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Rail freight development in Europe: how to deal with a doubly-imperfect competition?

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Abstract

The development of rail freight is central to the European Union's transportation policy. As it has been the case for road and air transport and for other network industries (e.g. energy and telecommunications), deregulation and market opening have been the main policy options chosen by EU to promote rail freight. But rail freight is still facing a doubly-imperfect competition. On one hand, the intermodal competition is off balance between road and rail. On the other hand, intra-modal competition between railway operators is imperfect. Railway operators are not all alike, major companies exist and they play a structuring role that regulation must take into account. According to the HHI (Hirschman Herfindahl Index) the market structure is still characterised by a strong concentration. Therefore, the key roles played by the major companies as well as, in some countries, the remaining action of the state, have to be addressed, since both of them represent some of the key features of imperfect competition in the rail sector. Numerous entry barriers remain and market power manifest itself in many areas of rail freight. This should be given special attention by regulators or competition authorities. National regulators should also communicate with one another, as they will be confronted with major companies' market power.

Keywords: Barriers to enrry, Competition; Concentation index; EU; Liberalisation, Road freight; Rail freight; Regulation

0. Introduction

The development of rail freight is central to the European Union's transportation policy. The EU objective regarding rail freight development is mainly driven by energy-related and environmental concerns (e.g. improving road safety and reducing pollution, greenhouse gas emissions and other adverse environmental impacts of road freight transport). As it has been the case for road and air transport and for other network industries (e.g. energy and telecommunications), deregulation and market opening have been the main policy options chosen by the European Union to promote sustainable development in rail freight. The European Union's focus on competition and market opening is paramount, as it is a pre-condition for enhanced efficiency in the rail sector in general, and in the freight sector in particular. However, progress in the area of competition and market opening has been uneven across member states. This might be seen as an explanation of the remaining low modal share of rail freight in Europe.

Based on national case studies from Belgium, France, Germany, Italy and the United Kingdom (Crozet 2014), the paper shows in a first part that measures to establish competition are slowly but profoundly transforming the landscape of European rail freight operators (1). The "competitive solution" proposed by the EU, already tried and tested in many network industries, leads to significant changes (2). Market opening and intermodal competition have played a key role in changing trends, made possible by considerable organisational changes within companies (3).

But the market structure is characterised by a high degree of concentration, competition is still imperfect.

Imperfect intra-modal competition does exist, but the rail freight operators are also facing an imperfect intermodal competition with road transport. Rail freight is therefore facing a doubly-imperfect competition. On one hand, the intermodal competition is off balance between road and rail. On the other hand, intra-modal competition between railway operators is imperfect. Railway operators are not all alike, major companies exist and they play a structuring role that regulation must take into account. Finally, addressing the regulatory issues, the paper describes the key challenges of regulators in a sector where numerous entry barriers remain and market power manifest itself in many areas. This should be given special attention by regulators or competition authorities. National regulators should also communicate with one another, as they will be confronted with major companies' market power (4).

1. EU, the competitive "solution" and the challenges of competition within the rail freight sector

Given rail freight's protracted decline, one option would have been to consider it as an obsolete mode of transportation, definitely and permanently surpassed by road, sea and air freight. This is more or less what has happened in many Western European countries. After World War II, public policy simply followed this activity's decline. In the 2001 and 2011 white books, the objective of the European Union was to reverse this trend.

With Directive 91/440 and the subsequent "Railway Packages", the EU has sought to extend rail freight's relevant perimeter by using the same logic as in other network industries. The goal was to put an end to traditional monopolies by what is called the "competitive solution". In what follows we describe the logic of this intra-modal competition but we have also to keep in mind the remaining intermodal competition with road haulage.

1.1 Rail and road: a radical intermodal imperfect competition

Compared to road haulage, where deregulation started almost 30 years ago, it appears that intra-modal competition does not manifest itself in the same form in both sectors. The major differences between the two are network access on the one hand, and the costs of market entry on the other:

- In terms of network access, road and rail are in radically different positions. Even in a scenario where each freight wagon were independently motorised and could come and go freely on the rail network, general open access remains a pipe dream for now. Rail traffic has to be planned, often several months in advance, by means of graphic timetables. Furthermore, it should be noted that the length of the rail network is relatively modest compared to that of the road network: the ratio is 10/100 in Germany, and 3/100 in France[2]. This means that rail needs to undergo extensive massification, as its relevance lies in its ability to transport large volumes over long distances. Transporting smaller quantities over short or medium distances is also possible, albeit still in a global scheme of massification;
- This massification turns rail freight into a capital-intensive activity, which effectively precludes small businesses. By contrast, deregulation in road haulage has led to the emergence of a myriad of small businesses operating just one or two trucks. This is a powerful factor of competition among hugely fragmented actors. The same does not apply to rail transport. In many countries the market is concentrated relative to road transport, given the low number of active rail freight operators. Regulators should definitely take this market structure into account, all the more because there is usually one major player who used to be the national monopoly provider (the incumbent).

Therefore, competition in rail freight can clearly be classified as imperfect competition. Competition is not a steady state, but rather a horizon that one aims to reach, yet obviously recedes as one approaches it. Another tell-tale sign of this situation, besides the limited number of players, is that new market entrants often fail to sustain their business and end up backing out. For instance, after the market was opened up in Sweden, one of the

[2] 60,000 to 600,000 km in Germany; 30,000 km to 1 million kilometres in France.

pioneering countries in this area, there were no less than eight market "exit" between 2000 and 2004, including "Ikea Rail". After 2004, only 10 operators remained. We can notice that intermodal competition played here an important role. In Sweden, road transport has experienced high productivity gains due to the allowance of "mega-trucks" (60 tons).

1.2 Rail and intra-modal competition: the "model" of network industries

In light of its strong commitment to bringing about an upturn in rail freight, the European Commission has implemented recommendations in line with those already in force in other network industries and in other transport activities in order to foster competition. However, merely establishing competition is not enough to transform an industry dominated by increasing returns and the logic of natural monopolies. Competition —more specifically, imperfect competition— can only be applied to network industries if the natural monopoly can be abolished or at least contained, so as to remove certain barriers to entry.

This was proposed by economists who suggested differentiating the components of the "system good", which are the network industries in general, and rail in particular (Katz and Shapiro 1985). These authors pointed out that the services provided by a rail or telephone network are the culmination of a "system good", which is an amalgam of several components. For rail, it is possible to distinguish infrastructure from operations. The dissociation between the two is not at all that obvious, as evidenced by recent debates about projects for the 4th Railway Package and multiple exposés on whether or not infrastructure and operations ought to be regarded separately (EVES-Rail 2012). The recent tug-of-war between the European Commission and several Member States regarding the "bundling vs. unbundling" dichotomy reminds us that there are probably several ways to constrain the natural monopoly.

Nevertheless, regardless of how exactly the railway sector is to be segmented, what ultimately matters is whether competition between operators will arise or not. One way or another the stakeholders in the railway sector will have to let go of the natural monopoly, because only through the arrival of new competitors will the impasse of old habits gradually be broken. These new entrants, at different stages of the production process of rail transport, are the source of innovations capable of changing the cost and content of rail freight's offer. Innovations can emerge in rolling stock (wagons with larger capacity and better suited to the goods being transported), in signalling and the relationship between infrastructure and trains (ERTMS, ETCS ...), in the operation of trains (human resources, equipment rotation ...) and, above all, in the quality of service provided to shippers. In order for the latter to improve, the playing field must be levelled, even within railway companies, and opened up to new production processes combining various innovations to better meet market demands.

Although the implementation of this "competitive solution" has been slow, this is what has happened as a result of the various Railway Packages. Since the 2001-12, 13 and 14 Directives rail freight market entry is possible, and this has had certain effects. It should be noted that freight was the part of the railway sector in which competition began to assert itself. A great achievement of the "Railway Packages" is that they have shown that competition is indeed possible in this sector and that it has managed to shake up the situation of inertia.

1.3 Intra-modal competition: the key issue of barriers to entry

Competition is not a *panacea*. It has a cost for new entrants who fail to make a profit on their investments. It often leads firms to restructure after a few years of operation. Because of a lack of interoperability, there are many sunk costs. It is not possible to go for a "hit and run entry", a concept dear to the theory of contestable markets (Baumol 1982). Unlike aircraft in air transportation, rail equipment purchased for use in one country cannot easily be transferred to another country due to the many differences in technical standards. Furthermore, such railway equipment is not easy to acquire. Delivery of new equipment is often counted in years, and the second-hand market is not very active. Incumbent operators have no interest in selling their available equipment, as it would likely only serve as a springboard for potential competitors. The same goes for human resources, such as train drivers, who have to undergo extensive training.

This means that the industry is characterised by multiple barriers to entry, including both market entry costs and market exit costs. Competition is therefore only legitimate if it ultimately leads to an overall improvement in efficiency in the sector. The latter is measured using various indicators such as rail freight's market share, changes in industry costs, productivity, and so on. The ultimate purpose of intra-modal competition is to increase the efficiency of individual companies and of the industry as a whole, so that intermodal competition can also lead to a collective gain.

Sectorial regulation presupposes that compliance with competition rules is taken into account, as well as the effects of said rules on the efficiency of individual companies and the sector as a whole. Besides short-term impacts, medium-term and long-term effects need to be addressed as well, keeping in mind that this is —much like the energy sector— a capital-intensive sector subject to high sunk costs. The main upshot of this type of

situation is that the market participants are not similar. There is no “representative company” as in the case of pure and perfect competition. Each company will adopt a strategy and will target markets suited to its specific assets (Williamson 1986). Since the latter are not of the same nature, nor of the same importance, market powers should be taken into account with a view to ensuring both companies’ and the entire sector’s long-term efficiency — a difficult task, as we shall see.

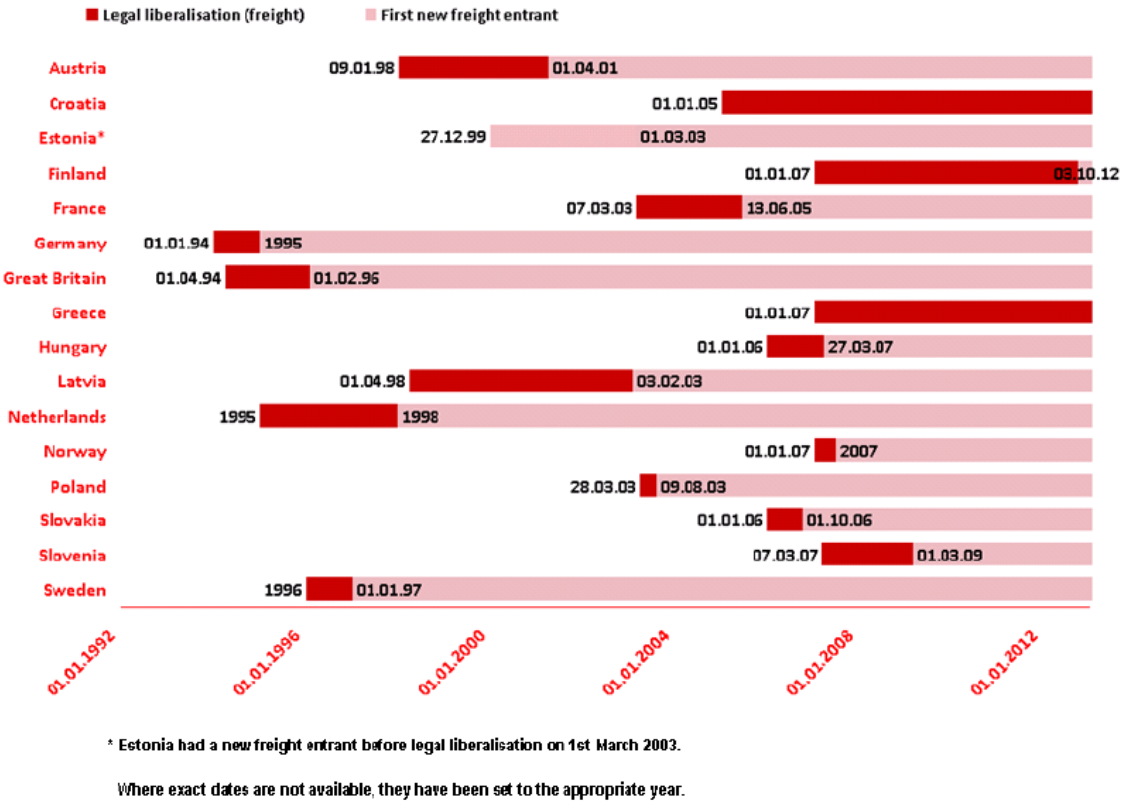
2. Liberalization and deregulation of rail freight in Europe: state of play

Since the first (2001) and second (2004) "Railway Package" established competition for rail freight, significant changes have been observed in most European countries. In general, markets are more open and competition is increasingly becoming a reality. The first phase of deregulation took time, but it is now in evidence in Europe, although the degrees of liberalisation differ from one country to another. We will highlight that even though no obvious direct causality relation can be noted between opening to competition and rail freight market share, liberalisation has led to a deep transformation of the sector; and that such process is not yet over.

2.1 General overview

There is no European-level regulator for the rail sector. The European Rail Agency (ERA) could eventually take on this role in the future. For now it is mainly involved upstream, in the field of standardisation and harmonisation of standards. So there are only national regulators, and they are not always independent, but there is a network of independent regulators (IRG-Rail) which has provided a general overview of the process of liberalisation in rail freight (see Figure 1).

Figure 1: Liberalisation progress in selected European Countries



Source: Independent Regulators Group - Rail, 2013

Figure 1 shows that different countries are in very different situations. Some, like The Netherlands, Sweden, Germany and Great Britain, legally established competition in the mid-1990s and shortly afterwards saw several new entrants gaining a foothold in the market. In other countries, the legal introduction of competition only came about as a result of the European Railway Packages in the early 2000s. The actual market entry of the first competitor then followed, often only after a few years, or after many years as in the case of Finland, or even never, as in Greece. This indicates that the liberalisation of rail freight does not necessarily bring about a tidal

wave of competition: it is a slow movement that manifests itself in stages across Europe. Nevertheless, even after the liberalisation, the sector remains highly concentrated, which raises questions about the different stages of the liberalisation process and its impacts on rail freight performance.

The issue of new entrants' market share therefore takes centre stage once more, as it is necessary to have a longitudinal approach. What becomes of these new entrants? In many industries, such as air transport, it has been found that after an initial phase in which the number of operators multiplies competition eventually leads to a period of consolidation, ultimately followed by increased concentration. Does this hold true for rail freight? Beyond the issue of the number of operators, the question of performance of the whole branch is addressed. Is it possible to link a rail liberalisation index (RLI, see annex 1) on one hand and the degree of concentration on the other hand?

2.2 Indicators of concentration and market powers

In traditional analyses of competition, economists pay close attention to the structure of the market, i.e. the number of competitors, since they consider that structure largely determines the behaviour of companies in terms of innovation, and ultimately their overall efficiency. Completely monopolistic companies are known to lead a "quiet life", as J. Hicks (1935) puts it.

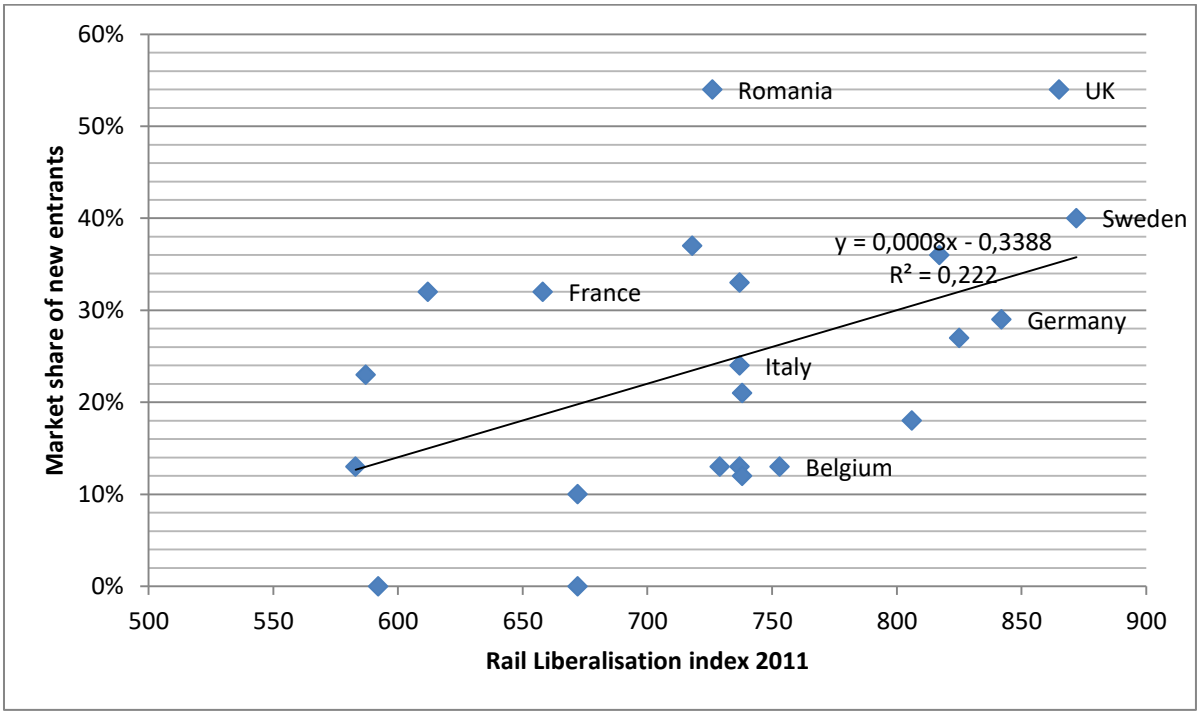
For these reasons, in the United States the issue of market structure within an industry is closely monitored by the authorities. They refer in particular to the Herfindahl-Hirschman Index (HHI), which is defined as the sum of the squared market shares (Shepherd 1984). The value of the index increases when the number of companies decreases. Thus, as the number of companies active in rail freight in the United States dropped from 36 to 7 between 1978 and 2004, the HHI rose from 589 to 2263 — well above 1000, which is considered to be the critical value above which strong market powers are likely to occur (Mac Cullough 2005). Is this the situation in Europe as well?

Compared to the United States in the late twentieth century, the European Union is in the opposite situation. The opening of the market currently leads to a lower HHI value. When there is only one operator, the HHI peaks out at its maximum value of 10,000[3]. In the case of Great Britain, for example, the growing market share of competitors of the main operator (EWS) gradually brought down the HHI value from 7450 in 1997 to approximately 3000 in 2012 (see Table 1 below). So there is clearly a downward trend, but we are still at extremely high levels of concentration found in most European countries. Germany has an HHI value of well over 6300, while that of France exceeds 5000.

If we now cross RLI and the market share of the new operators, we obtain the results presented below (Figure 2). The linear regression shows that there is a direct link between the two variables, but the R^2 value is quite low. However, some new operators in countries with a low RLI reach 20 to 30% of market share. The RLI explains then just a small proportion of the variance. As well as there is no "representative firm", national specificities, historical, geographical, socio-political…make it impossible to have a "representative country" that could stand for model to other countries. Nonetheless a background trend stands out being the large market share of a major company that plays a key role on the market.

[3] 10,000 if market shares are valued between 0 and 100, but 1 if market shares are expressed as a number between 0 and 1.

Figure 2: Rail Liberalisation Index and market share of new entrants in 2013



Source: RLI (IBM) & EU, RMMS, working documents, 2014

Despite major differences between the US and Europe, we end up with the same observation. Therefore one might question whether there is some specificity to rail freight keeping the HHI value structurally high, thereby maintaining high levels of market powers. In order to understand this, one should keep in mind that an HHI value of 1000 corresponds to a situation where 10 operators each hold 10% market share. Is this a reasonable goal for rail freight? Are we not in a business where, in order to develop certain activities such as single-wagonload transport or powerful corridors for container transport, it is necessary to hold a market share well above 10%?

If the answer to this question is yes, then that means that a certain level of concentration is inevitable, and even desirable for the community to benefit from increasing returns specific to certain activities. In terms of competition analysis, and therefore regulation, this entails that we should not go out of our way to keep increasing the number of operators. Nevertheless, market entry must remain possible for new competitors. The issue of barriers to entry has become pivotal, because such barriers risk sterilising the beneficial effects of competition, imperfect though it may be. In order to do this, we could look a little further than the HHI, to the Rail Liberalisation Index.

3. Organizational issues within the rail freight sector

In the rail sector, effective competition takes on specific forms, requiring context-specific analyses. For instance, for rail passenger transport, we have shown (Crozet, Nash and Preston 2012) that competition *for* the market (off-track) is easier to establish than competition *in* the market (on-track). In rail freight, there is definitely on-track competition, but there are many obstacles limiting the beneficial effects that are generally attributed to increasing competition. This has to do with the particular context of the rail sector, where there is still a strong presence of public authorities, when it comes to questions on optimal market structure and the role of major companies.

3.1 From the rail context to organisational issues

The issue of network access is crucial in order to understand why rail freight has such difficulty growing and developing. As we have indicated, the rail network is much less dense than the road network and it is not, except locally, being extended. Furthermore, freight trains compete with passenger trains for the allocation of train paths. Generally speaking, in Europe —unlike in the United States— priority is systematically given to passenger trains:

- To begin with, this is evident in the allocation of train paths where regular passenger-train schedules predominate, leaving freight trains to have to slip into leftover slots between passenger trains;
- Giving priority to passenger trains most often occurs in the operational phase. In case of a disturbance, it is usually the passenger trains that get to leave first. This often results in significant delays for freight trains, which can accumulate, as they travel long distances and may encounter several disturbances.

The development of rail freight therefore requires the availability of quality slots at an affordable price:

- Path quality depends primarily on the average allowed speed. This is a major factor in efficiency because the lower the speed of the train, the higher the capital costs (locomotives, wagons) and labour costs. Conversely, a higher average speed allows for more goods to be transported with the same amount of production factors. The reliability of the paths is another factor influencing their quality. In countries such as France where more than 20% of freight trains have substantial delays (see the France Case study), shippers tend to turn their backs on rail;
- The question of railway access charges is a delicate one. Infrastructure fees did not exist prior to the railway reforms. They are now almost universal in Europe, even when railway undertakings have remained integrated. Whether or not independent, the infrastructure manager (IM) provides railway undertakings (RUs) with a service the cost of which is reflected in the access charges. But the infrastructure charges cannot explain failures and success of rail freight in European countries. Note that access charges are relatively low in Great Britain and Germany, while they are apparently relatively high in France[4], where rail traffic has declined significantly since the early 2000s. However, access charges are also high in Poland, where freight rail traffic is now in second place in Europe, after Germany. Access charges are therefore not the sole cause of rail freight's problems. In fact, there seems to be an asymmetric sensitivity to these charges. Given rail freight companies' low profitability levels, any increase in access charges is detrimental and reduces rail's relevant perimeter compared to other modes. However, the lowering rail access charges does not always lead to significant improvements if the railway companies have not been able to make profound changes to their internal organisation and to the services they offer to shippers.

3.2 Organisational reforms and the ongoing presence of the state

Railway undertakings have long been in a monopoly position, and have therefore not been prone to look for productivity gains. The railway reforms promoted by the European Union are intended to rectify this situation. We should also bear in mind that throughout almost the entire twentieth century, as passenger and freight transport increased significantly, governments everywhere responded by trying to curtail road transport. Passenger transport by bus was highly controlled, hauling goods by lorry was strictly regulated (maximum distances, administered prices, required licenses for vehicles …), and so on. And yet these severe restrictions did not prevent rail transport's protracted decline. Europe's railway reforms, initiated a quarter century ago, have since turned away from this restrictive logic. Instead of trying to save the rail sector by increasing constraints on road transport, the aim is now to push rail transport towards profound transformation. However, since rail freight's relevant perimeter today is structurally reduced due to the changing nature of the goods transported, productivity gains in the rail sector can only be obtained, at least in the initial phases of the process, through considerable workforce reductions.

This phenomenon follows from an "iron" law of economics, which states that employment in an industry evolves with the ratio of variation in production to variation in productivity. When production increases less than productivity, employment decreases mechanically per constant amount of hours worked. For this reason,

[4] In France, freight operators do not pay the official tariff. A public subsidy lessens the burden of real access charges.

workforce cuts have been an essential part of railway reforms, in Germany and Switzerland for instance. Note that in both cases, unlike in Great Britain, the process did not involve privatising the activity, or even completely separating the IM from the other activities of the company. The important thing, though, was the explicit contract entered into with the unions on downsizing and accepting greater flexibility in the organisation of work in exchange for guaranteed compensation.

The presence of the state in the sector is not in itself a problem, but the state should insist on some necessary organisational redesigns, which is not always the case. In France, for instance, there have been successive railway reforms —one in 1997 (creation of RFF as an independent IM) and one that is set to be passed by the French Parliament in 2014— but neither addresses the issue of productivity head-on. The latter has progressed in France in recent years, but does anyone see that as fortunate? The railway reforms are not presented as an opportunity to reorganise the production processes. Particularly in the freight branch, these lay-offs were felt — both within the SNCF and in France as a nation— as an abandonment, as the inevitable price to be paid for the plummeting activity in this sector. This price is mostly linked to the difficulty in changing social relations and human resource management at SNCF. Any such decision is immediately presented as a social step backwards and relayed as such at the highest state level. The only option left for SNCF's senior management is to downsize and focus on the remaining profitable activities within the organisation as it is. And then there's also the ongoing expansion of the company's private-sector subsidiaries (VFLI…), as they are less hampered by the burden of having very rigid rules for HR management.

Most regrettable though this may be, it is important to emphasise that the state is not so much an actor in this situation as it is totally captured (Laffont & Tirole 1991). The EPIC status (*Établissement Public à Caractère Industriel et Commercial,* a category of public undertaking) is problematic, as the European Court of Justice recently pointed out. This status, which gives a company the equivalent of a state guarantee against any risk of bankruptcy, puts it in a weak position. It has very little room for manoeuvre to change things. This means that SNCF's rail freight branch has been able to accumulate losses for years on end. Despite the frequent workforce cuttings in the business sector, and despite effort made on reorganisation, the company remains above its breakeven point.

The "tyranny of the status quo" (M. & R. Friedman 1985) imposes its law, and successive managers of the freight branch have to operate under constraints prohibiting them from successfully re-launching their activity. Not to mention that at the same time, new competitors entering the market had more flexibility to adapt to demand from shippers. In just a few years, these competitors have taken a third of the market share, yet rail freight traffic in France has still decreased by over 40% since the early 2000s.

3.3 The restoring force of increasing returns and "major" companies

Comparing changes in France and in Germany is interesting because it leads to reflection about another issue, just as delicate as the previous one with regard to state involvement, but also just as challenging: the existence, both in rail and in air transport, of "major" companies with a large market share.

Deregulation in air transport has led to fierce competition, many bankruptcies and fragile profitability for many traditional companies. In Europe, those who survived managed to do so by developing hubs at large airports, allowing for a higher seat-occupancy rate per plane, thereby yielding increasing returns. At London Heathrow, Paris CDG and Frankfurt, more than half the traffic comes from British Airways, Air France and Lufthansa respectively. These companies are in a strong position in their domestic markets. Dismantling them would make no sense, neither for their countries of origin, or for the overall efficiency of the sector.

Based on this example, we can draw a parallel with rail freight. In every European country, there is one major company in the rail freight sector. This is not only the result of a former state monopoly, as shown in the example of Britain, where the monopoly was broken 20 years ago. It is a consequence of the increasing returns in the sector, playing the role of restoring force. Not only do these increasing returns stem from the very capital-intensive nature of the sector, they are also linked to the use of large hubs, as in air transport. This applies to single-wagonload transport. At the beginning and at the end of routes, these wagons can be towed by short-haul rail operators. But for the main stretch, when flows need to be consolidated, requiring trains to be assembled in marshalling yards, the major company is essential. Take the Xrail[5] project, for instance, which aims to restore the relevance of single-wagonload transport at the European level. This type of ambition leads to a need for cooperation between companies across the European TEN-T networks. In a way, this is a move away from competition towards cooperation, or at least "coopetition" (Y. Luo 2007) under the auspices of a major company.

[5] Xrail consists of seven European freight operators: NMBS Logistics (Belgium), DB Schenker Rail (Germany), CFL Cargo (Luxemburg), Rail Cargo Austria (Austria), CD Cargo (Czech Republic), Green Cargo (Sweden) and SBB Cargo (Switzerland). It has to be noticed that Xrail is not a closed group; it is an alliance opened to new members.

This also raises the question whether such cooperation is to be viewed as a cartel to reduce competition, or as the opposite — an alliance meant to improve the overall efficiency of the system, as is the case in air transport.

Major companies also play a role at the international level, as the development of international freight leads to strategic choices having to be made at the European level. Indeed, SNCF has subsidiaries operating in neighbouring countries (Captrain) and DB, through DB Schenker, controls many railway companies throughout Europe. These undertakings sometimes even become the major company in the country in which they are active, such as EWS in Great Britain. This requires a European rather than a national approach to major companies. As we can observe in the different countries' markets, local new entrants are indeed rarely absolute beginners in the sector. Most often, the new entrant is a subsidiary of a major company, or is already well established in another market. This is not necessarily a bad thing, given that we are in a sector where both learning costs and sunk costs are high. This does, however, raise specific questions regarding the way the sector is to be regulated. Although the liberalisation of rail freight has allowed competition to develop and new players to enter the market, regulation must also take into account companies' strategic behaviour, and how it affects the overall efficiency of the sector.

4. Critical issues of regulation within the rail freight market

The regulation of rail transport is a recent issue in Europe. The matter is approached very differently in different countries. This is due to the wide diversity of organisational choices made to implement the reforms and the different stages of progress reached through said reforms. Furthermore, the European regulatory framework surrounding these reforms is itself continuously evolving, and nobody knows for certain what will be the exact final content of the fourth Railway Package, which is still under discussion. We must therefore consider the next steps in rail regulation pragmatically, in particular when it comes to transporting goods.

4.1 Regulation in the strict meaning and regulation in a broader sense

Regulation cannot fix everything; But regulation is, however, not powerless. In order to grasp the extent of its scope, we propose a distinction between regulation in the strict meaning of the word and regulation in a broader sense:

- The former essentially aims to avoid any discriminatory behaviour on the part of the natural monopoly, curtailed in principle (Crozet 2012), of the infrastructure manager (IM). First and foremost, all operators need to have equal network access, including when it comes to the allocation of train paths in the planning phase (drafting of graphic timetables); equal treatment of trains in the operating phase; non-discrimination in charges and tolls for infrastructure; access to essential facilities such as fuel delivery points, depots or train storage tracks; and so on. The very list of such essential facilities can be up for debate. For example, should it include rail marshalling yards or maintenance centres? To what extent should the incumbent operator be forced to share its specific assets? The objective here is to lower the barriers to entry so as to facilitate market entry;
- Regulation in the broad sense also considers the mechanisms that will allow not only the survival, but also an acceptable level of profitability for a sufficient number of operators, ensuring the overall efficiency of the sector. This refers to technical issues such as the harmonisation of operating standards, which ultimately have to converge at the European level, but also economic and social issues pertaining to the management of companies in the sector. The issue of state intervention is crucial here. Having been for a long time and very often still being the main or sole shareholder of the incumbent operator, each national state will tend to interfere in the competitive game, albeit in an indirect or hidden way. This is a delicate issue that regulators cannot always deal with head-on, yet it needs to be addressed, taking into account the independence typical of the academic world.

Considering these various dimensions of regulation, the following points will be discussed. We will begin by making an inventory of the liberalisation of rail freight in Europe. We will see that the process is underway in

many countries where competition is actually no longer a goal to be attained, but a reality. However, national situations are still quite diverse and competition remains imperfect for many historical, technical, political or social reasons — and even the sector-regulating bodies and procedures vary from one country to the next. For this reason, any possible options considered in this document with a view to contribute to better regulation must take into account these national differences on the one hand and the specificities of the sector on the other; it should not do so to encourage a *status quo*, but, on the contrary, to show what could be possible next steps in regulation, once the initial phase of achieving liberalisation and establishing competition is completed.

4.2 Diversity of national choices in terms of regulation

In recent years, the European Commission has been very active in the railway sector. It has launched infringement proceedings against many countries in order to push them towards more competition. It has placed great emphasis on the need to establish a regulating body capable of enforcing free market entry, access to paths, and equal charges and fees for all. However, just as each country has carried out railway reforms in its own way, sector regulation too takes very different forms in different countries.

In the mid-1990s, Great Britain decided to establish an independent and powerful sector regulator, which made sense in the organisational structure adopted after the disappearance of British Railways. The ORR (Office of rail regulation, formerly Office of the Rail Regulator) has statutory duties towards freight (ORR, 2013a). The ORR performs these duties in three key ways (ORR, 2013b):

- To "regulate Network Rail's stewardship of the national rail network";
- To "licence operators of railway assets";
- To "approve track, station and light maintenance depot access".

We will not go into a detailed discussion of the many activities of the ORR here. However, one example we do wish to highlight is that the ORR carries out periodic reviews of Network Rail's financial structure, usually every five years. This process leads to the approval of track access charges for each type of freight locomotive and wagon for different commodity types, together with a range of other charges such as a coal spillage charge and a freight-only line charge (ORR, 2008), based on proposals from Network Rail. The ORR has published a detailed account of the proposed charging principles for 2014-2019 (Control Period 5, ORR, 2013c).

More recently, in December 2009, France introduced an independent industry regulator, but its scope of action is much more limited than that of the ORR. For instance, each year the ARAF (*Autorité de Régulation des Activités Ferroviaires* — authority regulating rail activity) has to approve the list of track access charges proposed by the IM. However, ARAF plays a much less prominent role in establishing the principles upon which such charges are to be based. In terms of freight, it intervenes mainly to verify that there is no discrimination between operators and to make a decision in case of appeal by one of them. This type of intervention by the regulator, usually *ex post,* is also the norm in Germany.

In the case of Germany, the rail regulator is not a sector regulator. Regulation of the rail sector is carried out by an independent regulator overseeing several network industries. Since 2006 the Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway (Bundesnetzagentur, BNetzA) is the regulator responsible for the regulation of the German railway market. Its responsibilities are based on the General Railway Law (Allgemeines Eisenbahngesetz, AEG) and the Regulation on Railway Infrastructure (Eisenbahninfrastruktur-Benutzerverordnung, EIBV), which determines its main task as monitoring and controlling the non-discriminatory access of all railway operators to infrastructure, especially the processes granting access to networks and service facilities, time-table schedules as well as non-discrimination of access fees (BNetzA, 2013). The German regulatory authority has ex-ante as well as ex-post competencies for regulatory control of access and charges issues[6]. It can also initiate investigations as a reaction to complaints and, if necessary, it is able to take action *ex officio* (BNetzA, 2013; LIB-Index, 2013). Decisions by the BNetzA are then immediately effective and an objection has no effect of delay. In addition to its monitoring responsibilities, the BNetzA has the authority to order coercive measures of up to 500,000 euros, without being able to impose fines. Since 2006, the regulatory authority has initiated around 600 investigations and taken about 150 decisions (BNetzA, 2013, LIB-Index, 2013).

[6] The infrastructure manager has an obligation to submit the list of charges and the network statements (including charging principles) for checking by BNetzA (process: submission, check, hearings, counter checks, decision). BNetzA has the right to object to the submitted proposal. If BNetzA objects, the status quo ante continues, until the infrastructure manager submits a new proposal.

In Italy, there was until recently[7] independent sector regulator. Regulation of the sector was in the hands of a department within the Ministry of Transport, which verified the IM's decisions, including proposed infrastructure charges, in advance. This is the same department that dealt with complaints from operators regarding network access and essential facilities. The situation is the same in Belgium.

4.3 Ups and downs of the 4th Railway Package and implications on regulation in the strict sense

As we have seen, the rail transport sector is regulated in many different ways in Europe. This situation is likely to persist. The ambitions of harmonisation in the railway systems that were included in the draft 4th Railway Package were opposed by several countries, and eventually severely limited in February 2014 by the European Parliament. The latter wisely favours considering rail regulation in a more pragmatic way and it is also the content of the agreement (8 October 2015) between the European ministers of transport about the final version of the 4th railway package.

Asserting their influence to prevent the 4th Railway Package from making mandatory the separation of ownership between infrastructure and operations, France and Germany — with the support of other European countries such as Italy and Luxemburg — have made the regulator's mission more crucial as well as more complex:

- More crucial, because the existence of a holding company increases the risk of a privileged relationship between the IM and the holding company's other subsidiaries;
- More complex, because extensive investigations may be required to reduce these risks of discrimination. Just as EU directives have left much room for manoeuvre for nations to reform their railway systems, the fourth Railway Package will not impose a complete separation of infrastructure and operations on all countries. This means that the rail regulator will need to carry out regular and thorough assessments of the inner workings of the IM, a (natural) monopoly.

Of course any form of price discrimination must be avoided, but that is fairly easy to check and verify. The same does not hold true for two other areas where regulators have their work cut out for them:

- The first is the allocation of train paths, and giving access to the network and essential facilities, to competitors of the railway holding company. If the incumbent railway undertaking should somehow obtain information on paths requested by other operators from the IM, then that would constitute a significant information asymmetry. It would then be easier for the incumbent to offer competing services, or it could even request train paths in the same space-time to saturate capacity. This is what SNCF was found guilty of by the French competition authority. It is for this reason that the fourth Railway Package requires real compartmentalisation, calling for proverbial "Chinese walls" to be built between the IM and the other entities of the holding company. But how can the absence of any information leaks between the different entities be ensured and monitored? As long as their subsidiaries are not fully separated into independent entities, holding-type companies should expect to undergo regular checks and evaluations. This is the quid pro quo for maintaining vertical integration and avoiding separation of ownership;
- The second area refers to the question of financial transfers between the IM and the rest of the holding. These transfers may be from the IM to the holding company, as it is the case in Germany. In that country, in fact, the railway reform has led to the Federal Government taking over the railway system's long-standing debt. For this reason the IM, DB Netz, has little debt. As it has also obtained significant productivity gains, it makes modest profits on the railway access charges since 2007 which contributes to better operating results for DB. This type of flow should therefore be

[7] The Italian "*Autorità di Regolazione dei Transporti*" (ART) has been officially set up in September 2013. Its first report to the Italian Parliament has been delivered in July 2014 (http://www.autorita-trasporti.it)

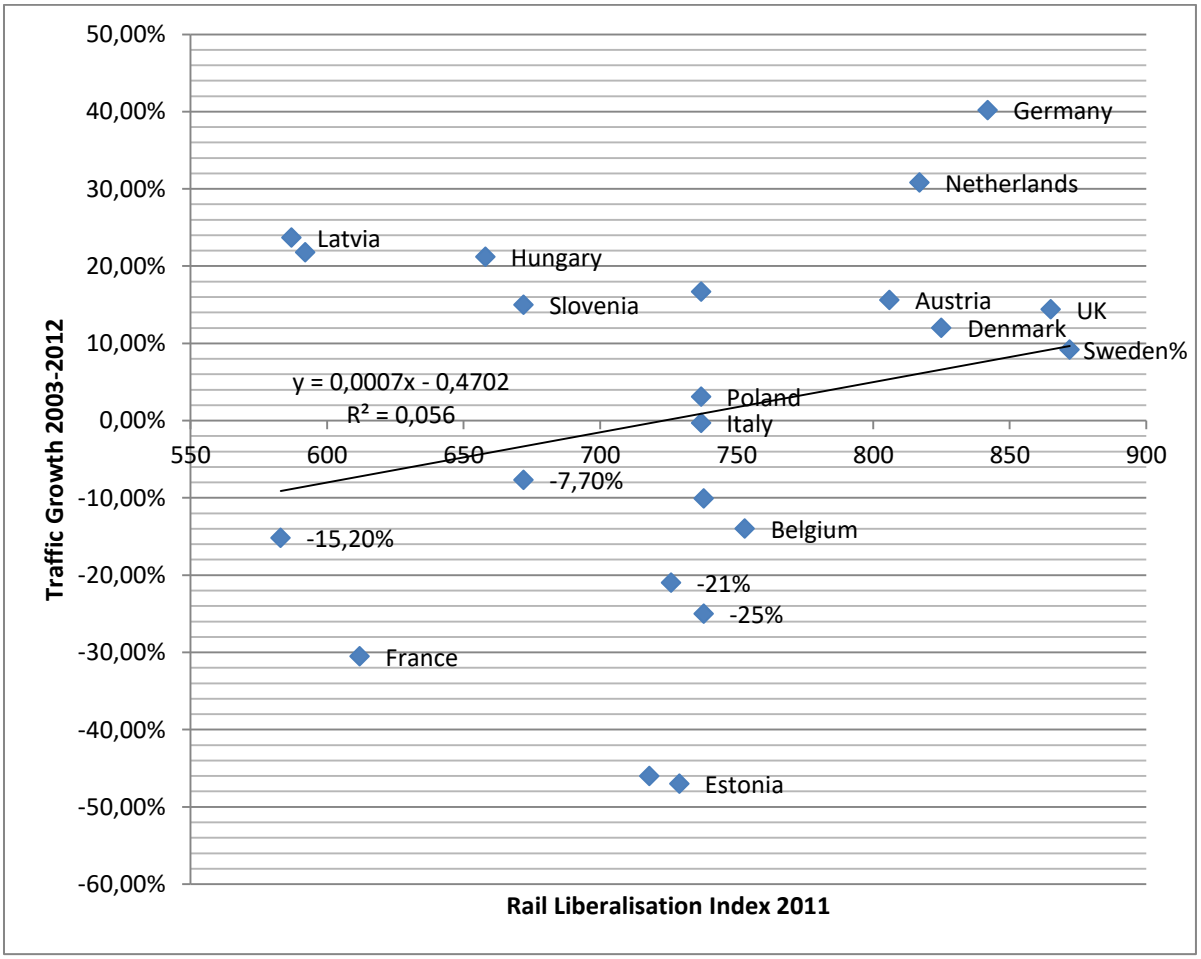
monitored closely by the regulator in order to assure that the incumbent operator does not gain undue benefits in terms of cost of capital and financing compared to its competitors. . In France, by contrast, the IM is highly indebted (33 billion euros by the end of 2013). It is for this reason that in the current draft of the railway reform, it cannot simply be merged with SNCF into a single entity, because the income statement of such a merged company would be permanently affected by the debt service burden (more than 1 billion euros per year).

Based on these examples, it appears that regulation in the strict sense, which essentially monitors discrimination and other asymmetries between operators, should be carried out with even more vigilance, and should take on forms that are suited to the various national contexts, which are likely to remain very different. However, regulators will also need to take a broader view in order to address more strategic issues regarding the long-term sustainability of rail freight.

4.4 Regulation of the railway sector in the broader sense: efficiency and sustainability of rail freight

Considered in broader terms, regulation of rail freight needs to focus on the latter's development. Liberalising the sector is not the main goal; it is a mean to get to a higher efficiency and affordable prices, which should result in an increase of traffic. As shown in Figure 3, the relation between liberalisation (RLI) and traffic growth is not easy to establish.

Figure 3: RLI and rail freight traffic growth (2003 – 2012)



Source: RLI (IBM), EU, RMMS, Working documents 2014

Dispersion of the points and the weakness of the R² show that liberalisation only is not enough. Traffic decrease in Spain is not only due to the poor opening to competition. One must keep in mind the deep recession the country has been going through for 5 years. For France, as shown above (see also case study on France) several organisational issues have to be taken into consideration. But it is still significant to underline that, countries

with a RLI higher than 750 have all encountered increases in traffic, despite 2008-2009 depression, that affected every country. Does that mean that there could be a threshold of liberalisation that should be reached and overtaken to sustainably inject dynamism into the sector? The issue deserves to be addressed even though it is clear that competition is not a stable state enough for this capital intensive industry.

Therefore, regulators must adopt a strategic approach to medium-term and long-term developments in the sector. The following key points warrant extra emphasis:

- The first aspect to be questioned relates to the relative fragility of rail freight companies. These undertakings are facing stiff competition from other modes, especially from road haulage. Any increase in infrastructure charges or energy costs (especially electricity) is a threat to the sustainability of these activities. It is therefore crucial that the regulator takes these elements into account, especially when it is responsible for determining or approving railway access charges. Public authorities must also see to it that rail freight is not penalised by their lack of investments in infrastructure or by their systematically giving too much priority to passenger trains. In order to reach the EU's rail freight development objectives — even partially — more will need to be done than relying solely on the mechanisms of competition. It is also crucial to consider the context in which it takes place;
- Another element of this context is the strategy followed by the companies. We have already highlighted the key role of some major companies, and we can broaden the subject by pointing out that the liberalisation process is still new. Consolidation mechanisms will arise. Companies will appear and disappear; others will merge or be acquired by those who have the capital resources to do so. It is therefore useful to consider just what an optimal situation in the railway sector would be. Can we expect a market structure with a vast number of operators, as is the case for road haulage? This seems unlikely. Should we then consider as very likely the presence of two or three dominant players, as in air transport? If we are moving towards an oligopolistic structure, and if this situation is considered as rather favourable to the efficiency of the sector, a specific kind of regulation will have to emerge, closely monitoring mergers and acquisitions, market shares, and the necessary survival of smaller operators, as they are important drivers of innovation.

Finally, we have to keep in mind the national specificities of rail freight industry. Table 1 below summarises the situation for eight key European countries. Traffics have not been equally affected by the 2008 economic slowdown. Competition is a reality in all these countries but there are big differences in market shares as well as in traffics growth. In the same vein, it is not possible to make a direct link between rail freight development and concentration index (HHI) or new entrants market shares. But in all these countries, regulators have to face the same challenge: how to foster rail freight traffic both from new entrants and from the increasing returns of the former monopoly?

Table 1: Rail freight national synthetic indicators about rail freight

	Austria	Belgium	France	Germany	Italy	NL	Poland	United Kingdom
Traffic 2012 in tkm	22,1	6,7	32,6	99,8	20,2	6,1	49	22
International traffic	73,5%	69%	32,2%	43,5%	50%	90%	36%	2,50%
Market share of rail	15,2%	39,9%	14,9%	23%	12,2%	5,1%	22%	12,60%
Market share of new	18%	13%	32%	29%	24%	36%	33%	54%

entrants								
Traffic growth 2003-2012	15,00%	-14,00%	-30%	40%	0%	30%	3%	14%
Traffic growth 2000-2008	4%	2,70%	-15,90%	49,20%	6,40%	51,5%	-5,3%	11,50%
Approached HHI	6850	7600	5000	6300	nd	nd	3850	3000

Source: EU, RMMS, Working documents, 2014

5. Conclusion

In light of the structural imperfect competition described in this paper, regulation and regulators have to face a lot of challenges.

Given the very capital-intensive and highly scheduled nature in all segments of rail transport, numerous entry barriers remain and market power manifest itself in many areas of rail freight. This should be given special attention by regulators or competition authorities. Take, for instance, the issue of access to freight terminals, which are often owned by the incumbent operator. Regulators have to ensure that access by third parties to these essential facilities is ensured. Similarly, regulators also have to ensure an equitable access to train paths.

Regulators have also to take into account the specificities of rail market segments:

- Intermodal service is a kind of shuttle service for containers and trailers between city pairs – or a port and a city. This service has oligopolistic characteristics since customers value frequency and high frequency increases rolling stock utilization and reduces costs. With rented locomotives and wagons and open access intermodal terminals, the barriers to entry are, however, quite low. And there are some big customers with high bargaining power. What is needed is a "business as usual" regulation (non-discrimination and control of market power).
- Industrial solutions are tailor made by traction providers for big shippers, e.g. iron ore, coal, steel, cars and petroleum products. There are probably close to a hundred traction providers of such services in the EU and also many in-house suppliers. The critical mass to start is one customer. The customers have high negotiating power and the entry barriers are typically quite low with rented locomotives and wagons. For this segment, the main regulatory issue is related to the fact that, very often, the incumbent railway undertaking (RU) controls the local infrastructure (sidings). Therefore, access to essential facilities remains a key point to deliver competition.
- Single-wagonload is a network service which offers freight wagon transport "from anywhere to anywhere", nationally and internationally. This supply cannot be provided by a multitude of small operators. This kind of business can work only through cooperation between a major company and smaller entities. So, in this case, it is cooperation that should be encouraged rather than competition. But it can be an unbalanced cooperation, given that big companies have more market power than the small ones. Hence, regulators or competition authorities should remain vigilant over the terms of cooperative agreements

In order for all these points to be fully taken into account by regulators, strengthening the powers of national regulators is crucial. The European directives already provide all the necessary legal basis and guidance for this. However, national regulators should also communicate with one another, as they will be confronted with major companies' market power. The latter is to some extent necessary for the development of rail freight. However, too much market power on behalf of one or two players cannot be a recommended outcome, because the risk of abusing market power would be too high.

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7. Annex # 1: The Rail Liberalization index (IBM 2011)

Varying degrees of liberalisation can be tracked in detail thanks to the Rail Liberalisation Index (IBM 2011). The general index took two broad categories of indicators into account, called LEX and ACCESS:

- Indicators grouped in the LEX category, representing 20% of the overall index, take into account the organisation of the sector and in particular the vertical separation between IMs and RUs, as seen below. However, the most weight is given to the regulation of market access and the power of market authorities;
- The ACCESS indicators comprise the bulk of the weight of the RLI (80%). They assess the different barriers to entry (information/administrative/operational barriers), but also the share of the domestic market that is accessible, and to a lesser extent also ticketing/sales services to passengers.

The scores for each indicator are then added up, taking into account the weightings shown in Table 2. The higher the RLI score, the more we can consider that the country has opened up its rail market. Countries scoring over

800 points are said to be in a state of "Advanced" liberalisation (Austria, Denmark, Germany, Netherlands, Sweden, and United Kingdom). Countries scoring between 600 and 800 points are said to be "On Schedule" (13 EU countries including Italy, France, and Belgium). The status of countries scoring between 300 and 600 points is called "Delayed" (6 EU countries including Spain and Luxemburg). Though the score for each country is interesting, it is best not to attach too much importance to the detailed results, insofar as they depend on changing weightings and measurement tools that are still open to improvement.

Table 2: The Makeup of the Liberalisation Indices in 2011

LEX (20% of overall index)		
(25% in 2002, 30% in 2004, 20% in 2007)		
Organisational Structure	**25**	
Incumbents' independent status with respect to the state		5
Degree of vertical separation - network/operations		80
Degree of horizontal separation - freight/passenger transport		15
Regulation of Market Access	**45**	
Market access regime for foreign RUs		40
Market access regime for domestic RUs		40
Legal controlled access to operational facilities		20
Regulatory Authority Powers	**30**	
General aspects of the regulatory authority		30
Scope of regulation		30
Powers of the regulatory authority		40
ACCESS (80% of overall index)		
(50% in 2002, 70% in 2004, 80% in 2007)		
Information barriers	**5**	
Duration for obtaining information		40
Quality of non-personal information provided		30
Quality of personal information provided		30
Administrative barriers	**20**	
Licence		35
Safety certificate		25
Homologation of rolling stock		40
Operational Barriers	**45**	
Track access conditions		25
Infrastructure charging system		50
Other service facilities		25
Share of domestic market accessible 2009	**25**	
Method of awarding transport contracts		20
Compliance with transparency provisions		10
Percentage of the accessible market for RUs		70

Sales services in passenger transport	**5**
Rental of space ticket sales offices	50
Access to sales services	50

Nevertheless, three points are worth being mentioned at this stage:

- Firstly, all countries are seeing a gradually improving trend in their RLI. In less than a decade, this is a major achievement, indicating that the "competitive solution" is at play;
- Secondly, the very act of changing the weightings reveals that liberalisation is a complex process, the ambitions of which adapt to observed developments. Indeed, the weight of the ACCESS indicators (assessment of barriers to entry) increased from 50% to 80% of the total weight of the RLI between 2002 and 2011;
- Thirdly, as an extension of the previous observation, the increasing weight of the ACCESS indicators is primarily due to the fact that other indicators, grouped under the name "COM", have since been left out of the general index. These COM indicators considered the effects of liberalisation from the perspective of regulation in the broad sense, particularly taking into account the evolution of rail's modal share and new entrants' relative share.