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## **Benefits and Costs of Vertical Separation in Network Industries. The Case of Railway Transport in the European Environment**

by

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### ***Abstract***

The article is devoted to a phenomenon called vertical separation in the area of network industries. Vertical separation is understood as de-merging of infrastructure and delegating control over it to independent manager banned from operating on downstream markets which are subject to liberalisation. Arguments for and against these tendencies have been examined using the example of the European railway transport. The complete analysis presents vertical separation as a promising solution for the railway industry. One of the conditions for the success of this reform is forming of a close cooperative relationship, based on loyalty and trust, between the infrastructure manager and its clients – rail operators. Building such a relationship should be supported by the implemented regulatory policy.

**Classifications and key words:** network industries, public utilities, railway transport, economic regulation, liberalisation, vertical separation.

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## I. Introduction

Contemporary economics considers the problem of vertical integration of economic activity to be an issue of great interest. Somewhat less attention has been so far paid to the “mirror reflection” of this problem – vertical disintegration. The latter issue is usually analyzed in the context of vertical specialization of production. However, vertical disintegration is also a particularly interesting area of the experiments of public authorities which undertake liberalization reforms in public utilities. Those that reform public utilities, eager to open them up to competition, can decide to de-merge infrastructure from a previously monopolistic incumbent and entrust it to an infrastructure manager banned from operating on downstream markets which are subject to liberalisation<sup>1</sup>. Literature rarely calls this approach “vertical disintegration” using instead terms such as “vertical separation” (as used in this article), “unbundling”, “vertical divestiture” or “break-up”.

The term “experiment” has been used here on purpose. The view is often stressed in literature that in recent decades economic regulation has become less discretionary and more based on an economic analysis (at least in OECD countries). However, the first wave of vertical separation in network industries, taking place in the last decade of the 20th century<sup>2</sup>, was based on activities of a discretionary and controversial character that prioritized positive results of liberalization above all else. At the same time, they lacked any in-depth analysis of the potential negative long-term effects of the reforms that took place in industries, which had been historically formed and, until then operating in a vertically-integrated manner.

This refers to EU countries as well. The basis of the reform of network industries in the EU can be summarized with the motto: “competition where possible, regulation where not”. When the introduction of competition is at stake, infrastructure de-merging and entrusting its management to a specially established company (vertical structural separation) seems to be a much better solution than its “liberalization alternative”. The latter solution is usually

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<sup>1</sup> I.e. final consumer service markets.

<sup>2</sup> In some countries, it began several years earlier, in others, it ended a little later (e.g. in Poland). In Poland, vertical separation in infrastructure sectors has been implemented in the power industry – where the PSE Operator, a Transmission System Operator (TSO), was established within the structure of the PSE energy company as a functionally unbundled company – and in railway transport – where the infrastructure manager PKP Polskie Linie Kolejowe SA (lit. Polish Rail Lines) was structurally separated. The telecoms regulator has for the time being withdrawn from the already advanced plans of a functional separation of Telekomunikacja Polska SA (TP SA).

referred to in literature as mandatory or open access<sup>3</sup>. It consists of the provision to new market entrants of non-discriminatory access to infrastructure controlled by an (vertically-integrated) incumbent.

An incumbent that controls infrastructure can be tempted to refuse or limit granting access to new entrants (its rivals in downstream markets). However, the means of blocking access to service markets and strategic entry deterrence available to an incumbent are very limited if infrastructure management is entrusted to a separate entity, which has no incentive to discriminate since it does not compete in downstream markets. Separating infrastructure from an incumbent is thus meant to eliminate the risk of vertical market foreclosure by a former monopolist<sup>4</sup>. Many examples of such activities are still taking place. Thus, while solutions based on mandatory access are aimed at counteracting foreclosure and consist of enforcing of the granting of non-discriminatory access by the regulator, the object of vertical separation is to eliminate it altogether. It is this very feature that determines the attractiveness of vertical separation. However, its critics argue that vertical separation in infrastructure industries entails a severe interference in the traditional vertical structure of these industries (mandatory access does not have a structural character) resulting, in particular, in an increase in the costs of vertical coordination of the production process. Some commentators go as far as to accuse public authorities of doctrinalism and ignoring the shortcomings of this solution.

Railway transport constitutes an area of particular interest from the point of view of vertical separation of infrastructure industries. The eminent American economic historian A. D. Chandler claimed that railway companies – besides telegraph ones – were “the first modern business enterprises to appear in the United States”<sup>5</sup>. The railway sector was the first industry to see the appearance of a hierarchical managerial organization (low, medium and top level management). Railway transport, the emergence and development

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<sup>3</sup> Presenting the „liberalization alternative” in this manner – vertical disintegration of an incumbent v. no disintegration coupled with mandatory network access – is a simplification common in industrial economics, especially this based on a formal analysis. In the practice of individual industries, several degrees of vertical disintegration can be distinguished. The growing literature on this subject usually speaks of its four areas – separation of accounts that must accompany mandatory access, functional (called also operational) separation as well as structural separation right up to the separation of ownership.

<sup>4</sup> The expression “vertical market foreclosure” is used in industrial economics to refer to a situation where a company operating in a competitive downstream market simultaneously operates in a closely connected monopolistic upstream market and denies (or hinders) access to an asset (e.g. infrastructure) supplied by this market which is a key production input in the downstream market. In this way the company expands its market power from the upstream market to the competitive downstream market.

<sup>5</sup> A. D. Chandler, *The Visible Hand: The Managerial Revolution in American Business*, Cambridge 1977, p. 79.

of which largely conditioned the industrial revolution of the 19<sup>th</sup> century, was not accidentally the first industry to be subjected to modern sector-specific regulation (in the US – in 1887). It constituted an innovation not only in technological but also in organizational terms. Its structure was well thought out and refined over the decades. The separation of infrastructure from operational business may thus seem to be particularly controversial and precipitate action in the case of this industry.

Indeed, vertical separation has been repeatedly criticized by railway circles<sup>6</sup>. Still, the opinions remain divided both among industry representatives and researchers. The dominant view among scholars is that railway transport is a particularly difficult and unpromising area for vertical disintegration as compared to other network industries. This view is supported by such eminent researchers as J. A. Gómez-Ibáñez<sup>7</sup> and R. Pittman<sup>8</sup>. Ch. Nash and C. Rivera-Trujillo<sup>9</sup> stress that the “[s]eparation of infrastructure from operations has been argued to be an essential prerequisite for non discriminatory access, yet it raises important issues of transaction costs”, which remains an important research question.

Similarly, according to the authors of econometric analysis, the conclusions that can be drawn for economic policy implications of vertical separation are ambiguous. At the end of their interesting econometric research, Ch. Growitsch and H. Wetzel<sup>10</sup> remark that: „[i]ndeed, economies of scope exist for a majority of integrated European railway companies. Future sector restructuring should be aware of that issue and avoid increasing transaction costs unnecessarily. On the other hand, not disentangling the railway sector further retains discriminatory incentives and complicates regulation. Policy makers should carefully outweigh positive and negative aspects of vertical integration in railways”.

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<sup>6</sup> See e.g. C. Pfund, “The separation of railway infrastructure and operations constitutes a fundamental mistake” (2003) 3 *Public Transport International*.

<sup>7</sup> J. A. Gómez-Ibáñez, *Regulating Infrastructure. Monopoly, Contracts and Discretion*, Cambridge 2003, p. 338.

<sup>8</sup> R. Pittman, *Structural Separation and Access Pricing in the Railways Sector: Sauce for the Goose Only?* (October 15, 2004), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=605621](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=605621)

<sup>9</sup> Nash Ch., Rivera-Trujillo C., *Rail regulatory reform in Europe – principles and practice*, Paper presented at the Conference on Competition in the Rail Industry, Madrid, September 2004.

<sup>10</sup> Growitsch C., Wetzel H., *Economies of Scope in European Railways: An Efficiency Analysis “University of Lüneburg Working Paper Series in Economics”*, No. 29, July 2006. p. 17–18.

## II. Benefits for competition resulting from vertical separation in railway transport in the European environment

Ch. Nash and C. Riveira-Trujillo refer to the American example where vertically integrated railway undertakings operate on each other's infrastructure. In their opinion, this can indicate that non-discriminatory access can be achieved without complete separation. Although this view is not stated directly, it can be assumed that what they mean is to achieve this goal without excessive regulation, at a satisfactory cost and in reasonable time<sup>11</sup>. Similar views were formulated by other scholars on the basis of American experiences<sup>12</sup>.

The example of the US is undoubtedly of particular interest. It should be pointed out however that American railway companies make their infrastructure available to each other on a reciprocal basis. It is this very reciprocity that differentiates the American from the European railway sector – while the former is characterised by symmetry, the latter is plagued by asymmetry when it comes to the problem of who controls infrastructure. In Europe, railway tracks are run either by vertically-integrated incumbents or, as a result of vertical separation, by independent infrastructure managers. Literature on industrial organization often stresses that asymmetry resulting from a competitive edge proves not only the necessary condition but also an impulse for a company to implement strategic behavior elements<sup>13</sup>. In the example presented here, the competitive advantage enjoyed by an incumbent stems from exclusive control over the key input (i.e. infrastructure) for the provision of downstream services.

Unlike in Europe, the situation of American operators is also symmetric in that they present similar efficiency levels. By contrast, at least in the period following liberalization (in practice for much longer), incumbents could be expected to be less efficient than new entrants. Lower efficiency of incumbents can derive from a number of factors such as: overstaffing; unfavourably structured personnel; frequently de-capitalized and obsolete production assets; ineffective management structures; inexperience of the management as far as free market conditions are concerned; poor circulation of information within an entity of an unusually large size; disproportionate strength of labour unions;

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<sup>11</sup> Assuming that costs and time flow are irrelevant, the problem of information asymmetry between a regulator and an infrastructure-controlling incumbent seems insignificant.

<sup>12</sup> See e.g. J. A. Gómez-Ibáñez, *Regulating Infrastructure...*, p. 339; R. Pittman, *Structural Separation...*, op. cit.

<sup>13</sup> See e.g. D. W. Carlton, J. M. Perloff, *Modern Industrial Organization*, Boston 2005, p. 352. Strategic behaviour (more strictly: non-cooperative strategic behaviour) encompasses the actions of a firm trying to maximize its profits by improving its position relative to its rivals.

a de-motivating remuneration scheme; and a negligent approach towards the firm's property which can lead to theft or destruction.

Moreover, at the moment of liberalization, vertically integrated incumbents were usually burdened with the public service task of providing passenger transport. In Europe, public services were traditionally financed by cross-subsidization. In the case of the railway sector, it took the form of subsidizing passenger transport by freight services. Market liberalization should entail the abandonment of these practices but this is not common. Instead, new entrants are most active in the most lucrative segments of the market and thus, by "skimming the cream", achieve higher operational efficiency than incumbents. It is clear, that the latter will note the asymmetry of efficiency and profitability to their disadvantage. It is thus likely that an incumbent will be eager to reduce that asymmetry by taking advantage of its control over railway tracks. It can also be assumed that the fiercer the competitive pressure exerted on a vertically-integrated incumbent, the more inclined it will be to strategic behaviours, which will in turn translate into denials of fair access to infrastructure.

As early as 1917, T. Veblen noted that: „[a]ll business sagacity reduces itself in the last analysis to a judicious use of sabotage”<sup>14</sup>. Sabotage, nowadays often referred to as strategic behaviour, can in this example take such forms as:

- 1) explicit refusal to grant infrastructure access;
- 2) demanding excessive price for access;
- 3) discrimination in network capacity allocation;
- 4) necessity to meet additional requirements;
- 5) denial of access to additional services or facilities;
- 6) delaying access to infrastructure and limiting access to information;
- 7) offering a lower standard of access than agreed and mounting "artificial obstacles".

The range of tools for discrimination at the disposal of a vertically-integrated incumbent is thus very wide. "Opportunity makes a thief" writes A. Sulejewicz referring to a situation where the drive to maximize profits makes a company take advantage of all available business opportunities<sup>15</sup>. Sticking with the criminal rhetoric, a vertically-integrated incumbent has not only the motives but also all the necessary means to commit a crime. Clearly, this metaphor should not be taken literally. An incumbent can indeed use illegal tools for discrimination (e. g. excessive access prices) but it can also take advantage of loopholes or inconsistencies in its institutional arrangements (e.g. those

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<sup>14</sup> T. Veblen, *An Inquiry Into the Nature of Peace and the Terms of Its Perpetuation*, The Macmillan Company, 1917 p. 152.

<sup>15</sup> A. Sulejewicz, *Partnerstwo strategiczne: modelowanie współpracy przedsiębiorstw*, Warszawa 1997, p. 117.

relating to network capacity allocation) which, theoretically at least, do not constitute a breach of existing provisions.

The asymmetry between vertically-integrated incumbents and other market players in relation to infrastructure control pushes incumbents to use discriminative measures in fulfilling their access obligations. Another form of asymmetry between an incumbent, its rivals (i.e. its clients in the upstream market) and a sector-specific regulator relates to information, which constitutes an additional incentive to discriminate for an incumbent. Information asymmetry is related to various aspects of granting infrastructure access and in particular, to access pricing and capacity allocation. Economic theory shows that information asymmetry can entail the danger of moral hazard, which is the case in the analyzed scenario. Such asymmetry may nevertheless be attenuated by a regulator, provided that appropriate resources (e.g. highly qualified personnel) are used for that purpose. This might prove to be a great problem in practice since regulatory authority is executed by governmental bodies that often suffer from the scarcity of resources (personnel and financial). Since railway transport is not a socially sensitive industry, such as telecoms or the energy sector, it can be difficult to persuade decision-makers to assign the necessary means to a railway regulator.

Despite the major importance of information asymmetry for an incumbent's motivation, it no longer plays a significant role in the case of several of the aforementioned categories of discrimination. One of those categories is the explicit refusal to grant infrastructure access, based on an incumbent's belief that such an action will prove profitable, or from loopholes and inconsistencies in regulatory provisions. The latter can occur, for instance, when law-makers fail to introduce a legal obligation to grant access to a specific infrastructure element (e.g. sidings in Poland). Referring once again to the famous opinion of T. Veblen, it can be assumed that refusal to grant access can be embraced by an incumbent as a judicious action providing that the relevant sectorial regulator remains passive in this respect or is unable to implement the necessary regulatory decisions or impose sanctions.

The passiveness of a regulator may result from a scarcity of the tools and resources at his disposal or even from an unwillingness to act. This can in turn be associated with internal reasons – with a close relationship between a regulatory office and an incumbent in particular. Such links are inevitable in industries which used to be monopolised – otherwise regulatory offices could not employ any personnel with notable industry experience. Lack of commitment on the side of a regulator can also be caused by external reasons such as political support enjoyed by an incumbent. Major state-owned companies (e.g. integrated railroad enterprises) enjoy a very strong position because of their large workforce, usually organized in strong labor unions,



their “social mission” and often a management structure closely related to the political sphere. Moreover, state authorities are usually responsible for the direct supervision of incumbents seeing as their treasuries generally remain as their primary shareholder. Regulated industries can thus struggle with a conflict between their regulatory and proprietary functions. In such cases, a regulator might be under pressure to turn a blind eye to some of the activities of an incumbent.

Railroad transport is no exception. In fact, a wider problem is addressed here of the will to act not only on the side of a sector-specific regulator but also of any given government that can hamper any reforms started by its predecessors. Additionally, already privileged state-owned incumbents frequently enjoy an informal (no legal basis) status of a “national operator”. To illustrate, in Poland, official governmental documents use this term when referring to all train-operating companies of the incumbent “Polish State Railways” even though it was not introduced by existing legal provisions<sup>16</sup>. This is all the more important because EU reforms of railway transport involve the opening up of national markets to foreign competition. As can be expected in such a situation, arguments are voiced in some EU countries for the strengthening of the competitive potential of “national operators”, granting them protection periods before the introduction of foreign competitors or even in favor of the creation of “European champions”. In this climate, it seems easier to gain political consent for the discrimination of some of the participants of national railway markets especially when their stockholders are foreign.

Thus the issue of a strategic use of political and legislative processes for one’s own purpose becomes evident. This issue has long since been raised in economic literature but not necessarily in relation to state-owned firms only. Among authors concerned with this problem are J. A. Ordover and G. Saloner, the latter calling such actions “perhaps one of the most efficient methods for disadvantaging existing and prospective competitors that is available to an incumbent firm”<sup>17</sup>. However, this problem seems to be particularly severe in the case of a state-owned incumbent operating in a regulated industry. It highlights the issue of a regulator’s autonomy from the sector it regulates, from other bodies of state authority and from other participants of the political process. Although autonomy does not guarantee a regulator’s commitment, it remains a necessary condition for a regulator to demonstrate his willingness to act.

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<sup>16</sup> See *Strategy for railroad transport till 2013* adopted by the Ministry of Transport in April 2007, p. 23, 31 and others.

<sup>17</sup> J. A. Ordover, G. Saloner, “Predation, Monopolization and Antitrust” [in:] Schmalensee R., Willig R.D. (eds.), *Handbook of Industrial Organization*, vol. 1, Amsterdam 1989, p. 573.

A number of criteria must be met for a regulator to be able to challenge a vertically-integrated incumbent that remains determined to prevent new entrants from accessing its infrastructure. Regulators must be equipped with sufficient resources, regulatory tools and the will to act. According to the authors of a report on structural reforms in the rail industry in the OECD countries [2005]: „[a] well-resourced regulator, through persistence and vigilance, could hope to limit the anti-competitive activity of the incumbent, but the outcome is unlikely to be as much competition as would arise in the absence of the incentive to restrict competition. Potential entrants, fearing the effects of discrimination, despite the best efforts of the regulator, may hesitate to invest in new capacity”. This is often the case, since the risk of incurring the costs of obtaining infrastructure access can be excessive in the perception of potential market entrants. This problem concerns primarily transaction costs associated with the formulation and enforcement of contracts (e.g. negotiations with the incumbent, legal costs, costs associated with running and governing the contract or possible court costs). It also relates to the costs of blocking financial resources in the means of production as well as alternative costs of investment in other industries or investment in financial markets. Even the most committed regulator cannot eliminate the risk of bearing those costs by new entrants – all a regulator can hope to do is to limit them.

It should be stressed however, that it is not only vertical foreclosure that contributes to the weakening of competition in downstream markets but also the beliefs of individual investors as to the risk of it actually occurring. Investments in rolling stock are highly capital-intensive and attributed to highly specialized assets due to, among other things, limited interoperability of railway networks in Europe. A high level of asset specificity tends to entail higher risk aversion among investors. The success of the liberalization process of railway transport might very well depend on enticing investors, seeing as its essence is to enhance competition. Vertical separation can in this sense constitute a clear sign that the authorities are truly committed to liberalization. Entrusting infrastructure to an independent manager eliminates the risk of vertical foreclosure and creates the necessary conditions for optimal exploitation of traffic capacity. The “incumbent v. rival” relationship is thus replaced by the “infrastructure manager v. client” link. This facilitates co-operation which is particularly important in industries where coordination plays a major role. This issue will be addressed further on.

However, vertical separation is not a remedy for opportunistic behavior of an infrastructure manager especially in relation to access pricing. Information asymmetry in this field still remains (even if it is reduced by more transparent cost allocation) and there is still only one provider in the upstream market, a fact that can induce it to use its market power. The infrastructure manager

must therefore remain subject to regulatory supervision. However, freed from the duty to focus on incumbents, the regulator can redirect its efforts towards the supervision of infrastructure access pricing and on raising the cost efficiency of the infrastructure manager. The latter issue remains of utmost importance to the market considering the relatively high share of monopolistic infrastructure costs in the overall costs of railway transport.

### **III. Other merits of vertical separation in rail transport in the European environment**

Benefits for competition that result from vertical separation in rail transport are paralleled by profits of another type. Separation is therefore expected to help achieve full economies of scale from infrastructure management. An independent manager that does not have anti-competitive motivations resulting from vertical integration can maximize its service provision potential. Literature frequently notes that an infrastructure manager and an incumbent operating on downstream markets can both benefit from separation-related specialization<sup>18</sup>. The fact that an infrastructure manager can focus on the task of granting access, in addition to its motivation to create a partnership in its relationship with its carrier-clients, makes it possible to better adapt the upstream offer to the needs of those acting downstream, a fact that can in turn lead to mutual benefits. In view of the European Rail Infrastructure Managers (EIM) concentration on infrastructure activities leads to economies<sup>19</sup>.

Nevertheless, extra specialization benefits can also consist of the fact that that the structural reform also allows for a horizontal division of the incumbent into separate companies operating in various segments of rail transport. This provides for a de-merger of not only the companies responsible for public service provision (passenger transportation) but also of a freight service operator. The latter would then be able to follow what it believes to be the optimal path of development (evolving towards e.g. Rail Logistics Operator) and, while adapting its offer to the expectations of its clients, enhance its competitiveness. A de-merger also makes it possible to evolve further through mergers and acquisitions within the transportation and logistics sector. The commonness of the division of incumbents into carriers in Europe makes it possible to suggest that specialization-related benefits dominate horizontal

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<sup>18</sup> See e.g. *Structural reform in the rail industry*, DAF/COMP(2005)46, (OECD 2005).

<sup>19</sup> J. Evans, *The case for separation of infrastructure*, EIM 2002, p. 2; available at: [http://www.eimrail.org/pdf/polipapers/The\\_case\\_for\\_Separation\\_\\_EIM\\_point\\_of\\_view.pdf](http://www.eimrail.org/pdf/polipapers/The_case_for_Separation__EIM_point_of_view.pdf).

economies of scope associated with the simultaneous provision of passenger and freight services.

Alongside the above analyzed benefits to competition, making it possible to privatise the incumbent seems to be the key advantage of vertical separation. Such an option also exists, at least theoretically, in the case of a vertically-integrated railway company. In practice however, since the financing of the development of infrastructure is commonly perceived as a task associated with a modern state, privatization of infrastructure is regarded in Europe (and elsewhere) as a controversial solution (except for telecoms). This is particularly so in relation to railway infrastructure since its development and maintenance is especially capital-intensive. Both investors and public authorities are additionally discouraged by the unsuccessful experiences of the UK. As a result, no European country is currently planning to privatize their railway infrastructure and it is unlikely that this approach will change in the near future. Unlike vertical separation, the privatization of an already de-merged incumbent is not controversial, usually after its division into at least two companies operating respectively in the passenger and freight segments of the downstream market. First, privatization eradicates the danger of conflict between the proprietary and regulatory functions of public authority. Second, it creates a chance for an incumbent to obtain the financial resources needed for modernization. Finally, in the case of privatization by a strategic investor, an incumbent can benefit from a new organizational culture and managerial know-how.

Thus a unique opportunity related to the vertical disintegration of a large railway company of building a new organizational culture and management structure of independent companies formed as a result of this process. This chance is of utmost importance for this sector. It creates the possibility of dismantling the fossilized structures of rail bureaucracy following an administrative or technical, rather than commercial, business model and having difficulties adapting to changing market realities. Moreover, the last few decades of continuing and deepening crisis have greatly affected rail transport which has, as a result, largely abandoned its traditional mission-oriented organizational culture. Instead, focus was placed on the maximization of internal benefits such as the privileges associated with “uniformed services” including: early retirement, their own health service, job security and free travel for employees and their families. In a number of European countries, the chance of introducing a new organizational culture seems to prevail over other benefits associated with vertical separation of rail transport. However, this task faces many challenges including opposition of the managerial staff and labour unions as well as the need to introduce an effective motivation scheme for passive or even demoralized personnel. Still, the break-up makes

it impossible to postpone restructuralisation, enforcing a decision which could never be taken otherwise for political reasons or because of the passiveness of the managerial sphere.

The benefits of vertical separation are thus not exclusive to new market participants and regulators. An incumbent can directly benefit from privatization, specialization, precipitation of restructuralisation and a new organizational culture. Shedding responsibility for infrastructure constitutes another advantage of vertical separation beneficial especially from the point of view of an incumbent's managerial board. This issue can prove to be of particular importance when public authorities fail to carry out their responsibilities in relation to the financing of infrastructure and a regulator prevents the raising of access charges for its use. A given incumbent may prefer to be in a situation where it is no longer in charge of infrastructure, especially if its regulator is proactive in its actions. This factor is particularly relevant in the initial phase of liberalization when the commitment of a regulator does not necessarily parallel his experience and especially when a regulator is authorized to apply such controversial regulatory measures as e.g. assisted entry.

According to the report on the restructuralisation of railway transport in OECD countries, even if some argue that vertical separation enhances costs transparency and the appropriate allocation of government subsidies to the development of rail transport, these benefits can be attributed primarily to the separation of accounts rather than to structural shifts<sup>20</sup>. However, in spite of the use of separate accounts, a vertically-integrated incumbent may still be inclined to inappropriately allocate costs between its infrastructure and transport business enabling it to allocate subsidies in a manner inconsistent with the intentions of public authorities. Structural separation can therefore be said to contribute to the creation of a transparent system of subsidization of rail infrastructure and public services.

Another key benefit of vertical separation can be associated with the fact that it creates a unique, not excessively burdensome, regulatory regime for all market participants<sup>21</sup>. On this basis, it is possible to adopt a precise and qualifications-compatible division of supervisory tasks between the antitrust authority and the sector-specific regulator whereby the former can assume responsibility for the monitoring of competition in downstream markets. An antitrust authority may prove more efficient in this area than a sectorial regulator seeing as it has at its disposal the necessary tools, experience and personnel qualified to deal with anti-competitive market behavior.

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<sup>20</sup> *Structural reform in the rail industry*, DAF/COMP(2005)46, (OECD 2005), p. 61.

<sup>21</sup> Such a regime would encompass, among other things, a duty to meet the requirements necessary to obtain a licence and technical certificates as well as an obligation of regulatory reporting.

A regulator, equipped with sectorial expertise, may thus attribute most of his resources to the supervision of infrastructure management and to the creation of procedures meant to improve the functioning of railway markets. A clear division of competence does by no means preclude the possibility of cooperation between the two authorities – quite the opposite in fact – it may contribute to its enhancement.

Moreover, the submission of all downstream market players to a unique regulatory regime and the elimination of infrastructure-control-related asymmetry can in the long term strengthen cooperation between operators. This factor might prove crucial, because due to the competitive pressure exercised by haulage companies, rail transport has not only the potential for competition but also for close cooperation. Thus, even though vertical separation remains a predominantly pro-competition measure, it can also create favourable conditions for cooperation in downstream markets.

#### **IV. Coordination of the production process and propensity to invest in specialized assets**

The “loss of coordinated action benefit” has long since been identified as a potential effect of introducing competition in network industries. To illustrate, D. W. Carlton and J. M. Klammer wrote in 1983 that in the case of the introduction of competition „the special need for coordinated action in network industries must be recognized”<sup>22</sup>. Does vertical separation aggravate the loss of benefit of coordinated action in comparison to mandatory access? Any attempt to answer it should, as it seems, take two factors into account, that is, the coordination of capacity utilization and investment decisions, which are in turn linked to the problem of the propensity to invest in specialized assets.

At first glance, the issue of allocation seems neutral from the point of view of the choice between mandatory access and vertical separation. Either way, EU legislation requires that allocation is made in a manner independent from operators – by an independent allocating body or by an independent infrastructure manager. Still, unlike an allocating body which has no influence over the incumbent’s investment process, an infrastructure manager can improve long-term capacity allocation by appropriately shaping its investments. The knowledge of recurring problem areas can allow an infrastructure manager to reduce or eliminate the risk of bottlenecks and direct its investments towards

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<sup>22</sup> D. W. Carlton, J. M. Klammer, “The Need for Coordination Among Firms, with Special Reference to Network Industries” (1983) 50 *University of Chicago Law Review*.

an increase of capacity on the busiest sections of the rail tracks. This factor must be stressed as extremely important.

Economic literature often presents the integration of subsequent stages of the production process within a single company as a tool of minimizing the risk of opportunistic behaviour of co-operators through the attempts to renegotiate contracts over their duration. The more specialized the assets used as inputs in the production process, the higher the risk associated with such behaviour. O. E. Williamson even considers the specificity of assets to be a crucial issue for vertical integration<sup>23</sup>. Both infrastructure and rolling stock are highly specialized assets and what's more, the possibility of using the latter is strictly dependent on the existence, physical characteristics and access to the former. This is the basis of the frequently articulated fear that separating infrastructure from an incumbent could negatively influence its propensity to invest in rolling stock.

However, the likelihood of this effect occurring in EU rail transport is minimized by the parallel existence of three factors:

- the infrastructure market is subjected to economic regulation;
- compatibility of infrastructure and rolling stock is regulated by strict technical standards;
- responsibility for basic infrastructure lies with its owner – in this case, the state.

Regulating the infrastructure market contributes to the reduction of the risk that an operator (also incumbent) that has invested in highly-specialized production assets – rolling stock in particular but also infrastructure such as freight terminals – will be exposed to attempts to renegotiate the economic terms of their contract (price in particular) relating to a key input or even of being issued a notice of termination (access denial). The risk of an infrastructure owner discretionally modifying its key physical features, making it impossible for an operator to use specialized assets that it has acquired, is eliminated by the existence of specific technical standards. Finally, the fact that the state is responsible for the infrastructure minimizes the risk of its manager being engaged in activities that could result in an irrevocable depletion of its reserves. To illustrate, an infrastructure manager would not be allowed to eliminate a chosen element of its infrastructure, vital to operators, just because it is located on an expensive plot of land which the manager wishes to sell. Since proprietary supervision is exercised by the state, it is justifiable to expect that such operations will be blocked in the public interest. On the same basis, it is likely that public authorities will be quicker to intervene if the regulation or management of the infrastructure market is not performed appropriately.

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<sup>23</sup> O. E. Williamson, *The Economic Institutions of Capitalism. Firms, markets, relational contracting*, Free Press 1985.

It could be reasonably argued therefore, that the risk of an incumbent reducing its investments in specialized assets as a result of vertical separation will be reduced by the simultaneous occurrence of the three aforementioned factors. At the same time, in the case of new entrants, vertical separation minimizes the risk of such investments by eliminating the possibility of strategic foreclosure of the downstream market by an incumbent. It can be thus assumed that vertical separation in rail transport in Europe helps maintain a low level of investment risk in specialized assets for downstream market competitors.

Vertical separation should not have a negative impact on investment decisions concerning the development, modernization and maintenance of railway infrastructure, which is public property and infrastructure investments are only partially financed from access fees. A decision taken by public authorities to de-merge an incumbent is taken on the basis of the belief that it is right to do so. It should therefore not lower the propensity to invest in infrastructure. Since structural separation favours the creation of a transparent infrastructure subsidizing system, it can positively influence the investment process in this field. In practice however, states often delegate decisions to infrastructure managers. Thus it is essential for them to know of their state's participation in the financing of infrastructure *ex ante* (i.e. before fixing access charges for a given schedule). State financing should not be exposed to excessive yearly fluctuations and public authorities must fulfil their obligations in this field. Otherwise, an infrastructure manager might find the risk of investment into network development and modernization too high to bear. These postulates are also valid for the financing of infrastructure owned by a vertically-integrated incumbent<sup>24</sup>.

It seems therefore that it is not so much the issue of propensity to invest but rather that of vertical coordination of investments between a manager and carriers that constitutes an area of potential problem associated with infrastructure de-merging in rail transport in Europe. Still, the very introduction of competition, irrespective of the nature of the access-granting measures, results in a need to horizontally coordinate investment decisions because different infrastructure users may present different demands as to the directions of its evolution. From this point of view, vertical separation seems far more preferable to mandatory access. While an integrated rail company is obliged to grant access to infrastructure to its rivals, it does not have to take their postulates into account as far as the infrastructure's future shape is concerned. Indeed, an incumbent would not account for the preferences of its rivals as it has no reasons to help its competitors. On the other hand, an independent manager, one that is neutral towards carriers and whose mission

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<sup>24</sup> While the reduction of investment propensity may, for a change, constitute a problem in the case of a separated private infrastructure, this issue goes beyond the scope of this article.



is to grant infrastructure access, is likely to try to adjust its offer to the needs of its customers. In order to do so, an infrastructure manager will consult its decisions on the expansion and modernization of the network with railway operators and will spare no effort to take account of their postulates<sup>25</sup>.

The problem of vertical coordination has two substantial dimensions. The first one is related exclusively to the incumbent and involves the breakage of established coordination channels. The second one involves the risk of an infrastructure manager maximizing its own utility at the cost of operators and of being cut off from vital information from the downstream market. Both dimensions can affect all downstream markets participants.

Breaking existing coordination channels of a vertically-integrated incumbent does not concern new market entrants since it does not generate any costs for them. Instead, they can expect that coordination with the participation of a neutral infrastructure manager will be more beneficial to them. For new entrants the “incumbent-rival” relationship is replaced by the “infrastructure manager-client” relationship, which favors the development of cooperation links that are particularly important in the case of a coordination process, including the coordination of investments. New cooperation links in the “infrastructure manager-client” relationship refer also to the incumbent. However, their development takes time and from the point of view of an incumbent, which possessed such links in the past, the necessity to wait for new links to form can constitute a negative effect of vertical separation.

What seems crucial at this point is the assessment of the quality of an incumbent’s old coordination channels. The result of an effective coordination of investment decisions relating to infrastructure and transport operations is the possibility of adjusting the offer to the changes of the requirements of final customers. It should be noted however, that state-owned monopolies enjoyed considerable freedom as to their decisions on the number and type of railway services provided. Being indifferent to the preferences of end users, they were unable to react to changes in demand making it one of the causes of the railway crisis mounting since the 1960s. Paradoxically, the lack of reaction to shifts in demand led to a situation where coordination channels between the monopoly’s subsidiaries were not developing. Coordination was replaced by central planning of investment decisions in both subsidiaries (infrastructure and operations) made by the management of the company.

Market liberalization induces former monopolists (current incumbents) to adjust their offer to the needs of end users – the creation of effective investment coordination channels is necessary to this end. If vertical separation

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<sup>25</sup> The question of whether these postulates can be contradictory constitutes a separate issue. However, if the incumbent is the infrastructure owner, it will probably tend to resolve conflicts from a position of strength.

is implemented during the initial phase of the liberalization process, the cost of dismantling old vertical coordination channels is relatively low since they are generally of poor quality. This cost may be higher when vertical separation is carried out during a later phase of the reform. Similarly to a vertically-integrated railway company before liberalization, an independent infrastructure manager is also a state monopoly. It can be nevertheless expected that it will be much more likely to take account of its clients' wishes seeing as they form a relatively small group of railroad operators rather than a large group of end-users.

The creation of new cooperation links between an infrastructure manager and its clients is an exceptionally interesting problem. Literature often emphasizes that vertical integration of previously independent entities decreases the "power" of incentives because managers feel less responsible for the results of their actions<sup>26</sup>. From this point of view, vertical separation strengthens the management's responsibility for the effect of the production process. However, this positive at first glance phenomenon can give unexpected results in industries for which vertical coordination is essential. In network industries, it can prevent the monopolistic infrastructure manager from encompassing the entirety of the production process and make it focus on the maximization of its own utility. That problem manifested itself in the UK where the executives of Railtrack (the infrastructure manager) missed the fact that the company's long-term interest was closely linked with the development of downstream markets. Stagecoach (one of the downstream market players) made an interesting observation in this context suggesting that this phenomena resulted, among other things, from the lack of a cooperative culture accompanied by fragmentation of the industry into a matrix of contractual relationships<sup>27</sup>.

According to C. Pfund, the manager's independence from operators leads to a conflict "in a natural way". He summarizes the effects of such actions in Europe as follows: "[t]he infrastructure units were declared as independent and this independence was clearly demonstrated. Cooperation was replaced by confrontation"<sup>28</sup>. His opinion is worth noting even though he does not seem to consider the new entrants' point of view or the fact that, for an incumbent, the very refusal of treating the "national operator" in a privileged manner may constitute proof of a confrontational attitude of an infrastructure manager. Confrontation and conflict are clearly not "the reverse" of cooperation, which is the lack of the latter. However, in an industry where the coordination of

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<sup>26</sup> See e. g. H. Cremer, J. Cremer, P. De Donder, "Costs and Benefits of Vertical Divestiture" (2008) 68 *Communications & Strategies*.

<sup>27</sup> *A Platform of change. The Potential of Vertical Integration on Britain's Railways. A discussion paper*, Stagecoach Group plc, November 2001, p. 8.

<sup>28</sup> C. Pfund, "The separation....", op. cit.

production efforts is a key issue, the lack of cooperation can particularly swiftly lead to a conflict as various market players blame each other for interrupting its harmony.

For this reason, the coordination of the investment process between a manager and operators proves of utmost importance. Infrastructure managers should know that operators possess the best knowledge of end-user preferences. The maximization of railway transport services utility for end-users conditions the long-term interest of all those involved in their provision. Thus, the investment decisions of a manager should take into account the needs, preferences and postulates of infrastructure users and fulfil its obligations as to the condition of the infrastructure. The risk of an independent manager being cut off from reliable information, relevant to the shape of the offer on downstream markets, is a potential problem related to the implementation of vertical separation in railway transport. The aforementioned possibility of an infrastructure manager maximizing its own utility at the cost of operators, constitutes an additional risk factor. Both risks may be substantially reduced by the creation of cooperation links based on trust and loyalty between a manager and its clients.

At this stage, a regulator is faced by an important task – he should aspire to the role of an entity that facilitates and, when needed, enforces cooperation between firms. If possible, he should restrain himself from any direct intervention into the complex process of service provision by railway transport. Instead, a regulator should serve as a readily available conflict solving platform for all market players and promote the development of cooperation links within the sector. This requires a regulator to strengthen his authority and make sure that his “legitimization for regulation” is not solely based on the provisions calling him to life. Finally, a regulator should be aware of the fact that yielding to the temptation of regulating coordination in a discretionary manner can disrupt the functioning of the railway market.

A separate issue refers to the decision-making process in the context of investments that require a modification of the technical standards regulating the compatibility of rolling stock and infrastructure. In theory, technological progress may necessitate the introduction of innovations affecting the “rolling stock v. infrastructure” interface. In practice however, the introduction of technological innovations in railway transport translates into enhancements of the quality of infrastructure and rolling stock without modifying the wheel-rail set parameters because its change would inevitably make the new infrastructure incompatible with the old one. As a result, the transportation process with the necessity of transfers, trans-shipments and the utilization of different rolling stock would be disrupted.

In contrast, it is relatively difficult to assess the influence of vertical separation on non-coordination-related transaction costs of an incumbent,

which result from disclosing its relationship with an infrastructure manager, that is, the costs of the access contract. These costs may be divided into running costs (e.g. costs of negotiating) and governance costs. However, according to the EU model, access contracts with individual operators should not be subject to negotiations<sup>29</sup> since non-discriminatory access entails the same conditions for all downstream market players. However, collective negotiations are not precluded – they can be conducted on behalf of the operators by their economic chamber. It is nonetheless still up to the regulator to ensure that those conditions are equally favourable, rather than equally unfavourable, for all. Supervision of access contracts lies within the competence of a regulator and it should be exercised in cooperation with the parties concerned. If a regulator proves incompetent, transaction costs can be expected to rise as a result of transactions being externalized. That refers also to the costs of the execution of contracts.

## V. Wheel-rail junction problem

One of the issues frequently raised in literature is a problem that H. Cremer, J. Cremer and P. De Donder<sup>30</sup> present as follows: “The wheels of railroad wagons and locomotives work best when they are round. However, as a wagon is operating, the wear and tear on the wheels is not symmetric and they become more irregular. This has negative consequences for the infrastructure: the wear-and-tear on the tracks is increased as is the risk of accidents. Of course, this implies that the suppliers of services create externalities towards the manager of the infrastructure; we would expect that integration would make them take into account these externalities in their choice of maintenance strategy”. It is worth noting for the sake of the argument, that the aforementioned externalities refer not only to an infrastructure manager but to other operators as well through a higher accident risk and the effects of the degradation of railway tracks on the condition of their rolling stock.

This is a very important issue from an economic point of view since it centres on moral hazard resulting from information asymmetry. It is tempting for operators to abuse this asymmetry by failing to meet technical standards regulating the wheel-rail set parameters. However, this problem should be considered from a broader context. The use of rolling stock has a negative

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<sup>29</sup> More precisely, they are not subject to negotiations in some of their key elements. For instance, in Poland an operator can negotiate with the PKP PLK SA infrastructure manager practically only the method of settling mutual delays (a non-obligatory element).

<sup>30</sup> H. Cremer, J. Cremer, P. De Donder, “Costs and Benefits...”, *op. cit.*

impact on the condition of railway infrastructure – rolling stock must thus be maintained and renovated. Precise regulations exist limiting the scale of this impact by setting maximum axle loads, maximum velocity on different categories of track sections, and technical standards regarding the condition of wheel sets.

An operator that does not own infrastructure which it uses is tempted to run trains at a higher-than-permitted speed, overload carriages and fail to observe the maximum permitted life-span of wheel sets, which results in their deformation contributing to the deterioration of railway tracks. Vertical separation may induce the incumbent to such practices while it will remain a neutral element for new entrants (in the case of mandatory access they also use someone else's railway tracks). This risk can be limited by, besides supporting a higher level of loyalty within the industry, sanctioning such practices and by reducing the asymmetry that handicaps an infrastructure manager. It needs to be stressed, that such practices are widespread in road transportation where carriers do not also own the infrastructure they use (overloading trailer units is the key problem). In Poland, the Road Transport Inspection was established and equipped with sanctioning tools to reduce information asymmetry.

In railway transport, sanctions can consist of fines and, in particular cases, of the refusal to admit the rolling stock onto the tracks. Nevertheless, central to this issue is the question of who identifies the offences. If it were to be up to an infrastructure manager to declare that an offence took place, an operator could defend its action by trying to shift the blame onto that very manager – an operator could claim that the manager tried to obtain extra profits by taking advantage of its privileged position of a judge of matters which directly concern its own operations<sup>31</sup>. For that reason, it might be advisable to advocate that decisions on potential offences brought forwards by an infrastructure manager should be taken by public bodies responsible for rail-traffic safety. Reducing information asymmetry necessitates appropriate financial outlays from the latter even though those would equally have to be made by any integrated infrastructure owner if new entrants were granted mandatory access to its network.

Moreover, after a more in-depth analysis of the industry's needs, it is possible to conclude that information asymmetry might not be the most important problem in this field. The need for regular check-ups of the condition of rolling stock as well as the necessity to monitor their weight has always existed in this industry. It even led to the creation of a specific profession of "car inspectors" that continue to be employed by railway companies. Their task is

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<sup>31</sup> The risk of an infrastructure owner acting accordingly may be even higher when the infrastructure is integrated, rather than disintegrated, because this is when the problem of the guilt comes into question.

to verify “on the spot” whether a car is fit for operation. In the case of vertical separation, it is essential for inspectors to act on behalf of infrastructure managers. Furthermore, the use of diagnostic track systems for rolling stock makes it possible to control the impact of the condition of the carriages on infrastructure and enhance traffic safety. Intensifying the use of diagnostic tracks is associated with technological progress; it is noticeable both in relation to integrated, as well as independent infrastructure managers. Vertical separation might be able to induce infrastructure managers to introduce such facilities more widely.

## VI. Conclusions

Vertical separation is a radical regulatory solution used to ensure access to upstream markets in network industries. Its wide utilization in the framework of the EU liberalization process can be traced back to the emphasis attached by EU law-makers on stopping incumbents from discriminating against new downstream market entrants. It can be expected that the scale and nature of the potential costs and benefits of vertical separation will vary between particular network industries. As shown in this analysis, vertical separation can prove a promising solution for railway transport in Europe.

It is not by accident that the term “potential” has been used here. In the opinion of the author, it is still too early for an *ex post* analysis of the pros and cons of vertical separation in the railway sector. The liberalization of EU railway markets is still not very advanced. In fact, it is still only in its initial phase in the case of passenger transport. Seeing as vertical separation is a very pro-competitive regulatory solution, its *ex post* assessment must wait. Thus the current phase could be referred to as an “experience gathering stage”.

This article has emphasised the role of the creation of a close cooperative relationship, based on trust and loyalty, between an infrastructure manager and its clients. The list of incentives that induce loyalty includes<sup>32</sup>:

- long-lasting character of the relationship,
- refraining from opportunism,
- reciprocity of rewards and penalties,
- existence of an institution that enforces cooperation e.g. state-imposed regulation, authority of one of the partners,
- clear and prompt communication between the partners regarding policy changes,

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<sup>32</sup> A. Sulejewicz, *Partnerstwo strategiczne...*, p. 116–117.

- reporting involvement: as to among others bearing sunk costs,
- complete cooperation contract.

The appearance of some of these factors can be expected to occur naturally, such as, for instance, the long-lasting nature of the relationship between an infrastructure manager and its clients. Others, such as refraining from opportunism or clear and prompt communication between parties, will be facilitated by an increase in the awareness of the long-term economic interest of managers at both levels (infrastructure and operations).

The development of some incentives can be supported by regulatory policy. A complete cooperation contract is (even under the constraint of opportunism) difficult to formulate *ex ante*, even more so if market relations are something new to one or both parties. A regulator should therefore supervise the evolution of contracts rather than impose his own solutions. The authority must consider itself to be as a “third party” in the already complex contractual relationship between a manager and a carrier. As such, a regulator is charged with the task of facilitating that relationship rather than hindering it. The authority’s unique role is to ensure that the frames of the contract are strictly in line with the institutional frames of the newly created infrastructure market. The reciprocity of rewards and penalties can be enhanced by contractual provisions such as “performance schemes”, which are already in use in the European railway sector. Promoting and designing these kinds of tools in close cooperation with market participants, remains an important task of a regulator.

A general postulate regarding the role of a regulator in the coordination of the provision of railway services is that the authority should not become excessively involved. The actions of a regulator should be limited to promoting the development of tools serving its enhancement (e.g. reservation charges or congestion pricing). He can also favour development of cooperation links within the industry, becoming a platform for mediation, and consultation between market participants. This, however, requires a regulator to consciously build up the level of his authority.

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