Vertical Integration and Discrimination in the German Railway Sector: Results of a Questionnaire Survey

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Diskussionsbeitrag 2004/1

Impressum

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1. Introduction

In this paper we draw on the results from a survey of train operating companies (TOCs) to demonstrate potential and actual discriminative behaviour of a vertically integrated railway network supplier (DB Netz AG) in Germany against new entrants on the downstage-market.

The German railway market is characterised by the vertically integrated Deutsche Bahn AG (DB AG) which is, on the one hand, the monopolistic owner of the physical railway network (upstream market) and, on the other hand, a dominating transport provider on the downstream market. In general, vertical integration describes a market structure in which a firm undertakes two or more separable production stages.[1] Given this vertical relationship between the upstream network market and the downstream transport level, the network operator (DB Netz AG) has an incentive to discriminate[2] between its own TOCs – DB Reise & Touristik, DB Regio AG and Railion – and their competitors, which have been able to access the railway network since the beginning of the railway reform in 1994.[3] This discriminative behaviour can result in higher prices for the newcomer regarding access to railway network or to other facilities that are required to provide transport services.[4] In the extreme case, vertical foreclosure can result, which is a consequence of the upstream monopolist's incentive to raise rivals' costs to an untenable level.[5] If vertical foreclosure is impossible due to regulation, the network monopolist can hinder new entrants and competitors of its own transport companies from accessing the market by other non-price (i.e. qualitative) instruments. In the first instance, this behaviour aims at the provision of network services having different qualities. For example, an allocated railway slot can be narrowed by the sudden initiation of railway maintenance. Thus, the slot can not be realised so that the owner of this slot is not able to transport his product to the final customer. Likewise, the minimum requirements of railway vehicles can represent a structural barrier for entering the market.

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[1] See Kruse (1997). For examples of vertical integrated market see Vickers (1995). For the economic reasons of vertical integration see Williamson (1989).
[2] In the following, discrimination means the unequal treatment of equal facts and, vice versa, the equal treatment of unequal facts; see Aberle and Eisenkopf (2003).
[3] See exemplary Aberle and Brenner (1996) for content and realisation of the German railway reform.
[4] See King (1999) for the claim of downstream competitors that the provider sells access at a lower price to its own down stream subsidiary than to competitors.
[5] See Buehler (2003).

In formulating a regulation, it is necessary to clarify whether the targeted facility (i.e. railway network) is essential for the supply of rail transport in the final market. A so-called 'essential facility', which must be provided to competitors, exists if

a) the facility is unalterable to reach the transport customers and/or to enable business activity for the competitor,

b) it is impossible for the competitive petitioner to duplicate the facility under suitable expenditure (no *potential* substitute),

c) it is impossible for the competitive petitioner to use any alternative facility (no *active* substitute).[6]

To constitute an essential facility, these three prerequisites must be in effect simultaneously.

A questionnaire survey has been administered to selected TOCs to estimate the actual and potential discrimination. Actual discrimination describes strategies which directly have an effect on the competitors and/or potential entrants, whereas potential discrimination describes the *possibility* of discrimination as a threatening potential. This discriminatory *potential* of the DB AG – as a vertically integrated railway undertaking – often is thought to be an important barrier for competition.[7] The present analysis begins with a description of the survey design and the survey instrument. Subsequently, the results are presented. Finally, based on the survey results, possible options regarding an efficient organisation and regulation of the railway system in Germany are proposed.

2. The questionnaire survey amongst TOCs

Selection of TOCs/target population

The target population includes all TOCs with efforts to accessing the DB AG railway network. This selection criterion led to a final number of 152 TOCs.[8] These TOCs operate in various rail transport markets: freight transport (FT), regional passenger transport (RPT) and long-distance passenger transport (LPT). It is also possible that TOCs operate simultaneously in different markets.

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[6] See Rottenbiller (2002) and Knieps (2001).
[7] See Aberle and Eisenkopf (2002).
[8] The selection is based on the Competition Report of the DB AG; see Deutsche Bahn AG (2003a).

Basically, TOCs can be divided into state-owned TOCs[9] and private TOCs. Regarding their ownership structure, private TOCs can be distinguished between international transport groups (ITG), medium-sized private TOCs (MPT), industrial TOCs (IT) and local-state TOCs (LST). The following Fig. 1 shows the output volumes in respect to the market (FT, RPT and LPT):

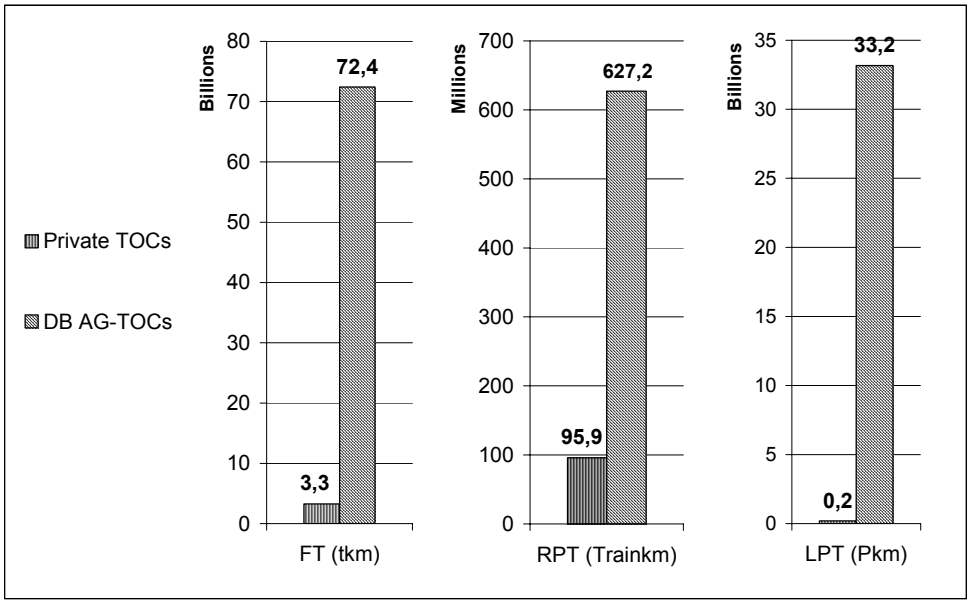

Fig. 1: Market output volumes in 2002[10]

Fig. 1 demonstrates the high market dominance of the DB AG-TOCs in comparison to the private TOCs. The most evident domination of the DB AG is represented at the LPT market. The RF market is characterized by increasing market shares of private TOCs, especially concerning freight transport by block trains over long distances. Nevertheless, the DB AG still has an undisputed market position. Recently, the DB AG has taken over the Stinnes AG to strengthen its market position.[11] Since 1996 the federal states have been ordering the regional passenger transport from the TOCs. The states can do so by direct placing or by competitive invitations to bid (competition *for* the market). Due to this practice, private TOCs are able to increase their market shares, however attended by decreasing subsidies. From the point of view of the dominant position of the DB AG-TOCs on the transport market, the vertical integration of railway

[9] As a rule, these are TOCs of the DB AG: Railion (FT), DB Regio AG (RPT) and DB Reise & Touristik AG (LPT) and their subsidiary companies, respectively.
[10] See VDV (2003), Deutsche Bahn AG (2003b) and own calculations.
[11] The former freight TOC of the DB AG, the DB Cargo, now has the firm-name "Railion" (since September 2003). In this paper we use the former firm-name DB Cargo because the survey has been executed before the take-over of the Stinnes AG.

network and transport subsidiaries offers an instrument to hinder competitors in accessing the market.

Sample and questionnaire response

The sample of TOCs was designed by a qualitative selection, which was supported by experts like VDV, EBA and railway consultants. Altogether, the questionnaire survey was sent to 86 TOCs showing competitive market behaviour. The addressed TOCs cover between 94 % (RPT) and 100 % (FT and LPT) of the market volume with respect to the performance of the target population (compare Fig. 1). Thus, the survey includes the most important TOCs of the railway market.

37 TOCs responded to the questionnaire survey, equaling 43 % of the selected TOCs. Considering the sensitive content of the questionnaire, this represents an acceptable value. The market performances of the responding TOCs cover between 52 % (FT), 60 % (RPT) and 100 % (LPT) of the sample performances. In comparison to the lower total response-quota (43 %), the most powerful TOCs have replied.

3. The results

In this section, we present items with relevance to discriminatory behaviour based on the vertical integration of the DB AG. Firstly, we show the results concerning aspects of price-discrimination. Thereafter, aspects of non-price-discrimination will be addressed.[12]

3.1 Price discrimination

Track access charges

The railway network can be regarded as an essential facility according to the definition on page 2. From there, it must be opened for new entrants in exchange for a suitable fee. A general exclusion is not allowed.[13] Given the vertical integration of the railway network and transportation, DB Netz is able to impede access through the *level* and

[12] It bears noting that the results are rather subjective market estimations of the addressed TOCs instead of endurable and objective items with regard to an inference of an optimal regulative organization of the railway market. Nevertheless, the results can point to discrimination of competitors of the DB AG caused by vertical integration.

[13] See § 14 AEG as the national legislation of a guaranteed non-discriminating access to railway network. The international regulation for a non-discriminating network access is given by the guideline (RL) 2001/14 of the European Commission.

structure of charges. Considering that railway network costs are responsible for about 25 % of all costs for transportation services, this is an instrument of discrimination that should not be underestimated.

The track access charges system (TACS) of 1998 was characterised by a two-part tariff. Depending on the demanded track kilometres, one could choose a so-called 'Infracard' as a fixed cost block in combination with a low variable price for track kilometres. This implies a degression of the average costs. Alternatively, a linear so-called 'Variopreis' could be selected in case of a lower demand of track kilometres. This TACS was criticised by the German Federal Cartel Office (BKartA) because it favours TOCs with high demand of track kilometres, namely the TOCs of the DB AG (up to 40 % lower average costs). The new TACS – implemented in 2001 – is linear, which suppresses the incentive to expand the demand. Conclusively, a TACS is characterised by the trade-off between competitive neutrality (linear system) and economic incentives for additional demand (two-part tariffs).

The following Fig. 2 shows the evaluation of the track access charges level and the price system structure by the questioned TOCs. As a relative benchmark, the price level and the structure of private railway infrastructure operators (Pr-RIO) were evaluated.

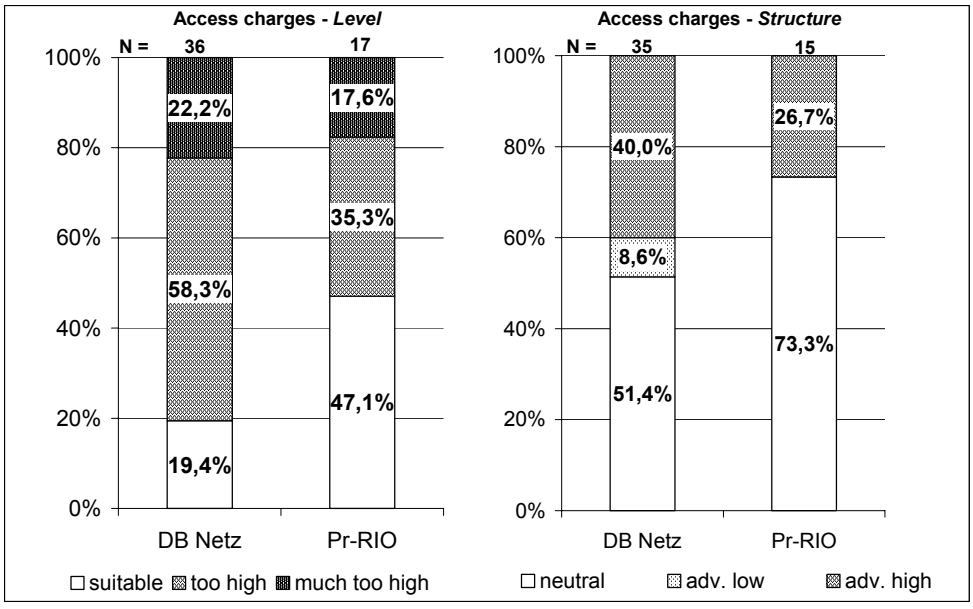

Fig. 2: Rail track access charges – Level (l.) and structure (r.)

More than 80 % answered that the track access charges of DB Netz are too high, whereas 53 % assessed the access charges of private RIOs as being too high. This suggests a relative high charge level for DB Netz, and – diminished – for private RIOs. A

more positive opinion exists regarding the track charge structure, again with advantages for private RIOs. 40 % of the responents said that the access charges structure of DB Netz is suggested as advantageous for buyers of high volumes of track kilometres. On the other hand, more than 51 % hold that the access charges structure of DB Netz is neutral – with no advantages for buyers of high or low volume. Moreover, 8.6 % say that the TACS is profitable to buyers of low volumes as a result of the linear tariff.[14] Hence, a significant discrimination by track access charges (level and structure) could not be noticed. Due to the fact that the track access charge system is directed by the DB AG (holding company)[15] – and not by DB Netz as an autonomous infrastructure operator – the general incentive to discriminate competitors of DB-TOCs persists.

Regional factors

Due to the control of track access charges by the German competition authority (BKartA), the railway infrastructure operator's (DB Netz) room to discriminate competitors via access pricing is (slightly) restricted. Hence, the introduction of regional factors (RF)[16] as a mark-up to the track access charges can be seen as an instrument to raise rivals' costs in just another way. RF effect a spreading of access charges by a factor of 1.1 up to 2.45. They are imposed on railway lines of the regional passenger transport (RPT). The DB AG explains the introduction of these charges with the need for reconstruction and the higher effort of maintenance regarding the respective railway lines: the RF of a line is positively co-related to its maintenance costs and negatively co-related to its receipts. In average, the track access charges have increased about 18 %.[17]

In Germany, the regional passenger transport is ordered by the federal states. On the one hand, the states can allocate the respective transport volume by a call for tender or, alternatively, they can place the order to a specific TOC directly. The contractual relationship between the federal state and the assigned TOC offers two possibilities:

(1) Net-principle
The TOC takes the risk of potentially occurring increase of costs.

(2) Gross-principle
The federal state takes the risk of such increase of costs.

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[14] A linear tariff ignores possible fixed costs digressions caused by high demand.
[15] See Aberle/Eisenkopf (2002) and Monopolkommission (2003).
[16] The German translation of this construct is 'Regionalfaktoren'.
[17] See Zimmer (2003).

Considering the vertical integration of the DB AG, an increase of costs – produced by the introduction of RF – can be an instrument to raise rivals' costs with the consequence of the competitor abandoning the line. After this, the DB Regio as the regional carrier of the DB AG is able to serve the line. In the face of its high market share[18] DB Regio can compensate a possible increase of costs (RF) by cross-subsidising from profit-yield lines. Furthermore, additional costs for DB Regio are additional profits for DB Netz, so this will be neutral for the DB AG (holding company) on balance.

From all companies having answered, 18 private TOCs are producing regional passenger transport what means about 37 % of the train-kilometres (private TOCs) of the target population and 71 % of the sample. The following Fig. 3 shows the number of concerned TOCs and the consequences.

From the introduction of regional factors…	Number of TOCs (RPT)	Performance (train-kilometres)	
		in % of target population, TOCs (RPT)	in % of response, TOCs (RPT)
not concerned	8	13,8	37,3
n/a, don't know	2	1,8	4,8
concerned	8	21,4	57,9
increase of costs	*5*	*13,8*	*37,4*
RPT at risk	*1*	*4,8*	*13,0*
no increase of costs	*2*	*2,8*	*7,5*
Total	18	37,0	100,0

Fig. 3: Consequences of the regional factors of DB Netz for private TOCs

Fig. 3 shows that eight (of 18) TOCs are concerned by the RF. The performance (train-kilometres) of these eight TOCs reflects about 58 % of the target population's performance. Five of these TOCs state an increase of costs, and for one TOC the maintenance of transport is at risk (indication of net-principle). For two TOCs the RF do not interfere with their costs (indication of gross-principle).

Having infrastructure and transport vertically integrated, the DB AG is able to raise rivals' costs by introducing RF. The fact that lines being operated by competitors of the DB Regio are concerned predominantly by these factors points into direction of structural discrimination.[19] Finally, the total competitiveness of the RPT-sector compared to the intermodal competition (road, bus) can be reduced because the federal states have a diminished scope for ordering transport volume due to higher costs.[20]

[18] About 92 % in respect to the performed train-kilometres, 2002. See VDV (2003).
[19] See Quandt (2003).
[20] Given fixed financial resources for ordering (so-called 'Regionalisierungsmittel').

Traction power charges

The transmission system for traction power also represents an essential facility because specific transport services have to be produced by electric traction, and no active and potential substitutes exist. The traction power charges sum up about 17 % of total transportation costs.[21] Since 2004 the DB Energie as the operator of the grid has opened its network for alternative power producers. Hence, the TOCs can choose between a complete supply by DB Energie or a combined supply by a power producer (input power) and DB Energie (transmission). In the case of alternative input power, DB Energie requires grid access charges for transmitting the power from the producer to the TOC. In case of receiving power from DB Energie, the price is formed by the traction power charges system (TPCS). This system is linear and spread referring to time. In the survey, the TOCs were asked for the TPCS' level and structure (advantages for buyers of high or low volumes). The following Fig. 4 shows the results:

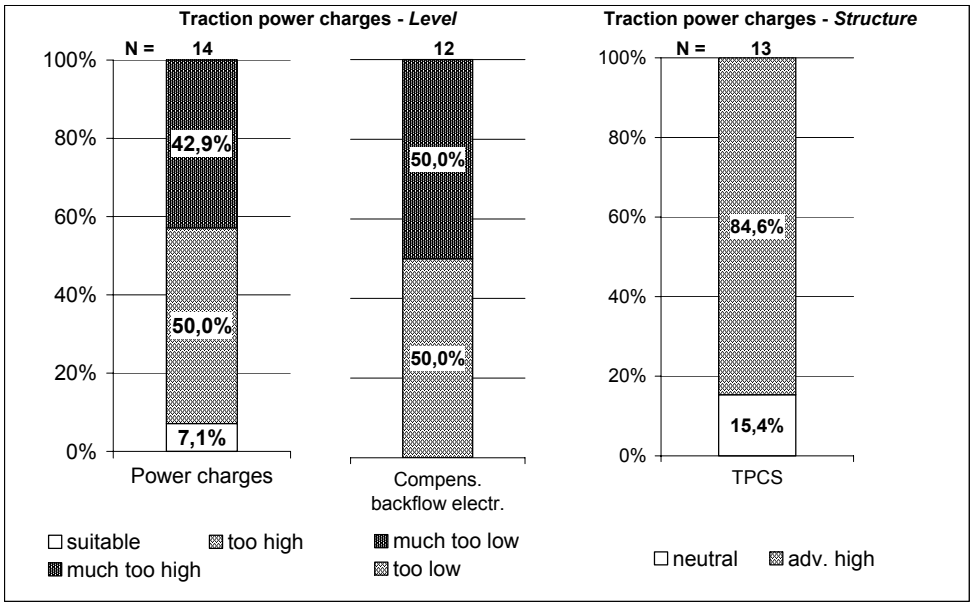

Fig. 4: Traction power charges system (level and structure)

Apparently, for 13 of 14 TOCs[22] the level of power charges is (much) too high. Moreover, the compensation by DB Energie for backflow electricity is estimated as (much) too low by all TOCs. About 85 % are of the opinion that the TPCS bears a structural advantage for buyers of high power volumes. The price reduction steps in from a

[21] See Handelsblatt (2003).
[22] This covers about 40 % of the TOCs relying on power supply by DB Energie; see Frankfurter Rundschau (2003).

volume higher than 500 GWh/year. This high purchase quantity seems to be reserved only for the DB-TOCs, which would be discriminatory.[23]

Additionally, the TOCs were asked about their opinion about the forms of contract. Between 71 % and 100 % mention that the responsibility for payment in advance, the unilateral right to cancel by DB Energie, the declaration of line announcements and leasing of locomotives are critical because this means a transfer of sensitive data to a undertaking (DB Energie) which is vertically associated with competitors (DB-TOCs). With respect to the recent opening of the power grid for alternative power suppliers, the TOCs estimate predominantly positive effects on the security of supply, the flexibility and the development of the fare structure.

3.2 Non-price discrimination

Beyond price discrimination, non-price discrimination becomes a concern for a vertically integrated network supplier.[24] Compared to price discrimination, non-price discrimination is hard to prove and, thus, to regulate by the competition or regulatory bodies because of its wide range of opportunities. The following remarks reproduce the results of the survey regarding this (potential) behaviour.

Requesting and allocation of railway slots

In this section, the experience of TOCs regarding (potential) discrimination by DB Netz at railway slot[25] allocation is presented. The TOCs were asked about the conformance of requested slots and the slot allocation by DB Netz.

[23] If price reductions are equivalent to economies of production, this reduction is “legal”.
[24] See Weisman and Kang (2001).
[25] A railway slot is the right to use a part of the railway network which is defined by time and position. See Aberle and Brenner (1996).

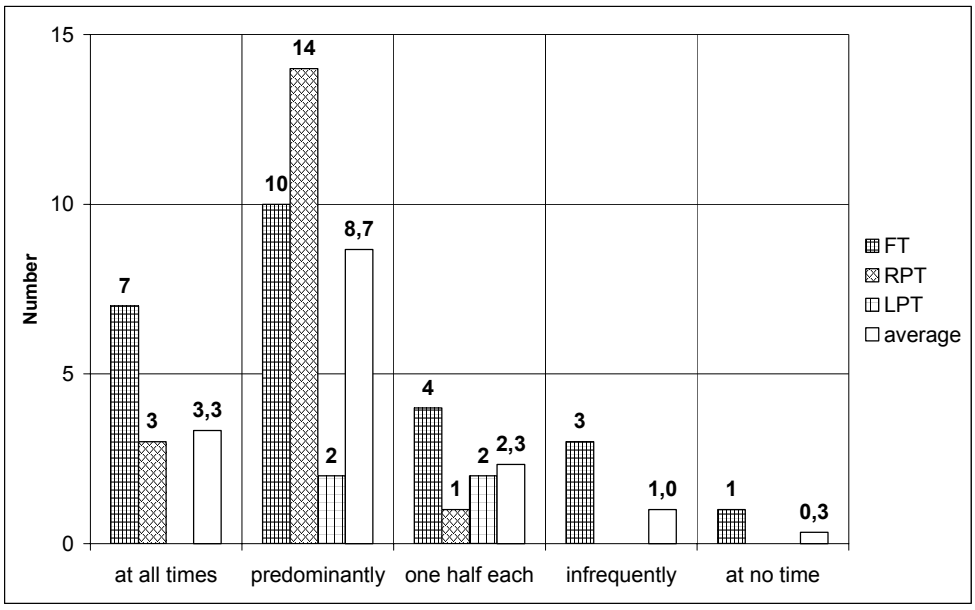

Fig. 5: Conformance of requested slots (by TOCs) and their allocation (by DB Netz)

Fig. 5 indicates that the allocation of slots by DB Netz is predominantly in accordance with their requesting (see average category). But, in individual cases the incentive to discriminate occurs. For instance, the Connex Regiobahn wants to access the LPT-market on the connection Düsseldorf-Heidelberg via the old right Rhine-line (on which new capacities must have been arisen by the shifting of DB-capacities to the new high-speed connection Cologne-Frankfurt).[26] However, DB Netz only offered a long-time running slot with low attractiveness for passengers. This offers the conclusion of protecting the DB's LPT-market by the DB's infrastructure section. The survey does not represent a structural discriminatory behaviour by DB Netz. However, individual cases of discrimination regarding the line allocation are important. The EBA stated that DB Netz has preferred DB-TOCs at the allocation of lines (grandfather-principle) which must be corrected.[27]

Allocation and compliance of railway slots

Besides the discrimination by non-allocation of requested slots to private TOCs, DB Netz can protect their associated transport-TOCs by non-compliance of an allocated and contractually guaranteed slot. This discrepancy can be of temporal or geographical nature. The following Fig. 6 shows the amount of complied and non-complied slots within the scope of the questionnaire survey:

[26] See Financial Times Deutschland (2002).
[27] See Eisenbahnbundesamt (2003).

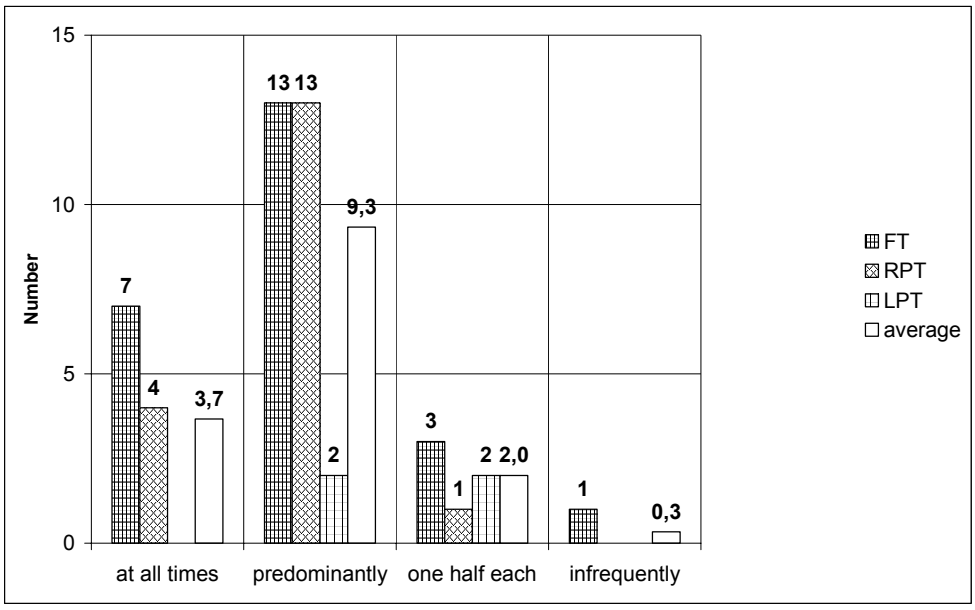

Fig. 6: Compliance of allocated slots by DB Netz

Fig. 6 shows similar results compared to Fig. 5. The once allocated slots were predominantly followed by DB Netz, especially regarding the slots for RPT. However, in some cases the allocated slot was not available.[28] Here, some individual reasons hint towards specific obstacles for competitors: operating trouble, network parts with speed restriction, temporary shifted slots or loss of substance of the railway network. Likewise, slow and repeatedly interrupted – over several years – reconstructions of railways are stated as reasons. In the face of a "high" market share of one of these TOCs, the delay due to reconstruction can be classified as a deliberate strategy of hindrance. Also, a high potential of discrimination can be stated with regards to the vertical integration of DB Netz and the DB-transportation TOCs.

Minimum standards for rolling stocks

Another way for a vertically integrated rail infrastructure operator to create market entry barriers for competitors, and to protect the associated TOCs respectively, can be the setting of high standards for rolling stocks when using the infrastructure.

The technical minimum standard for rolling stocks is set by the EBA (see § 4 Nr. 2 Allgemeines Eisenbahngesetz, AEG). Beyond this, DB Netz can define operational specifications. These requirements can cause a barrier to entry in the market especially for financially weak TOCs compared to the DB-TOCs. For example, the future Euro-

[28] In theory, this applies to all cases of the categories "predominantly", "one half each" and "infrequently".

pean Train Control System (ETCS) has already signified a shifting of technical equipment from the infrastructure to the rolling stock. This discrimination occurs when the infrastructure operator's requirements for using the infrastructure exceed the standard which is necessary for a safe maintenance (see § 3 Eisenbahninfrastruktur-Benutzungsverordnung, EIBV).[29] In the end, this can lead to a trade-off between an optimal safety standard and a non-discriminatory network access which can be affected by setting high standards for using the railway infrastructure.

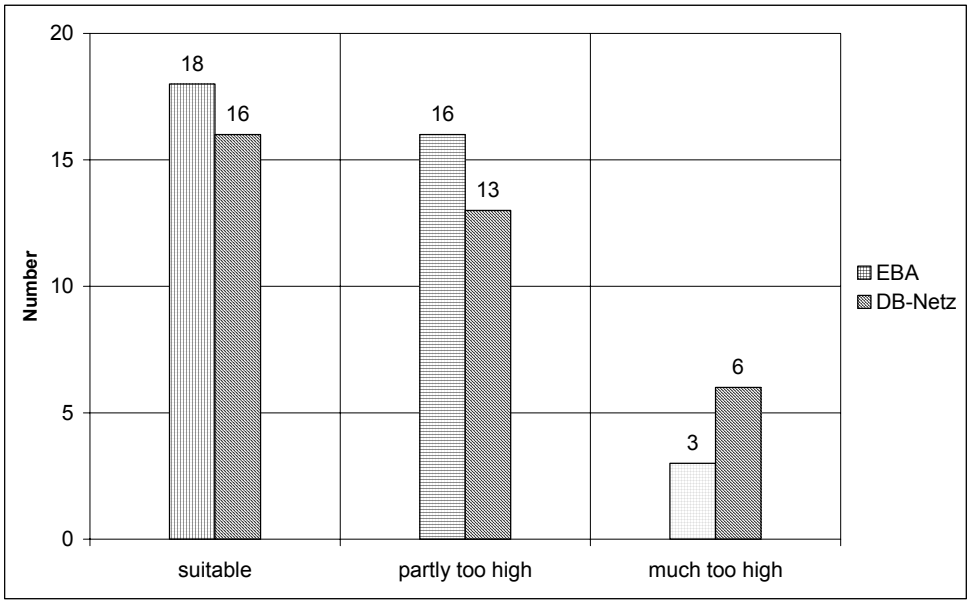

Fig. 7: Minimum standards for rolling stock (EBA and DB Netz)

As far as the predominant part of the TOCs is concerned, the rolling stock standards are suitable for both the technical standard by EBA and the operational standard by DB Netz (see Fig. 7). Of course, twice as many TOCs state that the standards of DB Netz are much too high compared to the EBA's standard, but on a low level (N=6 and N=3, respectively). In principle, the survey cannot detect a specific discrimination by disproportionate standard requirements of DB Netz. Overall, a similar evaluation of standards required by EBA and by DB Netz can be observed.

Schedule information system

Schedule information systems are an important instrument to supply transport services to potential customers, particularly in the case of passenger transport.[30] In connec-

[29] See Heinrichs (2003).
[30] Currently, Railion and the OHE are trying to implement a schedule information system for freight transport. See http://www.portal-c.info.

tion with the DB-railway network's opening, the question arises whether the competitors should have legal access to the DB's schedule information system.[31] To permit competitors' access to the system, the DB-schedule information system has to be defined as an essential facility (see definition on page 2). The Superior Court of Justice of Berlin obligates the DB to integrate two LPT-connections of Connex into their schedule system. Following this judgement, the system is an essential facility. On the other hand, the DB argues that they can not be committed to advertise the products of their competitors. At first glance, this argument seems to be justifiable. Hence, it is possible for a competitor to *duplicate* a schedule information system with reasonable investment. This represents an existence of a *potential* substitute for the essential facility 'schedule information system'. In contrast to this, as a matter of fact, the DB-TOCs have a dominant position in the related transport markets. From there, the DB AG must not take advantage of this position to the debit of its competitors. Nevertheless, it is not the task of the regulatory or competition authorities to undertake the risk of the competitive TOCs. Before an essential facility's operator is committed to open this facility, the petitioning companies should have attempted on their own to duplicate the facility by reasonable efforts.

Despite this, a new perspective will occur if the railway network is separated and transferred to a new institution (see 4). This offers the opportunity to implement the schedule information system at this new institution.[32] This solution makes it possible for all competitors – irrespective of their competitive relation – to use this independent schedule information service.

Due to the judgement of the Superior Court of Justice of Berlin (see above), no TOC stated problems regarding the access to the DB's schedule information system.

Emergency services

Likewise, the emergency service of the infrastructure operator is affected by the problem of discriminatory behaviour regarding the vertical relationship of the network operator and its associated transport companies.[33] In theory, DB Netz has an incentive to prefer the DB-TOCs or to delay the emergency service of a private TOC. Of course, this incentive is limited, i.e. if the broken down train of a competitor effects delays on

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[31] Regarding RPT, the TOCs which are serving the state-ordered line are integrated into the schedule system of the DB AG.

[32] This separated and autonomous institution is also responsible for the slot management. Hence, an implementation of the schedule information system at this institution seems to be obvious.

[33] In the view of RL 2001/14 EG, Art. 29 Abs. 1, the network operator is responsible for the disposal of service in case of a network failure caused by technical reasons or accidents.

the following or connected traffic. However, DB Netz is in a monopolistic position: The economical situation of small TOCs does not allow having their own emergency service.[34] They depend on the service of the infrastructure operator who orders this capacity from the DB-TOCs. On the opposite, the DB-TOCs do not depend upon the network operator's facilities, but due to their extensive fleet of vehicles they can make traction available to solve a problem.

The DB Netz and the DB's transport companies are monopolists regarding the emergency services. In general, there are no ex-ante contracts made between a (private) TOC and the network operator. The TOCs rely on the general right of emergency services regarding RL 2001/14 EG. Hence, the network operator can take advantage of its monopoly: DB Netz can enforce high (monopolistic) prices for its service. Moreover, any broken-down train must be placed on a holding track which is owned by DB Netz, and the train must be picked up by the TOC. Therefore, additional charges must be paid to a monopolist.

In the survey, 32 TOCs have mentioned maintenance failures. The following Fig. 8 shows the reasons for broken-down trains and the kind of removal of these failures.

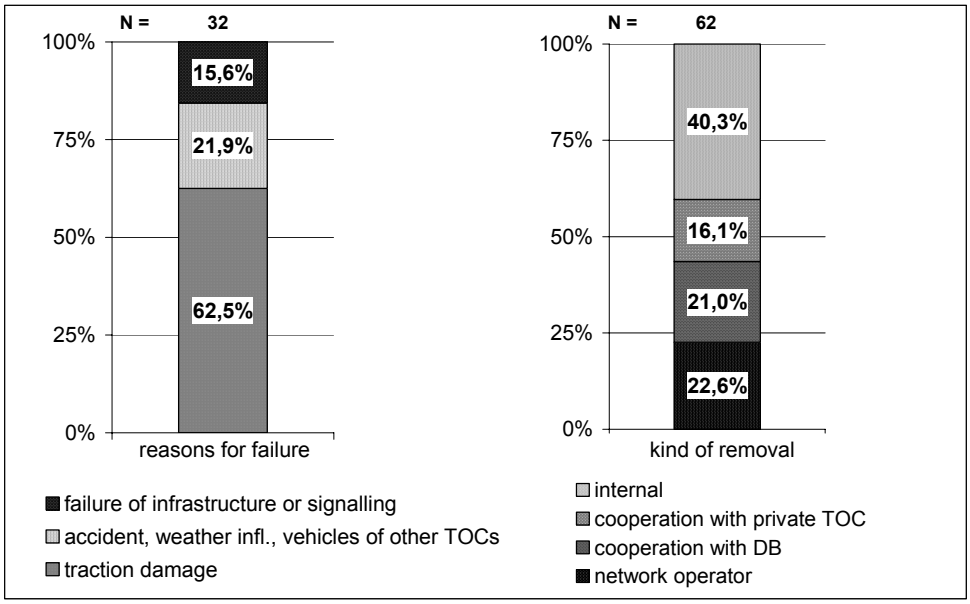

Fig. 8: Reasons for failures and kind of removal

[34] Out of this reason and due to the – felt – discrimination of the DB AG regarding the emergency services, some private TOCs has founded a private network to help each other in case of a train failure. See Netzwerk Privatbahnen: www.netzwerk-privatbahnen.de

With respect to Fig. 8, damage of traction ranks first on the list of failures. Up to 40 % of the failures are solved by internal solutions, for example by own locomotives;[35] intervention by the network operator (23 %), cooperation with DB (21 %) and cooperation with other private TOCs (16 %) are following. In the view of potential discrimination of the vertical integration, it would be interesting to see if the network operator DB Netz prefers its associated transport companies in case of emergency. The predominant part (60 %) of the TOCs cannot state a preferential treatment of DB-TOCs. On account of the sensibility of this point up to 27 % do not make any statement. Finally, 13 % state a preference of DB-TOCs. In view of 27 % of deniers this could be interpreted as a hint that, at least in individual cases, DB transport companies are preferred by DB Netz. The following reasons are given:

- prompter service,
- hints of weather problems predominantly for DB transport companies,
- information of customers of DB-TOCs by DB Netz or DB Station & Service.

Access to important and other basic facilities

Besides the rail network there are other facilities which are important for producing rail transport and which are in possession of the DB AG. In relation to their nature, these capacities must be proved to be essential facilities (§ 19 Abs. 4 Nr. 4 GWB). In case of affirmation they must be opened for general access in exchange for adequate charges. The considered facilities are:

- passenger stations,
- marshalling yards,
- sidings,
- holding tracks,
- filling stations,
- work yards,
- automobile-train installations,
- maintenance plants and
- washing-bays.

In the survey the TOCs are asked whether the access to these facilities was denied, complicated, or trouble-free. Additionally, they could decide between ‘no requirement’

[35] This is a surprising result: In respect to the introducing consideration “cooperation” with DB must have been the most dominating case.

of the facilities or 'not available'. The following Fig. 9 shows the results (N=333 in total):

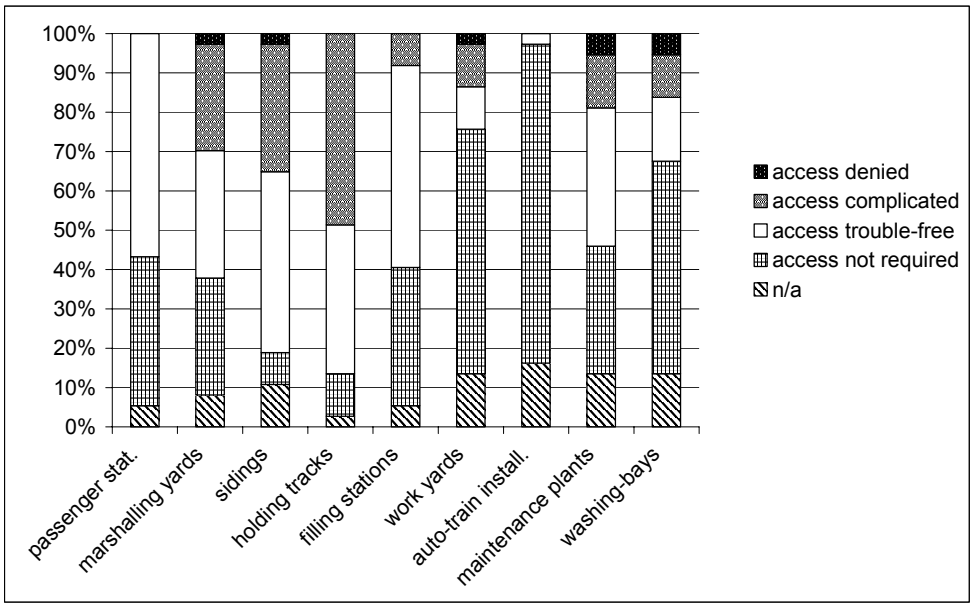

Fig. 9: Conditions of access to important and basic DB-facilities

Based on the results of the survey the access to passenger stations and automobile-train installations[36] is trouble-free. Denied access – with a low proportion, though – is stated in the cases of:

- maintenance plants,
- washing-bays (each 5 %),
- marshalling yards,
- sidings and
- operation yards (each 3 %).

First of all, the reasons are lacks of capacity or blocked capacities. In this connection, the complete leasing of facilities to DB-TOCs inhibited the access to those facilities. Often, the capacities are not completely exploited by the DB-TOCs, hence, in principle an access by other (private) TOCs would be possible.

[36] The Nord-Ostsee-Bahn, Connex, (NOB) wanted access to the DB's automobile-train facilities (loading ramps) to operate between Niebüll and Westerland. Although the NOB was given slots by DB Netz, it could not operate because of denied access to the specific automobile-train facilities. See Hamburger Abendblatt (2003).

Complicated access (anyhow, up to 17 % of all N) was mentioned for:

- parking lines (49 %),
- sidings (32 %),
- marshalling yards (27 %),
- maintenance plants (14 %),
- washing-bays and operation yards (each 18 %) and
- filling stations (8 %).

These complications are also based on lacks of capacity (57 %), deconstructions, blocking of tracks and the complete leasing out of capacities to DB-TOCs. In addition, low flexibility and the search for an adequate contact person are rated as hindering. Fig. 10 represents the reasons for complicated access:

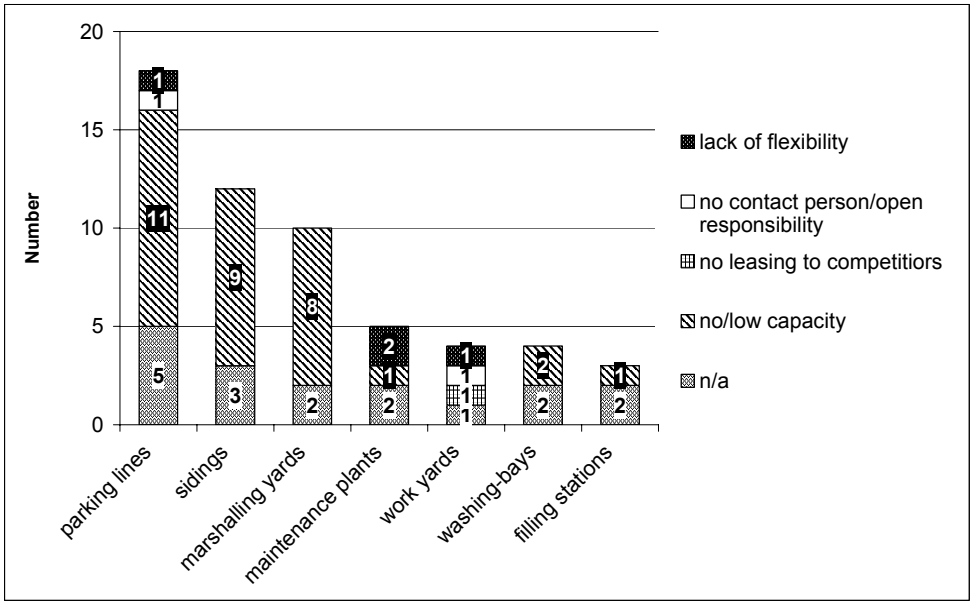

Fig. 10: Reasons for complicated access to important DB-facilities (cp. Fig. 9)

The number of explicit deny of access is relatively low. In contrast, complicated access is mentioned quite often. Especially the complete leasing out of facilities to DB-TOCs is evident (no/low capacity). The results of this section refer to the hindering effects of the vertical integration of the railway infrastructure (DB Netz) and the transport level (DB-TOCs). Beyond the vertical integration, the dominant position of the DB AG in the downstream transport market plays a decisive role. This position ensures an excellent negotiating status to DB Netz – in relation to the weaker positions of private TOCs – and can be seen as a motivation from the perspective of the DB-holding com-

pany to protect this dominant position, even by using discriminatory instruments given by the vertical integration.

3.3 Conclusion of the survey

The vertical integration of railway network and transport companies offers an incentive to minimise the competition in the downstream transport market. The vertical integration enables DB Netz to prefer the associated TOCs (DB Regio, DB Reise & Touristik, Railion) and to discriminate private TOCs, respectively. The kind of discrimination can be divided into price and non-price discrimination (see 3.1 for price discrimination and 3.2 for non-price discrimination). The results of the survey of private TOCs partially confirm this discriminatory behaviour of the DB AG.

Actual and, above all, potential discrimination are discovered at the following aspects:

- Track access charges
  Due to the vertical integration the system of track access charges is built on the interests of the holding company of the DB AG. Hence, the DB AG has an instrument to set structural market entry barriers by high prices or a discriminating access charge structure. Prejudicially, the DB Netz is not able to set a system which allocates the network capacity in an economic reasonable way (i.e. two-part-tariffs, elasticity-orientated price setting like Ramsey-pricing[37]). The results of the survey correlate with this behaviour: 80 % of the TOCs state a discriminatory treatment by high prices and more than 40 % by systematic advantages of the access charge structure for buyers of high volumes.

- Regional factors
  Regional factors can be regarded as special case of access charges. Especially the fact that regional factors are charged on lines operated by competitors of the DB AG encourages the suggestion of a discriminatory behaviour by the vertically integrated DB AG. The DB AG attempts to protect the rail network against disentanglement by building regional network divisions.

- Traction power charges
  The case of traction power charges can be economically compared to the problem of the network access charges. Both, noticeably high prices and advantages for buyers

[37] See Ramsey (1927) and Braeutigam (1989).

of high power volumes arise from the survey. It is yet to observe whether the power network opening for alternative power suppliers causes positive effects for the competition (lower prices, increasing competition).

- Request and allocation of slots
  The integration of the network management into the DB-holding company – as a consequence of the integration of the physical railway network – offers the opportunity to prefer the associated transportation TOCs concerning the allocation of requested slots. The EBA detected such discriminatory behaviour with the consequence that slot-allocation in consideration of captive company priorities is prohibited.[38] The survey covers, at least in individual cases, the statement of the EBA and points out disadvantages for private TOCs. Additionally, the supply of non-competitive slots (i.e. detours or stops) also suggests such a discriminatory treatment.

- Allocation and compliance of slots
  Due to the vertical integration the infrastructure operator has an incentive (and the opportunity) to make a once allocated slot non-attractive for a competitive TOC. Predominantly, the survey does not confirm a general behaviour regarding this aspect. However, that fact that the infrastructure operator initiates constructions on the line which is operated by a competitive private TOC (RPT) suggests at least tendencies towards this behaviour. Nevertheless, it is highly sophisticated to prove a structural discriminatory behaviour of DB Netz.

- Emergency services
  Currently, the emergency services represent an essential facility. It is not possible for small private TOCs either to use any active substitute or to build up a potential substitute. Hence, a way must be found to organise an independent emergency service or to regulate the existing one (responsible: DB Netz as infrastructure operator). Small private TOCs depend on solutions made between DB Netz and its associated transport companies. The survey provides two findings: a) Surprisingly, private TOCs can help themselves or in co-operation with other private TOCs in case of for example traction damage (about 56 %).[39] b) The fact that 27 % deny an answer to the question if DB Netz prefers its associated transport companies and, anyhow,

[38] So-called "Konstruktionsprinzipien". See EBA (2003).
[39] In respect to the argument that emergency services are an essential facility (caused by the non-existence of active and potential substitutes), this result is contrary.

13 % stated a preferential treatment of DB-TOCs by DB Netz shows a possible discrimination.

- Access to important and other basic facilities
  Besides the rail network infrastructure, other facilities are important for producing rail transport services. These facilities as well as the rail network are owned by the DB AG. The same question occurs: Does the DB AG discriminate competitive private TOCs concerning the access to these facilities? The results of the survey show that especially the access to holding tracks, sidings and marshalling yards is complicated or partially denied.[40] On an alleviated level this is also observable for maintenance plants, washing-bays, work yards and filling stations. In the view of a possible regulation, it is yet to be proved whether the respective facility is an essential facility according to definition on page 2. Otherwise, the facility can be build by the petitioner.

Less and – at the moment well regulated – discrimination potential, respectively, can be stated as follows:

- Minimum standards for rolling stocks
  Currently, the (potential) discrimination by exceeding requirements upon the rolling stock seems to be adequately regulated by the EBA.[41] The EBA follows § 3 EIBV that a discrimination is given if the technical and operational requirements of an infrastructure operator exceed an equipment which is necessary for a secure transportation.

- Access to schedule information system
  Due to the judgement of the Superior Court of Justice (Berlin), connections of DB-competitors have to be integrated into the schedule information system of the DB AG. Hence, the survey detects no deny or complication of access for petitioners.

[40] The predominant part is related to complications at the access to the respective facility.
[41] See EBA (2004). In dialogue with the EBA, the DB AG will not implement the GSM-R standard at once but successively and in conference with their regional subsidiaries. Hence, the TOCs have additional time to change over from analogue to digital (GSM-R-based) radio communication for trains.

4. The survey results and railway organisation and regulation

The results of the survey noticeably show actual and *potential* discrimination by the DB AG which can be seen as a consequence of the vertical integration of railway infrastructure – in a broader sense – and transport companies within the holding company DB AG. The dominant position of nearly all DB-TOCs on the transport markets intensifies the incentive to protect this position by discrimination against competitive (private) TOCs.[42] Based on the results of the survey, an implementation of an adequate railway organisation represents the next step. In general, two options are conceivable. Firstly, the momentary vertically integrated railway system of the DB AG persists. In this case, a 'hard' regulation must be found to restrict the discriminatory behaviour and potential of the DB AG. Secondly, the DB AG will be vertically separated. For this purpose, the railway network has to be materially separated from the DB AG. The transport companies can be materialised, too (i.e. by an initial public offer). In case of separation it must be proved if the loss of transaction cost advantages by an integrated production is compensated by the positive (welfare) effects of the increasing competition.[43] The solution of a separation requires a lower level of regulation than the vertically integrated option. Nevertheless, a natural monopolist – this will be an autonomous railway infrastructure operator due to economies of scale and economies of scope – must be regulated in respect to the *level* of access charges. The greatest advantage of a vertical separation is the removal of the incentive for a former vertically integrated railway infrastructure operator to discriminate competitors of its associated transport companies. An autonomous infrastructure operator endeavours to optimise its capacity loads regardless of the petitioner's company membership. In the view of competition of the transport market, a vertical (and material) separation seems to be the most promising solution.[44]

Beyond that, the question of the regulative organisation must be discussed. At the moment, the railway sector is controlled ex-post by the Federal Cartel Office (BKartA) in respect to general competitive abuse and, especially regarding the access to the railway network, by recurring to the essential facility-doctrine of § 19 Abs. 4 Nr. 4 GWB. Due

[42] There is also discrimination between national railways, for example at the railway network access. The DB AG only grants access to its network on the reciprocal principle. The European Commission wants to enforce a Europe-wide and non-discriminative railway network access. See European Commission (2002) and European Commission (2004).

[43] For pitfalls regarding the restructuring of network industries with natural monopoly characteristics from the industrial organisation theory, see Buehler (2003). Main pitfalls are double marginalisation, underinvestment and vertical foreclosure.

[44] Positive welfare effects – based on the increasing competition – and losses of transaction cost advantages must be compared. In general, transaction costs advantages rest on economies/costs savings through a vertically integrated production. It is difficult to empirically estimate these transaction cost savings.

to the dominant position of the DB AG on the transport markets, this control shows a level of imperfection. Possible and actual discriminations are discovered by the ex-post-control only with temporal delay. Additionally, due to its dominant position the DB AG is able to delay processes and sanctions respectively. Hence, the competitor's economic interest may be extinguished.

In addition, the railway sector is regulated ex-ante by the EBA recurring to the prescriptions of the AEG and EIBV. Since the latest amendment in 2001, the EBA has been authorised to take steps against discriminatory behaviour of a railway infrastructure operator ex officio. Prior to this amendment the EBA could only intervene when a TOC notified (possible) discrimination to the EBA. The ex officio-clause prevents temporal delays of ex-ante market control and regulation respectively. Possible disadvantages of this ex-ante regulation lie in the tendency to intervene even though discrimination does not exist. This instrument can also be abused by TOCs when they denounce discriminatory behaviour to the EBA as a preventive precaution.

In a next step, the organisation of the ex-ante regulative institution can be discussed which includes a decision between a sector-specific institution and a sector-overlapping institution. A sector-specific institution can provide expert knowledge and an intensive observance of the actual market. However, a disadvantage lies in the problem of phasing-out. Once, an institution is implemented, it is hard to reduce its personnel body when the regulated sector does not need a specific regulation anymore.[45] A phasing-out of a sector-overlapping institution can be moderated by distributing the phased-out sectors' regulating staff to other departments. A second problem of a sector-specific institution represents its so-called regulatory capture which means the influence of lobbyists on the staff of a regulatory body.[46] This influence is more probable in case of sector-specific institutions because the staff of sector-overlapping institutions can be assigned rotary between the alternative sectors.

The general ex-post market control by the BKartA should not be influenced by the organisation of an ex-ante regulation. Furthermore, a competitive and co-operative control by both institutions can be established – the sector-overlapping regulatory body and the BKartA.

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[45] See Haucap and Kruse (2003).
[46] See Lanoie, Thomas and Fearnley (1998).

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