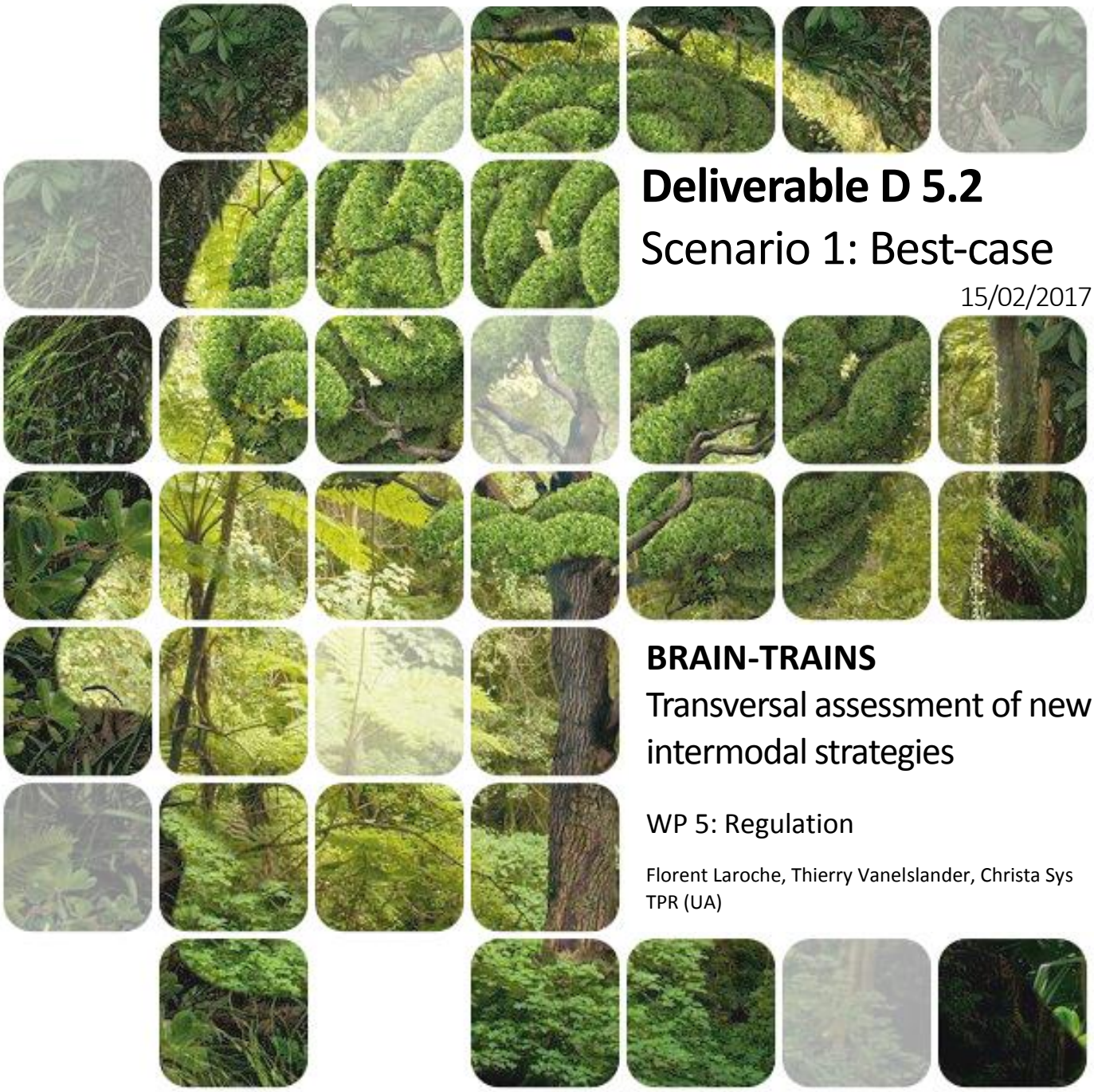
BELGIAN RESEARCH ACTION THROUGH INTERDISCIPLINARY NETWORKS



Deliverable D 5.2

Scenario 1: Best-case

15/02/2017

BRAIN-TRAINS

Transversal assessment of new intermodal strategies

WP 5: Regulation

Florent Laroche, Thierry Vanelslander, Christa Sys
TPR (UA)

CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

The objective of this deliverable is to apply the method (cf. deliverable WP5.1) to the best scenario developed in the WP 1. The best scenario forecasts a low concentration of the number of operators in the Belgian market from 6 in 2014 to 10 in 2030 and a fast development of the market size in ton-kms (+ 133%). This is contrary to the two others scenarios (medium and worst case, handled in deliverables 5.3 and 5.4 respectively), which are less optimistic in terms of concentration (four and two operators respectively) and market development (+ 64% and +10% respectively).

The analysis of the "best case scenario" is based on two questions:

- What are the levers for policy makers to increase the market size in a context of free competition?
- Which policy path can be drawn for the best scenario?

This deliverable examines the new regulation framework and levers for Belgian and European policy-makers to influence the rail freight market. Moving from a national level with monopoly and cooperation to a European level with free players and competition, the European states need to find new tools to drive their market and keep their engagement to increase the modal share of rail freight. In Belgium, the objective is to increase the competiveness for a modal shift from road to rail of 30% in 2030 to reduce CO_2 emissions.

The analysis is based on the methodology described in the second part of the deliverable 5.1. It proposes a qualitative approach of the rail regulation in Europe and Belgium which is improved by a benchmark analysis through a selected number of European countries to provide an overview of the main challenges for rail in terms of regulation and practices.

The organization of this deliverable is as follows. Section 2 highlights the need to extend the analysis from the rail freight organization to the global rail organization (freight and passengers). Section 3 proposes an overview of the practices in some European countries for regulation through a benchmark analysis. Finally, the last section makes a link between the results and the best scenario developed in the WP1.

1. NEW MARKET ORGANIZATION AND LEVERS FOR REGULATION

The European rail freight liberalization changed the paradigms of the market from national markets and monopolies towards a single European market with competition. The goal was to find a solution for the decline of the railway freight market in Europe and the lack of competitiveness compared to road (91/440/EEC).

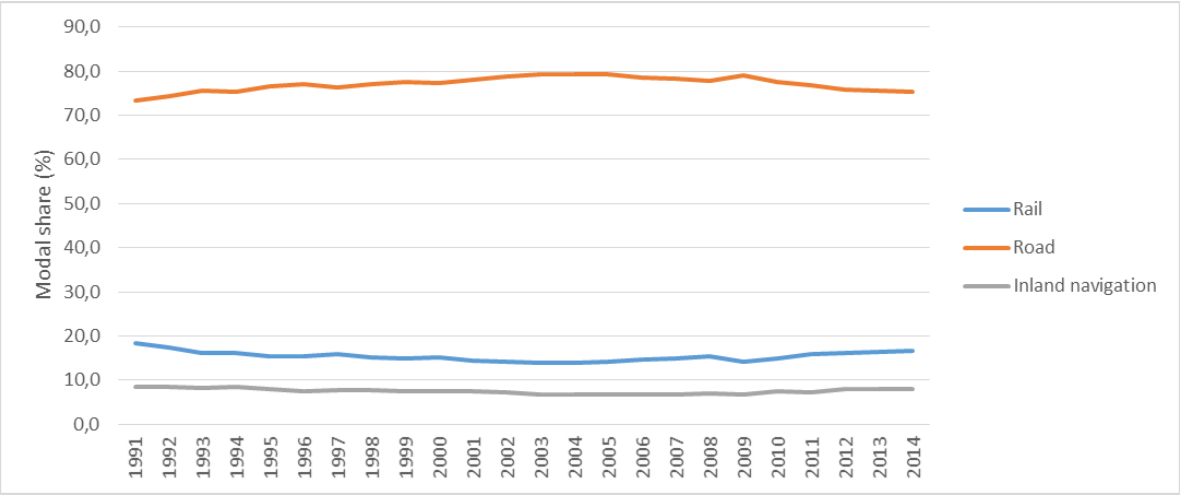
The purpose of this section is to describe the new organization of the market. The first sub-section gives a short overview of the rail freight market in the transport ecosystem. The second sub-section presents the European organization. The last one proposes a reading grid of concentration and levers to regulate.

1.1. A NEED FOR REGULATION OF A NON-DOMINANT INDUSTRY

This sub-section assumes that regulation is useful for the rail freight market because of its specific position in the transport ecosystem.

First, the rail freight sector is a very small sector in the European transport industry. Laroche et al. (2016) show that the aggregate turnover for the rail freight industry in Europe is small, with around €15 billion in 2014, comparing to €300 billion for road transportation[1]. Also in traffic volume, road keeps a strong position in Europe, with 75% of traffic in 2014 (figure 1). This weak position in terms of turnover and modal share can be a first barrier to the weight of the industry face to the policy makers mainly to justify huge investments in infrastructure. Thus, it is necessary to consider not only the sector, but also its externalities in terms of opportunities for business or reduction of CO_2 emissions compared to road transportation. On these points, WP 3 and 4 show that externalities can be high and compensate for the relative weakness of this sector in terms of direct economic impact.

Figure 1: Modal share for freight transportation in EU-15 between 1991 and 2014 (%)

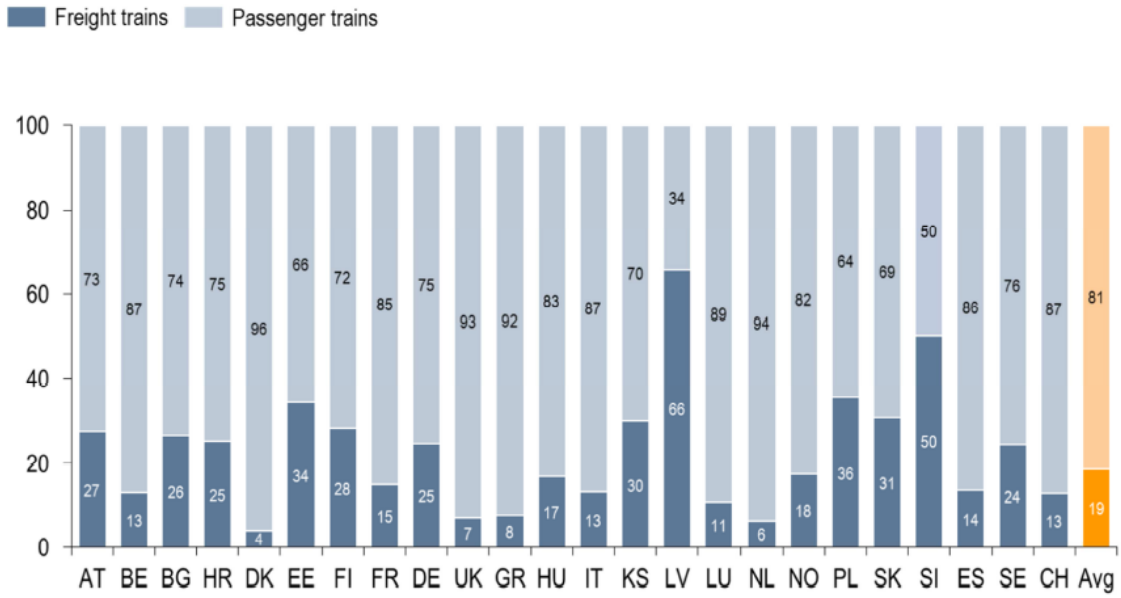


Source: Eurostat, 2016

[1] http://ec.europa.eu/transport/modes/road/news/road-haulage-report_en.htm

Second, rail freight is only a small part of the railway traffic in Europe. Figure 2 shows that only 19% of the railway traffic concerns freight. Implications can be several. First of all, the rules for traffic priority are most often in favor of passenger traffic. Freight is always in a second order of priority in case of perturbation. These rules increase the risk of delay and the unreliability of traffic. Second, priority for investments in the network is most often given to the passengers. Exclusive investments for freight are very rare in Europe. During the last decade, only one new major infrastructure, totally dedicated to rail freight, has been built in The Netherlands (the Betuwe line).

Figure 2: Network use by type of traffic (% per train-km)



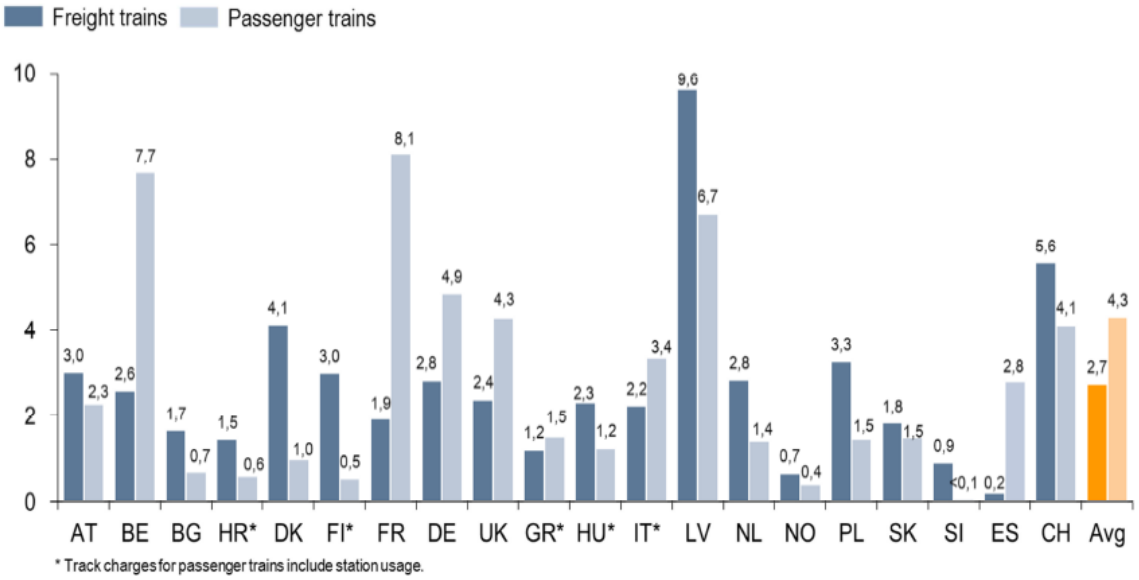
Source: IRG-Rail, 2016

To finish, the rail freight operators have a double constraint to access to the network. First, they have to pay access charges (figure 3) that are considerably higher compared to road transportation (ECA, 2016). Second, the railway market is still confronted with a monopoly organization because of the persistence of national monopolies for passengers (except for some countries like Germany, Sweden or Great-Britain[2]). Crozet (2010) assumes that for the French case, this situation can have a negative impact on the pricing for access charges. In the case of a monopoly by the dominant operator or a system of tenders with compensation from local authorities, the sensitivity of the incumbent to the access charges is less important than the sensitivity of new operators for passengers or freight[3]. Thus, in a network where traffic passengers are in monopoly, the rail freight operators can be collateral victims of a strategy from incumbent operators to support an increase of access charges and reduce the likelihood of having new rail passenger operators (Nash, 2009; Preston, 2009). This point has been also highlighted by Lang et al. (2013) who show that competition can have a positive impact on access charges. But one of the conditions is to have a large part of the market being opened up and not only a minor part as is currently the case.

[2] Perennes (2016) shows that the biggest part of competition for rail passenger is for the market (tenders). Concerning the open access, only 34 experiences have been tested in Europe on the last decade in 7 countries (Austria, Czech Republic, Germany, Italy, The Netherlands, Sweden and the United-Kingdom). Most of them have been a failure (47%) and were operated for a national or regional market.

[3] *"It exists a third function of access charges […], […] more the access charges are high and less it is likely to have competitors on a high speed line"* (Crozet, 2010, p.5)

Figure 3: Average revenue for network manager from track charges for the minimum access package (€ per train-km)



Source: IRG-Rail, 2016

Consequently, the rail freight market is facing a triple constraint in the transport ecosystem: the dominant road position, the dominant rail passenger position and the access charges to use the network. Regulation analysis needs to take into account these relative weaknesses and find levers to compensate for them.

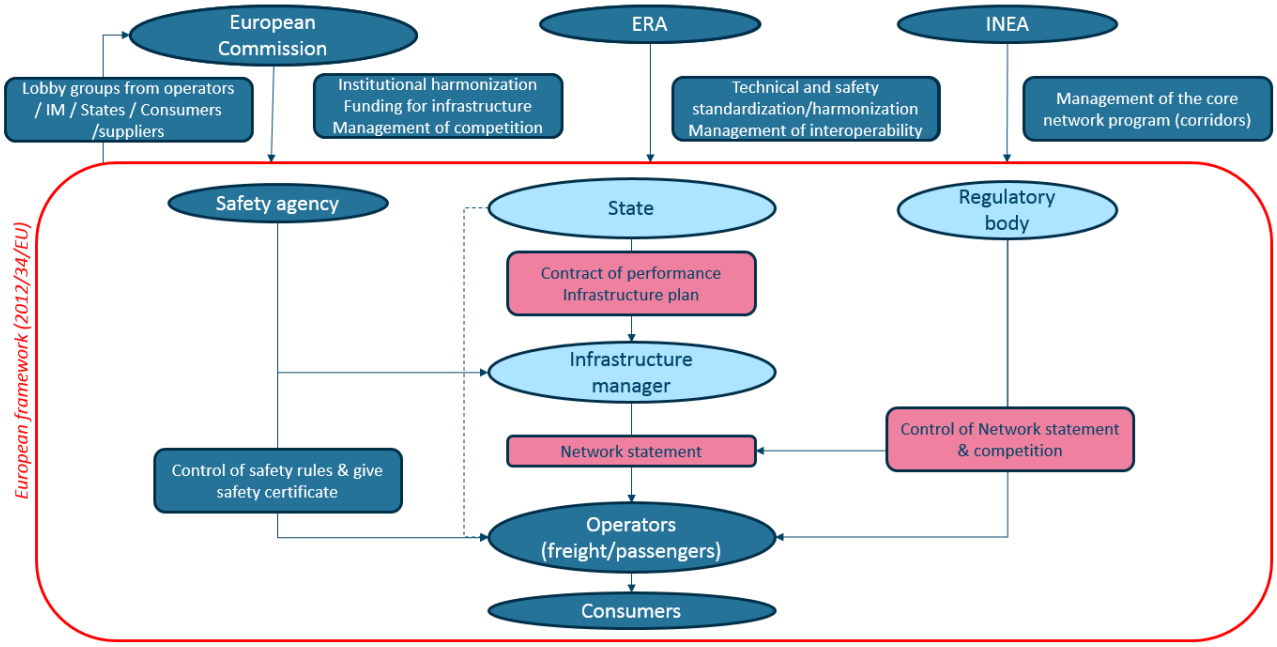
1.2. FOCUS ON THE NEW EUROPEAN RAILWAY INSTITUTIONAL ORGANIZATION

The levers to regulate the rail freight market need to be identified before analyzing the institutional framework. The European framework changed slowly between the first Guideline in 1991 and the discussion in 2016 about the Fourth Railway Package.

The new railway policy driven by the European Commission (EC) can be summarized as follows: to create an integrated market with efficiency and competitiveness to support the transfer of goods and passengers from road to rail. Liberalization of the different market segments is one of the main challenges to support this policy, but not the only one. The institutional framework for railway policy has been also deeply changed and the national policy-makers have to come up with new tools to support their market.

Figure 4 proposes a simplified scheme of the institutional framework according to the EC in 2016. Changes from the Fourth Railway Packages are not considered in the figure, as so far in 2016, they are still under discussion.

Figure 4: European scheme for railway organization



Source: Authors

The scheme presents the main institutions and their functions in the railway system. It is a theoretical overview, according to the last Guidelines (2012/34/EU). The benchmark in section 3 will show that some adaptations are possible depending on the countries. Several observations can be made according to this scheme.

First, the railway system has to compose a policy between the EC and national institutions. The EC defines the general institutional and technical framework for harmonization (common policy), while the national states and their agencies control the application. The EC shares its skills with specific agencies for technical and safety standardization/ harmonization (European Railway Agency, ERA) or implementation of the strategic corridors (Innovative and Networks Executive Agency, INEA). The ERA has been established in 2004 (2004/49/EC) and started its operations in 2006. This is the only European agency specifically dedicated to the railway system. INEA's tasks also include other transport modes, telecommunications and energy. ERA's main function is to manage the migration towards a single network from a technical point of view. It works in cooperation with the national agencies and its competencies will be extended as from 2019, according to the technical pillar in the Fourth railway package, to the safety certificates and the vehicle authorizations.

Second, the optimal scheme for the EC in terms of organization, is the unbundling between the network manager and the historic operator to better identify the natural monopoly. This approach does not make consensus among the European community (Van de Velde et al., 2012) and states like France or Germany support an integrated solution to reduce the transaction costs in the Fourth Railway Package. The network manager is considered as a natural monopoly because of high economies of scale (2012/34/EU). To avoid over-profit by excessive access charges or under-performance because of this monopoly, the national state has to define a performance contract with the network managers for a minimal period of 5 years (art. 30, 2012/34/EU). Six essential objectives are referenced by European law (annex 5, 2012/34/EU): train performance (reliability), network capacity, asset management, traffic volume, safety level and green policy.

According to this framework, each state is free to define the indicators, the objectives and the incentive scheme to reach the target.

Third, the relationships between the network manager and the operators are commercial, even in the case of an integrated organization. They are regulated by the network statement (art. 27, 2012/34/EU) which defines mainly the process for capacity allocation, the pricing for access charges and the performance scheme (incentives and penalties in case of train delay). This document is updated every year and is obligatorily controlled by the national regulatory agency. The EC gives a common framework developed in annex 5 of the 2012/34/EU to define the document. In this way, it can be an interesting resource to make a benchmark of the different practices in Europe for performance schemes or pricing.

Fourth, each member state has to establish an independent control agency (2012/34/EU). Main tasks are to ensure the non-discrimination between operators to access on the market and control the conformity of the network statement. According to the European law, it is not possible to consider these agencies like regulation agencies. They cannot give objectives to the network manager for pricing or performance. Nevertheless, they can exert indirectly an economic regulation on pricing through their judgment on the network statement. Generally, the economic regulation is still a competency from the EC to organize the market, while national states manage the natural monopoly. There is no specific agency to coordinate the different national control agencies, like it exists for safety. The EC keeps this full competency.

To finish, each group of actors of the European rail system is constituted of lobby groups. They have different functions that defend their interests to the EC and the European Parliament, share their practices and information or develop common projects for a better cooperation. These groups are essential to the European life to structure and animate the single market. However, they are not always well-constituted by actors. There are different groups for the same category of actors according to their position in interest. One of the biggest groups is the CER (Community of European Railway and Infrastructure Companies). It represents mainly the national incumbents for freight and passengers as well as the integrated network managers and can be opposed to the European Rail Freight Association (ERFA) for the independent rail freight operators or to the European Rail Infrastructure Managers (EIM) for the independent infrastructure managers. Finally, the only one well constituted network is the Independent Regulators' Group – Rail (IRG-Rail) for the national control agencies. It has the feature to be established by the Guideline 2012/34/EU (art. 57). National regulators have to cooperate and to work together through a European network. Their tasks are to share information and best practices, but also to give them a mutual assistance to control the market and manage the complaints. This network can be considered an alternative to a European agency for regulation on a similar model of the ERA. However, established in 2011, the efficiency in the long term is still to be demonstrated.

To conclude, this short overview of the theoretical institutional framework and relationships for rail gives some first indications on the different available levers to regulate for a national state. The following sub-section proposes a formalization of these levers.

1.3. METHOD FOR IDENTIFICATION OF LEVERS AND ACTIONS ON THE MARKET

Actors and relationships are multiple in the railway system. Considering this context, regulation can become complex, especially if the external factors which can have an impact are added like road and inland navigation regulation, energy prices, environmental policy, etc. This sub-section creates some clarity in this complexity by drawing first a grid to analyze the need for regulation and then to make a short list of the different levers and their specificities.

The identification of the relevant levers starts by a good identification of the scope of the problem. First of all, the scale is a key point to define the scope: global, European, national, local, etc. In the case of an over-concentration of rail freight operators on the Belgian market, this first step consists of determining if concentration is on the European market or only on the Belgian market. According to the result, the responsible authorities and levers will be different. Second, the identification of the scale highlights the responsible authorities.

A case of over-concentration on the European market can result from a lack of attractiveness of the rail industry and concerns mainly the common policy and the European institutions (table 1). At opposed to this, an over-concentration only on the Belgian rail freight market questions the attractiveness of the market and network. Responsible authorities are the government and the control agency which have to ensure a good level of performance on the market. Thus, the last point is the identification of the relevant levers and its impacts on the market.

Table 1: Reading for actions according to the problem of over-concentration

Scale level	**Over-concentration on the EU market**	**Over-concentration only on the Belgian market**
Action level	European challenge (industry attractiveness)	Belgian challenge (market attractiveness)
Authorities	European Commission European Railway Agency	Federal State Regulatory agency

Source: Authors

An exhaustive analysis of the different possibilities for levers and impacts would be long and complex. Here, the purpose is to highlight the main tools/levers for a national state to support its rail freight market. The following table explores a selection of strategic levers for a national state.

Table 2: Identification of main levers to regulate the national rail freight market according to the European law

LEVER	AUTHORITY	DETAIL OF LEVERS
Performance contract	National State (European Commission)	Pricing principles Performance objectives Financial transfers
Transport policy	National State (European Commission)	Priority for infrastructure investments Priority for technologies Funding and taxes
Network statement	Infrastructure manager (Regulatory body)	Pricing for access charges Capacity allocation Performance scheme
Regulatory body	National State (European Commission)	Control of network statement Control of competition on the market
Lobby	National State Other actors according to the topic	The European Council The European Commission The European Parliament The Council of the EU

Source: Authors

The **performance contract** is a key lever for national states, as it is a direct control on the IM and indirectly on the market. The general framework is given by the EC but each state can adapt freely the contents. Main tools to impact on the market are the pricing principles, the performance indicators (and objectives) and the conditions of financial transfers. First of all, a pricing of access charges to the total cost or marginal cost will not have the same impact on the market and the financial equilibrium of the IM. There is a political choice to make between a policy of marginal cost with massive financial transfers from public funds as in Sweden or Italy for the high speed market and a policy of total cost with a reduction of needs in public funds as in France. Second, total cost or marginal cost are calculated according to the financial and technical performance of the network manager. Financial performance can be the cost of the maintenance, energy and asset management. The technical performance then depends on the speed, the traffic management or the capacity management. According to this, the basis for the cost is variable and depends on the ability of the network manager to improve its practices and to develop the attractiveness of its network. The EC gives a minimal framework to the national state to fix indicators of performance but the target and the structure of each indicator is highly sensitive and impact on the market can be high in terms of capacity, reliability and price. To finish, the conditions of the financial transfers from the national state to the IM are the keystone of this architecture and highly political. There is a first political choice to fix the access price to the marginal or total cost. There is a second choice to fix objectives in terms of technical performance and reduction of cost. Finally, there is a last choice to implement an incentive scheme with penalties and bonus according to the results linked to the target.

The **transport policy** is a second key lever for the national state. This is a privileged way to make political choices on long term and give priorities in terms of infrastructure and technologies. Tools for priorities are mainly the fund allocation between different modes and options for infrastructure and technologies. They can be supported by the taxes and the regulation to rise new financial sources and to reduce the unbalance

between modes. Consequently, the transport policy for rail needs to be linked with the objectives of the contract of performance mainly for infrastructure investment and technologies. Technologies can be a new system to manage traffic, like ERTMS (European Rail Traffic Management System) or the centralization of the traffic control activities. The implementations and investments in strategic infrastructures as connection through borders, flyovers for capacity, electrification, etc. can increase the performance of the network and the attractiveness of the market.

The **network statement** can be considered as a lever for the national state even if it has no direct responsibility. This document is standardized across Europe and has the objective to ensure the transparency of essential facilities towards the market. Only the regulatory agency has a direct control on it with a main mission to prevent all risks of non-discrimination. However, this document is interesting as it fixes the access charges each year and gives an annual picture of the IM's progress according to the contract of performance. The process for capacity allocation is also an important lever for the attractiveness of the market as the more the allocation is flexible and fast, the more the rail operator can be flexible to face customers needs and be competitive.

Linked to the previous point, the **regulatory body** and its skills is also an important lever for the national state. The current skills give mainly power for the agency to control the network statement and competition on the market in terms of non-discrimination. It assumes in this report that an extension of the competencies to follow the transport policy and contract of performance in terms of results could have a beneficial impact on the management of the IM and indirectly on the market. Indeed, the regulatory agency is the only independent institution able to make a direct link between the reality of the market and the global transport policy. Thus, it is the responsibility of the national state to give more competencies to the regulatory body and transform it in a regulatory agency.

Finally, in the case where the need of regulation extends beyond the national context, the national state can use its different positions among the European institutions to make **lobby**. It can also coordinate its actions with other lobby groups according to the topics.

To conclude, the levers are multiple for the national state, which keeps strong powers on the global organization and management of the railway system. However, to be efficient, the political choices and objectives need to be coherent from the fund allocation between the different modes to the daily train management.

2. THE BELGIAN CASE AND A BENCHMARK OF THE EUROPEAN PRACTICES

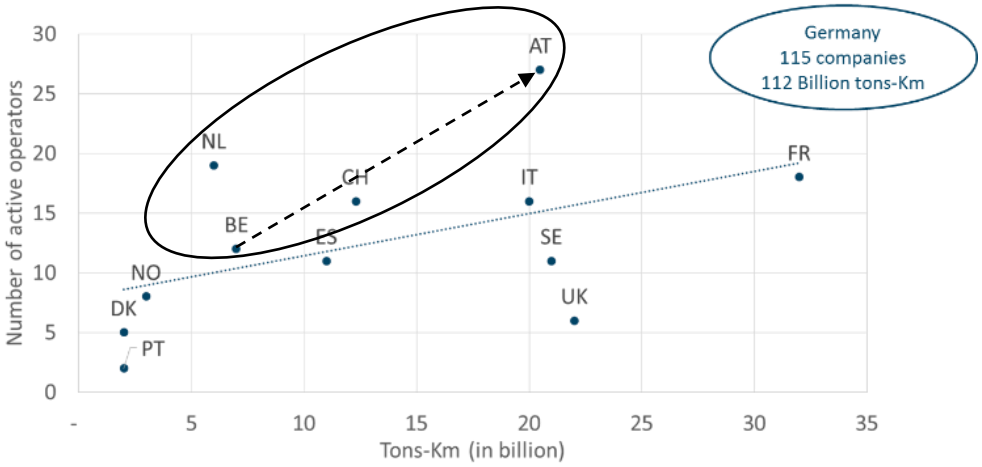
Although the EC gives a general framework for the rail organization in Europe, practices can differ from one country to another.

This section provides an overview of the different practices through some European countries. In section 3.1, the method of analysis is given. Section 3.2 describes the Belgian case. Section 3 finishes with the results for other countries.

2.1. METHOD FOR THE BENCHMARK ANALYSIS

The objective is to provide an overview of the different practices in terms of rail market regulation in Europe. The benchmark is based on the European model presented in section 2.2. Criteria for comparison are the five main levers identified in table 2. The last criterion about "lobby" will be less discussed because of a general lack of data and transparency about action of national states at the European level. The scope of analysis is extended to similar countries compared to Belgium, according to figure 5.

Figure 5: Scope for benchmark based on the correlation between the number of active operators and the market size (ton-kms) by European country in 2014



Source: Authors

The selection is based on a comparison between the number of active operators and the performed ton-kms. The Belgian market is above the average and is part of a specific group of countries. They are mainly similar by their modest size in Europe and their strategic position (transit, ports, etc.). Thus, they have more operators than average in comparison to other markets.

For the Belgian market, a target could be Austria in terms of tons-km and number of operators or The Netherlands in terms of number of operators. Switzerland can be an intermediate step. However, this first approach allows highlighting the potential of the Belgian market in terms of dynamic. Consequently, the scope of the benchmark is based on the analysis of the Dutch, the Swiss and the Austrian organizations.

The sources and data are given in the following subsections case by case.

2.2. THE BELGIAN CASE

The Belgian organization follows the European way. Since the last reform[4], the IM (Infrabel) is independent from the national operator SNCB. Furthermore, a regulatory body has been created (Regulatory Body for Railway Transport and for Brussels Airport Operations). The main relationships and levers identified in the section 2.3 are applied in the Belgian system. However, some differences in the application are interesting to highlight.

THE CONTRACT OF PERFORMANCE

A first contract of performance has been drawn between the Belgian Federal State and Infrabel in 2008 for a period of 4 years (2008 – 2012)[5]. Since the end of this contract, no new contract has been designed. The previous one continues to run by Royal decree waiting for a new contract in 2016. The main reason for this delay is the new organization of the Belgian rail according to the unbundling between Infrabel and SNCB. Another reason can be the difficulty for the responsible authorities to write the contract and especially to fix the indicators, targets and incentives in case of non-achievement.

Concerning the latter, the last contract was very light in terms of objectives and indicators.

- For rail freight, one quantitative objective has been established: + 35% ton-kms between 2006 and 2012. But no incentive or penalties were linked to it. Results are a decrease in the period by -12.7% (Eurostat, 2016).
- Concerning the indicators, only one was linked to penalties. It concerns the performance for passengers and was fixed in terms of minutes of delay in one year. In the case of non-compliant results, a financial penalty can be applied to the financial transfer from the Federal state to the IM. However, this system does not exist for rail freight.

The two objectives seem to be partially in contrast with each other. The IM can be tempted to give more priority for passengers than freight and decrease the performance for rail freight. The development of a similar indicator for rail freight in terms of delay would be a good tool to reduce this unbalance.

To finish, there are no clear objectives in terms of pricing for infrastructure (Art. 11, 12, 13) except a principle (optimize the use of the network) and a better transparency in the framework. The control of the inflation and framework is attributed to the regulatory body according to the European law.

THE INFRASTRUCTURE PLAN

A new plan for infrastructure investment is still in progress in 2016[6]. Nevertheless, investments for railway forthcoming are mainly:

- The interoperability and safety of the network by the implementation of the ERTMS (full migration in 2025).
- Modernization of the connection between Belgium and Luxembourg (axis 3).
- A better port connectivity by investment in access to Zeebruges (new line between Ghent and Bruges) and Antwerp.
- Modernization of the Brussels area network.

[4] Loi portant le Code ferroviaire du 30 août 2013 (http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2013083057&table_name=loi)
[5] http://ecms.infrabel.be/DMS/ds/fr/6619936
[6] https://www.infrabel.be/fr/projets

- A better traffic management by a reduction of the number of traffic centers from 350 in 2005 to 31 in 2017, then 10 in the long term.

These projects show three objectives. The first one is to improve the global safety of the network after some tragic accidents (2010, 2014). The external benefit for freight is the migration towards the new European signaling system, ERTMS. It improves the efficiency for traffic management and the interoperability with the European networks in the long term. The second is to improve the port connectivity to the European network. Investments are concentrated on the port access but also in the hinterland to increase capacity and traffic reliability (line Ghent– Bruges, line Belgium – Luxembourg on the EU corridor 2 North Sea – Mediterranean). To finish, the modernization of the network and traffic centers should have a global positive effect on the system thanks to a better coordination between centers to manage the disruptions and increase the resilience. Consequently, these objectives and investments seem to be in the good way for a better efficiency of the Belgian network and a better integration to the European one.

Finally, the Federal state supports some specific segments on the national rail freight market through subsidies. They are for the combined traffic (€4,5 million) and the single wagon loads (€10,5 million). Amounts and traffic are very low but are essential to the persistence of some industries on the territory. The fund for subsidies is approved each year by the European Commission and the Federal State. However, the power of the Federal state in this field is limited and the probability of an extension to these subsidies to other market segments is very low.

The network statement

The document is published every year[7] and controlled by the regulatory body. It contains the detail of the pricing for access charges. As there are no specific rules from the Federal state, the IM uses rules from the guideline 2012/34/EU: “the cost that is directly incurred as a result of operating the train service” (Art. 31). According to this, there are several basic parameters like the number of kilometers, the environmental impact, the level of priority, the type of line, the period during the day and the weight of the train. A first observation about these principles highlights a drawback for freight according to the weight and the speed. However, it can be partially compensated for by the period during the day (off-peak hours), the type of line (no high speed) and the level of priority being usually less important than for a passenger train.

But, the most important to retain is that the direct cost depends on the cost of the network like the maintenance costs, the asset costs, the administrative costs, etc. Consequently, it is important to control the framework and the inflation to avoid an excessive increase due to the position of natural monopoly.

To finish, the capacity allocation is a key element to increase the flexibility of the market. In Belgium, an operator needs 9 months to book a slot against 8 months for the best in Europe (The Netherlands).

Finally, the regulatory body has a key role in the monitoring of the IM and indirectly on the market. If access charges are lowered due to structural efforts from the IM, the rail market will become more attractive.

The regulatory body

The Belgian regulatory body is a new structure since 2013. Its main powers are limited to the control of the network statement and the market (2012/34/EU).

Concerning the network statement, its control is not restrictive for the IM. It can give advice but not force the IM to change its strategy. On this point, only the contract of performance can drive the strategy of the IM and

[7] https://www.infrabel.be/fr/professionnels/entreprises-ferroviaires/document-reference-du-reseau

the regulatory body does not have power on it. Consequently, the regulator cannot give objectives to the IM or develop a strategy for the market.

About the market, it has competencies to interfere in case of discrimination from one operator to another. Nevertheless, it has no competencies to interfere in case of abusive merger or acquisition and it is limited at the European level in case of abuse by an international operator between Belgium and another country. The European law requires international cooperation between national regulatory bodies, but in reality, good cooperation depends on the level of good will towards each other. Consequently, a European agency could be a good solution to ensure the regulation across the borders and on the core network.

To conclude this subsection, Belgium is on time with the European regulation for the global framework. Nevertheless, several first observations can be drawn for future improvement. The analysis of other national organizations in the following sub-section will further update this list:

- Rail freight is currently a second priority for the IM in the contract of performance. The definition of a specific indicator similar to the one for passenger traffic (maximum number of minutes of delay in one year) could be a good lever to improve its priority for the IM.
- The regulatory body has limited power on the IM and market, while it is a key player in the system because of its independency and its intermediation. An extension of its skills to the definition of the contract of performance (with a validation from the Federal state) could be a good lever to improve the monitoring of the IM and the implementation on the market of the freight policy.

Table 3: Synthesis of institutional organization and levers for Belgium

LEVER	MAIN FACTS
Performance contract	Every 4 years, last period: 2008 – 2012 Objective for freight: +35% tons-km between 2006-2012 One indicator with incentive for passenger (max number of minutes for delay) No indicator with incentive for freight
Transport policy	Port connectivity: Antwerp & Zeebruges Safety and interoperability: full migration towards ERTMS in 2025 Modernization of the network: reduction from 350 traffic centers in 2005 to 31 in 2017
Network statement	Pricing according to the direct cost from a train service No advantage to the rail freight for access charges
Regulatory body	No restrictive control on network statement Limited control on the rail freight market because of the large share of international traffic
General facts	Rail freight modal share: 11%– 14% (2013) Rail freight traffic (ton-kms): 7,7 billion (2000) – 6.5 billion (2013)

Source: Authors

2.3. BENCHMARK FOR OTHER COUNTRIES

The benchmark concerns similar countries to Belgium, being The Netherlands, Austria and Switzerland. For each of them, general facts about their rail freight market are given first, and then a synthesis table is proposed with comments.

2.3.1. THE NETHERLANDS: ACTIVE POLICY FOR RAIL FREIGHT

The Netherlands is an interesting case in comparison to Belgium for its transport policy. Pushed by the biggest port in Europe (Rotterdam), the rail freight sector has a key position in the transport policy. The best example is the building of a new line fully dedicated to freight in 2007 (the Betuwe route). It is an exception in Europe in terms of price (€ 2,5 billion) as well as position, functioning as a direct and heavy link between a major port and its hinterland (German border). The result of this strong policy is a high number of active competitors (around 19 in 2016), as the national incumbent (NS Cargo) was bought by DB Schenker in 2000. Furthermore, the rail freight modal share increased from 3% to 5% between 2000 and 2013 while the market size increased over the same period from 4,5 billion ton-kms to 6,1 billion (+ 34,4%).

Table 4: Synthesis of institutional organization and levers for the Netherlands

LEVER	MAIN FACTS
Performance contract[8]	Every 10 years, current contract: 2015-2025 with yearly monitoring and deep evaluation of indicators and objectives at mid-term (2019). Two type of indicators: - For information: 27 indicators with no quantitative objectives (traffic, time for slot allocation); - For performance: 11 indicators with quantitative objectives, including 2 for freight (user satisfaction and punctuality). Incentive scheme: financial penalties in case of non-achievement.
Transport policy[9]	National strategy for rail freight (2014) Main objectives: reduce CO_2 emissions and operating costs to increase market attractiveness. Criteria for market attractiveness: - Quality of service: in 2020, 95% of the cargo can be found within a margin of 30 minutes on the terminals. - Cost efficiency: convergence between the Dutch and the German cost index from 120 for NL and 100 for DE in 2013 to 110 for NL in 2020. - Sufficient resources: the infrastructure capacity, train drivers, locomotives, wagons and terminal capacity have to be provided and facilitated by the railway sector as well. - Innovation: measured by the number of new operators and new destinations. Rail policy supported by a financial fund of €2.4 billion for: - Migration towards ERTMS. - The STS program: improve the daily resilience of the network. - The high-frequency program: frequency for density and to increase the traffic. - A third track towards Germany from the Betuwe route (2022). Implementation of the Eurovignette for trucks.
Network statement[10]	Pricing of access charges according to the direct cost from a train service. Pricing modulation according to the type of service (freight/passengers) and the weight. Two types of modulation for rail freight: - Price for access charges more attractive on the Betuwe route than the classic network (-24%); - Advantage for access charges above 600 tons.
Regulatory body	Not specialized in rail No restrictive control on the network statement
General facts	Rail freight modal share: 3% (2000) – 5% (2013) Rail freight traffic (ton-kms): 4,5 billion – 6.1 billion (2013)

Source: Authors; Eurostat, 2016

[8] https://www.rijksoverheid.nl/documenten/rapporten/2014/12/15/bijlage-2-beheerconcessie-2015-2025
[9] https://zoek.officielebekendmakingen.nl/blg-310665.pdf
[10] https://www.prorail.nl/vervoerders/network-statement

Comments

The analysis of the rail organization in The Netherlands highlights a strong involvement of freight compared to Belgium.

First, the contract of performance contains two out of eleven indicators of performance for freight. This is a positive signal and there is a will to take into account the market point of view with the user's satisfaction. Furthermore, the indicators of performance are designed on the basis of an incentive scheme with penalties in case of non-achievement. Penalties can be fines or freezing the price for access charges.

Second, the policy transport has a document dedicated to the rail freight for the next decade with objectives and criteria to assess the results. Two points are interesting to highlight. The first one is the objective to reduce the difference of the cost of operating between Germany and The Netherlands through a cost reduction for the IM and a better access to resources for operators. The impact on the market attractiveness can be strong and competitive in comparison to Belgium. This policy reminds that competition for the sea port market is not only in the port performance but also in the hinterland efficiency. The second one is the implementation of the Eurovignette for trucks on the national market. It is a positive signal towards the actors for an intermodal policy.

To finish, the regulatory body is not specialized in rail freight. It is a part of the Authority of consumers and market. Its skills are similar to the Belgian ones but an interesting advantage to this framework is the combination with the authority for competition. The transfer of experience is easier and resources can be higher.

To conclude, The Netherlands can be characterized by an active policy for rail freight and a strong involvement of actors in this policy (Port of Rotterdam, government, IM, etc.). The effects are an increase of the market size and a high level of competitors on the market in 2016.

2.3.2. AUSTRIA: A POLICY FOR COMPETITION

The Austrian rail freight market can be characterized as a dynamic market compared to Belgium. Indeed, the market is shared by the highest number of active competitors (around 27 in 2016) in Europe after Germany (around 115 in 2016). This market is driven by the second European rail freight operator in Europe (Rail Cargo), after DB Schenker, in spite of the small size of the country. This success comes for a large part from a key position in Europe between North and South-East but also from an internal dynamic market based on several local incumbents (integrated and mixed service between passengers and freight). Since the market liberalization in 1998, they developed their market in Austria and outside through partnerships with foreigner operators (the Graz-Köflacher Bahn – GKB – develops since 2000 a partnership with LTE towards Germany) or direct lines (Wiener Lokalbahnen Cargo started to operate abroad in 2007). There is a strong entrepreneurial spirit on the Austrian market supported by a developed market monitoring from the national regulatory body. The effects on the market are an increase of the modal share from 27% to 36% between 2000 and 2013 and an increase of the market size in the same period from 16.6 billion ton-kms to 19.3 billion (+ 20.9%) while the road traffic has been reduced by 16%.

Table 5: Synthesis of institutional organization and levers for the Austria

LEVER	MAIN FACTS
Performance contract[11]	Every 5 years, current contract: 2016-2021 with yearly monitoring. Mission: implementation of the transport policy defined on the period 2012-2025. Indicators to control the implementation (progress of works, congestion, punctuality). Incentive scheme: financial penalties in case of non-achievement.
Transport policy[12]	National transport strategy (freight and passengers) between 2012 and 2025 Objectives for freight: + 42% in ton-kms for freight by 2025 and + 30% of capacity on the network. Actions: - Yearly investment of €2 billion. - Schedule timing for passengers. - Reduction of bottlenecks on the network and speed increasing. - Infrastructure modernization (ERTMS implementation). Other: policy of subsidies for the rail freight market - To the private rail freight access. - To the single wagon, non-accompanied vehicle and rolling roads. - To the operators and leasing firms to implement ERTMS on their fleet.
Network statement[13]	Transparent pricing of access charges according to the direct cost from a train service: maintenance cost, traffic management cost, signaling cost and security cost. The Federal state has a restrictive power on pricing for access charges. Pricing modulation according to the type of service (freight/passengers) and the type of line. Special penalties for freight upper 60 minutes of delay. Special discount for locomotives equipped with ERTMS on the equipped lines.
Regulatory body	Extended skills according to the Railway act of 1957 (Eisenbahngesetz): - Promoting fair and functional competition between railway companies. - Promoting the occurrence of new railway companies in the rail market. - Ensuring the access to railway infrastructure for beneficiaries. - Creating a monitoring of competition against abuse of dominant position. In practice, skills of the regulatory body are as follows: - Handling complaints from the actors of the sector but also from customers. - Restrictive power on the pricing of access charges only in case of new mark-up. - Acting as an observatory of competition. Missions and actions of the observatory are: - Analysis of the economic conditions. - Analysis of traffic and market share of new operators (per company). - Analysis of partnerships and mergers between national companies and foreigners. - Annual survey to know the market about network access, business factors, transport policy, staff availability, technical standards and new technologies.
General facts	Rail freight modal share: 27% (2000) – 36% (2013) Rail freight traffic (ton-kms): 16,6 billion – 19,3 billion (2013)

Source: Authors; Eurostat, 2016

[11] https://www.parlament.gv.at/PAKT/VHG/XXV/III/III_00217/index.shtml
[12] https://www.bmvit.gv.at/bmvit/verkehr/gesamtverkehr/gvp/index.html
[13] http://www.oebb.at/infrastruktur/en/_p_Network_Access/NetworkStatement/

Comments

In comparison to the other case studies, the Austrian rail policy has a strong orientation towards the market and its monitoring. Different elements can be identified.

First, the contract of performance does not assess directly the performance of the IM but its capacities to implement the transport policy and its objectives. In other words, the IM is considered a lever to implement policies and not like a specific body to regulate. This difference with other countries comes mainly from the diversity of network managers in Austria where the national incumbent (OBB Infra) is one among others.

Second, the pricing for access charges is highly transparent compared to the other cases. There is a clear definition of direct costs.

To finish, the railway act gives clearly the priority to the market and its monitoring through the missions of the regulatory body. The observatory and the collection of data are unique in Europe and should be extended to the European market for a better knowledge of competitors and needs. Furthermore, the extension of its skills to the consumers of freight and passengers services is an original organization and can be interesting to give an overview of the rail system and problematics to the regulator.

To conclude, the policy towards the market and entrepreneurial spirit gives interesting results with a transition from the local incumbents with their historic market scope to the national and European markets. The effects are obvious on the rail freight traffic but also in the top 10 of the biggest operators where the second one is the national incumbent OBB Cargo, behind the German one (DB Schenker) and before the French (SNCF Fret) and the Polish (PKP Cargo).

2.3.3. SWITZERLAND: EXHAUSTIVE TRANSPORT POLICY AND PERSISTENCE IN THE LONG RUN

This last case is original because non-European. However, it is relevant to include in the benchmark for several reasons. First, it is a small country but with a strategic position for the European network, similar to the others of this benchmark. It is a key country on the “Rhine-Alpine” corridor directly linked to the ports of the North Sea like Rotterdam and Antwerp and in competition with the Scandinavian-Mediterranean corridor through Austria. Second, The Swiss rail system has the same particularity as the Austrian market with several local incumbents on the market. Each incumbent manages its own infrastructure and proposes freight and passenger services. Consequently, there is also an entrepreneurial spirit on this network with some success like BLS Cargo. Third, the Swiss policy can be characterized by its persistence and stability for renewing the rail freight system and reduce road traffic in the long term. To finish, the institutional organization can be compared with other case studies as the Federal state implements the European guidelines. Furthermore, it has already a long tradition of contract for performance as a pioneer since the first one was defined for the period 1980 – 1984 (Finger & Holterman, 2013).

The effects of this policy are strong but could be better in the long term. Indeed, the modal share for rail freight is one of the highest in Europe. However, it is decreasing from 52% in 2000 to 47% in 2013. This comes from a weak growth of the market size, from 11.1 billion ton-kms in 2000 to 11.8 billion ton-kms in 2013 and a strong increase of road traffic (+30.9% on the same period) in spite of a clearly policy oriented towards the rail freight mode.

Table 6: Synthesis of institutional organization and levers for Switzerland

LEVER	MAIN FACTS
Performance contract[14]	Every 3 years, current contract: 2017-2020 with yearly monitoring. Objectives: - Maximum expenses for infrastructure (maintenance and development). - Indicators with target and penalties in case of non-achievement. - Annual report. Main indicators: - Safety: number of collisions, passenger accidents, etc. - Availability of the infrastructure: delay, number of slot cancelled, etc. - Utilization rate of the network: total of slot produced and sold. - Productivity: traffic management cost, maintenance cost, etc. - Other indicators: congestion, user satisfaction, ERTMS implementation, etc.
Transport policy	National program to develop the rail infrastructure by 2025 (PRODES). Objective: increase network capacity by 2025: +60% of passengers and +70% of freight. - First plan for infrastructure (freight and passengers) in 1986 (Rail 2000) improved in 1992 with the NFLA to make new tunnels through the Alps towards Italy (as Lötschberg and Gotthard) and extended successively in 2009 (ZEB) and 2014 (FAIF) to get new funds to achieve it. - Contract of performance between Federal state and IM since 1980 and liberalization of the market in 1999. - Taxes for road since 2001 (RPLP) according to the distance and the CO_2 emissions; - Subsidies for rolling roads and indirect subsidies by discount on access charges for the migration of the fleet towards ERTMS and the investment to reduce noise from rolling stock. - Plan for migration towards ERTMS.
Network statement[15]	Pricing of access charges according to the direct cost from a train service: electricity cost, maintenance cost, traffic management cost. Evaluation every three months of pricing for access charges according to the market and costs. The Federal state fixes the pricing according to the type of line and the type of train. Pricing modulation (incentives) for: - Locomotives with a good environmental performance. - Locomotives equipped with ERTMS. - Rolling stock equipped to reduce the noise.
Regulatory body	Independent Commission (CACF) to control the non-discrimination on the network mainly for pricing and access. Part of the Federal Office for Transport (OFT) which assumes the biggest part of the economic regulation (transport policy, contract of performance and pricing for access charges).
General facts	Rail freight modal share: 52% (2000) – 47% (2013) Rail freight traffic (ton-kms): 11.1 billion – 11.8 billion (2013)

Source: Authors; Eurostat, 2016

[14] https://www.bav.admin.ch/bav/fr/home/themes/liste-alphabetique-des-sujets/formulaires/financement-de-l-infrastructure/planification-cp.html
[15] http://www.cff.ch/groupe/les-cff-comme-partenaire-commercial/offres-pour-etf/onestopshop/bases-de-lacces-au-reseau.html

Comments

The analysis shows how the Swiss transport policy is exhaustive and planned in the long term in comparison to the other cases.

First, there is strong persistence in the political choices from 1987 with the popular adoption of the program Rail 2000 to the FAIF in 2014 in achievement of the first program. It comes from a high consensus among the main political party and population about the transport policy but also from the institutional stability of the Federal Office of Transport (OFT) to design the transport policy.

Second, the transport policy is exhaustive through the number of levers pushed to support the rail freight and incentives scheme. A first lever is the strict control from 1980 of the national IM by the OFT. The objective was to control the expenses (and the rail debt) and to push the IM towards a strategy of productivity and performance. It was a condition to implement a large infrastructure and modernization plan on the network to improve capacity and quality in the long term (second lever). The liberalization of the rail freight market in 1999 can be considered a third lever. To finish, due to the increase of road traffic around 2000, the last lever pushed has been the implementation of an incentive scheme towards road and rail freight. The global objective is to reduce the number of trucks crossing the Swiss Alps per year from 1.4 million in 2000 to 650.000 in 2018. Concerning road, a new tax has been implemented to support a part of the investments on the rail network. In return, the maximum weight for truck increased from 28 tons to 40 tons in 2002. Concerning rail, the objective is to increase the performance of the rail freight trains and reduce the heterogeneity of traffic (gain of capacity and reliability). Consequently, discounts in access charges are proposed for modern fleets according to their environmental performance (new locomotives), their noise emissions (new locomotives and wagons) or their equipment in ERTMS (better interoperability and performance).

To finish, it is interesting to highlight the popular support to this policy. Investments from the first program have been huge and constant in time. The fund for Rail 2000 was CHF 5.4 billion. It has been increased by CHF 21.4 billion in 1992 for the NLFA (New Alpine railway program). Then these programs have been extended by CHF 5.4 billion in 2009 (ZEB) and CHF 6.4 billion in 2014 (Transports romands, 2014). Desmaris (2014) assesses that the level of investment for rail per inhabitant has grown from CHF 82 in 1980 to CHF 405 in 2000 and CHF 495 in 2011. However, Crozet & Raoul (2011) shows that this effort has been compensated for by a general improvement of the productivity[16] with a gain of +75,8% between 1996 and 2008.

To conclude on this case, it demonstrates that a huge policy for rail and especially rail freight is possible at the condition of controlling the different parameters of the system from the productivity of the natural monopoly to the incentive scheme towards the rail market and competitors like the road market.

[16] Productivity is considered here as the volume or production (train-kms) compared to the resources used to produce it (maintenance cost, operating cost, etc.).

3. SCENARIO ANALYSIS: HOW TO REACH THE TARGET FOR THE BEST CASE?

This section provides a framework for regulation according to the different scenarios defined in WP1. Section 4.1 translates the scenarios in the context of the regulation analysis. Section 4.2 describes the values used to analyse the best case scenario. To finish, section 4.3 proposes path policies in coherence with the best scenario.

3.1. SCENARIO ANALYSIS AND LEVERS

The scenarios from WP1 are based on a selection of 35 parameters grouped in 9 sections and 14 subsections. Parameters and attributed values have been fixed by a panel of experts according to the Delphi technique. The values and objectives for the best case scenario will be discussed in section 4.2. In section 4.1, the proposed scenario framework is aligned with the different levers identified previously for regulation.

Table 7: Coherence between scenario parameters and levers for regulation

PARAMETERS	LEVERS
Transport emissions	Transport policy Pricing for incentives
Energy consumption	Transport policy Pricing for incentives
Infrastructure and maintenance costs	Contract of performance
Noise exposure	Transport policy Pricing for incentives
Operational costs	Transport policy Regulatory body (Market monitoring)
Road taxes	Transport policy

Source: Authors

To begin, the analysis of the scenario framework shows a difference of nature between parameters. Some parameters are not included in the table because there are more results of the regulation policy than levers. These parameters are the rail ton-kms and the number of players. The number of active players can be considered as a result of the global attractiveness of the market. More the attractiveness is high and more the opportunities for business are important, reducing the risk of monopoly of duopoly. Furthermore, the market size expressed in ton-kms is a result of the transport policy and global organization of the market. The market size grows because there are less barriers to start up business. Consequently, these both parameters are considered as indicators to assess the performance of the regulation policy and not like levers.

To continue, a large group of parameters depends on the global transport policy and the incentive scheme of pricing for access charges. Section 3.3.3 shows how Switzerland started to regulate the transport emissions, the energy consumption and the noise exposure by an incentive scheme for access charges. This policy depends of the transport policy produced by the government and is supported by the European law: "*The infrastructure charges […] may be modified to take account of the cost of environmental effects caused by the operation of the train. […]. Any such modification of infrastructure charges to take account of the cost of noise effects shall support retrofitting of wagons […].*" (article 31.5, 2012/34/UE). Here, the characterization of the

parameters assumes that a special pricing for environmental performance has a double impact on the transport emissions and on the source of energy (modernization of the fleet).

Both parameters of cost for network (infrastructure/maintenance) and operating depend on different levers. The former is mainly linked to the contract of performance. The capacity of the governmental authority to define its priorities and to monitor the IM is a key element to control this parameter. The latter depends on the transport policy in terms of investment but also on the market monitoring as liberalization of essential activities (maintenance, leasing, etc) or technical standardisation. A policy for a reduction of the barriers to enter on the market and operate is a key element to increase the number of competitors and improve the market size.

To finish, the last parameter concerning the road taxes depends directly on the transport policy. However, the Swiss case shows that the implementation of a tax can be difficult and needs compromises. In this case, the tax has been negotiated against an increase of the maximal weight for trucks to cross the Alps (from 28 tons to 40 tons).

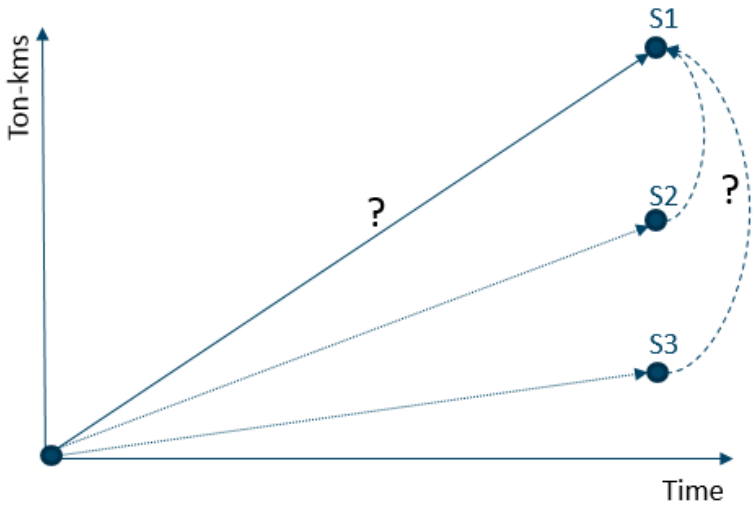
To conclude, a first remark is that regulation cannot do everything (Crozet et al., 2014). The parameters defined as indicators for results can vary according to the internal growth but also because of external shocks. However, it assumes for the following that the rail freight market size can increase even in case of strong external shocks. This case would be the sign of an efficient transport policy for modal shift similar to Austria where the global market for transport decreased by 12% between 2000 and 2013 (Eurostat, 2016), and for road transportation by 16%, but for rail freight increased by 36% (Eurostat, 2016). A second remark is about the impact of political choices on the market and modal shift. The association of levers to the parameters shows that a large part of the parameters depends on the transport policy and the political orientation.

3.2. ASSIGNING VALUES TO THE BEST CASE SCENARIO: AN AMBITIOUS TARGET

The scenarios are explored over three paths according to a common objective indicated by the European Commission in the White Paper (2011): a 30% shift of road transport over 300 km towards rail or IWW by 2030.

The objective is reached for Belgium with a rail freight market size of 17 billion ton-kms or an increase by 133%. The best case scenario (1) considers this target fully achieved by 2030. The two other scenarios assume a non-achievement of the target. The medium case scenario (2) considers an intermediate stage to 12 billion ton-kms (+64%), while the worst case scenario (3) considers a failure with a market size of 8 billion ton-kms (+10%). Figure 6 gives an overview of the scenarios according to the market size (ton-kms) and time.

Figure 6: Path for the three scenarios according to the common objective



Source: Authors

The scenario analysis is based on the three possible paths to reach the target. This deliverable considers only the first one and certainly the most difficult to achieve for several reasons.

First, the objective to increase the number of independent operators and the volume by 133 % in 15 years can be interpreted like an ambitious challenge. From a market point of view, it means a renewal of the rail freight market in Belgium. Compared to the other European countries, it will be the best performance for a rail freight market in Europe since the nineteen century. Consequently, the doubts about the realism of this scenario are several mainly because of a structural disadvantage for the rail freight transportation compared to road.

Second, the value for parameters are based on strong assumptions to reduce the structural disadvantage between rail and road. Table 8 shows in general an improvement of the performance for rail faster than for road in terms of CO_2 emissions (respectively -40% and -20%), energy consumption (respectively -20% and -10%) and infrastructure cost (respectively -20% and -10%). The two last one are the most important for rail because of their contribution to the improvement of the price competitiveness.

The last reason but not the least considers the conditions to achieve this target. It is possible to assume that it will need a radical and structural change in the governance of the transport sector in comparison to the last decades. The increase of the road taxes (+20%) assumed that without a strong regulation from national authorities and engagement from European authorities, the chance to see a better situation for rail freight are low.

The sub-section 4.3 explores the framework of this change in Belgium.

Table 8: Synthesis of the variation of the value for each parameter according to the best scenario by 2030

PARAMETERS	MODE	S1 - BEST
Transport emissions	Rail	-40%
	Road	-20%
Energy consumption	Rail	-20%
	Road	-10%
Infrastructure and maintenance costs	Rail	-20%
	Road	-10%
Noise exposure	Rail	-30%
	Road	-30%
Operational costs	Rail	-30%
	Road	-10%
Independent operators		10
Rail ton-kms		+133%
Road taxes		+20%

Source: Authors

3.3. DESIGNING POLICY PATHS: A COMPLEX PACKAGE OF POLICIES

The best case scenario bets on a strong change in terms of transport policy in Belgium and in Europe. It assumes a strong preference for rail through road taxes and incentives for a better productivity of the sector in comparison to the road. The following table gives for each lever a part of the path policy to reach the final objective.

Table 9: Levers and policies for the path policy of the best scenario at the national level

LEVERS	POLICIES
Transport policy	Local target Long term Incentive scheme for shift from road to rail (taxes)
Contract of performance	Implementation of transport policy Incentive schemes for IM performance
Network statement	Incentive schemes towards the market by pricing of access charges
Regulatory body	Extension of skills to: - Defining and monitoring the IM contract of performance. - Observatory of the market and competition monitoring.

Source: Authors

The path policy for the best scenario is a package of several policies linked to the different levers. The implementation of all of them is a key condition to reach the final objective.

Concerning the first lever, the benchmark analysis highlights three essential characteristics to ensure an efficient transport policy. The first is to define a realistic and measurable target. It is a key condition to improve the implementation of the transport policy and to design the relevant indicators. According to the Dutch experience, the concentration of the efforts on the rail freight link between Rotterdam and the German border has been an interesting driver for investments and incentives. In the Belgian case, the target of a 30% shift

over 300km can be difficult to assess as there are no distances longer than 200km from Antwerp to the German or French border. Consequently, a local target could be better to improve the chance of success and use the relevant indicators. The second is to draw the transport policy in the long term and keep the line according to the Swiss experience. The persistence of their transport policy since 1986 can be a positive signal for the market, the infrastructure and the institutional organization through the progressive implementation of new tools and indicators (monitoring of the IM, funds for investments, etc.). In the Belgian case, there is no clear transport policy, except the implementation of the European law. The latter highlights the necessity to give a concrete application to the political choice by an incentive scheme for shift from road to rail. The taxes are the common tool used to reduce the difference in cost between rail and road according to the Dutch case (Eurovignette) or the Swiss case (taxes for rail fund). However, the incentives have to be implemented on the basis of a compromise between the actors and this compromise should be easier to find if the transport policy is clear and ensured in the long term (time to develop new business models).

The second lever is related to the contract of performance between the responsible authority and the IM. The contract is a key lever to implement the transport policy, to ensure the performance of the rail system and to manage the IM as natural monopoly. The Swiss and the Dutch cases highlight how important it is to combine these actions by designing indicators and incentive schemes (financial penalties). The indicators can be the percentage of achievement of new investments or ERMTS implementation, the maintenance costs or the level of customer's satisfaction. In the Belgian case, only one contract of performance has been produced since 2008 and the indicators with penalties were limited to the delay induced by the IM to the passenger operator (in minutes). Thus, there is a high potential to increase the political monitoring of the IM.

The third lever is the concrete translation of the transport policy and performance of the IM trough the network statement. One of the main points is the pricing for access charges and the related incentive scheme. In the Dutch case, the pricing for access charges on the Betuwe route is directly linked to the transport policy through a discount on the line in comparison to the rest of the network. The objective is to incite a concentration of the freight traffic on this dedicated line and improves the capacity for passengers of the rest of the network. In the Swiss case, the pricing is more complex with a panel of discounts according to the level of environmental performance of the locomotives, the noise or the equipment in ERTMS. The objective is to incite the operators to modernize their fleet and improve their performance to reduce the traffic heterogeneity between freight and passengers. In the Belgian case, there is no incentive in the pricing for access charges and as such, no signal to the market.

The last lever is the institutional one. The benchmark showed that the regulatory bodies are the newcomers in the rail system. It is visible by the heterogeneity of their skills and fields according to the countries. However, some advantages would be interesting to develop for a better organization of the transport system. First, they are totally independent from the political power. This is a strong advantage to ensure the continuity of a policy and the objectivity of the control. It is mainly an interesting tool to fight against the risk of public capture between lobbies and politics very common in the transport sector (Laffont and Tirole, 1991; Crozet et al., 2014). Second, the field of the regulatory body can be extended to the entire transport sector as in Sweden (road, rail, air, inland navigation etc.). It is a strong opportunity to build in the long term an intermodal policy. Finally, its main skill currently is to manage the rail market against discrimination. This position should give the regulator a large knowledge of the market such as its actors, their needs and the barriers.

To conclude, the regulatory body has potentially all the elements to become a major actor in the rail and transport sector. It seems possible to extend progressively its skills and fields according to its resources to the:

- Extension of the skills to the entire transport sector: possibility to design the transport policy for intermodality and submit the proposition to the government.

- Management of the contract of performance (monitoring and control): possibility to design the contract of performance, according to the transport policy and the needs of the market, and submit the proposition to the government.
- Management of the market (observatory as in Austria): possibility to define the incentive scheme for taxes and access charges under control of the government.

To resume, the policy path for the best case scenario supposes a transfer of the competencies from the government to the regulatory body in terms management. The government keeps the hand on the political choices and the independent regulatory organization ensures the stability and the coherence of the policy on the long term.

CONCLUSION

The analysis shows a high potential for Belgium to improve its intermodal policy and the share of rail freight. The country has a strategic position as a gate for the European continent between France and Germany. However, the analysis of other countries shows that the geographic position is not enough to support the rail freight market. Other criteria like institutional organization, transport policy or incentive scheme for pricing can have a strong impact on the market.

This conclusion proposes a short synthesis of the best practices identified among the different case studies.

Considering the Belgian network as a key element for hinterland competition. The performance indicators with targets and corresponding financial penalties to push the IM towards a better productivity, like in Switzerland and The Netherlands, can be a good signal towards the market in the long term to ensure a stability of the access charges.

Drawing a transport policy on the long term and keep the consensus like in Switzerland. This is maybe the most difficult lever to implement in a policy but also the most efficient to give a vision on the long term and drive investments. Beyond the political changes, a stable Federal agency for transport policy can be a first step towards the long term. The stability of the funds in the long term can be a second step.

Drawing an exhaustive transport policy taking account not only the infrastructure investment but also the performance of the IM, the market conditions and the incentive schemes for the other modes. The analysis of the Swiss case shows that this exhaustiveness has been developed progressively from the first performance contract in 1980 to the infrastructure plan in 1986, the rail freight liberalization in 1999 and the incentive scheme in the years 2000. Today, each of these levers are cumulated.

Considering the IM as a privileged way to implement a transport policy by a strong monitoring. In Austria, the monitoring considers mainly the implementation of the infrastructure plan, while in The Netherlands and Switzerland, it concerns the implementation of the rail transport policy and the network manager performance. In any case, in each country, the performance contract is clearly a lever for the State and the monitoring is annual.

Considering the pricing of access charges as an incentive lever to drive the market. In The Netherlands, the price per train-km is decreasing for trains above 600 tons and for the dedicated line from Rotterdam to the German border compared to the rest of the network. The highest number of incentives are in Switzerland where several discounts are offered for trains with a good environmental performance, anti-noise equipment or ERTMS equipment. This type of incentive scheme seems to be more and more preferred over the classic system of subsidies, costly and borderline with the European law.

Considering the regulatory body as a key lever to manage the IM and the market. A major change in the regulatory body would be an extension of its skills to the definition of the contract of performance. This approach does not exist in Europe but the advantages could be high according to the independence of this institution. First, it is a perfect intermediate between the political vision and the reality of the market. Second, such organization would be a small revolution for a rail sector used to be drive by the government with the risks of public capture (Laffont & Tirole, 1991; Crozet et al., 2014). Third, it will be a guarantee in the stability of the IM monitoring on the long term. Concrete skills would be:

- A regular and deep market analysis similar to Austria.

- The definition and the monitoring of the contract of performance according to the political orientations.
- A restrictive power on the pricing of access charges.
- An extension of the juridical fields to the consumer's complaints similar to The Netherlands.
- An extension of the field of the regulatory agency to the other modes of transport similar to Sweden[17].

Implementing a European transport agency for regulation. The benchmark shows a high heterogeneity in the missions of the different regulatory body while the basics are similar. The European Commission keeps the competencies for regulation and market monitoring. Then, it transferred its competencies for technical harmonization to the European Rail Agency. A similar transfer to the ERA or another agency would have beneficial impact in terms of coordination and harmonization for a better regulation of the rail single market. This last point cannot be neglected to improve knowledge about the market and its economic efficiency.

[17] This case has not been detailed in the benchmark but since 2009, the Swedish regulatory body (Transportstyrelsen) is the only in Europe to be intermodal.

REFERENCES

Crozet, Y. (2010) « TGV : le temps des doutes ? », *Transports*, 460, pp. 87-92.

Crozet, Y., Haucap, J., Pagel, B., Musso, A., Van de Voorde, E., Vanelslander, T., Woodburn, A. (2014) "Development of rail freight in Europe: what regulation can and cannot do?", *Discussion paper*, Centre on regulation in Europe.

Crozet, Y., Raoul, JC. (2011) « Le transport ferroviaire en France : avis de tempête organisationnelle ? », *Transports*, 468, pp. 213-220.

Desmaris, C. (2014) « Une réforme du transport ferroviaire de voyageurs en Suisse : davantage de performances sans concurrence ? », *Les Cahiers Scientifiques du Transport*, 65, pp. 67-96.

European Commission (1991) "Council directive on the development of the Community's railway", *Official journal of the European Communities*, 91/440/EEC, L 237/25.

European Commission (2004) "Directive 2004/49/EC of the European parliament and of the council of 29 April 2004 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", *Official journal of the European Union*, 2004/49/EC, L220/16.

European Commission (2011) *White paper: roadmap to a single European transport area – Towards a competitive and resource efficient transport system*, COM (2011) 144 final, Brussels.

European Commission (2012) "Directive 2012/34/EU of the European parliament and of the council of 21 November 2012 establishing a single European railway area (recast)", *Official journal of the European Union,* 2012/34/EU, L 343/32.

European Court of Auditors (2016), *Rail freight transport in the EU: still not on the right track*, Publications Office of the European Union, n°8, Luxembourg.

Eurostat (2016) "EU transport in figures: Statistical pocketbook", *Publications Office of the European Union*, Luxembourg.

Finger, M., Holterman, M. (2013) *Incentives-based Governance of the Swiss Railway Sector*, Florence School of Regulation, Florence, 103p.

IRG-Rail (2016) *Fourth Annual Market Monitoring Report*. Independent Regulators'Group – Rail, IRG-Rail (16) 1a, 62.

Laroche, F., Sys, C., Troch, F., Vanelslander, T. (2016) "Which regulation for which rail freight market structure in Europe? The Belgium case study". *Paper presented at the 4th Research Seminar on railway Policy*, Karlsruhe, 11 March 2016.

Laffont, JJ., Tirole, J. (1991) "The politics of government decision-making: a theory of regulatory capture". *The quarterly journal of economics*, 106 (4), pp. 1089-1127.

Lang, M., Laperrouza, M., Finger, M. (2013) « Competition effects in a liberalized railway market ». *Journal of Industry, Competition and Trade*, 13, pp. 375-398.

Nash, C. (2009) “When to invest in high speed rail links and network?”, Discussion paper, *In: International Transport Forum (ITF-OECD): 18th Symposium*, 16-18 november, Madrid, 24p.

Perennes, P. (2016) “Open access for rail passenger services: lesson learnt from forerunner countries”, *In: 14th WCTR*, 11-14 July, Shanghai.

Preston, J. (2009) “Competition for long distance passenger rail services: the emerging evidence”. Discussion paper, *In: International Transport Forum (ITF-OECD): 18th Symposium*, 16-18 November, Madrid, 23p.

Transports Romands (2014) « Quelle politique suisse pour le développement des infrastructures et de l’offre de transport par le rail ? », *Transports Romands*, 20, pp. 4-5.

Van de Velde, D., C. Nash, A. Smith, F. Mizutani, S. Uranishi, M. Lijesen & F. Zschoche (2012) *EVES---Rail – Economic effects of Vertical Separation in the railway sector*. Full technical report for CER – Community of European Railways and Infrastructure Companies, Amsterdam.