and adjust reforms by adopting them stepwise (Friebel et al., 2005).

### **3.3 The proposed recast**

Section 3.1 illustrates the obvious shortfalls of the current railway policy, notably the large disparities of implementation across member states. Section 3.2 shows

that the reform has positive impacts on cost efficiency wherever it is properly implemented. Besides that, there are remarkable claims for a completion of the market opening, targeting domestic passenger transport in the member states. Being aware of this, the Commission begins to elaborate a recast of the existing legislation in 2008.

The proposed act - establishing a *single European railway area* - is currently at the top of the political agenda in Brussels and in the member states as the Parliament and the Council express their position very soon. Moreover, academics and private stakeholders assess the proposal in detail and publish their criticisms; Prof. Kirchner of Humboldt University of Berlin just chaired a conference on competition and regulation in the railway sector on January 27, 2011; others are to follow.

### 3.3.1 Brief summary of the legislative procedure

Basically, the Commission proposes a directive or a regulation to the Parliament and to the Council. Acts regarding railway policy “[...] shall be adopted by the European Parliament and the Council, acting in accordance with the *ordinary legislative procedure* [...]” (Art. 172, TFEU<sup>23</sup>). Since the Treaty of Lisbon, this system of co-decisive power is ordinarily applied.

Early 2008, the Commission organizes a stakeholder consultation in order to consider the needs and opinions of all stakeholders of the railway policy in Europe (Railway Gazette International, 2008). The Directorate General (DG) for mobility and transport, which is in charge of railway policy, mandates consulting firms to analyze the “Situation and Perspectives of the Rail Market”<sup>24</sup> (European Commission, 2010e) and to conduct a “Study on Regulatory Options on Further Market Opening in Rail Passenger Transport”<sup>25</sup> (European Commission, 2010c). Using this input, they develop - in close collaboration with the other Directorates-General (figure 7) - the proposal for the recast of the first railway package in order to face the problems stated above.

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<sup>23</sup> Treaty on the Functioning of the European Union.

<sup>24</sup> Research conducted by *NEA, University of Leeds, PriceWaterhouseCoopers* and *significance. PwC* was conducting a survey among stakeholders. The survey was much criticized, e.g. by the *UITP*, one of the industry’s leading interest groups (UITP, 2008).

<sup>25</sup> Research conducted by *Everis* and *NTU*.

On September 17, 2010, the Commission presents the proposal<sup>26</sup> to the Parliament. The Committee on Transport and Tourism of the EP provides a rapporteur and shadow rapporteurs which examine the proposal and report their opinion to the Parliament. On December 12, 2010, the rapporteur Debora Serracchiani - working in close collaboration with the shadow rapporteurs - publishes a working document giving first remarks and orientations (Serracchiani, 2010). The ordinary legislative procedure, as defined in Art. 294 TFEU, foresees that the EP adopts and communicates its position to the Council. The Council agrees upon potential amendments or suggests further changes. The procedure lasts up to three readings. Finally, both the Parliament and the Council must agree in order to enact the final draft.<sup>27</sup>

The schedule foresees the first reading in the Council to take place on March 31, 2011 (European Parliament, 2011; Smets, 2011). Further dates are indicative only as they depend on potential amendments and are therefore not mentioned.

### **3.3.2 Objectives and essential regulatory changes**

The horizontal objective of the recast is to simplify, to clarify, and to modernize the EU railway policy (European Commission, 2010a). The first relates to a merger of the existing directives in order to prevent cross-referencing and to simplify the understanding. The second alludes to the scope of interpretation and aims to clarify the articles in order to ensure proper transposition of Community law. By eliminating outdated articles, the third aims to modernize the EU railway policy.

Besides those basic objectives, the recast addresses some fundamental shortfalls of the current legislation in order to establish fair and non-discriminatory competition. The Commission summarizes (2010f) those objectives as follows:

- i) improve non-discriminatory access to *service facilities*,
- ii) enhance *transparency* of the railway market's institutional framework,
- iii) enhance *co-operation and co-ordination* to facilitate international rail transport,
- iv) provide effective incentives for sound and sustainable *financing* and
- v) enhance *regulatory body* independence and competencies.

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<sup>26</sup> Reference: COM(2010)0475; Title: Proposal for a directive of the European Parliament and of the Council establishing a single European railway area (Recast); the procedure can be followed on the following website: <http://www.europarl.europa.eu/oeil/file.jsp?id=5872762>

<sup>27</sup> Please consult Art. 294 TFEU for more details on the ordinary legislative procedure.

In the following, I present specific proposed measures in respect to their impact on i) the vertical separation, ii) the infrastructure manager, and on iii) the market opening.

***Propositions regarding vertical separation***

The most radical option to counteract access discrimination is to totally separate the ownership of essential infrastructural facilities from operations, prohibiting the holding model. As this implies heavy interventions in the property rights of the companies, the Commission sticks to the current accounting separation while strengthening the access to essential service facilities and the power of regulatory bodies.<sup>28</sup>

By adapting the article on accounting separation, the law now prescribes that accounts must enable total auditability in order to verify for prohibited cross subsidization (Art. 6.4). The infrastructure manager must now explain its decisions regarding path allocation and disclose the calculation of access charges (Art. 7.1, Ann. II). Annex II defines the information to be disclosed. This annex shall be amendable by the Commission solely through *delegated acts*.<sup>29</sup> In case of bottlenecks on the network, when more than one RU apply for a track slot, the IM may now levy reservation charges (Art. 36). Furthermore, in such cases the IM must develop a *capacity enhancement plan* to prevent bottlenecks in future (Art. 50 & 51). The recast also aims to strengthen the access rights to services facilities such as passenger stations, freight terminals, train formation facilities, maintenance, and other technical facilities (defined in annex III, also amendable under delegated acts). Those essential service facilities now include ticketing and travel information facilities as well as further facilities important for rail freight transport. The operation of such service facilities must now be independent in terms of organization and decision-making from any market dominating TOC in order to prevent access discrimination<sup>30</sup>(Art. 13.2). Non-discriminatory access is

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<sup>28</sup> In respect to the legal actions against 13 member states, the decision of the European Court of Justice may have an impact on the further regulation on vertical separation (Langner and Jeck, 2010a).

<sup>29</sup> Those delegated acts were introduced by the Treaty of Lisbon. They transfer power from the EP and the Council to the Commission as certain defined parts of an act can be amended without consulting the MEP and the Council. The Parliament and the Council then have two months in order to object to the amendments under *Comitology* and to make them ineffective. Such a short period can be seen as de facto break with the democratic system of co-decisive power in the EU. The procedure is detailed in Art. 290 TFEU.

<sup>30</sup> This decision is seen controversially. The regulation of infrastructural facilities should be done where it is necessary. However, one can observe large differences depending on the type of service facility and the member states. Whereas there are, for example, lots of independent maintenance facilities available in Germany, in France, all those are owned by the incumbent SNCF.

mandatory as long as no alternatives allow a reasonable duplication of the service. In case of bottlenecks, the service facility operators must ensure a reasonable capacity allocation to all applicants (Art. 13.2).

In order to ensure the functioning of fair competition on the market, the recast foresees to give more strength and autonomy to the regulatory bodies. Now, they shall be independent not only from IMs and RUs but also from any other public authority (Art. 55.1). Art. 56.2 obliges the member states to provide the necessary organizational capacity to the body to fulfill its monitoring obligations. It shall further get more rights to scrutinize the conduct of the IM and the RUs and be empowered to enforce requests with appropriate sanctions, including fines (Art. 56.4-8). From now on, the operators of service facilities too have the right to object to the regulatory body if they are subject to discrimination by the IM.

***Propositions regarding the infrastructure manager***

The member states shall introduce financial agreements with IMs, covering a period of at least 5 years, in order to guarantee the financial viability of the business and the realization of crucial maintenance and network extension tasks (Art. 30.2).

The IM shall now provide the network statement, summarizing all essential information on the infrastructure as well as the using terms and conditions, in two official languages of the EU (Art. 27.1). Annex VI of the proposal extends the content of the network statement in order to increase the transparency for TOCs (also amendable under delegated acts).

***Propositions regarding further market opening***

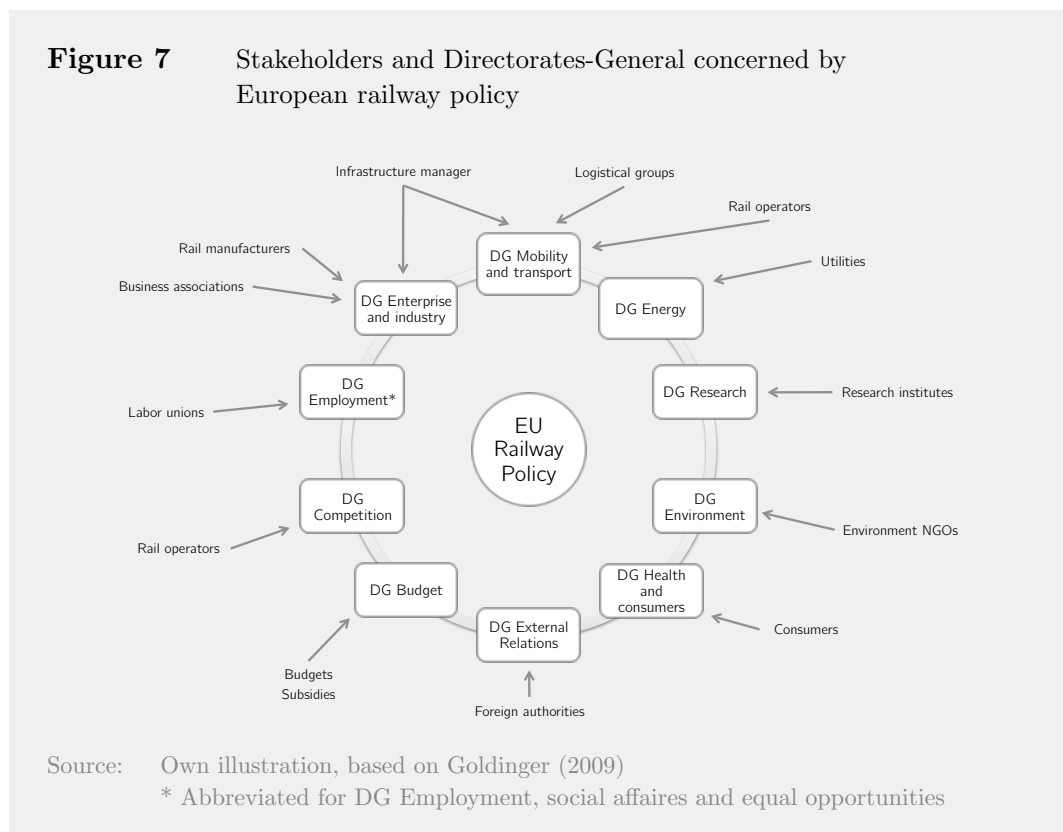
Surprisingly, the proposed recast does not force the member states to open their markets for domestic rail passenger transport. As early as in 2002, the Parliament pleads for a total opening of all rail passenger markets (Jarzembowski, 2002). The cautious decision is probably due to the fact that member states discuss the effects of the market opening controversially. Notwithstanding, in a communication accompanying the proposed recast, the Commission expresses its favor for a completion of the market opening (European Commission, 2010g). An evaluation of different options is currently under way and the Commission attempts to present results during 2011. The implementation of related measures shall begin in 2012 (European Commission, 2010g).

The chair of the Committee on Transport and Tourism Simpson suggests to introduce reciprocity to the railway market; i.e. RU from a member state get access to another member states' domestic market, only if their home market is

opened to competition, too (Simpson, 2010). This allows to reduce asymmetries in the market opening. So far, there is no official statement of the Commission regarding this principle.

### 3.3.3 Political involvement and position of stakeholders

The economic impact of the railway reform is significant and any further changes of the policy generate advantages for some and disadvantages for others in the markets. Consequently, there is a strong lobby of different interest groups in Brussels. Figure 7 illustrates the different stakeholders and their respective counterparts at the Commission. Hereafter, I concentrate on the lobbying and the position of train operating companies.<sup>31</sup>



### *Lobbying in the railway market*

The legislative procedure in the EU allows stakeholders to shape the drafting of the law at different steps. Yet, constructive influence can only be given prior to and during the preparation of the proposal by the Commission. Later, during the

<sup>31</sup> I conducted an interview with a lawyer and a lobbyist of Deutsche Bahn and Arriva in order to get more profound insights on the functioning of the lobbying regarding railway policy. The interview is anonymized. However, I thank them for their helpful support.

readings at the Parliament and the Council, the Commission only makes minor amendments to the act (DB and Arriva, interview 2011).

An effective way to shape the law drafting is to provide constructive information and evidence on the status quo of competition and regulation in the market (DB and Arriva, interview 2011). By financing studies as the *Liberalization Index*<sup>32</sup> (in cooperation with Humboldt University of Berlin and IBM) and publishing annual competition reports, Deutsche Bahn promotes the railway reform this way. Those studies launch debates among stakeholders, especially politicians, and have the highest chance to influence decision making (DB and Arriva, interview 2011).

Large incumbents enjoy the financial background and the governmental support to lobby themselves in Brussels, but they also represent their interest via interest groups such as the *Community of European Railway and Infrastructure Companies* (CER).<sup>33</sup> New entrants, mainly smaller competitors, represent their interest via associations such as the *European Passenger Transport Operators* (EPTO) or the *International Association of Public Transport* (UITP). They face the problem that civil servants in Brussels will not listen to small companies as they fear the rumor of corruptibility.

#### ***Stakeholders' position regarding vertical separation***

Although there are some TOCs lobbying for total vertical separation,<sup>34</sup> RUs generally prefer vertical integration in terms of the holding model because it implies incentives for the integrated firm to maintain a high-quality infrastructure. The case of Great Britain shows that the standalone IM is not customer-oriented as he does not understand the business and the needs of the TOCs (DB and Arriva, interview 2011). In Great Britain and other European countries, a *vertical reintegration* of the infrastructure and regional franchising is currently under debate.

RU care more about unambiguous regulatory conditions and powerful national regulatory bodies as well as resolute enforcement of Community law throughout the EU. Empowering the Commission to supervise and to intervene if a national

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<sup>32</sup> A new edition is currently under way and will be published on April 20, 2011 (DB and Arriva, interview, 2011).

<sup>33</sup> CER represents not only historic incumbents but also new entrants to the market.

<sup>34</sup> For example, Pierre Cunéo, former director of rail strategy and regulation at the SNCF, criticized on a conference on transportation and competition in Paris on December 16, 2010, that Deutsche Bahn is still vertically integrated (holding model). <http://www.thejournalofregulation.com/III-3-10-The-French-Directorate.html>

regulatory authority is not working properly may ensure the well functioning of the regulatory framework.

The most important interest group of IMs, the association of *European Rail Infrastructure Managers* (EIM), states that "the ideal organisational model of full unbundling/separation provides more guarantees of non discrimination and greater market opening" (EIM, 2010b).

***Stakeholders' position regarding further market opening***

Most rail undertakings welcome a completion of the liberalization by opening domestic passenger transports to competition (CER, 2010a; EPTO, 2010; VDV, 2010; Aberle et al.,2010). This gives them new business opportunities and puts more pressure on member states to establish strong regulatory authorities. However, CER, for instance, stresses the point that the market opening of domestic passenger railways requires certain conditions, most of all robust financing abilities for PSO contracts. Likewise, the railway technology manufacturers favor a complete market opening since increased competition strengthens the pressure to innovate and to provide high quality rolling stock and infrastructure (UNIFE, 2010).

The press often states that historic incumbents inhibit further market opening in order to protect their markets (e.g. for Deutsche Bahn see Wettach, 2010). In the case of DB, one may doubt this theory, as lots of statements, position papers, and my interview have shown (Deutsche Bahn AG, 2010 & 2010a; DB and Arriva, interview 2011). Protecting markets makes no sense for DB, especially as its traditional home market Germany is already opened to competition in many parts and as it is interested in gaining market share in other European member states.

## 4 Evaluation of the proposed recast

The empirical evidence shows that competition promotes cost efficiency as well as innovation and quality. Hence, I assess the recast's potential to further improve the regulation required for fair and viable competition. Besides that, I identify the major criticisms regarding the proposal.

The recast evokes a considerable debate in the European railway "milieu". Interest groups and academics alike make assumptions on its impacts. I consider their first statements in the evaluation.

### 4.1 Effects on competition

The impact assessment of the Commission expects the recast to lead to a 3 to 4 percent increase in new RUs and to increase the market share hold by non-incumbents by 2 to 3 percent in rail freight and passenger transport (European Commission, 2010f). Accordingly, this creates new employment opportunities for an estimated 1000 people in the railway sector. It is difficult to consider whether these estimates are correct or not. Despite that, I reveal the likeliness of some tendencies to occur in respect to the regulatory propositions.

#### 4.1.1 Lower market entry barriers

By extending the scope of the regulation of service facilities to ticketing and travel information facilities, the recast strengthens the ability of newcomers to attract customers. This makes sustainable operations alongside incumbents more likely and makes the market more attractive to newcomers. Moreover, by requiring detailed information on path allocation and access charging decisions from the IM, the recast will further limit discrimination and lead to fairer competition.

The right to sanction and to enforce fines strengthens the regulatory bodies. This, combined with a appropriate workforce, enables the regulator to react stricter in respect to the IM. Hence, the IM acts less discriminatory, facilitating the infrastructure access for competitors and new entrants. This solution is preferable to ownership unbundling, which leads to a lack of customer orientation of the IM. Yet, this is essential for TOCs to plan and operate their services.

So far, competition on the market for international passenger services is rare. This is partially due to administrative and language barriers which cause high costs. The provision of network statements in a second official EU language, in most European countries this surely means English, facilitates the access to

foreign markets. This favors small competitors and potential market entrants with weak human resources. Until now, only large, historic incumbents are able to allocate the necessary resources to such projects. As they fear "cannibalistic", ruinous competition, their motivation to engage in international services is rather small.

By introducing mandatory financial agreements between the governments and the IMs, the recast enhances the planning security of the IMs and provides incentives for lower network access fees (Deutsche Bahn AG, 2010b). Lower access charges will increase the attractiveness of the business for potential market entrants.

Altogether, the recast strengthens competition in rail passenger transport as it lowers the barriers to enter the the market and as it strengthens the regulatory authorities.

#### **4.1.2 Reshaping of the competitive landscape**

The industry witnesses a number of important mergers and acquisitions. In 2010, Deutsche Bahn buys the UK-based public transport operator Arriva - operating in 11 European countries - for almost 2.8 billion euro (Eurailpress, 2010). One expects another important merger between the French groups Veolia and Transdev to be closed by the end of 2011. The European and national competition commissions authorized the transaction, requiring to limit its activities in some regions (Eurailpress, 2011). The market consolidates as a consequence of rising competitive pressure, giving advantages to large state-owned companies with strong financial backgrounds. Operators generate economies of scale by the mean of external growth. A similar consolidation of competitors takes place in the rail freight transport before (EIM, 2010a). By that mean, growing competition leads to an oligopolistic market where price agreements and coordinated actions between competitors are more likely to occur. Experts argue that further consolidations are possible, but that a similar market development occurs earlier in Great Britain, where an optimum market configuration comprises 5 to 6 major players (DB and Arriva, interview 2011).

By strengthening the rights of TOCs and the regulatory authorities, the recast enhances the attractiveness of the international passenger transport business. Therefore, the competition on border-crossing lines will grow. Today, mainly joint-ventures of historic incumbents run those profitable services. In the medium-term, standalone services may replace those joint-ventures without separate branding, e.g. Alleo GmbH, a joint venture of DB and SNCF, running the ICE and TGV trains between Paris and Frankfurt and Paris and Munich. Longer

existing services, such as the joint-ventures Thalys and Eurostar, will last much longer as their brands represent a source of competitive advantage. Non-discriminatory rail road and facility access as well as strong regulation reduces the need for cooperation. This, too, promotes competition on the rail passenger market.

## **4.2 Criticisms on the proposal**

The recast represents a substantial improvement compared to the current legislation. Still, interest groups and MEPs alike criticize some essential aspects of the proposal (e.g. Serracchiani, 2010).

### **4.2.1 Enduring asymmetries of market liberalization**

The proposal lacks a commitment to liberalization as it does not foresee a market opening for domestic passenger transport. TOCs and IMs largely criticize this decision (CER, 2010b; Aberle et al., 2010; VDV, 2010).

Bearing in mind that the drafting of the policy begins in 2008, the Commission has enough time to come up with an approach to complete the market liberalization. The separate development of strategies is a mean to avoid a further delay of the recast adoption as some member states still prefer to protect their domestic markets (Pünder, 2010). One may argue that it is better to primarily guarantee the functioning of the regulatory authorities and to ensure proper financing for PSO services (in line with the findings of Friebel et al., 2005). Nevertheless, there is a number of countries fulfilling the necessary conditions for a market opening.

Policies for an opening of domestic passenger markets must consider the horizontal distinction of rail passenger transport. Introducing competitive tendering for PSO services requires specific know-how on service planning and contracting. The preparation is time consuming for both the awarding authority and the bidding companies. Introducing competition on the market for commercial lines needs a good infrastructure management. For bidders, the market entry requires extensive market studies prior to the launch of a service.

Accordingly, the market opening for commercial services does not create any perturbations. Competitive tendering for PSO services should be introduced stepwise. This enables the awarding authorities to develop the necessary capabilities. Moreover, the TOCs are not able to respond to a large number of tenders at the same time. Therefore, gradual introducing of competitive tendering is preferable.

The idea of the reciprocity principle is to reject as it contradicts the basic rationale underlying market liberalization. It may except competitors which may provide efficient services. Additionally, the handling of companies from outside the EU poses a considerable problem of reciprocity.

#### **4.2.2 Remaining regulatory shortfalls**

##### ***The regulatory authority***

Strengthened and more independent regulatory bodies are essential, but may still discriminate TOCs for several reasons. As a consequence, the Commission needs the right to withdraw competencies from the national authorities (DB and Arriva, interview 2011). In order to investigate for cross-subsidization, the regulatory bodies shall get the right to audit the financials of IMs whenever they want. This task requires a significant workforce if detailed audits should be accomplished for holdings like Deutsche Bahn in Germany and others.

##### ***Preventing cross-subsidization***

The recast aims to forbid cross-subsidization in vertically integrated companies. Even so the respective article 6.1-2 remains unclear as cross-subsidization can be done on the overhead level or by reallocating profits via the holding company.<sup>35</sup> First, this is relevant due to the fact that the company may use cross-subsidization to have competitive advantages compared to others. Second, this is important because the company may use profits generated due to subsidies to develop other business areas, as often criticized in the case of Deutsche Bahn.

In France, for instance, the railway network is owned by a “totally“ independent company, but the maintenance is subcontracted to the incumbent operator SNCF. It is definitely difficult and burdensome to investigate hidden cross-subsidization when there are manifold contractual relations between the IM and an operator.

##### ***The regulation of service facilities***

As stated above, the extension of service facility regulation to ticketing and travel information lowers market entry barriers to the market. However, one may argue that those facilities are not essential as they are duplicatable. Both can be provided on the internet or using local partners. For example, the InterConnex service, part of Veolia Transport, sells its tickets in the offices of BVG, a local transport provider in Berlin. From a theoretical perspective one may argue that

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<sup>35</sup> On the overhead level means that cross-subsidization may be done through holding fees, which are accounted as costs and deduced from the revenue. Profits can also be reallocated as dividends, deduced from the profits.

this regulation inhibits innovation because competitors are not forced to develop own solutions.

Still, from a customer's perspective, centralized ticketing and travel information facilities are advantageous as they facilitate the travel planning and as they allow to buy a single ticket for a journey with different TOCs.

***Delegated acts***

Amendments to the annexes of the directive shall be possible through delegated acts of the Commission. This is not in line with the TFEU which allows the *comitology* procedure<sup>36</sup> for inessential parts only. The annexes of the recast include, for instance, information on the delimitation of essential facilities and the contents of the network statements. They are essential and amendments therefore necessitate the agreement of the European Parliament and the Council.

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<sup>36</sup> The Comitology procedure designates the work of committees which oversee amendments by the Commission in the form of delegated acts.

## 5 Conclusions

In this thesis I evaluate the European railway reform in respect to the economic theories of competition and of contestable markets. I summarize empirical evidence on the effects of the regulation to date and deduce the prospective outcome of the proposed recast of EU legislation.

The EU adopts a particular model of railway reform based on vertical separation of incumbents and market opening. Competition among train operating companies shall increase cost efficiency and hence lead to substantial cuts of subsidies and improve railways' modal competitiveness. So far, the legislation requires separated accounts for the infrastructure manager and the operations within holding companies only, letting total ownership unbundling optional. The EU prescribes total market opening for freight traffic and international passenger services. The opening of domestic passenger markets is not compulsory.

The institutional framework - including legal unbundling, the supervision of path allocation and access charging, mandatory network statements as well as the establishment of regulatory bodies - responds to the economic assumptions on the consequences of natural monopolies and the behavior of the firm.

The gradual adoption of three railway packages leads to an opaque legal framework on railway regulation. The ambiguous formulation and numerous exceptions explain the variety of implementation across EU member states. Yet, those disparities allow the assessment of alternative railway regulations. The general tendency indicates increasing cost efficiency and a growing modal share wherever the national framework allows fair competition on and for the market. However, this positive conclusion applies mainly to the case of EU-15 countries, less to the case of EU-12 countries.

The experience affirms vertical and horizontal separation of historic incumbents as it leads to increased cost efficiency within the separate divisions. This is the result of increased transparency and managerial autonomy. Moreover, the empirical evidence proves a positive effect of competitive pressure on costs, supporting the arguments for market opening. Accordingly, the rationale of the EU railway reform seems to pay off, if properly applied.

The recast aims to clarify the legislation in order to reduce the discrepancies among member states. Additionally, the proposal strives for i) non-discriminatory access to service facilities, ii) more transparent infrastructure managers, iii) incentives for sustainable investment commitments, and iv) stronger regulatory

bodies. These measures target the opportunistic behavior of market-dominating incumbents, asymmetric information among market participants, obvious hold-up problems, and the insufficient enforcement of EU law. The proposal does not foresee the opening of the domestic passenger transport market.

The recast will definitely increase the competition in the market as it lowers the market entry barriers for competitors and new entrants. However, a significant effect would have required the completion of the market opening for domestic services. The Commission attempts to present respective options during 2011.

Moreover, the recast will have significant implications on corporate strategies. First, increasing competition may lead to further consolidations in the passenger railway market. Second, strengthened access rights for service facilities as well as more transparent network statements will facilitate the access to foreign markets and reduce the need of cooperations. Smaller competitors may be able to run international services and historic incumbents may replace their joint-ventures by proper services.

All in all, this thesis generally affirms positive effects of competition on the market outcome for the European railway market. Nevertheless, further analysis and more empirical evidence is necessary in order to compare the benefits of competition to the total costs of regulation. Interesting insights may result from comparing the effects of the railway regulation to the telecommunications and the energy sectors. In doing so, one should especially consider the different shares of costs bound in the incontestable market segment and of fixed costs in the operations business. Moreover, one may anticipate future influences on the regulatory priorities of EU policy. For example, environmentally friendly individual transport like electric cars may reduce the political willingness to subsidize rail transportation.<sup>37</sup>

The liberalization of the railway sector is not undisputed. More research needs to be done in order to determine the optimum institutional framework, allowing reliable and safe transportation at the lowest costs for the community.

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<sup>37</sup> Currently, a research project on "Railways in the age of the electric car" is done at the Institute for Climate Protection, Energy and Mobility of the University of Greifswald, jointly with TU Braunschweig, TU Berlin and TU Dresden.

## Appendix

### Appendix 1 Rail transport revenue over total costs in European Countries in 1998

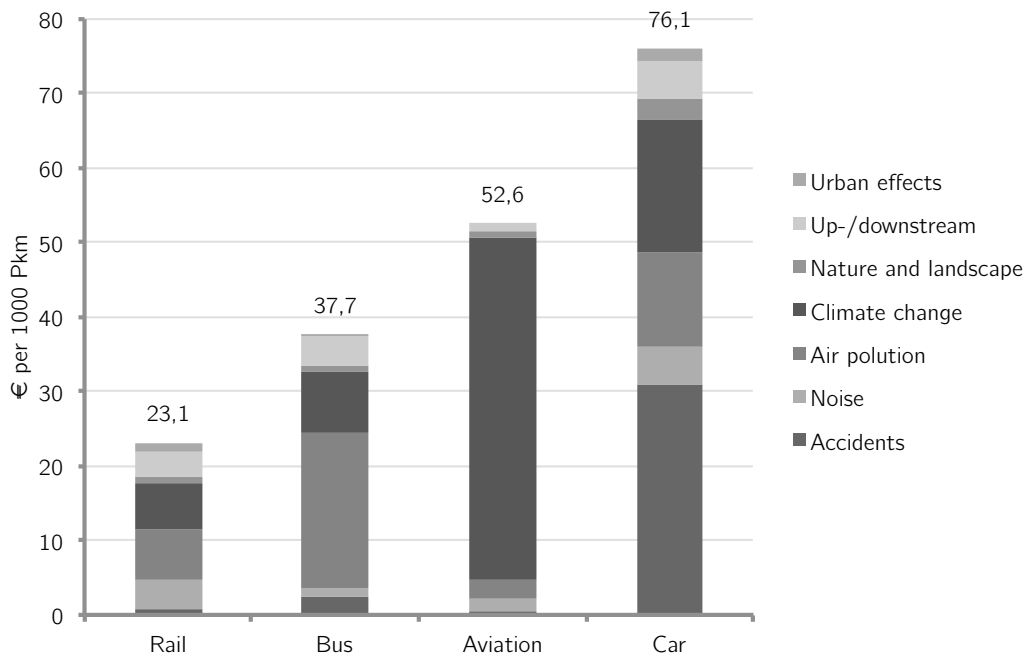
Country	Revenue over total costs
Austria	0.31
Belgium	0.24
Denmark	0.54
Finland	0.66
France	0.41
Germany	0.43
Greece	0.18
Hungary	0.09
Ireland*	0.46
Italy	0.28
Luxembourg**	0.26
Netherlands	0.35
Portugal	0.22
Spain	0.27
Sweden	0.62
Switzerland	0.45
UK	0.57
Total	0.39

Source: Nash (2004)

\* Operating, signalling and depreciation costs only

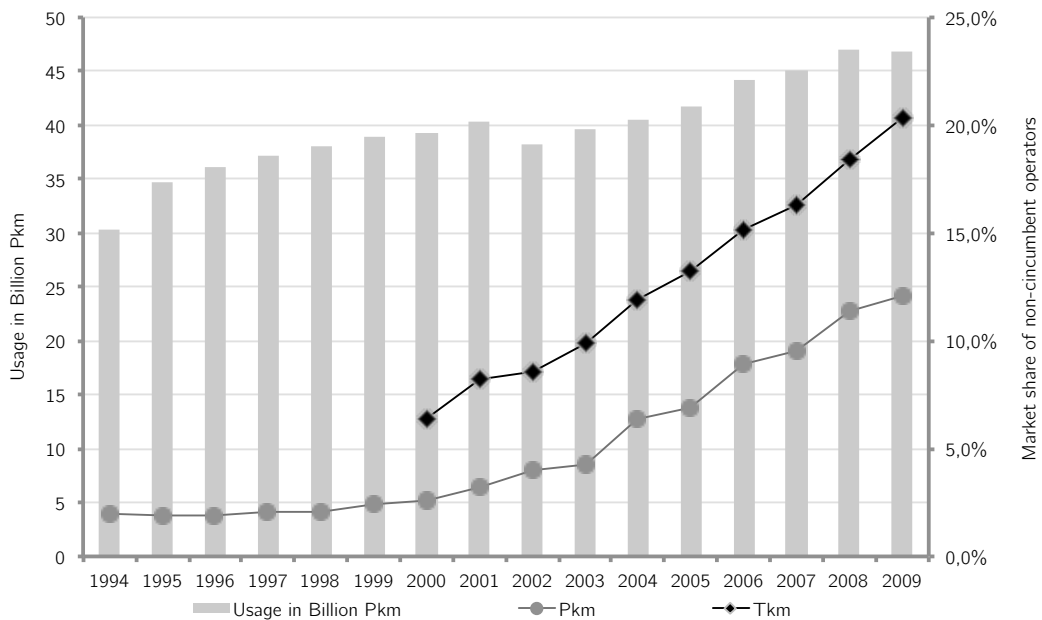
\*\* Rail owned buses included

**Appendix 2** Average external costs 2000 by mode of passenger transport (for EU-17)



Source: Schreyer et al. (2004)

**Appendix 3** Usage and non-incumbent market share in Germany 1994-2009



Source: Compiled from Brenck and Peter (2007) and Deutsche Bahn AG (2010)

## Appendix 4 EU Regulations and Directives related to the Railway Market Regulation

Act	Description	Date
Regulation 1191/69	n action by Member States concerning the obligations inherent in the concept of a public service in transport by rail, road and inland waterway	26 June 1969
Regulation 1192/69	on common rules for the normalisation of the accounts of railway undertakings	26 June 1969
Regulation 1107/70	on the granting of aids for transport by rail, road and inland waterway	4 June 1970
Regulation (EEC) No 1893/91	on action by Member States concerning the obligations inherent in the concept of a public service in transport by rail, road and inland waterway	20 June 1991
Directive 91/440/EEC	on the development of the Community's railways	29 July 1991
Directive 95/18/EC	on the licensing of railway undertakings	19 June 1995
Directive 95/19/EC	on the allocation of railway infrastructure capacity and the charging of infrastructure fees	19 June 1995
Directive 96/48/EC	on the interoperability of the trans-European high-speed rail system	23 July 1996
<b>First Railway Package</b>		
Directive 2001/12/EC	amending Council Directive 91/440/EEC on the development of the Community's railways	26 February 2001
Directive 2001/13/EC	amending Council Directive 95/18/EC on the licensing of railway undertakings	26 February 2001
Directive 2001/14/EC	on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification	26 February 2001
Directive 2001/16/EC	on the interoperability of the trans-European conventional rail system	19 March 2001

Act	Description	Date
<b>Second Railway Package</b>		
Directive 2004/49/EC	on safety on the Community's railways and amending Council Directive 95/18/EC on the licensing of railway undertakings and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification (Railway Safety Directive)	29 April 2004
Directive 2004/50/EC	amending Council Directive 96/48/EC on the interoperability of the trans-European high-speed rail system and Directive 2001/16/EC of the European Parliament and of the Council on the interoperability of the trans-European conventional rail system	29 April 2004
Directive 2004/51/EC	amending Council Directive 91/440/EEC on the development of the Community's railways	29 April 2004
Regulation (EC) No 881/2004	establishing a European Railway Agency (Agency Regulation)	29 April 2004
<b>Third Railway Package</b>		
Regulation (EC) No 1370/2007	on public passenger transport services by rail and by road and repealing Council Regulations (EEC) Nos 1191/69 and 1107/70	23 October 2007
Regulation (EC) No 1371/2007	on rail passengers' rights and obligations	23 October 2007
Directive 2007/58/EC	amending Council Directive 91/440/EEC on the development of the Community's railways and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure	23 October 2007
Directive 2007/59/EC	on the certification of train drivers operating locomotives and trains on the railway system in the Community	23 October 2007

Source: Own illustration

**Appendix 5** Independence of IMs from incumbent passenger RU

State	No common board members	Offices in separate buildings	Incumbent RU not involved in infra. mgmt.	Incumbent does not control any asset access	Independent regulator
Belgium	+	+	+	+	-
Bulgaria	+	+	+	+	+
Czech Republic	+	+	+	-	+
Denmark	+	+	+	+	+
Germany	-	+	+	-	+
Estonia	-	-	-	-	+
Ireland	-	-	-	-	-
Greece	-	-	-	-	-
Spain	+	+	+	n/a	-
France	+	+	-	-	+
Italy	+	+	-	-	-
Lithuania	-	-	+	n/a	-
Luxembourg	-	-	-	-	-
Latvia	-	+	-	-	-
Netherlands	+	+	+	+	+
Hungary	-	+	+	n/a	+
Austria	+	+	+	n/a	+
Poland	-	+	+	-	-
Portugal	+	+	+	n/a	+
Romania	+	-	+	+	+
Slovenia	-	-	+	+	-
Slovakia	-	+	n/a	n/a	-
Finland	+	+	+	-	+
Sweden	+	+	+	+	+
UK - GB	+	+	+	+	+
UK - NI	-	-	-	-	-
Switzerland	-	+	+	+	+
Norway	+	+	+	+	+
Croatia	+	-	+	+	-
Macedonia	-	-	-	-	-
Turkey	-	-	-	-	-

Source: European Commission (2010c)  
 + Criterion met  
 - Criterion not met  
 n/a information not available

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