Railway Reform in Germany: Restructuring, Service Contracts, and Infrastructure Charges

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Diplom-Volkswirt Diplom-Ingenieur
Benedikt Peter
aus Berlin

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Dr. rer. oec

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Promotionsausschuss:

Vorsitzender:	**Prof. Dr. C. Helberger**
Berichter:	**Prof. Dr. K. Mitusch**
Berichter:	**Prof. Dr.-Ing. habil. J. Siegmann**

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1 Overview

From the middle of the 1950s to the beginning of the 1990s, the German public railway company Deutsche Bundesbahn lost a substantial part of its market share: from 1960 to 1990 it decreased from 36 % in passenger transport to 6.1 % and from 56 % in freight transport to 20.5 %. Against this background, the federal German government initiated a commission to develop a reform agenda in 1989. According to this commission, the aims of the Deutsche Bundesbahn lacked an entrepreneurial drive, public service obligations and the employees having the status of civil servants being major obstacles. In October 1990, the tasks of the commission were amended in a substantial way. With the German reunification, the East-German Deutsche Reichsbahn had to be considered in the reform as well. The Deutsche Reichsbahn was heavily overstaffed and suffered from a rapid loss of market shares after the reunification.

The only solution of the problems was seen in the introduction of economically driven governance for the state-owned monopolist. Three elements were identified as being crucial for such a reform:

- The necessity of equity, alongside with a debt-relief,
- the entrepreneurial governance in the form of a public limited company, and
- a clear distinction between entrepreneurially and politically motivated activities.

The preparation of the reform took five years. It finally came into force in 1994. The reform pursued several partly overlapping aims. The two major goals were to change the modal split in favour of the railways and to unburden the public households. A

further goal, arising through the German reunification, was to handle the excessive personnel of Deutsche Reichsbahn.

A major part of the railway reform was the shift of responsibility for the provision of regional rail passenger services from the federal government towards the states ("regionalisation"). This started in 1996. Today, regional rail passenger services are subsidised with about € 7 bn per year. The federal government pays these subsidies to the states. The newly established system gives the states a considerable amount of freedom of choice. In particular, the states are free to contract with the Deutsche Bahn AG or its newly established competitors. There are different ways on how to assign the contracts to the railway undertakings. The states can also choose between different contractual forms and service specifications.

Parallel to the reform process in Germany, the European Commission started to foster the competition in the railway markets of its member states. Since 1991, directive 91/440/EEC claims an opening of the markets for some cross border traffic and a separate accounting of the infrastructure. The infrastructure managers shall also act on a more commercial base and measures are to be taken to reduce their debts. In a further step, the commission issued the first railway package in 2001. This package claims for an advanced opening of the railway infrastructure and the independent allocation and pricing of the capacity. A special focus is set on the infrastructure charging, where the European Commission prescribes certain pricing principles.

In this paper, we analyse the reform process in the German railway sector. We take a look at the process and the outcome of the reform and compare it with the theoretical findings. The regionalisation of the regional rail passenger services is of a special importance to us. We scrutinise the contracts for the provision of these services and try

to find interrelations between the different contract elements. A further emphasis is placed on the influence of the European Commission on the reform process. We analyse the European Commissions policy on railway infrastructure charges and the charging principles to be found in the member states. In the following we summarise the contents of the three subsequent chapters.

Railway Reform in Germany - Negotiations in the Restructuring of a Public Firm

In chapter 2, we analyse the rail reform process that started in the year 1994. Our focus is set on the long-distance passenger transport and the freight transport, while the regional rail passenger transport is left to chapter three.

We identify the main stakeholders and their interests. In the second part of chapter 2, the negotiations between the politicians and the managers of the railway company in the reform process are analysed using a bargaining model. Assuming opportunistic behaviour of politicians, we explain some issues of the last 13 years of railway reforms in Germany. We adapt a model, which was developed by Shleifer and Vishny in 1994 (Shleifer & Vishny, 1994). The model analyses the bargaining processes between the government and managers in the process of commercialisation and privatisation. Public firms are seen as a vehicle for the government to win elections. State-owned enterprises produce benefits for the politicians in the form of excess employment or other output. If the government chooses to cut its control over the firm, there is still the possibility to influence the firm by subsidies.

We present some evidence that the model's prediction were realised with the corporatisation in 1994. It can be acknowledged as far as the employment is concerned,

as it rapidly decreased after 1994. In long-distance passenger transport and in freight transport, restructuring processes were pursued. The performance in both segments decreased after 1994, at least in terms of market shares. There is also evidence that infrastructure was closed down after the commercialisation. However, the effect of the commercialisation on the infrastructure is not as eminent as for the employment or the transport services, as a total closing down of rail infrastructure has to be approved by the authorities. Another question is whether the commercialisation of the DB AG led to an increase in subsidies, as predicted by the model. We find that the model's predictions are ambiguous if there is a simultaneous increase in the political costs of subsidies, which is quite likely to have happened. There is evidence about bargaining processes on subsidisation, which might have lead to an increase in public support.

Regional Rail Passenger Services in Germany: Competition and Contracts

As a part of the reform of the German rail sector, the organisation of the local and regional rail services was changed in 1996. The intention was to create a more transparent procurement of the transport services.

We describe the institutional framework and the market structure. Our special focus is on the design of the contracts between the public authorities and the railway undertakings. These contracts are analysed using a unique data base. They exhibit a remarkable heterogeneity not only in terms of duration and network size but also concerning the degree of service specification and risk allocation. We try to establish interrelations between some design features of the contracts. In a first regression, we find that the contract duration is dependent on the annual train kilometres, the time span

between the publishing of the tender and the start of the services, and the provision of public instruments to mitigate the risk from rolling stock investment. For a second estimation, we create a measure for the completeness of the service contracts. We find that the completeness is determined by the time span between the publishing of the tender and the start of the services, the provision of demand information, and the obligation to become a member of the regional public transport association.

Rail Infrastructure Charging in the European Union

The rail infrastructure of each of the European Union's member states is used by different rail undertakings. The allocation of this infrastructure capacity is done using charging systems. They are designed by the infrastructure manager and subject to regulation. The European Commission has strived to open the railway markets since the beginning of the 1990s by influencing this regulation. The core element of the "First Railway Package" was a directive to shape the charging systems across the member states.

In chapter 4, we identify standard pricing principles do be used for rail infrastructure. The economic aims of the pricing principles are contrasted with the content of the above mentioned directive. Scrutinizing the charging systems of different member states it is found that there is a broad variety in terms of the level of charges and their structure. We use the theoretical and empirical findings to formulate recommendations to enhance the rail infrastructure charging systems.

2 Railway Reform in Germany - Negotiations in the Restructuring of a Public Firm

2.1 Introduction

The German railways suffered a decline in their performance from the 1950s to the beginning of the 1990s. Over the decades, many schemes and initiatives were developed to alter their situation. After several reform failures, a major step ahead was undertaken in 1994. Two smaller reform projects followed. The reforms were accompanied by discussion processes between industry representatives and politicians, as the railway sector has always been heavily regulated. Due to the involvement of different government levels, politicians from all parties and interest groups, it took four years to elaborate a series of new laws to lay the foundation of the Deutsche Bahn AG in the first reform. Although this decision was considered to bring about the long-term relief to the German rail sector many problems remained. There is still a high degree of influence by the political sector on the decisions of the company and the future structure is uncertain.

Usually it is argued that the main reason for regulation is the nature of the railway infrastructure being a natural monopoly. This chapter casts a light on another explanation for the involvement of public bodies. It is argued that members of governments of different levels behave in an opportunistic manner in formulating their railway policies. They convince the managers of rail companies to generate output which serves their political interests. It is shown that the output of the DB AG is often motivated by politicians rather than by markets.

The structure of this chapter is as follows:

First, the major railway reform processes that took place in Germany during the last ten years are described and analysed. A major focus is on the decision-making processes. The driver of the reform and the influence of European initiatives are identified.

Second, we take a closer look at the financing of the infrastructure. The original legal setting is described and the way it was amended and put to use. We are particularly interested in the flow of public subsidies.

Third, the hypothesis is explored that political bargaining plays a major role in transport policy decision making, particularly in the rail sector. A bargaining model developed by Shleifer and Vishny (1994) is used to analyse the aforementioned policy processes.

2.2 Railway Reforms in Germany

2.2.1 The German Rail Reform of 1994

2.2.1.1 The Historical Background

The Deutsche Bundesbahn was founded in September 1949 in the Federal Republic of Germany (FRG) as a special federal property (*Sondervermögen des Bundes*) under the control of the federal German ministry of transport. The chosen structure was the result of intensive discussions between different interest groups, e.g. the states and the federal level. The discussion circulated around the new German constitution, which stated that the railways had to be part of the federal administration. This meant that it could not get its own legal personality. As a *Sondervermögen des Bundes*, it was no ordinary department of the ministry of transport either.

Deutsche Bundesbahn was the successor of Deutsche Reichsbahn and remained a state-owned monopolist. The exclusive federal ownership was reflected by a centralistic governance structure. The states could exercise controlling functions in an administrative board. A board of directors was in charge of running the business and an economical management. Deutsche Bundesbahn had to be compensated for public service obligations and special tariffs for certain user groups. However, the board had neither the obligation to be profitable or at least to cover costs, nor the necessary freedom to pursue such goals.

Deutsche Bundesbahn was heavily protected from competition until the beginning of the 1990s. In the passenger market, long distance coach transport was limited to very few relations, usually starting from or ending in West-Berlin. Domestic airline services hat to be approved by the Ministry of Transport. In the freight markets, road transport was heavily regulated. Market access was restricted and a price floor regulation prevailed as well, although it became less restrictive over time. Cabotage of foreign carriers was prohibited. Inland water transport was also heavily regulated, with the exception of Rhine shipping. Initiatives of pressure groups did not succeed in deregulating the German transport sector (Sobania, 2003, 159f).

These regulatory measures did not fulfil their purposes. The Deutsche Bundesbahn could not be prevented from losing market shares and from financial decline. Since the middle of the 1950s, Deutsche Bundesbahn lost a substantial part of its market share: from 1960 to 1990 it decreased from 36 % in passenger transport to 6.1 % and from 56 % in freight transport to 20.5% (BMVBW, 2003, Sections B5 and B6). Alongside with these losses, the financial situation of the company became difficult. It had accumulated a deficit of around € 25.5 bn at the beginning of the 1990s, although the German federal

government paid an amount of approx € 7 bn per year for public service obligations and distortions of competition (Regierungskommission Bundesbahn, 1991, 10f).

Since the beginning of the 1960s, it had been a political goal to improve the financial performance of the Deutsche Bundesbahn. At least three reform projects were developed and carried out (Dengler, 2003, 155ff):

- In 1961 the laws were changed in order to emphasize the entrepreneurial goals of the company; the executives could be hired on the terms of the private law and lost their status as public servants.
- In 1975 an attempt was made to concentrate on the most profitable parts of the network, but the initiative was stopped by the federal states, the town councils and the unions, who feared the closing down of many lines.
- In 1980, the accounting method of Deutsche Bundesbahn was changed. It got a higher degree of detail, in order to identify the origins of the deficit, particularly in local and regional passenger transport. Three cost centres were identified:
    - Public service obligations, i.e. local and regional passenger transport
    - The remainder of the transport
    - Infrastructure as a public obligation.

  The profits were divided between the transport businesses only. The accounting did not separate the profits between infrastructure and transport. In the end, this was just an effort to justify public transfers; a modern cost accounting was not implemented until the privatisation of 1994.

These measures didn't stop the deficit spending of the company. The underfunding was between € 1.5 bn and € 2 bn in the period from 1980 to 1989 (Dengler, 2003, 160). However, the share of the personnel cost was cut from 68 % in 1980 to 61 % in 1990 (Aberle, 1997, 126). But the basic problems, i.e. the high influence of political interests and the very limited commercialisation of the business, were not tackled. Aberle explains that all measures concerning prices, product differentiation, investments, and even personnel had to be approved by a federal ministry (Aberle, 1997, 124).

In this time, the social democrats, being in the opposition since 1983, proposed another reform of the railways. They wanted to turn the separate estate into a public undertaking with a detailed and separated accounting system. But the governing liberal-conservative coalition postponed any changes in the railway sector until the end of the 1980s. In this light, an initiative of the Federation of the German Industries, claiming a three-way split in the operations, was also rejected (Lodge, 2002, 144).

2.2.1.2 Setting the Stage: The Regierungskommission Bundesbahn

Against the background of the deficit of the Deutsche Bundesbahn, the federal German Government initiated the *Regierungskomission Bahn* (governmental commission on the railways, RegB) in February 1989. The only two corner stones to be defined at this stage were the debt-relief and a federal subsidizing of the infrastructure (Lodge, 2002, 145). In July 1989, the federal government agreed to the proposal of the Federal Ministry of Transport over the scope of the analysis to be carried out and the participants of the commission.

The aims, which the RegB had to pursue, were defined as follows (Regierungskommission Bundesbahn, 1991, 4):

- Create a sustainable base for a positive development in respect of transport policy, regional policy, environmental policy, economy and fiscalism.
- Define relations and products, which can sustain competition in the long run.

This framework, that the RegB had to respect, was very rough and allowed for plenty of alternatives. The instructions on the chapter made no preconditions in terms of ownership, regulation, competition or structure of the whole sector.

The RegB started in September 1989. One of the first tasks was to analyse the balance sheets of the Deutsche Bundesbahn. It blamed it for heavily under reporting of the deficit. According to the data of the RegB, the company's deficit was at € 62 bn in 1990. The figures of the company only showed an accumulated deficit of around € 34 bn in 1990, after € 16.5 bn in 1980 (Aberle, 2000, 132). The governance of Deutsche Bundesbahn was criticised as being too centralised. According to the RegB, the aims of the company lacked an entrepreneurial drive, public service obligations and the employees having the status of civil servants being major obstacles (Regierungskommission Bundesbahn, 1991, 20ff).

In October 1990, the tasks of the RegB were amended in a substantial way. With the German reunification, the Deutsche Reichsbahn (Deutsche Reichsbahn) had to be considered in the reform as well. Deutsche Reichsbahn was the former German Democratic Republic's railways, which had kept its name from the pre-World War II railways. With 203,000 employees in 1991, Deutsche Reichsbahn was heavily

overstaffed and suffered from a rapid loss of market shares after the reunification (Regierungskommission Bundesbahn, 1991, 11).

The only solution of the problems was seen in the introduction of economically driven governance for the state-owned monopolist. Three elements were identified as being crucial for such a reform (Regierungskommission Bundesbahn, 1991, 15):

- The necessity of private capital, alongside with a debt-relief,
- The entrepreneurial governance in the form of a public limited company, and
- A clear distinction between entrepreneurially and politically motivated activities.

The core proposals of the RegB were (Regierungskommission Bundesbahn, 1991, 22f, 62f):

- Fusion and transformation of Deutsche Bundesbahn and Deutsche Reichsbahn into a public limited company with three divisions: passenger transport, freight transport and rail network
- Open access to the rail network
- Abolition of public service obligations in the transport sector
- Regionalisation of the local and regional transport, i.e. a decentralisation of the decision making in the transport sector
- A debt-relief
- Special legal institutions for the formal transfer of the former civil servants to private sector employees.

2.2.1.3 The New Sector Structure

The RegB issued its report in December 1991. Under the pressure of the rising DB deficit and the massive worsening of national debt, resulting from transfers to the former East-German states, the first measures proposed by the RegB were turned into draft laws in 1992. The reform itself came into force at 01/01/1994. A couple of new laws were set up or amended as a basis for the radical change in the railway system.

First of all, the German constitution had to be changed. This change required a two thirds majority in the Lower House of German Parliament and of the Federal Council of Germany. This opened up a lively negotiation process between the federal and the states and between all political parties and their supporters lasting from December 1991 to December 1993. Especially the states demanded a compensation for giving up their influence on the DB. So far, they had been part of the supervisory board, which controlled the long-term strategy but also short-term decisions. As a result, the states receive massive transfers to finance public transport (see the chapter on regionalisation). Additionally, the states enforced the codification of public ownership of the rail infrastructure (at least 50.1 %) in the constitution.

The *Eisenbahnneuordnungsgesetz* (law on the restructuring of the railways) was enacted at the end of 1993. It contains (i) the *Allgemeine Eisenbahngesetz* (general railway law) which was subsequently changed and amended and (ii) the *Deutsche Bahn Gründungsgesetz* (Deutsche Bahn foundation law)

The federal rail network extension law *(Bundesschienenwegeausbaugesetz* - BSchwAG) was enacted on 15/09/1993. It stipulates the responsibility of the public hand for construction, upgrading and replacement investments of the rail network.

The content of these laws formed an enterprise which was very close to the proposals of the RegB (Knorr, 2003, 39 and Aberle, 2000, 136ff): Deutsche Bundesbahn and Deutsche Reichsbahn merged and were transformed into Deutsche Bahn AG (DB AG), a public limited company in public ownership. The reform stipulated an enterprise restructuring in at least two steps (see figure 1):

- In the first step, DB AG was subdivided into four divisions for
    - Local and regional passenger transport
    - Long distance passenger transport
    - Freight transport, and
    - Infrastructure.
- In the second step of the reform (01/01/1999), the four divisions were turned into five companies under the roof of DB AG, which now worked as a holding:
    - Local and regional passenger transport: DB Regio AG
    - Long distance passenger transport: DB Reise und Touristik AG
    - Freight transport: DB Cargo AG
    - Rail network: DB Netz AG
    - For passenger train stations, DB Station + Service AG was newly created additionally to the legal requirements.
- The third step stipulated a privatisation. No agenda was set for it and it is heavily discussed at the moment.

To realise the debt-relief and to free the DB AG from the civil service law, several measures were taken:

- A depreciation of the assets of the DB AG at a rate of 75 %.
- The DB AG was granted more than € 5.6 bn of equity.
- The "Bundeseisenbahnvermögen" was created as a new federal separate estate. It took over all the debts of Deutsche Bundesbahn.
- The public servants of Deutsche Bundesbahn could maintain their status. In this case they belong technically to the "Bundeseisenbahnvermögen". They are leased to the DB AG to market conditions, particularly at a wage rate which is below that of public servants. The total difference in personnel costs to be covered by the "Bundeseisenbahnvermögen" was estimated at € 4.1 bn per year.

In addition to the enterprise restructuring, three measures are of special importance for the whole railway sector:

- An open access to the rail network was granted to third parties.
- The federal railway agency (*Eisenbahnbundesamt)* was founded as a regulatory institution. It pursues monitoring and authorisation goals.
- Moreover, on 01/01/1996, a regionalisation took place (see 2.2.2). The German states became responsible for the local and regional train services. To buy these services from the train operating companies (TOCs), they get funds from the federal government on a yearly base.

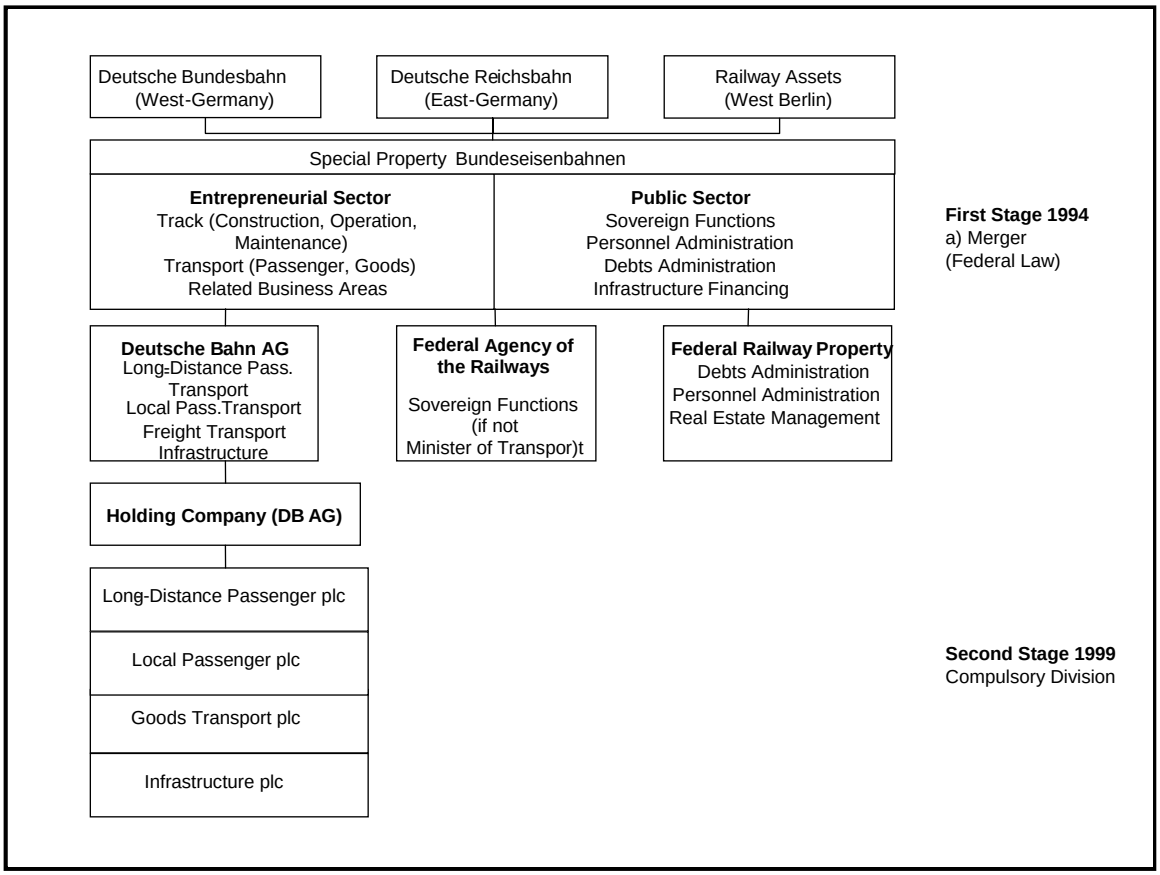

Figure 1: Steps of the German Railway Transportation Act

Source: own figure, on the basis of http://www.bmvbs.de.

The reform pursued several partly overlapping aims (Knorr, 2003, 38). The two major goals were to change the modal split in favour of the railways and to unburden the public households. A further goal, arising through the German reunification, was to handle the huge amount of (excessive) personnel of Deutsche Reichsbahn.

From 1994 to 20041, the reform only partly met the first goal (BMVBW, 2006, sections A2, B5 and B6):

- The performance decreased in long-distance passenger transport from 34.8 bn pkm to 32. 3 bn pkm.
- The performance increased in local and regional transport from 30.3 bn pkm to 40.2 bn pkm.
- The market share of railways in the passenger market remained at a rate of 6.6 %.
- The performance in freight transport increased from 70.7 to 86.4 bn tkm, that results in a
- Decrease of market share from 16.8 % to 15.8 %.

It is doubtful whether the DB AG met the second goal of the rail reform. The company itself claims its financial performance has been a relief for the public households compared to the situation without reform (Deutsche Bahn AG, 2003, 10). Critics claim that the benchmark calculation for the case without reform is ill-defined, because not the appropriate cost components are considered (Ilgmann, 2003). The relief of the public households was not sustainable, regardless of the interpretation of the deficit. From 1994 to 2002, the national government annually spent between € 16 bn and € 19 bn, an amount which includes the interest rates and repayments for the debts inherited from the Deutsche Bundesbahn and Deutsche Reichsbahn. The amount accrued to € 165 bn in 2002 (Deutsche Bahn AG, 2003a, 10). We will have a closer look at the subsidies in chapter 3.

[1] Due to a change in the Statistics, the data is only consistent from 1994 onwards.

2.2.2 The Regionalisation of 1996

A major part of the railway reform was the shift of responsibility for the provision of regional passenger transport services by rail (RRPS) from the federal government towards the states ("regionalisation"), which took place in 1996. Since then, RRPS have been heavily subsidised. The regionalisation funds reached about € 7 bn in 2006. They form an important part of the German railway sector. Details about the sector structure and development the development since 1996 can be found in chapter 3 of this paper. In the following, we analyse the processes and negotiations between the DB AG and authorities from different federal levels after the regionalisation.

The German market for RRPS attracted the interest of some foreign railway companies once the public authorities started with open tenders. Many (potential) entrants expected that in the following years additional tenders would come onto the market, and that the existing contracts between the states and DBAG would run out regularly. In this situation, Thuringia signed an exclusive contract with DB AG without a competitive tendering. The contract, concluded in March 2002, comprised the whole regional passenger transport in Thuringia, 17 million train-km per year, had a contract-term of ten years and was worth € 1.5 bn (total volume). Likewise Saxony-Anhalt signed a similar contract with the DB AG with a value of 2 billion €.

Hereupon, two competing railway companies – Connex-Group and Karsdorfer Eisenbahngesellschaft – appealed to court. In June 2002 the Chamber of Tenders in Madgeburg decided that all regional services have to be allocated by competitive tendering and that sub-networks have to be tendered in a size which allows chances to all bidders.

This decision was for many actors and observers a surprise. It marked the start of a negotiation process of remarkable intensity.

- In a letter to the state ministers of transport, Hartmut Mehdorn, CEO of the DB AG, announced that his enterprise had to reduce jobs, investments and transport services, if the Federal States should put out all regional services to competitive tender (Jensen, 2002).
- In a publicity campaign, the DB AG declared that the decision of Magdeburg would cause the cancellation of investments amounting to 4.3 billions € and – consequently – a drastic loss of jobs due to the loss of planning reliability (Brauner/Sattler/Kühlwetter, 2002).
- The railway industry announced also a loss of jobs if DB AG would have to cancel their orders. At Bombardier Transportation in Hennigsdorf 1,500 jobs were in danger, it was said (Kirnich 2002).

In the end, the German government adopted a new law about the assignment of public services (VgV) in September 2002 - shortly before the elections for the federal parliament. The modified regulation should provide a basis for an incremental change from monopoly to competition and legal certainty. It allows the states to award contracts for RRPS directly if an essential part of the services runs out during the contract and will be brought into tenders. The contract duration shall not exceed twelve years. Experts of the Federal Ministry of Economics and Labour and advocates of the DB AG quickly defined that “essential part” means “at least 30 % of all train-km”. Most of the states adopted this definition.

After the enactment of the VgV the states began to award large contracts to the DB AG. This development could be interpreted as the result of the superior efficiency of the DB AG. Critics claim, that it is more the result of a fundamental asymmetry between DB AG and newcomers (allowing DB AG for example to combine offers for regional transport with infrastructure measures, long-distance passenger services or the regional allocation of their service workshops) and the inertia of the public sector.

Just before the enactment of the new VgV, the Connex-Group took legal proceedings against the contract between the DB AG and the state of Brandenburg. In September 2003, the court (*Oberlandesgericht* Brandenburg) decided that RRPS do not have to be tendered because the general German railway law regards tenders only as an option. The European legislation, which typically calls for tenders, has been regarded as inferior to German Railway Law. Anticipating this decision, the Connex-Group had already complained to the European Commission. The advocates of Connex argued that the decision of *Oberlandesgericht* Brandenburg directly contradicts European tender law and the European principles for state aid control (Bremer/Wünschmann 2004). According to their argumentation, all service contracts which are not tendered cause the danger of overcompensation which could - according to the European Court of Justice - finally become relevant for state aid control.

As a first reaction the EC DG Common Market sent a request for detailed information to the German government. According to this letter the decision of the *Oberlandesgericht* Brandenburg is not consistent with European Legislation. After that, the EC started a procedure of contract breach against Germany. It threatened to bring Germany to the European Court of Justice for violating the European tender law. The German federal ministers of transport reacted in February 2006. They proclaimed to

abandon direct awarding and design future tender procedures in a transparent and non-discriminating way. Subsequently, the EC stopped the procedure of contract breach. It declared to closely observe the future contract awards in Germany.

The decisions by a number of states to directly award service contracts – mainly, but not only – to the DB AG is in contrast with the good experience of some states with open tenders. According to an evaluation of 37 open tenders, cost savings of at least 18 % can be realised by an open tendering of services (Holzhey/Tegner, 2004). The public organisations to carry out these open tenders exist in the states. The description above shows that once a public enterprise starts do be commercialized or even privatized, negotiation processes about subsidies, investments and employment are set in place. We will have a closer look at the subsidies for RRPS in chapter 3.

2.2.3 The Task Force „Zukunft der Schiene“ of 2001

As in many other industries, the European Commission intends to open the national railway markets for more competition and efficiency. In the 1990s, a first step had been taken by the Directive 91/440/EC (later completed by Directives 95/18/EC and 95/19/EC) to promote competition and transparency. Due to the not fully satisfying impact of these directives on the market, more comprehensive instruments by the Directives 2001/12/EC, 2001/13/EC and 2001/14/EC (first Railway Package) were adopted in February 2001 (Scherp, 2002).

The main content of these directives, which had to be turned into national law, is:

- Open access to further parts of the rail infrastructure,
- Common infrastructure charging principle: marginal costs plus mark-ups,
- Each infrastructure manager is obliged to publish a network statement, containing the necessary technical and organisational information for the operators,
- Pricing and allocation of infrastructure capacity have to be independent from operators; in the case of integrated railway undertakings: independent body responsible for these tasks,
- Open access for all licensed operators to the Trans-European Rail Freight Network from 15/03/2003: 50.000 km of tracks.

In March 2001, the German federal Minister of Transport Kurt Bodewig, announced the separation of transport activities and ownership of rail to meet the EC requirements. This statement was made against the background of a predicted substantial traffic growth and a difficult financial situation of the DB AG. Since 2001 the balance sheet of DB AG showed net annual losses (€ 406 mill. in 2001, € 468 mill. in 2002 and € 245 mill. in 2003).[2]

The announcement produced a debate and controversy between the DB AG's management and politicians on the necessary degree of integration of infrastructure and transport. This debate and - as a second reason - the requirements of the first EU railway package led to the appointment of the Task Force „*Zukunft der Schiene*" (= future of

[2] In 2000 the balance sheet had shown an annual net profit of € 85 mill. (Deutsche Bahn AG , 2002 and 2003b)

rail). The task force was founded in March 2001 with the objective of finding „the best" and most practicable solution for the structure of the German railway sector. It can be seen as both a reaction to the "First Railway Package" and a means to prepare the continuation of the German railway reform of 1994. The 3rd scheduled step, i.e. the privatisation of DB AG had not yet been realised. To carry out this 3rd step of railway reform the task force had to answer the question which organisation model should be chosen to ensure the rail transport policy aims – commercialisation and improving the performance of rail. The options discussed by the task force ranged from complete institutional separation of the network to an independent organisation within the DB AG. In detail:

- DB Netz AG as an independent organisation within DB AG,
- complete separation of DB Netz AG and the transport divisions of DB AG,
- state as owner of railway infrastructure and
- set up of a regulatory agency.

Five members of the task force came from the federal Ministry of Transport (three members), the federal Ministry of Finance, and the federal Ministry of Economics and labour. One of the chairmen was a former state Minister of Transport. The seventh member was Hartmut Mehdorn, CEO of the DB AG. His nomination caused critics among competitors of the DB AG, as they feared an asymmetric representation of transport companies in the task force.

Seven monthly meetings of the task force took place. Pressure groups, business representatives and economic advisors were heard during the process. Their statements referred to the following questions (BMVBW, 2001):

A. How do you evaluate the existing steps of the railway act / railway reform?

B. What meaning has competition for political goals in the transportation sector?

C. The relation infrastructure / transport should be designed by which basic model (please keep in mind the directives 2001/12/EC, 2001/13/EC and 2001/14/EC)?

D. What should be the size of the infrastructure?

E. Allocation and pricing of slots.

F. How to encourage development of economic efficiency of the infrastructure?

G. What will be the consequences of different organisation models regarding the infrastructure funding?

H. What is the appropriate degree and way of influence of the federal Ministry of Transport on rail planning, construction and maintenance?

I. Recommended structure to administer duties of transport and infrastructure.

J. Impacts of the preferred organisation model on DB AG and other railway companies.

The statements showed a consensus concerning the importance of open access to rail infrastructure. Concerning sector organisation the proposals ranged from total disintegration to the opinion that the European Commission's requirements were already fulfilled in Germany.

According to an interviewee, most of the members of the task force declared after the hearings to be in favour of a separation. But due to the influence of Hartmut Mehdorn the majority broke down. Two camps existed within the Ministry of Transport: the department of "basic issues" argued pro, the department "railways" rather against a separation of infrastructure and transport. The opinion of the EC, that more competition is needed in order to have more transport on the railways, was emphasised by the task force. It was also acknowledged that nondiscriminatory access to rail infrastructure is necessary. But contrary to the former announcement of Transport Minister Bodewig, the task force voted for a remaining of DB Netz AG in the holding. This result allegedly goes back mainly to the influence of Hartmut Mehdorn, who emphasised the synergy-effects of an integrated company.[3]

The following main results were generated by the task force:

- According to the task force and present statements of the Ministry of Transport, an integrated structure of DB AG is compatible to European law, as long as an open access for competitors to infrastructure and services is warranted. Non-discriminatory allocation and pricing of capacity is to be ensured by a new founded independent path agency (*Trassenagentur*), which will be part of the regulator, the federal railway agency (*Eisenbahnbundesamt*, EBA). The task force ruled out to have an independent path agency or to make it part of the Ministry of Transport. The path agency is still in discussion (more than two years after the decision), and has not yet started to work. Furthermore, its duties and activities are not yet defined.

[3] After the intervention of the DB's CEO, the announcement and consideration of "total separation" were changed to "independence" of rail infrastructure. This term would allow for a wider range of institutional arrangements.

- DB Netz AG's main operation shall be concentrated on reduction of bottlenecks in railway capacity and enhancement for a better capacity utilisation.
- The full privatisation of the DB AG remains the 3rd step of the German Railway Reform to come, but no concrete schedule was defined.

Although the discussions and developments mainly took place "behind closed doors" it is argued that the result can be traced back to intervention of a main player. This shows clearly the importance of the firm that is to be privatised for the transport-policy decision-making.

2.2.4 Conclusion: Driving Forces of the German Rail Reforms

The most important influence on the outline of the German rail reform came from the RegB. But the basic initiative for a radical change goes back to the political/administrative system itself. In September 1989, the Federal Ministry of Transport got a report by McKinsey, which stated the poor financial condition and the loss of market shares of Deutsche Bundesbahn. This report had an influence on the future promoters inside the ministry, although it is not sure to what extent the setting up of the RegB was initiated by this report (Schwarz, 1999, 389).

The composition of the RegB and the instrument of a commission itself can only be explained against the historical background and the actors involved. During the 1980s, there had been no major attempt of a railway reform and promoters of the railways existed in every political party. After military aims had lost their significance for the development of the railways, the promoters used more and more ecological and social arguments. From the side of the Deutsche Bundesbahn, a major change in their strategy

could not be expected, as its head had been responsible for the undertaking since 1982, and such a change would have meant to admit mistakes in the past. The same held for the federal government, which was in charge since 1983, and the household commission of the German parliament, which was formed by all political parties of the parliament.

In this situation, only an independent commission could be expected to relentlessly analyse the situation of the national carrier. It worked independently and was accepted by the political parties (Schwarz, 1999, 391ff).

The composition of the RegB has to be seen in the light of its aims and functions. There was clearly the aim to prepare the ground for the most radical railway policy change in post World War II Germany. This was seen as a major task, particularly because there had been no experience with privatisation of utilities in Germany beforehand. Therefore, a very good scientific and commercial expertise was considered to be necessary. This led to the deployment of two academics (one from the area of business administration and one transport economist) and three business persons. The chair of the commission was given to Günther Saßmannshausen, who himself was a very well respected former CEO of ThyssenKrupp AG. A vital function of the RegB was to reduce the costs of political decision making by conflict identification and solution at an early stage (Lodge, 2002, 146). This led to the incorporation of four politicians in the RegB. They served both as representatives of the different political parties and as promoters of the proposals to be developed by the RegB. Two trade union representatives took part in the commission as well. The rail workers have a high degree of organisation in trade unions and it was clear from the beginning of the process that no reform could be carried out against the will of the unions.

Given the very little initial instructions the RegB was granted, it was clear from the start that there had to be an intense process of discussion with all of the actors and organisations involved. Otherwise, the findings of the RegB would have had no chance to be carried out. The federal transport ministry was very interested in the upcoming rail reform, and RegB-members held frequent discussions with ministry officials. The results of these talks were agreed upon within the commission afterwards. The Deutsche Bundesbahn was involved in an exchange with the members of the RegB as well and during these talks it expressed its strong opposition against a separation of transport and infrastructure. This was a controversial issue within the commission as well, alongside with the question on how to deal with the personnel from Deutsche Reichsbahn and Deutsche Bundesbahn. Apart from that, there was a congruence of opinions within the commission (Lodge, 2002, 147ff). The only member to be opposed to the final report was the head of the civil servants' association (*Deutscher Beamtenbund*) (Schwarz, 1999, 396).

Apart from the growing deficit of the Deutsche Bundesbahn, an additional pressure was exerted on decision makers by the EC legislation towards a common market. From the content of directive 91/440, it is clear that it ought to have a direct influence on the German railway legislation. It is not clear to which extent the reform of 1994 was triggered by the Directive 91/440/EEC. There are indications that the members of the RegB were aware of the preparation in Brussels, but that the influence from outside Germany was generally very low. The influence of the rail reforms in Japan and Sweden, which had taken place in the 1980s, was very small too. The German parliament clearly elaborated the laws, on which the reform is based, in order to comply with Directive 91/440/EEC. But it is not sure whether it was really intended to meet the

goals of this directive. The laws, which were enacted in 1994, stipulated a separation of the organisation and of the accounting, but allowed for a common profit and loss accounting, which might be against the sense of the directive (Stertkamp, 2000, 197). This might have been a mistake due to the time pressure in the elaborating of the laws; Lodge states that the directive was used to gain further political support (Lodge, 2003, 170).

There was an indirect influence of EC directive as well. The competing modes of the railways were granted a higher flexibility and thus became a bigger threat for Deutsche Bundesbahn. In particular the deregulation of road freight transport increased the coercion to respond on the national level in the railway sector (Boss et al., 1996, 7). In this sense, the EU policy was helpful to foster the reform of the German railway sector too.

Compared to the reform of 1994, the result of the task force didn't foresee a great change of the sector structure. The importance of this part of the recent German rail history can only be realized against the background of the original plans of the federal transport minister. He wanted to carry out a separation of infrastructure and transport. The stop of these plans is allegedly due to the influence of Hartmut Mehdorn, who managed to convince the committee. He turned around the outcome of the process, which had beforehand been quite clear for many stakeholders.

The composition of the task force was originally planned to allow for an efficient decision-making. High-ranked bureaucrats from the ministries involved should find a solution on rather how to vertically disintegrate the DB AG than if to disintegrate at all. The task force was not staffed to allow for a broad consensus between all relevant actors

but within the ruling coalition parties. But this all changed with the entry of the DB AG's CEO.

There are rather few references on the work of the task force and on the motivation of its members. From what is known it can be concluded that the first railway package played a role different to the reform of 1994. This time, the European legislation was an important reason for the change in the German rail sector. The Ministry of Transport wanted to set an end to the loss-making of the DB AG and to promote competition, but at the same time, the government was willing to accomplish the EU directives. It must be assumed that this congruence of the political aims of the Ministry of Transport and the content of the first railway package worked in favour of the acceptance of the directives.

Recent developments show that the Task Force of 2001 could not bring to an end the discussions about the structure of the German rail industry. In 2005, the German parliament urged the department for transport do issue a big study. Four different industry structures were discussed, ranging from complete integration to complete separation. After a lot of debate, the government voted for an industry structure which was pretty close to the actual one. There where two important changes: an arrangement was foreseen between the DB Netz AG and the government for a period of ten years. This arrangement should entail the amount which the government is prepared to spend and the size and quality of the network which it will accept in return. The second change was the plan to transfer the legal possession of the infrastructure to the German state, while the DB Netz AG still holds the commercial possession. After the department for transport had already started to draft a new law, including amongst

others a price cap regulation, the government presented a new idea to shape the industry structure, which is discussed at the moment.

2.3 Funding Mechanisms and Subsidies for the Rail Sector

2.3.1 Financial Relationships and Incentive System of the DB Netz AG since 1994

The reforms that came about before 1994 were in accordance will the principles of political order. They also showed that the state wanted to reserve for itself a strong influence on important developments in the rail transport sector. This led to a complex incentive system for the DB Netz AG that we will here briefly describe.

The Financing of Enhancement, New Construction and Maintenance

The rail network and the other stationery infrastructure elements are the property of the DB AG. They are divided between the various sister companies (most importantly the DB Netz AG, DB Station und Service AG und DB Energie GmbH). These sister companies are expected to have a profit-making orientation. At the same time the federal authorities and entities from other levels influence the direction of the investment. This means that political aims often distort investment decisions. This increases the costs of the business, especially because the infrastructure of the rail network includes a relatively high part of the value creation. On the other hand the public bodies contribute a significant proportion of the investment costs. This leads to a complex incentive structure for the various investment activities.

The infrastructure costs are usually divided into three categories:

- New construction and enhancement (development and enlargement measures, increasing the capacity of the rail system). These projects are stipulated in the

federal transport network plan (*Bundesverkehrswegeplan* – BVWP). This plan is set up every five years by the federal minister of transport under cooperation of the regional governments. There is no compulsion of realisation and it is financed by the public purse (BSchwAG) (see below).

- Replacement (replacement of used equipment at the end of their lifetime): also financed through public money, often as result of long-lasting decision-making processes. In general, these investments are difficult to defer because the availability of the infrastructure can be put at risk. On the other hand, there is an incentive for the DB Netz AG to postpone maintenance measures until they can be declared to be enhancement, as this is not paid by the company
- Maintenance expenditure and operating cost; they are paid by the DB Netz AG alone.

The DB AG receives funds from two main public sources for its infrastructure investment:

Federal Rail Network Extension Law (BSchwAG)

The finance of development, new construction and reinvestment is from BSchwAG funds. The original construction of installations is regarded as new construction and enhancement. It is based on the BVWP. However, the plans that are laid down there are not binding; rather they form the basis for the requirements schedule (*Bedarfsplan für die Bundesschienenwege*) which is approved by parliament on an annual basis. The projects that are binding are those that are determined in the current year and become part of the annual federal household law. In the BVWP the plans are arrived at using suggestions from the federal states and the DB AG. The plans are then prioritised on the

basis of an overall economic analysis and a precisely defined political decision making criterion. Besides making suggestions the DB AG can also influence planning in that it provides the important data for the comprehensive economic analysis.

On the other hand, replacement is not included in the requirements schedule**.** It is mainly decided in individual agreements and occasionally in collective agreements with the federal authorities. The promise of funds is dependent on the state of the public finances. In the case of individual agreements the DB Netz AG submits specific projects that have to be checked and accepted by the federal railway agency („Input-based control: which measure should be implemented?"). After the work is concluded, the federal railway agency controls the use of the public funds. For collective agreements a similar operational sequence applies. This process is a very cost intensive procedure for both sides because all the invoice documents have to be individually checked. Apart from that, the DB Netz AG has to repay the subsidies, if the tracks stop being used after a certain number of years, which leads to investment problems in particular on little used lines.

Because replacement is not included in the rail requirements schedule it is difficult for outsiders to identify all the measures. However in 2005 parliament decided that these reinvestments should be included in the report of the development of the railways (*Bericht zum Ausbau der Schienenwege*). Also, the rail infrastructure investments funded by the federal states must be specified.

The finance of development, new construction and also replacement measures is made by construction cost subsidies (*Baukostenzuschuesse – BKZ*) and interest-free loans. Interest-free loans were originally meant as a rule by the BSchwAG when enhancement, new construction and also replacement were thought to be in the interest of the DB AG.

The repayments would then follow as part of the annual depreciation. Besides this the construction cost subsidies should be granted for any part of the investment that is motivated by parliament's transport policy (total costs, minus any revenue related advantages that might accrue to the DB AG).

In 1998 the federal government and the railways AG agreed upon a general conversion with regard to enhancement and new building investments in the BKZ. Interest-free loans should be only used for replacement measures. For the federal government expenditure neutrality was desired. Its portion of the investment into the actual network should be reduced to approx. 50%.

The next change to investment financing took place in 2001. In the "trilateral agreement" the federal government allocated additional funds for rail infrastructure investment (generated by spectrum auctions - UMTS) for 2001-2003.

This agreement also said that by 2003 the investments into the actual network should be financed through the cost subsidies (the DB AG contributed 0.5 billion EUR. of its own funds). In the meantime this agreement has been extended. For 2006 the intended contribution from the cost subsidies for the finance of enhancement, new building and replacement is 3.39 billion EUR.

What proportion of the financing of new construction and replacement is provided by the DB AG is disputed. The Federal Audit Office says 2 %, the DB AG itself claims 10 % (Boettger, 2004, 4). The BMVBS says it has no reliable figures for the DB AG's contribution (Bundestagsdrucksache 16/462).

Local Transport Finance Act

Another source for infrastructure financing are the funds that result from the Local Transport Act (*Gemeindeverkehrsfinanzierungsgesetz* – GVFG). At least half of the annual 1.6 billion EUR is intended for the public transport (Boettger, 2004, 4). 80 % of these funds go to specific projects in the federal states, 20 % are used directly by the central government for large projects. These 20 % constitute the main GVFG investments in the DB infrastructure. Since the GVFG funds are spent on infrastructure and vehicles and the road-bound public transport is also eligible for subsidies, without more detailed information about the individual finance sources, it is impossible to give an exact answer about the annual funds that come the way of the DB AG. In 2004, regional funding alone for the DB AG amounted to € 568 million.

Further Investment Grants for the DB Companies

Apart from the funding sources listed above there are a number of other programs that support the DB AG in investing in infrastructure. They are also granted as building cost subsidies. Besides the federal government and the states, the providers of funds include the local communities and the EU Commission.

2.3.1.1 Subsidised Transport Services: Regionalisation Funds

Public money also flows into rail transport. As part of the rail reform a purchaser principle was set up for the provision of essential but non-economic services. The federal states were to set up authorities which carry our transparent contract awarding processes. The placing of an order goes through the 33 *Aufgabentraeger* in the federal states. The federal government provides these regionalisation funds. In 1996 these funds

had a value of EUR 4.5 billion and in the following year due to reorganisation they grew to over 6 billion EUR. An annual increase was stipulated by law. In June 2006 the government decided to make cuts to the regionalisation funds. In this year, they amounted to 7.1 billion EUR, but it seems like this will fall to € 6.7 billion in 2007.

These resources are intended for the RRPS, but they are not earmarked. A part of them is also spent for bus transport and infrastructure. In 2004 only 74 % of the funds went into placing orders for RRPS. In that year 11 % of the money went into investment in the railway infrastructure – this was a sum of € 725 million (SCI, 2005, 66).

Out of the regionalisation funds a large proportion goes to the DB Netz AG in the form of infrastructure charges. Most of the tender documents for RRPS provide cost pass through rules for track and station charges. Especially since the introduction of the regional factors, the share of these fees in the total cost of the RRPS is large. The regional factors are a special multiplier in the infrastructure charging system which lay between 1 and 2. In general, they apply only to RRPS, although the regional networks are to a minor extent used by other transport products as well. According to the company, they reflect both the cost and the demand in the respective region. The track charges amount to 40-50 % of the costs of the RRPS (Laeger, 2004, 88). The infrastructure charges from RRPS in particular, make up a large proportion of the turnover of the DB Netz AG (see below).

2.3.1.2 Subsidies for Infrastructure and Transport

The description in the two preceding sections shows that the DB Netz AG depends, to a considerable degree, directly and indirectly on public funds. As figure 2 shows, the direct capital subsidies vary heavily. This is partly because of the varying usage of

disposable funds of the DB Netz AG. More importantly though, these funds are strongly dependent on the overall budget situation. Direct capital investment grants sank after 2003. In the period 2006-2009 the federal government has a medium term finance plan which provides for a stabilisation of funding at a figure of between € 3 and 3.5 billion.

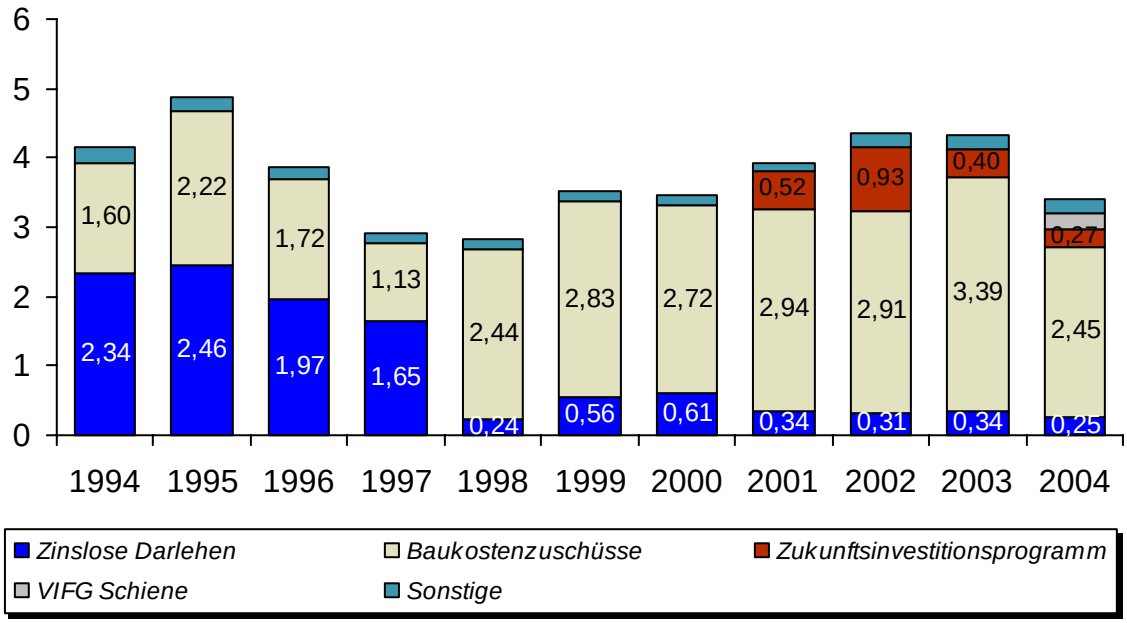

Figure 2: Important Federal Sources of Investment Funds for the DB AG 1994–2003 (in billion €)

Source: Booz Allen Hamilton, 2006, 75.

The values of the regionalisation funds and therefore the RRPS infrastructure charges show less variation (figure 3). But they are also subject to political decision-making processes. As described above, it was decided in June 2006 to make cutbacks. It is intended that they sink from € 7.1 billion in 2006 to € 6.6 bn in 2008.

This will also have an influence on the revenues of the DB Netz AG. In 2004, the DB's business segments Regio and Stadtverkehr paid sums amounting to € 2.2 bn in track charges to the DB Netz AG. At the same time the DB AG received € 4.56 bn of the regionalisation funds.

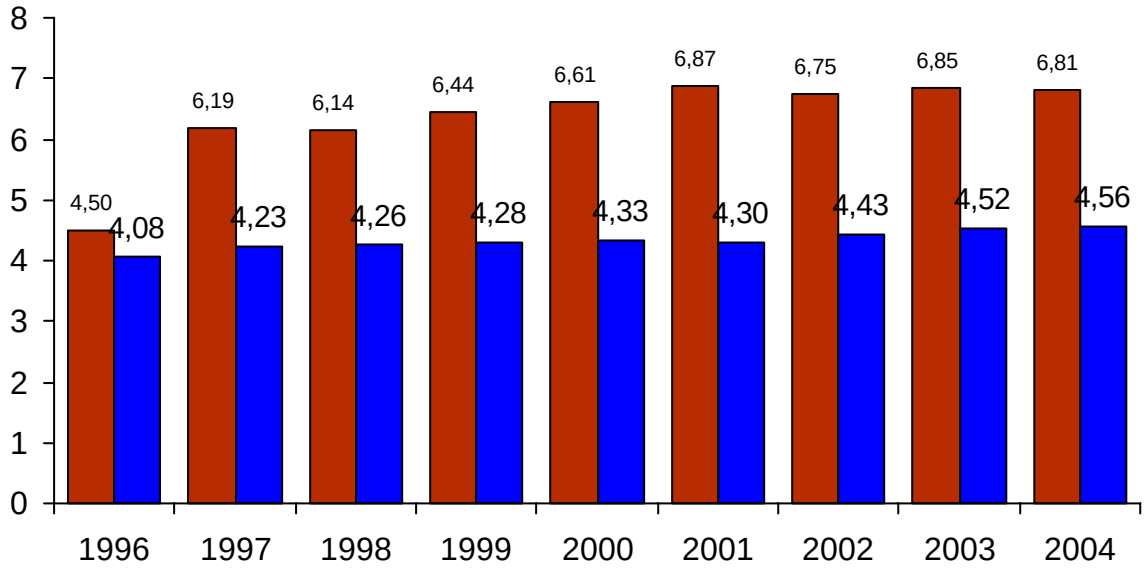

Figure 3: Regionalisation Funds – Total and for the DB Regio AG

Source: Booz Allen Hamilton, 2006, 74.

Fig. 4 shows the supreme importance of the internal train path revenue. External revenues count for less than 10 % of the total income of the DB Netz AG from track access charges. The flow of funds inside the concern, are not confined to the track charges. In line with the company's internal profit transfer in 2004 the DB Netz AG received loss compensation payments to the tune of € 183 m. It paid the holding the charges (*Konzernumlage*) for internal corporate services. With this income the DB Netz AG finances the operation of the rail network and invests in the maintenance this

amounts to € 1.3 – 1.7 bn. per year. It also contributed 2 – 10 % of the replacement, new construction and enhancement investment. The major part of these investments was paid with public funds. In 2004 this was around € 4.1 bn.

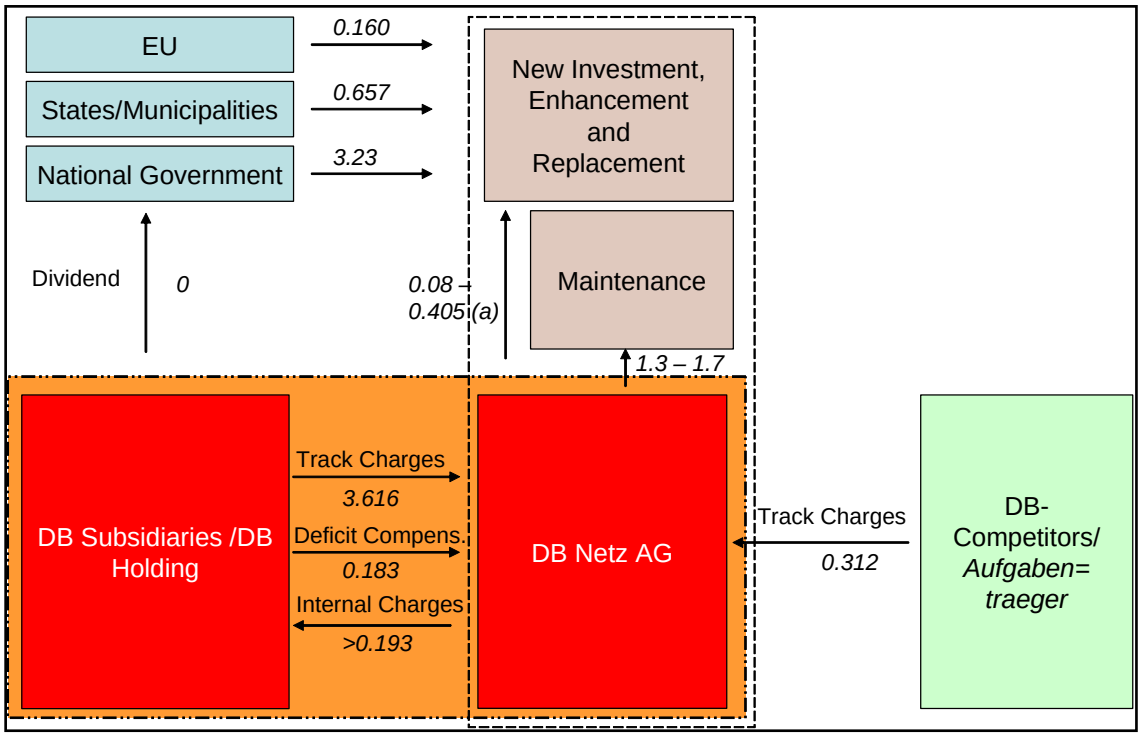

Figure 4: Internal and External Funding of the DB AG in 2004 [billion EUR] (a: estimated)[4]

Source: own figure on the basis of DB AG 2005b, p. 283f, DB Netz AG (2005), p. 39, DB Netz AG (2006), p. 42, and own estimations.

2.3.2 Conclusion: Incentives for the DB Netz AG to Invest

The main task for the government in the design of a funding mechanism for the rail infrastructure is to find the most efficient financing of investment and the long-term maintenance while ensuring a level playing field for the (potential) competitors. The investment (both the sources of funding and where it is invested) in new construction and enhancement determines to a large degree the operation costs and especially the

maintenance expenditure. Efficient investment planning requires a careful examination of life-cycle costs. Life-cycle cost calculations can lead to decisions in favour of high initial investments which result in lower maintenance costs. In the current investment environment because the DB Netz AG has to pay the maintenance costs itself, it has the incentive to substitute maintenance with replacement investment. This substitution can lead to the situation that maintenance is neglected until equipment deteriorates and needs to be replaced. This process can be intensified by attempts within the company to cut costs, and at present the DB Netz AG is being accused of doing just that.

On the other hand, the government's responsibility for new construction, enhancements, and replacements poses a risk for the DB Netz AG. The company has an important but limited influence on investment decisions, but has to pay maintenance costs not just now but also in the decades that follow. Furthermore, in the role of project leader for construction, the DB Netz AG is responsible for any cost overrun. It is also subject to authorisation and verification procedures that are transaction cost intensive for all those involved. E.g. the authorization and verification rules vary according to the source of funding; in most circumstances the federal railway agency must be provided with very detailed verification evidence.

A further problem for the investment decisions in the current regime is that new construction, enhancement, and replacement decisions are always dependent on the availability of public funds. The binding commitments given by the budget legislators are generally only for one year. This increases the difficulty of budget planning (e.g. construction time Cologne - Frankfurt: six years) and can lead to an investment log-jam.

[4] The DB Netz AG pays at least € 0.196 bn internal charges, 0.104 for energy and 0.089 as lump sum payment.

Increasing the funding does not always solve the problem because before projects can start, planning capacity must be expanded at the DB Netz AG.

The high amount of public funds which the DB Netz AG receives each year doesn't appear in their balance sheet. The company doesn't capitalise investments which have been paid by public subsidies. While there may be good reasons for this it also entails problems. First, it leads to a situation where it is often hard to follow how many subsidies have flown into the rail infrastructure and what exactly they were spent for. Secondly, as they are not activated, the expenditure from depreciation of the DB Netz AG is very little compared to other asset-intensive firms. Nevertheless, the DB Netz AG has always been loss-making since the railway reform. One of the ideas of this reform was that the company should be able to pay the maintenance and the operation of the infrastructure itself, i.e. mainly with revenues from track access charges. An equated balance-sheet was expected, but obviously so far not possible, although the depreciations are artificially low.

A central problem in the current investment environment are the permanent negotiations that the DB Netz AG has with the various funding bodies (see the report of the National Audit Office of 8.3.2006[5]), which led in particular to the change from interest-free loans to subsidies. The German rail reform of 1994 aimed at a "purchaser principle" for the infrastructure: the DB Netz AG was to receive compensation for the parts of the investments that are socially valuable but economically unprofitable. Although this principle is difficult to put into practice, it is desirable from a regulatory policy point of view. However, as described above, it has not been applied since 1998. The complex

[5] According to the National Audit Office, the DB AG has an advantage of € 7-8 bn against the legislation on which the public investment funding is based (1998 - 2008).

legal funding mechanisms from different federal levels lead to a situation which the DB Netz AG knows to take advantage of. On the other hand, it signifies an unstable financing framework for the DB Netz AG and the sector as a whole, in particular as it doesn't only apply to funding from the federal government, but also from the states and the local communities.

2.4 The Political Economy of Railway Subsidies and Performance: A Theoretical Assessment of the German Experience

2.4.1 The Problem

The Deutsche Bundesbahn and the East-German Deutsche Reichsbahn had been in public hands since their foundation. As public utilities, they hardly pursued commercial goals. Governing politicians and managers applied a variety of instruments (pricing, infrastructure and service provision, location of workshops, …) to implement their agenda in terms of regional development, environment, equity etc. The railways also served as a means to generate employment and - according to institutional economics – as an instrument to generate votes for the parties in power. This led to a significant amount of excess employment before the German rail reform. After the reform, the employment decreased steadily, but DB AG was not entirely disburdened from non-commercial goals.

As shown in the previous chapters, the decline in the performance and the growing debts lead to the reform in 1994. One of the few clearly defined aims from the beginning was the commercialisation of the firm. A privatisation, i.e. the selling of the shares, was not scheduled legally. The issue was left open. Ten years after the reform,

the future organisation and ownership of DB AG is still unclear. The discussion on the top political level has started again and there are different options, ranging from the perpetuation of the status quo (for more than a short period) to a privatisation of 49 % of the shares of the integrated company. Until recently, the most likely outcome was very close to the latter option (cf. section 2.3.2). The discussions, in which the top management of DB AG is heavily involved, address two questions:

- When should a privatisation of DB AG take place?
- To what extent should the corporatised enterprise be privatised?

This chapter analyses what interests the ruling politicians have in a restructuring and what the expected outcome of the latter. Assuming opportunistic behaviour of politicians, it explains the last thirteen years of railway reforms in Germany and forecasts possible outcomes of the ongoing discussion. Section 2.4.2 explains a theoretical model of Shleifer and Vishny, and sections 2.4.3 to 2.4.5 deploy it for the case of railway privatisation in Germany.

2.4.2 The Bargaining Model

To formulate the hypotheses, a model, which was developed by Shleifer and Vishny (1994), is adapted. The model analyses the bargaining processes between the government and managers in the process of commercialisation and privatisation. In contrast to the median-voter model, it assumes that the public is disorganised and the non-benevolent politicians seek the support of interest groups.

The relationship of politicians and firms is governed by incomplete contracts, and one focus is thus on the (residual) control rights. In the model, public firms are seen as a vehicle for the government to win elections. State–owned enterprises produce benefits

for the politicians in the form of excess employment or excess output. If the government chooses to cut its direct control over the firm by privatisation, it still might benefit from excessive employment or output, which can be influenced by subsidies.

In the model, the organisation type of the enterprise is defined by two criteria. First, the employment can be controlled by the politician or the manager. Second, the cash flow is controlled either by the treasury/the minister of finance or by the manager of the firm.

Table 1: Allocation of Control Rights in Different Organisation Types of Enterprises

	Control of Cash Flow	**Control of Employment**
State-Owned (Nationalised) Firm	Treasury	Politician
Corporatised (Commercialised) Firm	Treasury	Manager/Shareholders
Regulated Firm	Manager/Shareholders	Politician
Privatised Firm	Manager/Shareholders	Manager/Shareholders

Source: own table according to Shleifer and Vishny (1994).

The combinations of the controls of the cash flow and the employment lead to four different types of enterprises (table 1). A further parameter of importance is the amount of subsidies. The Treasury is in charge to set the level of subsidies. The politician in power can try to make the Treasury pay subsidies to the enterprise in order to generate personal political benefits.

There are three players in the model: a (non-benevolent) politician, the Treasury and the manager of the enterprise. The Treasury is passive, the other two players maximise their

private welfare by deciding on excess employment resp. subsidies. The manager fully represents the interests of the shareholder, an assumption that avoids overburdening the model with principal-agent issues.

The politician wants the manager to employ excess employees **L** in order to gain a political benefit **B(L).** B(L) is increasing and concave in L. These employees earn a wage **w**. It is assumed that they produce nothing. The politician can influence the employment by subsidies **t**. Subsidies are either fully spent for excess employment and output (in which case L= t/w) or they contribute to firm profit by the amount t – wl.. If the firm is partly in public hands, the Treasury owns a part **(1-α)** of the shares and of the cash flow **π**. Some of the subsidies flow back to its budget. Thus, the Treasury and the manager are only interested in the net subsidy **T** it has to pay:

$$\mathbf{T = t - (1-\alpha)(t-wL) = \alpha t + (1-\alpha)wL.}$$

The Treasury pays the gross subsidy t, but gets back a part (1-α) of the profit, which reflects its share of the company. At the same time, it has to account of (1-α)wL, which is its part of the excess wage bill. T is controlled by the politician throughout the model. The cost of the net transfer T to the politician is denoted **C(T).** It reflects the effort the politician has to exert in order to convince the Treasury or the ministry of finance to grant the subsidy. It can also be interpreted as the political cost of raising tax revenues. In this interpretation, C(T) reflects the extent to which government takes or has to take taxpayers‘ interests into account. It is assumed that C(T) is always smaller than T (C(T)<T), as C(T) refers to the private cost of the politician (not the social cost of taxation). The functions B and C satisfy B(0)=0, B’>0, B’’<0, C(0)=0, C’>0 and C’’>0.

The utility of the politician is

$$\mathbf{U_p = B(L) - C(T).}$$

Let π denote the profit of the firm if there are no excess employees and no subsidies (fixed and given). Thus the utility of the manager/shareholders, who own a part α of the company, adds up to

$$\mathbf{U_m = \alpha(\pi + t - wL) = \alpha\pi + T - wL.}$$

A further important assumption is that the control of the cash flow and the employment are completely separable: it is possible for the government to have the control over the firm (=the employment) without owning the cash flow, and vice versa. This implies that the control over the firm can be carried out by different means of regulation.

The social welfare is not in the focus of the model, which analyses the actions of the two active players depending on the allocation of control rights over L. The political benefit B can be seen as a transfer between politicians and neutral to the social welfare. The subsidies have to be compensated by taxes, which cause distortions. Therefore, they should reduce the social welfare. This holds for the excess labour L as well, as it has a positive opportunity cost. In the social optimum there would therefore be no transfers and no excess employees: L=T=0.

Suppose the politician controls L. Since he also controls T, there is no room for bargaining with the manager. The politician maximizes his utility, B(L)-C(T), by choice of L and t (T is given as above), subject to the constraint that the utility of the manager is non-negative ($\alpha\pi + T - wL \geq 0$).The first order conditions are:

$$\mathbf{T = wL - \alpha\pi} \text{ and}$$

$$\mathbf{B'(L) = wC'(T).}$$

The politician uses all of the cash flow of the firm to hire excess employees. In doing so, he keeps the manager down to zero utility: the difference of the manager's profit and the excess wages equals the net subsidies. The politician provides subsidies and hires labour until the marginal cost of doing so, $wC'(T)$, is equal to the marginal political benefit, $B'(L)$. Figure 4 illustrates the two optimality conditions as two curves in L-T-space. The politician's optimal solution is at the intersection.

Now assume the manager controls L. Without bargaining, or if the bargaining fails, the manager would set L=0 and the politician would choose t=0, as dominant strategies. The result is the Nash-Equilibrium L=T=0, it coincides with the social optimum.

The threat points of bargaining are therefore $B(0)-C(0)=0$ for the politician and $\alpha\pi$ for the manager. The implied Nash-Product is $(T-wL)[B(L)-C(T)]$. Maximisation with respect to T and L leads to the following bargaining solution

$$\mathbf{C'(T) = [B(L)-C(T)]/(T-wL)}$$

$$\mathbf{B'(L) = w[B(L)-C(T)] / (T-wL).}$$

Note that this solution also satisfies the relationship $B'(L) = wC'(T)$. However, in contrast to the optimum, under politician's control of L, the manager is not driven to zero. He receives his threat point level plus a share of the surplus. The bargaining solution is therefore above the manager's individual rationality constraint (cf. figure 5).

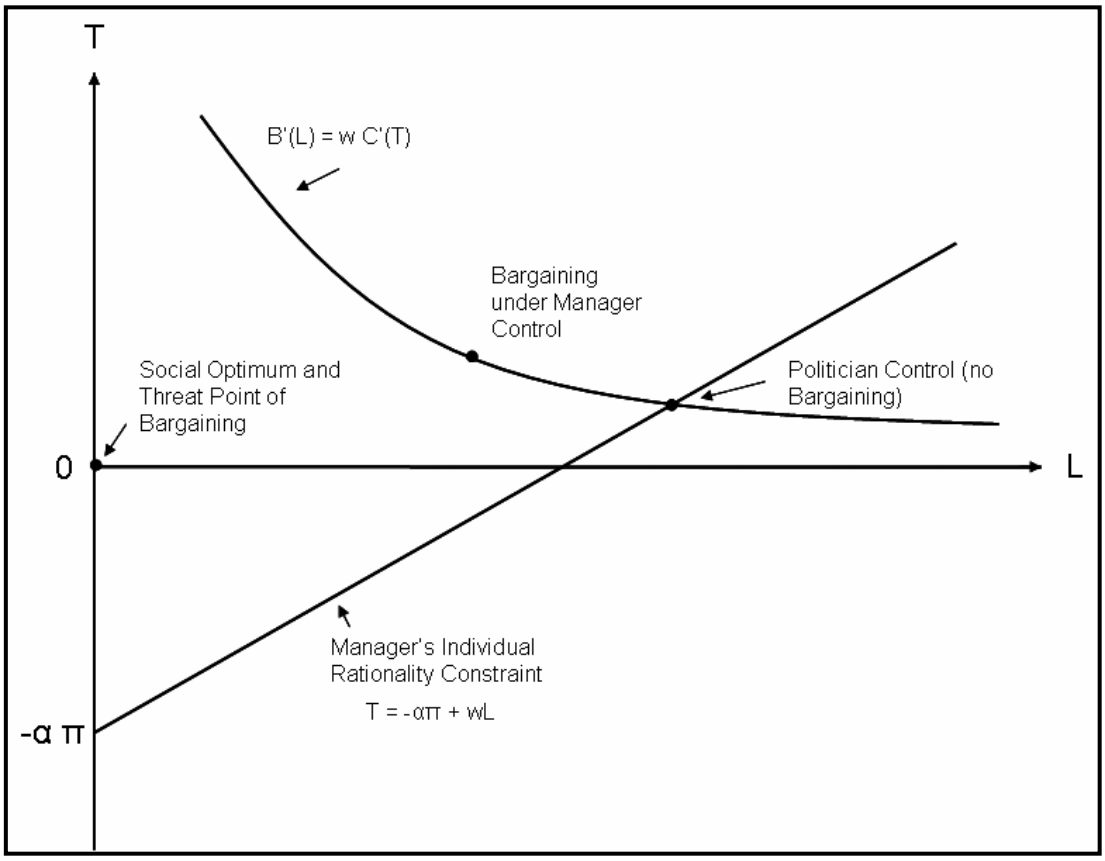

Figure 5: Bargaining between Manager and Politician

Source: own figure on the basis of Shleifer and Vishny (1994).

Results and Comparative Statics

The process of reforming a state–owned enterprise usually starts in a situation where the excess employment L is controlled by the politician and the treasury grants the subsidies. In this situation, the manager has no degree of freedom. As he cannot influence the benefit of the politician no bargaining takes place. The politician keeps the manager down to zero utility. The allocation of L and T is determined by the interception of the manager's individual rationality constraint and the B´(L) = wC´(T) – curve (cf. figure 5).

The commercialisation of the firm leads the politician to hand over the control of L to the manager. In doing this, the latter is provided the opportunity to bargain with the politician. The resulting allocation of L and T is still on the $B'(L) = wC'(T)$ - curve. However, L is now lower and T higher as under the politician's control. As a result of the bargaining, the excess employment decreases. The manager's utility is negatively affected by excess employees and he tries to keep their number low. He is convinced by subsidies to raise the excess employment above zero. The utility of the manager is now higher than zero.

The influence of these changes of L and T on the social efficiency depends on the social welfare function. If the social cost of subsidies T are high relative to the social cost of excess services and employment, a restructuring might be negative for the social welfare. In the opposite case, a restructuring increases the social welfare.

Note that the bargaining outcome is independent of the ownership share α. This implies that a further privatisation of the DB AG would not change the likelihood of a further restructuring very much.

If the private costs of the politician for generating subsidies increase, the C(T) curve gets steeper. With an increase of $C'(T)$, the $B'(L) = wC'(T)$ – curve moves towards the origin. Anything else being equal, the excess employment and the subsidies decrease if it gets harder for the politician to direct subsidies to the firm. In contrast, if $C'(T)$ decreases, the excess employment and the subsidies will increase.

Imagine the politician's benefit from one unit of excess employment of the commercialised firm, i.e. $B'(L)$ decreases. For a fixed L the total benefit of the politician decreases, i.e. the B(L) – curve is less steep. The politician will then "buy"

less excess employment, i.e. the B´(L) = wC´(T) – curve moves towards the origin, and the subsidies of the firm sink as well. The other way round, i.e. if the politician's benefit of excess employment increases, he will also generate more subsidies for the firm.

2.4.3 General Applicability of the Model

There is a significant public interest in the passenger rail transport in Germany. Moreover, European railways are usually state-owned and heavily subsidised. These particular features of the industry make the bargaining model suitable for application to the railway sector. Like other (former) monopolists, the DB AG is a large company in terms of employment. In fact it is the most important non-public employer in Germany. Given the number of jobs and the geographical extension of DB AG´s various branches, it is very seductive for politicians to influence the company, and for the company to influence the government.

Therefore, basic assumptions of the model apply to the situation in Germany, as shown in section 2.2:

- Politicians are willing to grant subsidies to the DB AG in order to get political benefits, and
- The DB AG is willing to accept this form of influence and offers employment and other output, which would not be profitable otherwise.

Before the reform of 1994, the German railways were controlled by the federal government (politician control of L). Since the reform, the DB AG holding in its current structure is a corporatised enterprise with the treasury owning the surplus and the control on the business decisions (L) in the hands of the managers. One could argue that

the federal government owns the company and therefore controls the business process as well. This is prevented by the German stock companies act. The board is entirely controlled by the federal government, but it is not allowed to work against the interests of the company. The political influence on the DB AG, which is very strong, is only exerted to a minor part via the advisory board. Instead of this, other means, e.g. subsidies, are used.

2.4.4 Interpretation of German Railway Politics as a Bargaining Process between Politicians and the DB AG

2.4.4.1 The Meaning of L and B: Activities Generating Political Benefits

Politicians have certainly benefited from the excess employment of Deutsche Bundesbahn (and Deutsche Reichsbahn) since its foundation. It may have prevented the employees from striking and may also have yielded votes for regional and national politicians. They are willing to offer subsidies in exchange for the benefits they internalise. There is a good record of inefficient industrial policy decisions in Germany, where politicians have granted subsidies to declining firms, particularly ahead of elections.

There is also evidence of politicians and the management of the DB AG bargaining over employment and other output. Since the German states have been granted yearly lump sum payments for public transport, this bargaining process also takes place on the regional level. One example is the rule of a German court (Vergabekammer Magdeburg on June 6, 2002) that local passenger services have to be tendered. The DB AG started an information campaign indicating that this was likely to result in a sharp cut in investment and jobs. The process and its outcome are described in section 2.2.

As the total employment of DB AG has constantly decreased after 1994 (acquisition effects not considered), other benefit-generating activities have become more and more important. Shleifer and Vishny state that wages and employment are not the only benefits generated in public enterprises (Shleifer & Vishny, 1994, 996). Railway services are in the focus of the public interest in Germany, and people judge the regional and national government on the basis of the rail services on offer. DB AG is still widely perceived as a public company and public authorities are perceived to have a decisive influence on rail transport decisions, not only on the local and regional level.

Activities L by the DB AG, which generate political benefits, are thus (apart from the excess employment):

- Excess transport services: services, which a profit-maximising operator would not offer under the prevailing regime of infrastructure charges. E.g. the long-distance passenger transport of the DB AG has suffered from load factors of less than 40 % for years. Although there are no profit and loss statements available, critics argue that several lines are not profitable. In 1998, the CEO of the Deutsche Bahn AG used the high speed passenger-services to the city of Kiel as a means to bargain in a tender for regional transport. Allegedly he threatened to cut Kiel off from the high speed passenger services, if the DB AG was not granted the contract for regional transport (Ilgmann, 2003, 3).
- Excess infrastructure services: the operation of lines, which are not profitable in the long run. At the beginning of the 1990s, the Deutsche Bundesbahn started to build high speed-lines. They are highly expensive, as the requirements for these

projects are very high – technical equipment, curve radiuses etc.[6] The DB AG is responsible for the cost-benefit analyses, which form the base for the decision on the projects. They are usually too optimistic, particularly if they know that ruling politicians are especially interested in a certain line. The government in turn pays 80-98 % of the high speed-infrastructure (Ewers & Ilgmann, 2001, 16f.).

The excess employment that leads to political benefits has not necessarily to be generated within the DB AG. One way to generate political benefits is to influence the DB AG to purchase inputs from a subcontractor in an area of low regional development. This happened e.g. in Bombardier's branch in Henningsdorf in 2002, when 1.500 jobs were at risk.

It is a crucial prerequisite for the application of the model that politicians are able to internalise the benefits of the excess services and excess employment. This is given, because politicians are perceived by the voters to have a significant influence on the output of the DB AG. B(L) increases with the possibility to internalise the effects of these outputs.

The political benefits due to excess employment and excess services can be internalised by the politicians in a number of ways, additional votes in elections being the obvious one. Usually the ruling politicians benefit from decreasing unemployment rates. There may also be an additional support among the partisanship of the ruling government, e.g. if a leading party considers excess services as desirable.

The protection of the environment has gained more importance since the privatisation of the Deutsche Bundesbahn. This has led to the perception that the railways are a major

[6] A line kilometre for the high speed-connection Hannover-Würzburg cost € 26 mill. in 1992 (Ewers & Ilgmann (2001),

instrument of environmental politics. Subsidies for this mode of transport help to raise votes among the electors who are moved by environmental concerns. The politician is therefore tempted to excessively pursue ecological aims.

The excessive production of employment, transport and infrastructure services, and ecological goods creates benefits for the politician. The original model of Shleifer and Vishny assumes the excess employees don't produce anything at all and are hence welfare-neutral. This is certainly a restrictive assumption for the case we are looking at. Some economists call for active public interventions in this sector, which goes beyond an open access regulation of the infrastructure. Mainly because of positive environmental effects scientists expect the railways to be supported by public funds in order to increase the transport on the rails and raise the welfare. For example, the infrastructure has to be subsidised in order to allow for an efficient pricing. Hence there is some welfare W(L) generated by politicians´ influences. These findings don't challenge the model, as long as the total benefit of the politician P(L) is higher than the welfare generated by the services:

$$\mathbf{B(L) = P(L) - W(L) > 0}$$

Given this relaxation of the model's assumptions, B(L) can be regarded as excess benefits of the politician.

A number of examples show that the relationship P(L) - W(L) > 0 holds for the case of the German rail reform:

- There might be some employees of the DB AG's internal job market, who temporarily don't work at all; but most of the "excessive" employees will generate at least some benefits.
- There is a part of the infrastructure which is kept open, although there is currently no traffic, but there might be some benefits by the expectation of future traffic.
- There is hardly any train running totally empty; but with a load factor of 10% and less some regional services at certain times can still be called mainly excessive, although they generate benefits to some customers.

The benefit B(L) of the politician stems from the firm's activities L, which the firm would not pursue if it was solely driven by social activities. Activities, which are not socially profitable, such as the retention of certain lines or workshops, the construction of certain new infrastructures or the provision of not profitable services generate benefits to the politicians in power. The citizens perceive their possibilities for mobility as mainly influenced by the governments on various levels. There are numerous examples that politicians are blamed by citizen's groups for the closing down of lines. As the DB AG is still widely perceived as a public enterprise, politicians in power use its services for vote-seeking.

2.4.4.2 The Meaning of t: Gross Subsidies

All direct (gross) subsidies, which the company is granted by the German states and the national government, are denoted by t. Politicians both from the national and the regional level bargain with the DB AG and initiate subsidies. The most important direct subsidies by the national government are paid for infrastructure. The national German government granted in 2005 € 3.4 bn of subsidies. The decision-making processes for the identification of subsidies and the determination of the financing instrument (direct payments, interest-free credits or co-financing by the regions) are not transparent. The existence of an effective controlling of the subsidy-spending must be doubted. This leaves the actors involved room for bargaining and rent-seeking.

The German federal states have a powerful bargaining position, as the second chamber in Germany has a decisive influence on the rail sector organisation (see section 2.2.1). Since regionalisation, they issue large contracts of transport services and pay for parts of the infrastructure. Regional governments are interested in the maintenance and extension of regional stations and other infrastructure and partly pay for these. The amount spent in the tendering of local and regional rail passenger transport (€ 6.7 bn in 2007) represents a large financial opportunity for subsidisation of railways. They get these lump-sum payments by the federal government and can decide on its spending in the transport sector. As shown in section 2.2, the legal environment is not totally clear. As a consequence, lots of the responsible regional ministers avoid tenders. Instead of this, they make direct contracts, mostly with the DB AG. The evidence listed in section 2.2 shows that the ruling governments derive political benefits from these deals, e.g. in form of excessive employment and regional transport.

2.4.4.3 The Meaning of C: Political Costs of Subsidy-Generation

The politicians in power, on the state level as well as on the national level, have to bear private costs C(T) in order to make the Treasury grant the subsidies to the DB AG. Under the increasing deficit of the German national government, the negotiations between the ministry of finance and the ministry of transport on the budget are getting rougher. At the beginning of 2004, there has been a significant cut-back in the subsidies for infrastructure (from € 4.3 bn in 2003) to € 3.1 bn per year. The reduction was planned to last until 2008, but has been partly cancelled recently. A reduction limits the possibility for members of the national government to generate political benefits. The funds for regional transport have also been cut back in 2004. Politicians of the states are opposed to this measure, as it decreases their power to buy services from the train companies.

We assumed in section 2.4.4.1 that not all of the subsidies in the German rail sector flow for the sake of the politician's private benefits. Some of his activities are likely to increase the social welfare. Hence two questions arise:

- What is the optimal level of subsidies and services generated with these subsidies?
- Is the model still applicable to this setting, i.e. the politician's private benefit in the optimum is higher than 0?

The social costs of the subsidies are higher than the subsidies themselves, due to the excess burden of taxes. At the same time, the politician's costs of subsidy-raising are lower than the subsidies themselves. Thus the subsidies generate costs to the politician and the society as a whole. The same holds for the benefits. To control for the overall

effect on the welfare, the model would have to be extended. This is beyond the scope of this paper.

2.4.5 The Model's Results: Evidence on Corporatisation and Privatisation

Before 1994, employment and services of Deutsche Bundesbahn and Deutsche Reichsbahn had been controlled by the politicians. With the Deutsche Bundesbahn being a special property, there was no possibility of bargaining. According to the model, the manager got a utility of 0. Once the control over L was turned to the board of the newly founded DB AG in 1994, the managers could start to bargain with the politicians about L and T. The board's utility was increased. The model predicts an equilibrium point with less employment and more subsidies than in the case of non-bargaining.

There is some evidence that the model's prediction were realised with the corporatisation in 1994. It is confirmed as far as the employment is concerned. This continued to decrease from 376,000 in 1994 to 221,000 in 2002 (BMVBW (2003), 62). A part of this cut in employment leads back to the sharp fall of demand in the former GDR after the German reunification. Compared to the productivity of Deutsche Bundesbahn, the East-German Deutsche Reichsbahn was already overstaffed in 1990 (in 1990, Deutsche Bundesbahn counted 249,000 employees, Deutsche Reichsbahn 224,000 employees, the Deutsche Reichsbahn operating a much smaller network). The decrease of demand after 1991 made a job cut in the former domain of the Deutsche Reichsbahn necessary and it would have been carried out even without a reform. But there was certainly an additional decrease after 1994, which was stimulated by the commercialisation. It led to the number of employees of DB AG now being less than that of Deutsche Bundesbahn in 1990.

As far as a restructuring of the transport services is concerned, one has to make a distinction between regional transport and long-distance transport. The local/regional passenger transport performance increased as an effect of the regionalisation (cf. section 2.1). This initial finding contradicts the model, but has causes which are not considered by it. These transportation activities are not mainly a result of a bargaining process between the (regional) government and the DB AG's managers, but between the national and the regional governments. They result from the special legal powers the German states have in the second chamber when it comes to basic issues of railway policy. The subsidies for regional transport were the price which the national government had to pay to convince the states of the 1994-reform. The subsidies increased heavily after 1994. If there were not for these subsidies, a cut of regional services would have been likely, as only around 30 % of their costs are covered by ticket sales (Booz Allen Hamilton, 2006, 73).

In long-distance passenger transport, a restructuring took place. The traffic performance [in pkm] decreased until 2002 in a growing market. An important step of the restructuring was the abolition of the train category "Interregio" on the grounds that it was not profitable. In freight transport, the major restructuring scheme MORA C (*Marktorientiertes Angebot Cargo*, market-orientated supply cargo) was started in 2002. The freight division of DB AG stopped serving around 600 of the former 2100 freight track sidings. The justification was just the same as for the stop of the "Interregios": the lack of profitable perspectives.

There is also evidence that excessive infrastructure was closed down after the commercialisation. However, the effect of the commercialisation on the infrastructure is not as evident as for the employment or the transport services, as closing down of rail

infrastructure has to be approved by the authorities. The length of the network decreased from 41,300 km in 1994 to 35,800 km in 2002 (BMVBW, 2003, 53). There have been further changes for freight transport. As a consequence of the MORA C scheme, track sidings for freight were closed down after 2001.

The next question is whether the commercialisation of the DB AG led to an increase in subsidies. The empirical account of subsidies is difficult to develop, as there were several different channels for subsidies both before and after 1994/1996, and the basis on which to judge the relevant subsidies and their development is not obvious. A further obstacle for the comparison is the change of the accounting system in 1994. The figures given in statistics sometimes comprise all subsidies, regardless of whether they are subject of negotiations between DB AG's managers and politicians. They contain e.g. personnel costs, which have to be covered by the "Bundeseisenbahnvermögen" (cf. section 2.2.1). There are strings attached to the funds for regional transport services as well. They represent the total expenditure, which is spent annually by the regions for rail transport services and certain infrastructure. However, the sum of these funds is not subject to bargaining processes between the manager and politicians in the first place, but between the national and the regional governments. The overall size of these funds is therefore not negotiable, it represents an exogenous constraint. Furthermore, a small part of the regional funds is granted to the competitors of the DB AG. Once the two chambers have found an agreement about the amount of regionalisation funds, the DB can start negotiating with the German states about their spending. Negotiations are still prevailing as instrument to assign services, although open tenders have gained ground during the last years.

The subsidies by the national government for the railway sector reached an average of € 10.7 bn in the three years before the reform. From 1994-2002, the average spending was € 14 bn per year (BMVBW, 2003, 122). It increased further in 2003. This is in line with the theory:

- We showed in section 2.3, that the regionalisation funds increased from 1996 to 2006, both in total and for the DB Regio AG. This confirms the theoretical findings about raising subsidies after privatisation. However, a cut of these funds was decided in 2006.
- Subsidies for the infrastructure increased from 1994 to 1995 and fell then until 1998. A bargaining process took place in 1998 and led to a change in the funding of rail infrastructure. Before 1998, new infrastructure was financed by interest-free credits. This changed in 1998, when these projects started to be financed with direct payments by the national government. In 2001, a second bargaining process led to a further increase of infrastructure funding. In addition it was decided, that a large part of the replacement investment should be financed by direct public payments. Meanwhile, this decision has been extended. As a consequence, the subsidies for the infrastructure rose from 1998 to 2003. After that period, they have been reduced.

These findings indicate that the managers of the DB AG have considerable bargaining power. For the years from 1994 until 2003 they support our theoretical findings but due to data problems we can't be totally sure about the difference of subsidies before and after the reform.

A cut of the infrastructure subsidies from the national government took place in 2004. One year later, a decrease of the regionalisation funds was announced. At the first glance, these developments contradict the predictions of the model. The reductions were a result of the tight public budgets that prevailed at that time. It is straightforward to argue that it gets more difficult for the politician – and hence more costly – to direct subsidies to the firm if the public funds get scarcer. The change in the amount of subsidies after 2004 may well have been triggered by a rise of cost C(T) and a steeper C(T)-curve. If a tightening of the public budget and the commercialisation take place simultaneously, comparative statics yield no unique result for the change of subsidies in the model. This is because the $B'(L) = wC'(T)$–curve is shifted towards the origin if C(T) increases. In contrast, the decreasing effect on excess employment is reinforced by the simultaneous move of the C(T)-curve. Hence the cut of subsidies for the German rail sector after 2003 does not challenge the empirical relevance of the model.

2.5 Conclusion

The example of the German railways shows how strategic decisions in transport industries are influenced by the political sector. Governments from the national and the regional level are involved in the design of the regulatory framework. This poses a risk to the efficient allocation of resources by the railway company and leads to rent-seeking behaviour between the different government levels.

The comparison of the reform processes of 1994 and 2001 shows that there are at least two essential factors for an effective decision-making:

- The composition of the committee, that develops the reform steps, and
- The identification and solution of possible conflicts at an early stage.

Both reform processes were aimed at crucial decisions for the German rail industry. In contrast to the first reform, by far the most important player in the sector was allowed to take part in the decision in 2001. The DB AG managed to advocate the adoption of the company's favoured sector organisation by the decision-preparing committee. At the same time, this committee and the Minister of Transport had failed in anticipating the arising conflict with the DB AG. The powerful DB AG had always objected to vertical disintegration. A careful preparation of the decision-making process was absolutely necessary at that time and might have eased the conflicts.

The analysis shows, that the influence of European initiatives can at least be threefold:

- There have been indirect effects. The liberalisation of adjacent markets (trucking) increased the pressure on the railways to restructure.
- The European initiatives can be used to justify decisions which are not favoured by all relevant actors and to gather further political support. This was the case in the preparation of the first reform in 1994.
- The most direct form of influence is that national politicians try to entirely accomplish the EU directives. However, it seems to be necessary that there is a good deal of congruency of the respective directives and the political goals of the ruling politicians.

The regionalisation of 1996 and its outcome reveals further institutional problems in the national policy process. The preconditions for efficiency gains by a frequent tendering of rail transport services are very good because of the interest of international players and skilled authorities in the regions. But due to bargaining of regional politicians with the DB AG and their influence on the national government, tenders are often avoided. Moreover, the use of German courts has imposed many transaction costs upon the complainants but did not lead to a sufficient or even clear result so far. The possibility of cost reductions is missed and the federal government and the states risk a legal confrontation with the European Union. A fundamental change of the regulatory framework can only be expected by action of the European institutions.

The negotiations between the politicians and the managers of the railway company in the three reform processes are analysed using a bargaining model. The changes that have taken place since 1994 years led to a decrease of excessive output. There has been a sharp cut in the employment, and unprofitable services and infrastructure have been reduced as well. The theory and the empirical evidence show that a commercialisation of a former state-owned transport company is successful in terms of these restructuring activities. The influence on the subsidies is empirically difficult to analyse. There are different channels for subsidisation, the process of infrastructure financing changed over the years and is not transparent. But there are indications that the subsidies increased after 1994 and sank after 2003. This result would also be supported by the theory. It advocates a careful monitoring of subsidies during and after the process of rail commercialisation. A further observation would be the necessity to raise the costs of generating subsidies for a commercialised firm. In doing this, excess employment and subsidies are reduced at the same time.

Five years after the end of the Task Force the debate about the privatisation of the company has intensified again. One reason is the profit, which the firm has started to generate in 2004. The most important focal point of the debate is again the influence on the infrastructure. The current DB AG-management claims to realise economies of scope and scale if the current structure is perpetuated. Some analysts claim that one of the company's motivations is that they can use the infrastructure for bargaining with the government. On the other hand, some leading politicians try to maintain or even raise their influence as well: the social democrats advocated recently to sell less than 50 % of the DB AG's shares as a "people's share", but with no voting rights. This would have meant to cut off any influence by them. This is in line with the assumption of the model about the politicians' opportunistic behaviour. They intend to maintain their influence and seem to be prepared to accept constraints for competition.

3 Regional Rail Passenger Services in Germany: Competition and Contracts

3.1 Introduction

The German railway sector was fundamentally reformed in 1994. The state-owned West German carrier Deutsche Bundesbahn was consolidated with the former East-German rail undertaking, restructured and re-established as a state-owned joint stock company. In the rail freight market and the long-distance rail passenger market an open access regime was introduced.

Two years later, the organisation of the regional and local rail passenger market was changed. Responsibility for regional passenger rail transport and funds was transferred to the federal states. The intention was to use these funds for the creation of an attractive market segment, characterised by competitive tendering. Subsequently, the transport performance rose significantly, but competitive tendering played only a rather limited role in this development.

The focus of this chapter is to provide background information on the German regional rail passenger market and the emergence and importance of competitive tendering. We try to shed some light on the impediments to competition and on the parameters of successful tendering processes and contractual forms.

A lot of reflections and publications have been prompted by the tenth centenary of the regionalisation. We use these materials to complete our data and knowledge base. Nearly all of these sources are either very general or focus only on individual aspects, e.g. a special tender or an interesting feature of the service contracts. The scientific literature on the regional passenger train services suffer from the lack of available data.

To our knowledge there are three exemptions: Borrmann uses a questionnaire to gather data about contract design (Borrmann, 2003). Beck investigates the contract design by analysis of tender documents and interviews (Beck, 2005). The most recent collection of data was pursuit by Lalive and Schmutzler who use interviews and an internet inquiry (Lalive, R. / Schmutzler, A., 2007).

The course of the chapter is as follows. In the next section, we describe the "regionalisation" as the background of the current situation. We also give an overview of the legal framework. The drivers and hindrances to competition for regional rail passenger services are described. Section 3.3 looks closer at the forms of competitively tendered contracts and their elements. In section 3.4 we use our data set to estimate the influence of several variables on the duration and the completeness of the contracts. Section 3.5 concludes.

3.2 Development of the Market since 1996

The German railway reform started in 1994. In the first step, DB AG was subdivided into four divisions for local and regional passenger transport, long distance passenger transport, freight transport, and infrastructure. A regulatory institution was founded which, amongst other issues, was to ensure the open access to the rail infrastructure. In the second step of the reform (taking place in 1999), the four divisions were turned into five public limited companies under the roof of DB AG, which is now working as a holding.

A major part of the Railway Reform was the shift of responsibility for the provision of Regional Rail Passenger Services (RRPS) from the federal government to the states ("regionalisation"). The states receive "regionalisation funds" for the RRPS from the

federal government on a yearly basis derived from parts of the federal gasoline tax. The assessment for the actual amount of the regionalisation funds was based on estimated cost for an average train-km of the RRPS in 1993/94. Thus, in 1996 the federal government transferred € 4.45 bn of funds along with € 3.22 bn for the transport in local communities. In 1997 the federal subsidies were raised to around € 6 bn but at the same time the subsidies for the local communities were lowered to € 1.64 bn.

3.2.1 The Current Institutional and Legal Framework

Since 2002, regional passenger transport has been subsidised with € 6.6 – 7.1 bn per year[7] (see figure 6). A major cut of the funds was decided in June 2006. Over the years 2006-2009, the federal government will probably spend € 2.1 bn less than originally expected for RRPS. The states which receive the highest funds will have to deal with around € 100 m less than anticipated in 2009. The regionalisation funds are earmarked for public transport. Moreover, most of them shall be used for the procurement of train services. But, a part of the subsidy is also used for public bus services and infrastructure investments, e.g. station rehabilitation. In 2005, by calculation of SCI, 74 % of the regionalisation funds were dedicated to rail operation (SCI, 2005, 66).

[7] Without the subsidies for the local communities.

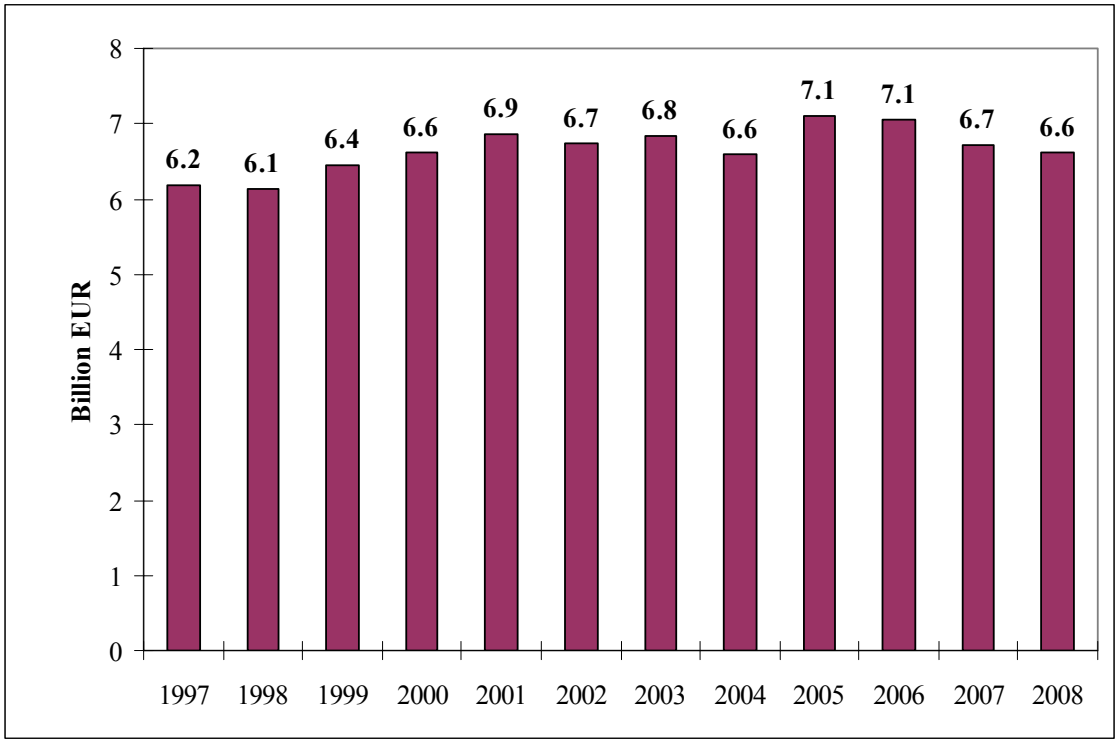

Figure 6: Federal Subsidies for Regional Passenger Transport in Germany

Source: Deutsche Bahn AG (2003), Krummheuer/Hauschild (2004), *Haushaltsbegleitgesetz* 2006 [accompanying budget law], Art. 13.

The states have established special regional authorities (*Aufgabentraeger*) which are responsible for planning, managing and procuring regional rail transport (see figure 7). They award service contracts to the DB Regio AG and DB Stadtverkehr, as well as to other publicly and privately owned TOCs. In Germany 33 of these authorities exist. They show a high diversity in terms of the area that they have to provide the services for. While some states have several *Aufgabentraeger*, e.g. nine in Northrhine-Westfalia[8], Berlin and Brandenburg have established one common responsible authority.

[8] A law is under way which will most likely reduce the number of *Aufgabentraeger* in Northrine-Westfalia to three from the beginning of 2008.

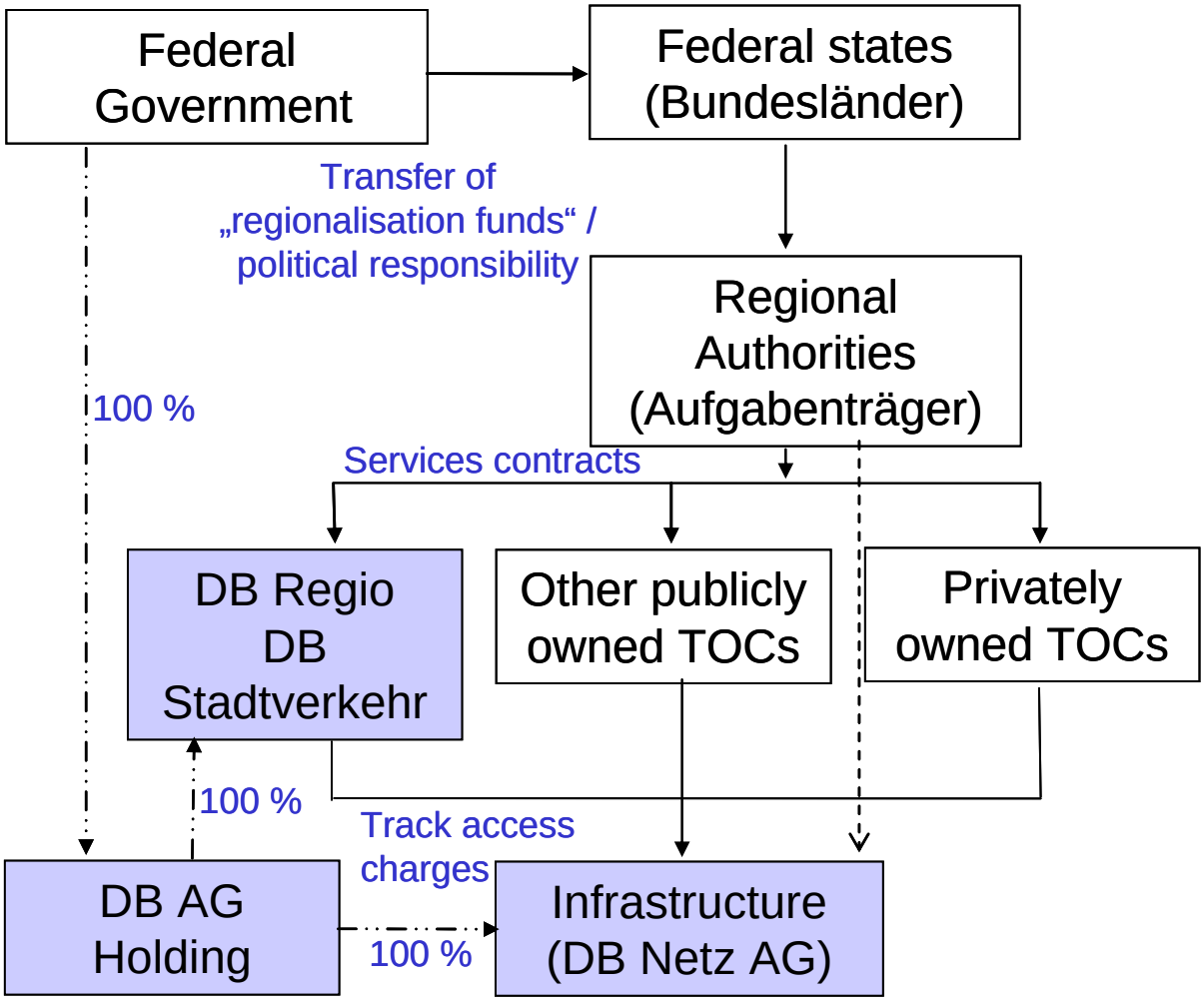

Figure 7: Funding of Regional Rail Passenger Transport in Germany

Source: own figure.

The system of regional funding gives the states a considerable amount of freedom of choice. The states can choose between different contractual forms and service specifications. The RRPS can be specified either for networks or single lines. They have varying contract durations. Service descriptions sometimes are very detailed but can also be very general in the case of incentive contracts.

The states are also free to directly contract with DB AG or its newly established competitors. Services can also be procured by tendering. The following different procurement procedures can be found across the states and sometimes within one state:

- Open tender: An unlimited number of transport operating companies (TOCs) are allowed to bid.
- Non-open tender: A limited number of TOCs are asked to submit a bid.
- Negotiation: a less formalised procedure in which the *Aufgabentraeger* directly negotiates with one or more TOCs. There can be a competition for participation prior to the negotiations.

All these procedures can be set off as a two-stage process.

Since 1996, at least 98 service contracts have been concluded. 37 of them were directly awarded, mostly to a subsidiary of DB AG. Apart from that, there were 43 open tenders and 18 non-open tenders (on-line version of the Supplement to the Official Journal of the European Union and DB AG, 2004, 2005, 2006). In contrast, Wewers (2006, 1) found 86 contracts for the latter two categories. These figures show the lack of data availability in Germany, because until recently there was no duty to publish the conclusion of a contract. They also overstate the importance of competitive tendering, since the directly awarded contracts cover the overwhelming share of services. An example for the awarding of services without competitive tendering could be observed in the states of Thuringia and Saxony-Anhalt. In 2002, Thuringia signed an exclusive contract with DB AG. The contract comprises the whole regional passenger transport in Thuringia, 17 million train-km per year, has a duration of ten years and is worth € 1.5 bn (total volume). Likewise Saxony-Anhalt signed a similar contract with the DB AG of a value of € 2 bn (see table 2). Table 2 shows examples for contracts which have been

concluded between DB enterprises and public authorities. It can be seen that most of the states awarded large shares of their services directly to the DB. In particular during the years 2002-2004 they proved to be sceptical about competitive tendering. In addition, these contracts limit the scale of competition for a long time, as most of them have a length of more than ten years and only minor parts of the services will phase out during this time.

Table 2: Contracts of the Federal States with the DB AG

State	Conclusion of contract	M Train-km (first year)	Value (bn €)	Duration of contract
Berlin / Brandenburg	December 2002	35.0	1.9	10 years
Lower Saxony	January 2003	27.8	2.5	10 years
Saxony-Anhalt	March 2003	16.2	2.5	12 years
Hesse (Rhine-Main-Area)[a)]	April 2003	33.0	4.4	11 years
Baden-Wuerttemberg[b)]	July 2003	49.0	4.6	13 years
Hamburg (S-Bahn-light rail)	July 2003	12.5	0.7	6 years
Rhineland-Palatinate	January 2003	29.5	2.4	11 years
Northrhine-Westfalia	July 2004	44.0	6.0	15 years
Saarland	July 2004	6.3	0.8*	14 years
Berlin (S-Bahn)	August 2004	32.4	3.0	15 years
Bavaria*	November 2004	98.1	ca. 8.0	10 years[e)]
Lower Saxony*	January 2005	5.3[c)]	n.a.	12 years
Saxony**	April 2005	2.6	n.a.	10 years
Northrhine-Westfalia[d)]*	June 2005	12.7	1.1	11 years
Bremen**	November 2005	2.4	0.02*	10 years
Hesse**	November 2005	2.4	n.a.	5 years
Bavaria**	November 2005	0.5	n.a.	12 years

a) Rhein-Main-Verkehrsverbund; b) without region Stuttgart; c) Verkehrsverbund Rhein-Ruhr; d) five contracts with different authorities

Source: Tegner (2004), p. 4; * press release; ** Deutsche Bahn AG (2006), p. 19.

Understandably, competitors of the DB challenge direct awarding. Hence, two railway companies appealed against the contract between Saxony-Anhalt and the DB AG. In June 2002, the Chamber of Tenders in Madgeburg decided that all regional services have to be allocated by competitive tendering and that sub-networks have to be tendered in a size which leaves chances to all bidders.

After a period of political debate and lobbying by the DB AG, the federal government adopted a new regulation of tenders (*Vergabeverordnung*) in late 2002. The modified regulation was designed in order to provide legal certainty and a sound basis for an incremental change from monopoly to competition. It still allows the states to award contracts for RRPS-services directly (without tendering), but only if an essential part of the services (train-km) is awarded for a shorter period and tendered competitively subsequently. The contract duration shall not exceed twelve years.

Just before the enactment of the new regulation, the Connex-Group[9] took legal proceedings against the contract between the DB AG and the state of Brandenburg. In September 2003, the higher regional court of Brandenburg decided that RRPS-services do not have to be tendered because the German Railway Law regards tenders only as an option. The European legislation, which typically calls for tenders, has been regarded as inferior to German Railway Law. Anticipating this decision, the Connex-Group had already complained to the European Commission. Connex argued that the decision of the Brandenburg court directly contradicts the European public procurement law and the principles for state aid (Bremer/Wünschmann, 2004). According to their argumentation, all service contracts which are not tendered cause the danger of overcompensation and

[9] In May 2006, the Connex Verkehr GmbH changed its name and became the Veolia Verkehr GmbH.

thus could be - according to the European Court of Justice - relevant for state aid control.

As a first reaction the DG Internal Market sent a request for detailed information to the German government. According to this letter the decision of the OLG Brandenburg is not consistent with European legislation. In October 2004, the EC started proceedings against Germany at the European Court of Justice for breach of contract. In June 2006, the German federal government alongside with the states committed themselves to change the procurement procedures of RRPS. Their intention is to set up more transparent, non-discriminating awarding procedures and to stop direct awarding. Consequently, the EC stopped the proceedings against Germany at the European Court of Justice and at the same time announced their close observation of the future procurement procedures in Germany.

3.2.2 Strategies of Competitors and Market Entry Barriers

The overall RRPS volume in 2005 was around 632 m train-km or almost 42 bn passenger-km. Regarding these numbers and considering the amount of public funds for RRPS, the RRPS market has developed not only to be a substantial source of revenue and turnover for the DB AG, but is also commercially attractive for other TOCs. Consequently, the number of the competitors has steadily increased. In 1993/1994, 25 mainly small or medium-sized companies operated alongside DB. Their market share added up to 3 % (based on train-km) (Schinke/Hempe/Kolodzinski, 2002, 21ff.). Since then, the number of competitors of the DB has risen to 93 (BAG-SPNV, 2006, 1). However, competitors like Arriva or Veolia each own several of these TOCs. The vast

majority of non-DB operators do not conduct any regular RRPS but work as contractors or as seasonal holiday operators. The competitors use two different business models:

1. The national privately owned TOCs are small and mid-sized firms with regional or railway-related skills. Their expertise and organisational flexibility allows them to offer cheap and high quality train-services. However it prevents them from taking part in larger, more complex tenders. The strategic focus of these operators is the deliverance of carrier-functions in minor networks or the cooperation with other operators.
2. The other group consists of management-orientated, often internationally focused operators. The organisation of transport firms, transport services and a keen market-orientated approach are strengths of these companies. The appropriation of regional and special operational skills is their central inner-operational strength. This strategy is based on the transfer of international experiences or pursued by acquisition of regional TOCs. These operators are in the position to conduct complex train-services with an adjusted, cost-focusing approach.

The national private TOCs are generally small. On the contrary, the international players are big companies, although there market share is still relatively small in Germany.

Over 60% of train-services delivered by operators other than DB are performed by the public TOCs (see figure 8). Consequently, their development poses one of the most important questions. At least some of these publicly owned non-DB operators show some traits of the above mentioned second group. Most of them only try to defend their local territory. Others, as the Hamburger Hochbahn, are expanding their businesses to

other regions. They compete in open tenders and also grow by take-overs of other service providers. Some of these public TOCs, such as Abellio, finance their activities by funds from capital investors and hence turn into partly private companies. This is not only a means to finance the expansion, but must also be seen to overcome legal restrictions that are attached to public TOCs.

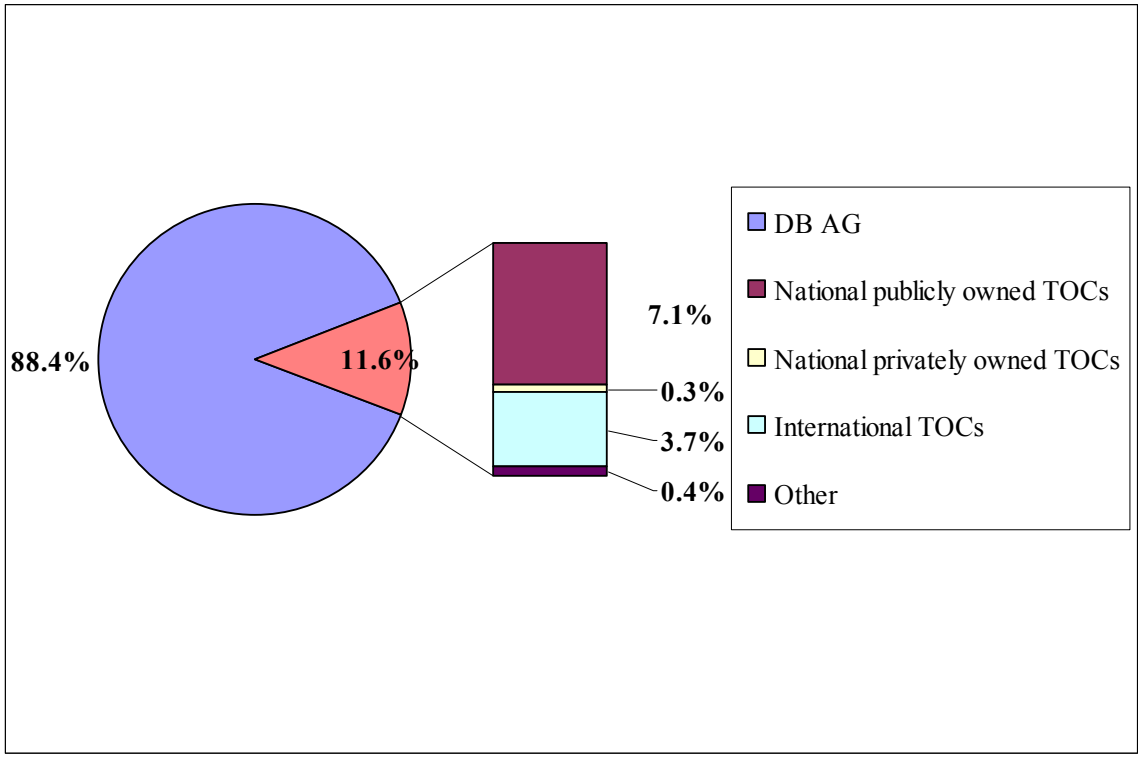

Figure 8: Market Shares of Strategic Groups in 2004 (percentage of train-km)

Source: Höhnscheid (2005).

The strategic orientation for the DB is different from its competitors. The DB focuses on delivering complex train-service solutions with a strong interconnection to more comprehensive services (mainly passenger transport, but ultimately offering their broad portfolio of logistic services), including bus transport. This strategy suffers at the moment from the reluctance of the *Aufgabentraeger* to leave the transport planning to

the TOCs. The DB Regio will not be able to keep a market share of 88 % if the importance of open tenders grows and its success rate maintains below 50 %.

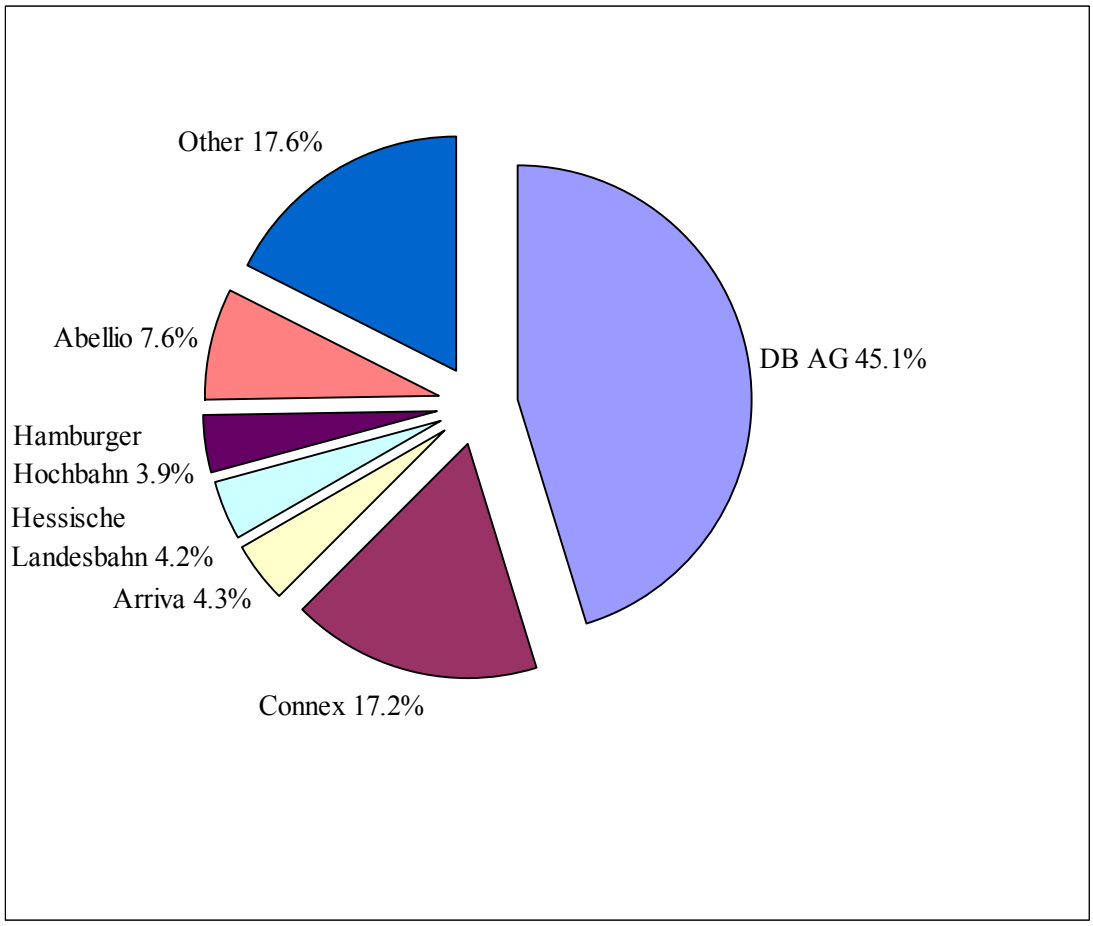

Figure 9 : Percentage of train-km Won by Different TOCs (1995-2005)

Source: Deutsche Bahn (2006).

The vast majority of competitors consist of small or medium-sized operators. Besides the DB only Connex, Arriva, Hamburger Hochbahn and Hessische Landesbahn exhibit a mentionable share of the market. The first international player to enter the RRPS market in Germany was the Connex group. It won 17 % of the competitively tendered services until 2005 (see figure 9).

According to a company's representative, their advantages over the DB are (Leister, 2004, 109ff)

- small overheads (greenfield approach),
- decentralised firm organisation, significant labour cost advantages
- substantial responsibility for regional branches and high flexibility
- usually local brands with co-branding to obtain customer loyalty
- specialised regional marketing activities
- customer orientation of the staff.

The Connex group is the largest of the competitors of DB. However, with only 2.5 % of the RRPS volume (passengers) it has only a very small market share. The marginal role of the competitors is due to two interlinked reasons:

- the reluctance of the regional authorities to conduct competitive tenders and
- the reluctance of TOCs to enter the market or expand their activities.

The RRPS market is primarily organised as a market driven by the demand of the regional authorities. Their tender policy is of overwhelming importance for the market structure. At the beginning of the regionalisation, the *Aufgabentraeger* had to cope with the deployment of the necessary substructures, like the creation of network plans and staffing. Additional know-how had to be developed. In the face of this highly transitional period the continuation of the status quo by simply extending existing contracts with the DB was expected and understandable.

Ten years later the responsible authorities now have overcome these initial problems and are able to deliver high quality transport planning and management. However,

numerous large contracts are still directly awarded to the DB (see table 2). Representatives of the regional authorities as well as competitors of the DB bemoan, that the DB AG, in order to acquire RPPS-contracts, interlinks its offers with services derived from its infrastructure ownership (e.g. Leister, 2004, 109ff). Critics claim that infrastructure measures such as electrification, dismantling and maintenance of tracks or the modification and maintenance of railway stations are directly interlinked with their contract proposals. Furthermore, some argue that DB links promises for job-creation and training positions with service contracts. These measures are even more critical since the funds for the infrastructure improvements are mainly federal funds.

Apart from this advantage of the DB, actual and potential competitors worry about a number of further discrimination possibilities by the DB:

- DB heavily influences the infrastructure investment decisions and the infrastructure pricing.
- The network operator has the opportunity to disrupt train services thus directly influencing directly operation costs for transport operators.
- TOCs interested in the tendering processes have to let the DB Netz AG prove their concept for operability. Sometimes their maintenance concept also hinges on the cooperation with the DB.
- Rolling stock of the DB has been partly financed with public money.

A current concern on market entry barriers is the volume of services that are tendered. So far, the volume has been between 0.1 and 8.7 m train-km p.a. with an average of around 2.5 m train-km. It is obvious that new entrants in a certain region can only be expected if a service contract allows covering the minimum fixed costs for workshops,

standby rolling stock etc. Laeger recommends 0.8 – 1.0 m train-km p.a. as a minimum volume (Laeger, 2004, 126).

A more serious concern is the maximum volume of service contracts. A number of *Aufgabentraeger* plan to tender great parts of the services they have assigned to the DB during the last years. Some critics claim (e.g. Tegner, 2004) that this might hamper competition. Most of the TOCs in the German market are rather small or medium sized enterprises and not able to provide large scale services. So, the tender of large networks could result in a reduction of competition.

This particular concern seems to be exaggerated. While offering large networks for tender would discourage small competitors, this could be more than compensated by the entry of international players not yet in the German market. Much more important are a commitment to offer operations for tender, a reliable schedule for the tendering and the prevention of discrimination.

There is only limited empirical evidence to support a relation between the volume of the contract and the number of bidders. The biggest contract in terms of train-km was the Rhine-Neckar light-rail system in the area of Stuttgart. Initially, there had been three bidders, but one withdrew rather quickly, and only one consortium with Connex and one with DB Regio AG remained. The contract was eventually assigned to the DB Regio AG. Tenders with less volume did not see much more bidders. From what is published and results of an own questionnaire we know the number of bidders of around forty tenders. In this sample, there is no correlation between the volume of services and the number of bidders. In any tender between two and four TOCs entered the bidding stage. There might even be more bidders once contracts with higher service volumes are

tendered. We know from interviews that further international TOCs are ready to enter the German market if higher revenues can be expected.

A further potential hindrance for TOCs to enter the market is the cost of rolling stock. According to our data, 49 % of the contracts (n=41) require the bidders to provide for new rolling stock. Other contracts require a minimum age of these assets at the start of the services or during the entire contract duration. There are only 24 % of the contracts which exhibit no requirements for the age of the rolling stock. Consequently, the cost of capital of rolling stock accrues to 18 % of the total costs (including track and station charges) (Laeger, 2004, 88)[10]. Taking into account that nearly all contracts regard track and station charges as pass-through cost components, this figure rises to 30-34 % (Laeger, 2004, 87). The lifetime of the rolling stock is longer than that of the franchises. This causes an investment risk for the TOCs. At the moment, there are limited possibilities to deploy used cars, although the attitude of the *Aufgabentraeger* seems to change in the face of tighter budgets and a better availability of used rolling stock. There are four ways which are chosen in order to mitigate this investment risk for the bidders:

- Some States (Lower Saxony, Baden-Wuerttemberg, Northrine-Westfalia, Bavaria, Schleswig-Holstein) have set up rolling stock pools for parts of their rail traffic. In general, maintenance is a task of the train operating companies, but for one of Lower Saxonys pools maintenance activities have been contracted out. If car pools and maintenance contracts exist, their use is sometimes obligatory.

[10] According to the limited number of observations in our sample (n=5), this figure rises to 27 %.

- An instrument which is more often found in service contracts are takeover-guarantees for the rolling stock. In this case, the contracts contain provisions to pass rolling stock on to the next service provider at the end of the franchise.
- Guarantees for the residual value of the rolling stock are a rather new instrument. In this case, the regional authorities offer to take over the rolling stock at the end of the franchise at an agreed price.
- Some authorities support the TOCs with financial means for the buying of rolling stock

Some TOCs have raised concerns about obligatory public rolling stock pools. They argue that the characteristics of the trains are part of their own product strategy. Others claim comparative advantages in the financing of rolling stock. A further possibility for the TOCs to ease their investment risk is the growing activity of private train car pools in Germany. There is limited information about the influence of financing risks on the number of bidders. Beck e.g. states that there is no evidence for a positive relation between the number of bidders and the use of a car pool or residual value guarantees (Beck, 2005, 96), a finding which is approved by our data. This result is rather surprising given the importance of capital costs for a TOC in the RRPS.

Residual value guarantees can help the companies to get a bank loan and public car pools even do more than that. If there is no financing problem it might reflect the fact that there are some big international companies in the German market and on the other hand a lot of smaller TOCs which are publicly owned and backed by states or local governments. We will challenge this finding in section 3.4.

3.2.3 Effects of Competition

In practice, competition among the various railway operators only takes place for tenders issued by the *Aufgabentraeger*. Additional competition very rarely occurs. The direct award of contracts – mainly to DB Regio - is still dominating. This procedure usually means that the federal states have signed long-lasting contracts (between 12 and 18 years) for a large network with the DB (table 1 lists some examples). Competitive tender procedures on the other hand have usually contained only single lines or smaller networks. In 2004, only 26.1 m train-km were awarded via tender procedures. This contrasts with 217.8 m train-km which were directly assigned to the DB (Deutsche Bahn AG, 2005, 15). Overall, approximately 130 m train-km were tendered between 1996 and 2005 in a competitive way (see figure 10).

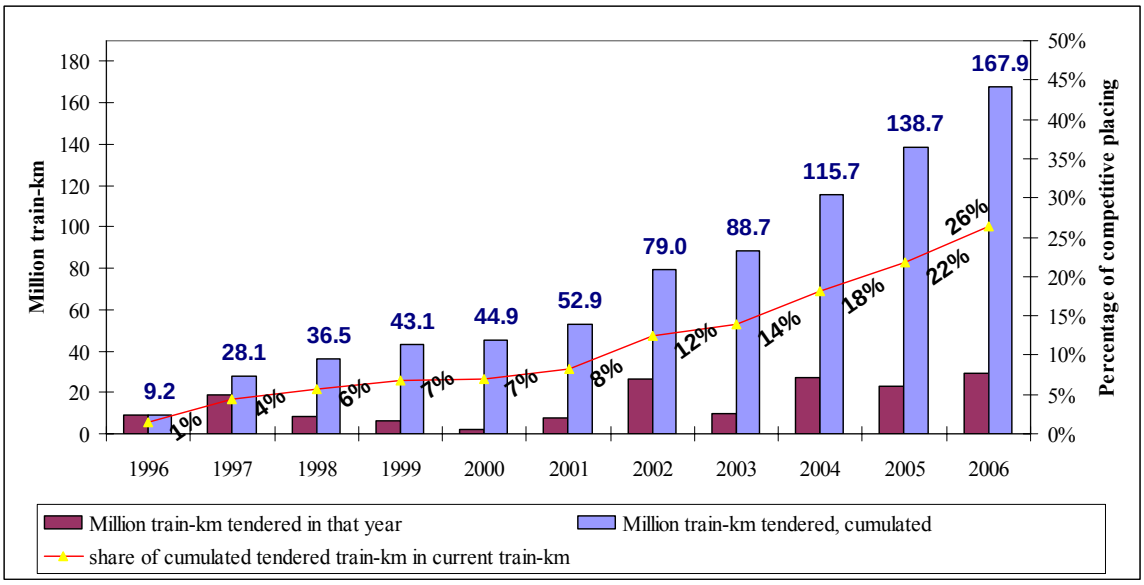

Figure 10: Competitively Tendered Services 1996-2005

Source: own figure, based on Deutsche Bahn AG (2004, 2005, 2006), 2006: estimated by DB AG.

Figure 11 shows the development of market shares of the DB and its competitors (share of passenger km). While the market has been growing since 1996, the DB lost a part of its market share.

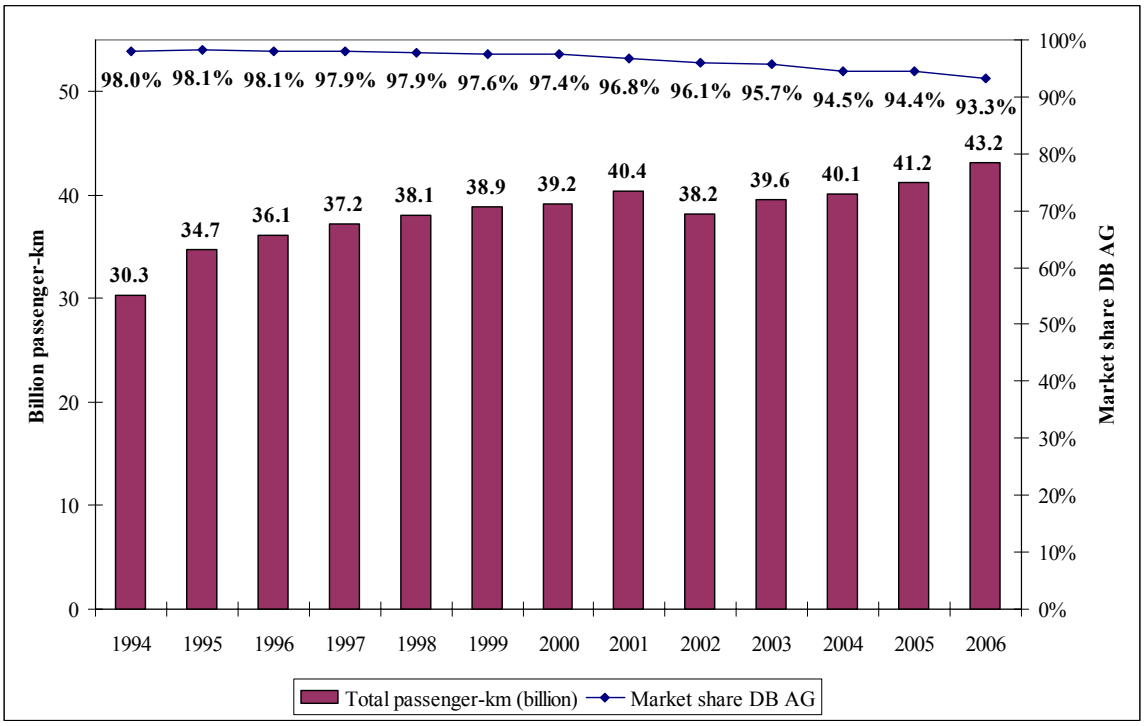

Figure 11: Development of Market Shares and Passenger-km 1996-2006

Source: 1993-2002: Progtrans (2005); 2003-2006: DB AG (2007), 2006: estimated by DB AG.

As already mentioned, the forces of the market are not the main drivers for the change over time. The most important parameter of the market structure is the awarding policy of the regional authorities. The DB has acquired "only" 45 % market share in tendered train-km between 1995 and 2005. The growth in market share (train-km) of the other railway operators from 6.4 in 2000 up to 13.2 % in 2005 can be mainly attributed to their success in winning tenders. Only very rarely the *Aufgabentraeger* awarded contracts directly to DB's competitors. A few regional authorities pursue a long-term strategy to support competitors of the DB in order to have more alternatives in the future.

The overall transport performance in regional rail passenger transport rose from 29.9 bn. passenger-km in 1993 to (estimated) 41.8 bn. passenger-km in 2005. Thus, the RRPS grew by almost 40 % within a decade. After a brief collapse in the year 2002 the transport volume of the RRPS has been growing consistently and reached a new peak in 2005. The generous endowment with federal funds and to a lesser degree the implemented competition is responsible for this very positive development. Additionally, the long distance passenger transport branch of the DB AG cancelled some interregional train services which helped the growth of the RRPS.

In 2004 (2005), the overall performance of DB AG's competitors was at around 2.6 (2.8) bn passenger-km (Deutsche Bahn AG, 2005 and 2006). Thus, the competitors had a market share of 6.3% (6.8%) (Deutsche Bahn AG, 2006, 18). In 2004, among the competitors of the DB, the three global players in the German market (Connex, Arriva, Keolis) had a cumulated market share of 40%. Consequently any one of them accounts nationwide only for a marginal part of the market (Höhnscheid, 2005, 22-23).

There is a substantial discrepancy between the share of train-km and the transport performance (compare figures 11 and 12). The reason for this discrepancy is the end user demand for rail transport in the past tendering processes. So far, the regional authorities have tendered only lines or networks of minor importance.

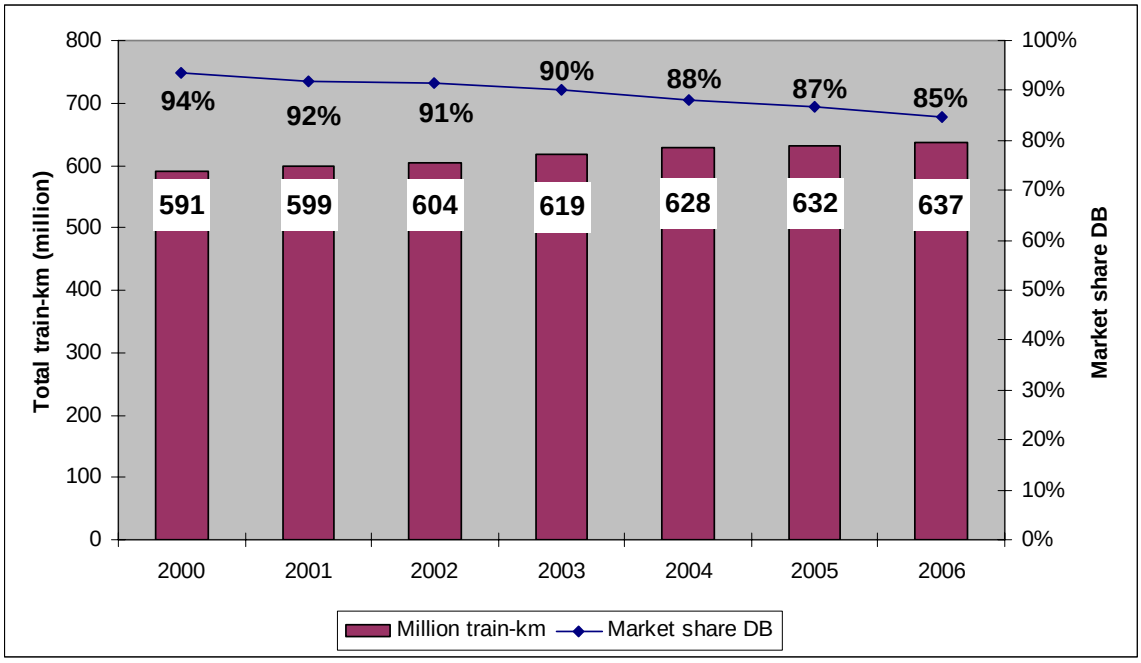

Figure 12: Market Share and train-km 2000-2006[11]

Source: Deutsche Bahn AG, 2007.

Reports about the experience made with competition for RRPS are seldom but can be summarised as follows (see e.g. Höhnscheid, 2005, and Leister, 2004):

- Tendering of lines and networks led to substantial savings for the states. A reduction of 20 % of granted funds for RRPS-operators could be observed. An analysis of 37 tenders shows that the *Aufgabentraeger* realise savings of around 18 % in competitive tenders of less attractive services. Some authors speculate that savings for high value RRPS could rise to around 38 % (Mehrbahnen, 2004, 4)[12]. It is not granted that savings are always accompanied by changes of the service provider. Allegedly, some providers offered in a tender procedure the same services as in the last period, only for 75 % of the prior price. This view is not rejected by our data: according to our data (cf. results from our own survey

[11] The train-km figure also includes occasional services.

[12] Some *Aufgabentraeger* are incentivised monetarily to realize cost savings. The Rhein-Main-Verkehrsverbund in Hesse for example is allowed to keep 10 % of the realized costs.

in section 3.4), 59 % of the open tenders led to a change of the operator (n=32). As a result of negotiation procedures, 52 % of the operators changed (n=29).

- Meanwhile, the quality of services improved substantially. Besides numerous measures taken by the states (buying/financing new rolling stock, introduction of integrated regular timetable services and pricing-systems) many point out, that the customer-orientated approach by the new entrants led to their success.
- As a result of these quality improvements, overall transport performance – in particular that of the DB-competitors - rose substantially. A number of lines are reported to have increased the number of passengers by more than 100 % (Leister, 2004, 110).

3.3 The Service Contracts

Regional as well as local rail passenger transport in Germany is almost completely undertaken through public service contracts. Despite its tremendous importance, a general standard for the contract of required public service obligations does not exist. The regional authorities responsible for awarding contracts have instead chosen to use solutions that they have adapted to their regional requirements, taking advantage of different contractual forms and the competitive environment - as they interpret it. This has resulted in a remarkable heterogeneity of contracts.

Before discussing in more detail this variety of contractual forms that are being used, some central aspects of public service contracts should be mentioned:

- Contract duration and network configuration

Both aspects are crucial for the attractiveness of market entry. Additionally, contract duration can be decisive for the incentive system; short-term contracts can rely mainly on the threat of losing a contract, while long-term contracts need supplementary incentives like bonus-malus-systems to ascertain a high quality performance of the provider. By network configuration we refer first of all to the volume of the service and in some cases additionally its complexity (e.g. the degree of integration in larger service networks). In Germany, there is an intense discussion first and foremost regarding the maximum service volume that should be tendered. This clearly reflects the concern for medium-sized competitors.

- Service definition

  What tasks have to be fulfilled and how "tight" is their specification? First of all, this aspect concerns service dimensions but also the means of production, e.g. whether the use of a car pool is mandatory. There is an ongoing debate in Germany about the appropriate level of TOCs autonomy to specify services, prices, marketing activities, and the rolling stock used. The trend towards a more intense integration of tendered RRPS into more comprehensive transport service networks (including bus transport) (e.g. Federal States initiatives), associated with the creation of regional brands limits the range of independent initiatives by the operators. Additionally, a tight specification of requirements eases market entry especially for medium-sized competitors (reduction of risks, less planning capacity required, transferability of rolling stock). On the other hand, this reduces firms' ability to differentiate their offers, thus intensifies price competition, and shifts planning tasks back to public authorities.

- Risk allocation

  The allocation of risks hinges on several parameters. The most important aspects are (i) to align risk taking and the ability to influence risk and (ii) the trade-off between risk taking and risk sharing. Authorities use a wide array of measures to deal with these questions and it is only partially possible to identify these measures. On the one hand, there are some clearly identifiable trends, e.g. almost all authorities share or bear the risk of infrastructure charge increases. In other cases, the measures are very specific for the particular case (e.g. some authorities guarantee ticket prices if these are determined by regional public transport associations or they guarantee minimum revenues if demand estimations are highly uncertain due to a lack of data). A relationship between risk allocation and market entry / intensity of competition should be expected. Theoretical models show a trade-off between risk bearing - and the consequential interest in cost reduction - and the intensity of initial competition for the contract (McAfee & McMillan, 1986).

- Additional incentive elements

  Service contracts often require additional measures, especially to assure compliance with quality targets. The necessary extent depends mainly on contract duration and risk allocation design. Particularly, the link between service quality and revenues is often weak. This is partly due to the impossibility to raise prices within a public transport association, to fully capture general demand increases (network externalities) and due to the limited importance of passenger revenues in general. To compensate for this, authorities can “correct” quality incentives by introducing a more fine-tuned system.

While the conceptual design of these incentives is complicated, time and resource consuming, it can avoid the assignment of unmanageable risks and it has forced the authorities - in Germany for the first time - to think systematically about quality measurement, quality targets and their willingness to pay for quality.

- Contract adjustment

  Like almost any contract, public service contracts are never fully specified. Of central concern is the question whether the possibility to re-negotiate contracts renders the incentive system and the tendering approach useless. In its most extreme form re-negotiations install a kind of cost plus contract, destroying incentive effects of fix-price arrangements and corrupting the tender process - tendering a cost plus contract does not assure the choice of the most efficient provider. On the other hand, in an ongoing relationship contractual flexibility - the other side of re-negotiations - is necessary to deal with changing circumstances, new information, and new opportunities. Thus, efficiency depends on design. Design questions concern especially the use of automatic adjustment formulas and the efficiency enhancing specifications for renegotiations.

3.3.1 Our Data Set

In the following sections 3.3.2 – 3.3.6 we show some results of the inspection of empirical data on contracts in the German RRPS market. Usually there are hardly any facts published about the awarding procedures, the contract specifications, and the performance of the winning companies. This is partly due to the fact that the public authorities face legal difficulties when disclosing information about the bidders for the contracts. The other part of the explanation is that some of the authorities in charge of

the tenders and the management of the services don't want the services of their region to be compared to other regions, especially when it comes to prices. Therefore we base our analysis on a number of different sources, like press releases, news reports, our survey and some interviews with stakeholders. Each of these sources offers only single bits of the whole picture. The bulk of our data is of the following origins

- Our most important data source was a survey which we conducted in 2006. It was sent to most of the *Aufgabentraeger* and contained 34 questions (cf. Annex 1) on (i) basic characteristics of the awarding procedures and the contracts, (ii) specification of the cost and revenue risks, (iii) additional incentive schemes, and (iv) provisions for contract adjustments. 31 questionnaires were returned, which is a rate of around 50 %. Usually, each of the 33 German *Aufgabentraeger* uses different types of contracts within its region. The subject of each questionnaire was therefore a single contract. We put our focus on competitively tendered contracts as there is more information available about them. However, we have a number of contracts in our sample which have been awarded by negotiation procedures.

- We enhanced the data of the survey by an analysis of around ten tender documents. These tender documents are not subject to confidentiality. They are usually sold by the regional authorities to the interested TOCs at the beginning of the tender process. They contain a huge amount of information including a draft service contract. Due to the legal requirements these information will eventually become part of the contract. With this document analysis we managed to get information about the content of the contract without actually looking at them.

- We scrutinized the "tenders electronic daily" service (TED), which is a supplement of the official journal of the EU. Information about ongoing tenders is to be found on this site as well as announcement about awarded contracts. Due to the different legal interpretations described in chapter 3.1, not all of the *Aufgabentraeger* competitively tendered their services. Consequently, not all of the tenders can be found in TED. Moreover, the data that is published there varies heavily in terms of quantity and quality. The standard form of TED for the contract notice allows for useful entries such as the number of train km, the duration of the contract, and the awarding criteria. Additional information can be provided in the standard form for the contract award notice. We found especially the data on the number of bidders and the final value of the contract helpful for our analysis.
- Selected problems were addressed in several interviews with representatives of two TOCs.

Altogether we managed to gather information of 82 contracts from the period 2001-2006, which have been issued by 22 different regional authorities. The data we have depends heavily on the willingness of the *Aufgabentraeger* to participate in the survey and the availability of additional sources. Moreover, most of the regional authorities refused to answer a number of questions, mostly because they felt they touched confidential information. As a consequence, there is a significant variance in the quality of our data records which is reflected in the following statistics. We have a core set of 43 contracts from 15 different *Aufgabentraeger*, based mainly on the questionnaire and on tender documents. They have a rather good coverage of most of the questions, apart from the ones related to realised revenues and costs.

To our knowledge there have been three similar studies on the German RRPS market:

- Laeger describes the process of regionalisation and conditions for failures and successes of service contracts from the first years after the regionalisation. He uses data from 38 tender documents and 20 service contracts. In his descriptive analysis he mainly focuses on basic data about annual train-km, contract duration, and costs (Laeger, 2004).
- Borrmann conducted a survey based on a questionnaire in 2001. His data set comprises 22 contracts of 15 *Aufgabentraeger* (Borrmann, 2003).
- The most recent work is a master thesis by Beck. His descriptive analysis are based on tender documents and some additional information of 30 service contracts. He also uses this data to estimate a linear model of the number of bidders (Beck, 2005).

Our data set is more comprehensive than the ones above. It comprises more recent contracts and is focused on the time from 2001 onwards. We focus our survey on contracts which were awarded in the period 2001-2006. We tried to exclude first round failures in contract design which have been committed directly after the regionalisation in 1996. With this homogeneity of the time dimension we try to grasp the most recent state of the art of the contract design in the German RRPS. Moreover, we try to avoid a spoiling of our data by trends e.g. in prices.

3.3.2 Contract Duration and Network Size

Service contracts in Germany last between two and 15 years, with an average length of nine years (cf. table 3). The average length of the contracts awarded by open tenders is

ten years, while service contracts awarded by negotiations are shorter. Their contract duration is on average eight years. Sometimes there is a prolongation clause of one or two years. Some preparation time after the signing of the contract is given to the winner. The start of the operation usually takes place around 1.6 years later. This period is partly defined by the availability of rolling stock, but is also influenced by juridical appeals from non-successful bidders.

Table 3: Contract Duration (Laufzeit) and Time Lag (Zeitspanne) after Signing of the Contract and Start of Services

		Laufzeit	Zeitspanne
Bidding Process	N	49	47
	Mean	10	2,01
	Std. Deviation	3	0,94
	Minimum	2	0,17
	Maximum	15	4,92
Negotiation	N	33	33
	Mean	8	1,11
	Std. Deviation	4	1,03
	Minimum	2	0,00
	Maximum	15	4,42
Total	N	82	80
	Mean	9	1,64
	Std. Deviation	4	1,07
	Minimum	2	0,00
	Maximum	15	4,92

Source: own Questionnaire; N: Number of Observations.

The difference in the time horizons of the contracts is one explanation for the awarding procedure the authorities decide for. They have to spend € 250.000 - 400.000 for an open tender (Gorka, 2005, 6). This amount can be reduced with a smaller number of bidders. This amount is contrasted with € 150.000 – 200.000 the TOCs spend to participate in an open tender. This amount is increased if they need additional demand

studies from external sources. In our sample, an average of around five TOCs submit bids in such a tender, which generates total ex ante costs of € 940.000 – 1.120.000. If there is only a small subnetwork to be tendered, the *Aufgabentraeger* rather choose direct negotiations because they think this is less costly.

Table 4: Number of Annual Train-km

		Betriebsleistung
Bidding Process	N	49
	Mean	2,3
	Std. Deviation	1,7
	Minimum	0,1
	Maximum	8,7
Negotiation	N	32
	Mean	1,7
	Std. Deviation	1,9
	Minimum	0,1
	Maximum	7,9
Total	N	81
	Mean	2,1
	Std. Deviation	1,8
	Minimum	0,1
	Maximum	8,7

Source: own Questionnaire; N: Number of Observations.

Up to now, only minor, mostly non-electrified, networks have been tendered. The average size is about 2.1 m train-km per year (cf. table 4). A remarkable exception was the light rail system in the Rhine-Neckar area which, including some further regional lines, covers an area with 8.7 m train-km per year. The smallest service contract so far entailed only 0.1 m train-km per year and served a net of 13 km. Winners of larger contracts face network lengths of more than 300 km (Laeger, 2004, 125).

The effect of the annual performance on the number of bidders remains unclear. But we did find a significant correlation between the duration of the contract and the requested

annual performance (train-km) (cf. section 3.4.2). A rather short contract with a high number of train-km will probably create problems to the bidders if the rolling stock market is not fully developed. This is one of the questions we address in 3.4.

3.3.3 Service Definition

There is no standard contract for RRPS in Germany. Even within one state there are sometimes different types of contracts. This holds for the service definition as well. The majority of contracts display a tight specification:

- Concerning operational factors (relations, running time, frequency, first and last services, and so on), the majority of contracts leaves almost no decision-making authority to the TOCs. We collected data on 13 vital elements of the contracts, concerning tariffs (different fare types, through ticketing, …), the timetabling (service frequency, daily hours of operation, …) and the rolling stock (personnel, equipment). Our questions were if there are exact specifications, minimum standards or no specifications for these elements. 29 % of our contract sample (n=41) made on average exact specifications and 71 % required minimum standards to be met. In negotiation procedures, minimum standards – and more degrees of freedom - are more often to be found than in open tenders. One reason for this is the legal status of the procedures. The degrees of freedom that the contracts leave have to be judged against the penalty system.

  Often, an offer to exceed predetermined standards is not taken into account in the awarding process. A central reason is the introduction of synchronized timetables by several German states. The coordination of bus systems and intercity rail traffic with regional rail services restricts the possibility of individual decisions by train

operating companies. The *Aufgabentraeger* usually require minimum standards to be met for the intra- and intermodal interchanges. They grant less freedom to the TOCs in the departing times of the first and last daily services.

Additionally, synchronized timetables also severely restrict available infrastructure capacity, complicating the introduction of additional trains, and finally, the scope for profitable additional services seems to be very limited.

- Pricing decisions of TOCs are also severely restricted. Public transport associations offer "one stop shops" to public transport users and have set up integrated regional passenger service offers. This has forced TOCs to adhere to the given price systems. Consequently, the most restrictive rules apply to the acceptance of third parties` tariffs. Usually, the TOCs have to offer some classes of tickets which are also applicable for other local public transport modes. According to our data, 73 % of the TOCs (N=45) have to accept tariffs of regional transport associations. There is also the need to find an agreement with the DB on mutual ticket acceptance. This means a further limitation for the TOCs of their pricing possibilities by the tariffs for long-distance passenger transport of the DB.

- Marketing is also a task mainly performed by public transport associations. They define the umbrella brand characteristics. In our sample, most freedom is left to the TOCs in their marketing activities, but usually minimum requirements are to be met. There are regional authorities that claim to have had bad experiences with TOCs, which did not make enough efforts to increase rail demand. Consequently, some service contracts specify initial investments and annual amounts to be spent for marketing, a substantial part of which has to be dedicated to the umbrella brand. In-

train service and to a lower extent information campaigns are the main marketing instruments that can be used by the TOCs to increase their own ridership.

In addition to service specification, almost all of the contracts lay down the rolling stock to be used. The technical capabilities are indirectly defined by the required service programme and the infrastructure. For the furniture of the trains (number of seats, toilets, ticket machines, and so on), the Aufgabentraeger make minimum requirements in 88 % of the service contracts (N=33).

Data of 20 contracts exhibit a remarkable difference of the payments: they reach from EUR 2.64 to 10.87 per train-km (cf. table 5). If one assumes an average load factor of 70 pkm/train-km[13], the franchise payments are on average 4 – 16 Eurocent per pkm. The differences in the types of contract, service specifications, alongside with demand and infrastructure characteristics and charges, do not allow for a simple comparison of the franchise payments. Further analyses e.g. on the productivity of certain services, have to be postponed, as knowledge about individual specifications of contracts is still limited.

[13] This is roughly the load factor of DB Regio. It is most likely above the average, as the DB Regio serves a great part of the high-demand-relations.

Table 5: Franchise Payments

		Franchise Payment	Franchise Payment per train-km
Bidding Process	N	15	15
	Mean	237,74	7,94
	Std. Deviation	194,87	1,97
	Minimum	2,5	4,29
	Maximum	650	10,71
Negotiation	N	8	7
	Mean	292,31	8,35
	Std. Deviation	235,6	2,95
	Minimum	11,6	2,64
	Maximum	613	10,87
Total	N	23	22
	Mean	276,29	8,07
	Std. Deviation	204,87	2,26
	Minimum	2,5	2,64
	Maximum	650	10,87

Source: own Questionnaire; N: Number of Observations.

For the future, representatives of regional authorities have announced the increased use of so called functional tenders (Wewers, 2004). The tendering documents shall contain minimum standards. Offers that exceed these standards shall be considered in the awarding process. The TOCs will then compete with different timetable-offers, and get more decision-making authority concerning rolling stock and marketing.

3.3.4 Risk Allocation

The classical trade-off in contract theory concerns costs and benefits of risk sharing between contract partners, i.e. costs of risk bearing and the incentives to economize. The actual risk allocation depends on the form of remuneration. One can distinguish between revenue risk and cost risk. Two questions are decisive:

The first central question is whether the TOCs receive realised revenues. In "net cost contracts" a railway company receives its revenues and the regional authority only pays the difference between revenues and costs. In this case, demand information plays a crucial role in the bidding process. This is usually perceived as an advantage for DB Regio. DB Regio possesses the most detailed information on demand and an area-wide ticket sales system. Moreover, the DB controls the long-distance passenger transport, which is a competitor for the RRPS on some relations. Due to limited information, the calculated revenues of the TOCs can differ significantly. In the tender for the Marschbahn (4.1 m train-km p.a.) in 2003, the DB claimed that the revenue forecast of the winning firm, Connex, had been highly exaggerated: according to the DB, Connex calculated with revenues of 8.2 Eurocent/pkm, which was 30 % more than the other two bidders expected (Deutsche Bahn AG, 2004, 11).

An additional risk for the service providers arises if his lines are part of a regional integrated tariff system. In these systems there are usually different operators of buses and trains that use a common set of tariffs. The revenues of ticket sales are shared among these members of the tariff system according to rules which can't always reflect the performance of a individual operator. In any case, the revenue sharing rules may be subject to changes which are not entirely controlled by a single TOC.

In a "gross cost contract", revenues generated are passed to the regional authority and the operator receives a compensation for its emerging costs. Revenue risks are in these contracts entirely borne by the regional authority.

Between these extreme forms of remuneration several intermediate contractual provisions are possible: The railway companies receive only a share of their revenues or they receive some form of "shadow revenue", that is, their remuneration is based on

ridership but not on revenues. Payments per passenger-km can in this case reflect social costs or they can be the result of revenue allocation rules of public transport associations. In other contracts, the TOCs have guarantees for a tariff mix on certain lines. This reflects their limited possibilities to influence the tariffs. Thus, not all of the net cost and gross cost contracts are of a pure nature, even if they assign 100% of the revenues in the first instance to the TOCs respectively to the *Aufgabentraeger*.

Some regional authorities mitigate a part of the risk in net cost contracts which is exogenous to the TOCs. We found provisions to share special threats for the revenues. There are for example arrangements for a change in demand which results from a change in the supply of long-distance passenger services. In gross cost contracts, there are usually bonus and malus schemes based on the realised demand. There are e.g. contracts, where the TOCs have to compensate the regional authorities to 100 % of the missing revenues, if the demand drops below a pre-defined threshold.

It is often argued that net cost contracts, leaving revenue risks with the railway companies, are essential to create adequate incentives for the companies to raise ridership. But the costs of these incentives may be too high. Gross contracts on the other hand are said to establish incentives to minimise costs - even by reducing quality. This argument is usually reinforced with the low demand elasticity in local public transport. Even if one neglects the effects or incentives of the tendering process this characterisation is only strictly true if the contracts are some kind of fixed-price contracts.

The second major issue of contracting is the question is whether a fixed-price or a form of cost plus contract is chosen. In the first case, the payment is simply the firm's bid (usually the required compensation per train-km). In the second case, the government

assures a certain profit (as percentage of actual costs). Again, not only extreme forms are possible: In an incentive contract the government agrees to offset a given share of a firm's deficit or the firm can keep a given share of higher-than-agreed revenues. Additionally, the introduction of cost pass-through rules allows a combination of fixed-price and cost plus elements.

Again, the situation in Germany exhibits a wide variety. In our sample we found the following characteristics

- 61 % net cost contracts, 29 % gross cost contracts and some forms of incentive contracting, i.e. regional authorities and TOCs share revenues (10 %) (n=38);
- In 2 % of the contracts, the tariffs are adjusted automatically
- In almost all cases, there are no guarantees about minimum revenues. 19 % of the contracts (n=31) contain some form of compensation rules for an unexpected change in demand. The *Aufgabentraeger* participates up to a certain degree in a rise and a decline of demand.
- 88 % of the contracts comprise cost-pass through rules for tracks and stations. These components accrue to 40-60 % of the TOCs´ total costs (e.g. Gorka, 2005, 5)[14]. Although these charges are regulated, some operators are afraid of discrimination by the DB. Most of the remaining 12 % provide for an annual lump-sum increase of these cost elements (n=40)[15].
- 80 % of the contracts (n=40) provide rules for the adjustment of some cost elements, which are not covered by cost-pass-through rules.

[14] An adjustment of the track access charges is planned for 2007. It will presumably lead to a 3-4 % rise of the total charges for RRPS (Wewers, 2006, 3).

[15] The TOCs usually have to enclose a cost calculation in their bid. On the basis of this calculation, cost adjustments can be pursued during the lifetime of the contract.

- In 73 % of the contracts, the regional authorities adjust their payments if personnel costs change. Alteration in energy cost lead to a change in 58% of the contracts. Not all of the change is adjusted for in any contract: around 38% of the contracts with adjustment rules use thresholds up to which a change of the personnel or energy costs is entirely borne by the TOCs. Energy costs (usually diesel), accrue to 6 % of the total cost (Laeger, 2004, 88)

A much discussed example for risk-sharing was the tender of the Netz Nordharz (2.8 m train-km p.a.) in 2003. It was stipulated to grant the operator 95 % of the revenues and to burden him nearly all costs apart from around 40 % of the track charges. The compensation for the remaining track charges was to increase by 1 % each year. Likewise, the compensation for all other cost components had been set to rise by 1.5 % each year. TOCs complained about the risk being unduly high (Quandt, 2003, 4). This tender has so far been the only one which to our knowledge did not generate any valid bid. Eventually, the contract was awarded to Connex in a negotiation process.

Additionally, one has to keep in mind that revenues are often the allocated shares of public transport associations´ revenues. This may limit the incentives for a TOC to raise its revenues, as the tariff income allocation rules of public transport associations can usually hardly be influenced by the TOCs.

3.3.5 Additional Incentive Elements

Bonus-malus systems or contractual penalties are often used to assure compliance with agreed upon quality and to introduce an incentive - beside additional revenues in net cost contracts - to raise quality. In Germany, almost all contracts entail contractual penalties for failing to achieve contracted quality. Formerly, punctuality was the only

quality dimension considered. In the last years, the malus schemes have become more complex. In our sample, all contracts provided the TOCs with additional incentives: 68 % (n=41) included a bonus-malus scheme, 32 % disposed of a pure malus scheme.[16] Typical elements of a bonus regime are increases of demand and punctuality. Malus payments are prompted by a wider variety of reasons, including typically cleanliness of rolling stock, punctuality, capacity, personnel on the train, cleanliness of stations, and no-show number of trains.

Net cost contracts are more likely to be combined with a malus system in our sample, while gross cost contracts are more often amended by bonus-malus systems. This finding is intuitive, as TOCs which operate under a gross cost contract must not only be incentivised to prevent a decrease of their performance but also to raise the patronage.

The design of the malus system is a delicate issue. Low penalties will have no effect on the performance while high penalties can drive the operator into financial difficulties. We found several contracts which provide a cap of the malus payments of 2-16 % of the total annual payments. Contractual penalties, e.g. for the delayed start of the operation, are treated separately from malus payments. They are often capped as well, e.g. 5% for the Marschbahn, 8 % in some other contracts. The operators may thus easily face a total reduction of more than 20 % of their annual payments if they do not deliver the required services. In some contracts, there is no cap on the malus payments which exposes them to even higher risk. Such a malus regime can threaten the viability of a business, as the margins in tendered services are - according to representatives of the TOCs - less than 10 %. But there are significant differences in the caps of the malus payments, e.g. in

[16] The enquiry of Beck (2005, 105) found bonus-malus payments in 50 % of the contracts and pure malus regimes in 47 % of the contracts. Wewers identifies only 23 *Aufgabentraeger* which measure quality and use this data for penalisation (Wewers, 2006, 1)

Saxony-Anhalt caps for malus-payments were at 1.5 % in 2003. As a result, the malus payments of the DB Regio were cut from EUR 7.7 m to EUR 3.8 m. In the same year, contractual penalties accrued to EUR 2.5 m (NN, 2005, 48).

While bonus-malus schemes can be useful to incentivise TOCs, their design poses significant informational requirements: Especially, restrictions like budget-constraints or costs of public funds require a planner to take account of the cost structure of the operators.[17] If this information is not known to the regional authorities when they prepare the tendering process, theory suggests e.g. offering a menu of bonus-malus-schemes to the bidders.

In the case of the Westerwaldnetz the TOCs had to select one out of three combinations of maximum bonus-malus payments. The maximum malus payments were in any case four times higher than the maximum bonus-payments. If the bidder chooses category A, the annual malus payments are capped at € 2 m, the annual bonus-payments are capped at € 0.5 m In category C, the cap is € 4.0 m for malus-payments and EUR 1 m for bonus-payments. It is not known how the regional authorities considered the choice of the bidders in the awarding process.

The introduction and enhancement of incentive regimes comes at a cost. The regional authorities introduce more and more quality management systems, which are expensive to develop and have to be fed periodically with a great amount of data. This data is partly generated by mystery shoppers, which is costly in itself. The generation of the data is sometimes at the expense of the TOCs. We found for a few contracts that the

[17] An ideal incentive scheme - intended to urge the operators towards socially optimal services - shall confront the TOC with the social consequences of its performance. E.g. if low performance results in lower ridership, only revenue effects are directly relevant to the TOC (in net cost contracts), while e.g. additional congestion costs on roads are not taken into account; thus, the planner has to correct revenue effects. Without the restrictions mentioned, a performance-based contract could be based „only“ on demand information (consumer surplus, externalities and so on) since the transfer of rents would be irrelevant. For a comparable problem see Hensher / Houghton, 2004.

cost which is paid by the regional authorities for the incentive schemes ranges from 0.1 - 3 % of their annual payments to the TOCs.

3.3.6 Contract Adjustment

Franchise contracts are usually long-term contracts. Changing conditions, e.g. changing factor prices or demand shifts, may require contractual adjustments to restore efficiency. However, these adjustments can also result in inefficiency. Especially renegotiations may actually transform a high-powered incentive contract into some form of a cost plus arrangement resulting in lower efforts and seriously damaging the selection efficiency of a tender.

Franchise contracts in Germany usually contain dynamic adjustment formulae. As stated above, most of the contracts entail escalation clauses for the franchise payments. The necessity to renegotiate contracts is drastically reduced by these automatic adjustment clauses. Apart from these clauses, which affect the distribution of costs and sometimes the revenues, there are provisions in the contracts for changes of the quantity and quality of the services to be delivered:

- In 80 % of the contracts (n=31), the *Aufgabentraeger* is allowed to unilaterally ask for an increase of train-km but the possible increase is capped in almost any contract. These increases have to be paid on the basis of fixed prices (in 34 % or 55 % of the contracts respectively).
- The *Aufgabentraeger* is allowed to cancel services unilaterally in 84 % of the contracts. This right is granted to the TOCs only in 53 % of the contracts. 61 % of the contracts entail compensation rules for these cancellations.

- It is possible for the *Aufgabentraeger* to unilaterally change the quality of services in 55 % of the contracts. Again there apply calculation rules for the payment of these changes.

If these clauses fail to carry out an automatic adjustment of the terms of trade, a renegotiation process is started. Around 16 % of all contracts in our sample entailed a specification of the renegotiation process. Usually these specifications clarify when a party has the right to call for a renegotiation, what information the parties have to provide, the rules that govern the decision-making board, and whether and when a party has the right to refer a matter to arbitration.

Whether the possibility of renegotiations renders franchising systems inefficient is a matter of design. The institutional design decides whether a public authority can hold up a franchisee or whether the originally intended risk allocation will adhere. In August 2003, e.g., the first case of bankruptcy in Germany occurred. The train operating company FLEX AG, a subsidiary of the Norddeutsche Nahverkehrsgesellschaft (NNVG), which had received a franchise in Schleswig-Holstein one year before (1.1 m train-km per year with a term of 13 years), had to institute insolvency proceedings. Its parent company followed shortly. One reason for the bankruptcy was the overestimation of revenues, as a net cost contract had been awarded. Furthermore, there was a problem with revenue allocation within the tariff association of Schleswig-Holstein. The regional authority denied any renegotiation but instead opened up a new award procedure (price request) immediately. Within two months a two year interim solution was established. A Connex subsidiary took over the business with more favourable conditions. Simultaneously, a new, regular award procedure was initiated. With only this single

renegotiation in case of the FLEX AG mentioned above, the German RRPS contracts seem to be immunized quite well against this threat.

A final clause to avoid renegotiations is the right of the regional authorities to denounce the contract without notice. This is possible in all contracts of our sample (n=30) on the basis of failures to meet quantified targets. Punctuality or other quality parameters serve as the crucial indicators for the retention of a contract.

3.4 The Influence of Specific Investments and Uncertainty on Contract Duration and Contract Completeness: Empirical Results

3.4.1 Transaction Cost Economics

Transaction costs are usually defined as costs of establishing and running an economic system (e.g. Richter/Furubotn, 1999, 48). This definition, which contrasts them with production costs, already implies that transaction costs can be fixed (e.g. most of the timetabling costs) or variable (e.g. most of the quality monitoring costs). A further distinction is often made depending on the time of their occurrence: there are ex ante and ex post transaction costs. The point of reference is usually the time of signing a contract, which leads to the core of the transaction cost approach: the analytical focus is the exchange of goods between two parties, which is based on an explicit or implicit contract. Contract parties can be part of different entities and they can be members of one firm, i.e. the transaction cost approach is used not only to analyse market transactions, but also intra-firm relationships.

Transaction cost economics have been widely used in empirical models which analyse contract design (Joskow, 1987; Crocker / Masten, 1991; Saussier, 2000; see Masten / Saussier, 2002 for an overview). Similar to the principal agent theory it is usually

assumed that contracting parties suffer from a bounded rationality and behave opportunistically. Most of these analyses are based on the hypothesis that certain characteristics of the transaction at stake define the governance mode (a firm, the market, or a hybrid of both) which minimizes the transaction costs (alignment hypothesis). Williamson identifies three main characteristics of transactions, or to put it more generally, of contracts (Williamson, 1990, 59ff)[18]:

- Asset specificity describes the difference between the value that a production factor generates for the contractual partner and the value it generates for the next best suitable partner. This difference of the values according to the use of the asset is clled the quasi-rent (Klein et al., 1978, 298) The higher the degree of customization for a special purpose, the higher is the asset specificity of the factor, which can be distinguished in several forms of appearance: dedicated assets, (the location of) a physical asset, human capital, information, or a brand name. If specific investments are made by one contractual partner, the other party can behave opportunistically during the contract term and try to alter the distribution of the common rent. A contract party who invests in high asset specificity is threatened by the loss of a high quasi-rent at the end of the contract. While specific assets are deployed in order to reduce production costs, transaction cost theory claims that the contract at stake will be designed in order to safeguard specific assets and hence minimize transaction costs. The

[18] Some more characteristics of transactions have been found to be important for the alignment between transactions and governance mode. Williamson himself nominated measurability as important dimension (Williamson 1991), Milgrom and Roberts find the connectedness of transactions to be underdeveloped in Williamsons approach (Milgrom / Roberts, 1992, 32f.). We think that both dimensions are of no great importance to our analysis. We showed in chapter 3 that it is possible to measure the output of the service provider, albeit in a costly way. Connectedness is of no importance for the way we look at the RRPS contracts in Germany as we think we can consider each contract to be independent from other similar contracts.

contractual risk might be mitigated if both parties invest in specific assets. One crucial safeguarding element of a contract is its duration.

- Uncertainty is a second determinant of transaction costs, which exists in two different forms. Behavioural or strategic uncertainty emerges because the behaviour of the contractual partner can not be predicted. Although he is assumed to behave opportunistically it is unknown how he will exactly react under certain contingencies (Williamson, 1990, 66). It is the existence of these contingencies - or environmental uncertainty - that leads to behavioural uncertainty. Environmental uncertainty concerns mainly the downstream and upstream markets of a business partner: examples are the development of input prices and end-user demand. A high degree of innovation in the sector increases the environmental uncertainty. Under uncertain conditions, it is more costly to formulate contracts, but it is impossible to design contracts which make provisions for every contingency. A contract which is subject to uncertainty faces high transaction costs only in the presence of specific assets, because they determinate the quasi-rent which can be appropriated by the contractual partner. Ways to deal with uncertainty are the inclusion of general clauses or the nomination of an arbitrator.

- The frequency of an exchange is important as it affects the costs of establishing and "using" the contract. A contract works best if it is designed particularly for the transaction at stake, but a customization is also costly and may not be worthwhile for a single transaction (Williamson, 1990, 69). A high frequency of a transaction therefore leads to a high "capacity utilisation" of the contract and hence economises on the transaction costs at stake. In spite of this, designing a

specialised contract is still often the right choice for a single transaction with a high financial volume. The main transaction of a service contract is the operation of a timetable, which has been mainly been designed by the regional authorities, for a number of years. There are a number of transactions involved on a smaller scale, including the change of the timetable over the years. The RRPS contracts hence govern a bundle of transactions, but we take this situation for granted. Our focal point is not whether the division of work between the *Aufgabentraeger* and the TOCs is optimal. Instead of this, we take a look at the contract length given this organisation of the German regional rail passenger sector. The frequency of a contract is the inverse of the contract length and is hence the output of our analysis (the dependent variable), rather than an input.

In this paper we assume that the public authorities behave welfare-maximizing; they try to minimize the overall transaction costs of the contract in order to yield the maximum benefit for both contract parties. This assumption is important, as there is usually very little space for negotiations. This holds at least in open tender procedures. The draft contract is part of the tender documents and there are legal restrictions for changes after the start of the tender procedure. TOCs willing to issue a bid have the possibility to ask questions during the franchise replacement process. These questions may lead to a change of the contract clauses, but the chances are usually very small. We think that our assumption of welfare-maximizing *Aufgabentraeger* is not too far fetched. They have learnt during the last ten years that they need to consider the restrictions their contract parties are subject to in order to craft good contracts. Our hypotheses will be based on this assumptions and thus enable us to test them.

Transaction cost economics are one important element of the institutional economics for the analysis of contracts. We think this approach is particularly suitable to explain some characteristics of the RRPS contracts in Germany, because it can be used to explain key design features of long-term contracts. To our knowledge this approach has been used twice to analyse contracts for rail franchises:

- Affuso and Newberry analyse the spontaneous investment of franchisees in the British rail sector. They use asset specificity as an independent variable (Affuso / Newberry, 2002).
- Yvrande-Billon analyses the contract duration of franchises in the UK (Yvrande-Billon, 2004). It is mainly based on transaction cost economics, again using asset specificity as one explanatory variable.

Like Yvrande-Billon, we cast a glance at the duration of the franchise contracts. Our data set exhibits more observations, but we have fewer explaining variables than Yvrande-Billon. In a second step, we try to establish the determinants of the completeness of the German RRPS contracts.

3.4.2 Determinants of Contract Duration

We pointed out in section 3.3.3 that the contract length in Germany varies greatly, showing durations of two to fifteen years. There has been a lot of debate about the optimal franchise length in Germany, but even more in other countries. In Sweden, the franchised RRPS have a duration of 3-5 years, usually containing a prolongation clause. Interregional franchised services were first tendered for one year, but the contract duration then changed to five years (Alexandersson / Hultén, 2005, 51ff).

In the UK, the contract duration has a smaller range and is more standardized than in Germany (Nash 2003, ORR 2005). Directly after privatisation, the franchise length was seven years, but franchises which involved the need of higher investments were awarded for longer periods. In the following years, there was a discussion about whether or not to extend the franchise length to up to 30 years. This idea was never realised and the franchise length for the second round of tenders was rather decreased than increased (Nash, 2003, 12). Currently there is a renewed discussion going on about extending the contract length and including options for a three year extension of existing contracts (ORR, 2005, 15).

One explanation for the different contract durations is the well-developed leasing-market in the UK and in Sweden, something we will look at in this section. The discussions show that the contract length influences the behaviour of the TOCs during the contract period in various ways (e.g. ORR, 2005, 13):

- One crucial aspect is the incentive the contract entails for investment in rolling stock and further assets. If a TOC is threatened with loosing the franchise in the near future, it will be reluctant to increase the number of trains or renovate them unless there are risk-mitigating mechanisms[19] in the contract or the market.
- If the contract length is expanded as a response to this threat, the franchisees might have fewer incentives to deliver the required quality of services. This is again subject to the incentive schemes of the individual contract and to the market conditions.

[19] While using transaction cost economics as basis of our hypotheses, we assume risk neutrality of the contract parties.

The production of RRPS requires a number of specific investments, which have mainly to be borne by the TOCs. The first investment decision that they undergo is whether to participate in the tender or not, as the placing of a bid is costly and the effort solely addresses the tender at stake. We argue that in this decision the rolling stock to be deployed is of special importance. The cost of the rolling stock has the biggest share of the total cost that the TOCs have to bear (cf. section 3.3).

Our first hypothesis is that the rolling stock is partly relationship-specific. Therefore, factors that tend to rise investments in relationship-specific rolling stock will entail longer contracts. The contract length is used to mitigate the hold-up problem. The contract parties – mainly driven by the interests of the TOCs to safeguard their investments – align the contract duration to the asset specificity. They have to trade off a contract prolongation with incentives stemming from a solution that relies more on market mechanisms. While doing this they minimise transaction costs. It is obvious that this mechanism does not lead to the duration being totally adjusted to the life time of these assets, which is 30 years. But we expect the contracts which involve higher specific investment to last longer.

We will now discuss the sources of this specificity. We start with the observation, that there is a high degree of technological interoperability on the German rail infrastructure and then show that this doesn't prevent the asset specificity of the trains.

The technological interoperability in Germany is high. On most of the sub-networks, one-storey trainsets are in use. There is nearly no problem with the power supply in our sample, as most of these services run on non-electrified lines. Signalling is also harmonized on the networks at stake and the relevant equipment is part of any train. The only technological specificity that we are aware of is the heights of the platform edge at

some lines. Legally, the most common trainsets have a licence to run on any part of the network, thus there is no legal factor that crucially influences the physical asset specificity in Germany.

About half of the contracts in our sample oblige the TOCs to deploy new trains, a further 25 % ask for a minimum (average) age. On the other hand, the average length of the contracts is nine years, and in our sample there are even contracts with a two and four year's duration requiring the deployment of new rolling stock. The service providers have to manage the risk of financing the rolling stock, which has a lifetime of about 30 years, after the expiration of the contract. They may fail in winning the particular franchise again. Even if they do win, they will probably not be able to use the same rolling stock, because the *Aufgabentraeger* asks for new assets. For the same reason, the possibility to use the trains in other franchises is limited. Even the authorities who agree to have used cars on their network usually require special characteristics of the rolling stock: 54 % of the contracts make exact specifications for the running times of the trains, thus partly determining the motorisation of the rolling stock. A 79 % of the contracts contain minimum standards or even exact specifications for their equipment (n=39).

These frequently used transaction definitions lead to a certain level of physical asset specificity. Some features of the equipment can be changed in order to meet the requirements of a new customer. This holds e.g. for the ratio of seating and standing room. Others features are virtually fixed like the number of doors. The motorisation is more restrictive, one reason being the different geographical and network characteristics of the tendered lines.

The degree of relationship-specific investments is increased by dedicated assets. Dedicated assets threaten one or both contract parties to lose quasi-rent because they leave the supplier with excess capacity and the buyer without supply in case of premature termination of the contract (Williamson, 1983, 526). This is exactly the case in most of the contracts in our sample, as the rolling stock is particularly bought to meet the particular requirements. It is manufactured only after the signing of the contract. This is one reason for the large average time gap between the signing of a contract and the start of the services. In the case of breach of contract by the *Aufgabentraeger*, the TOCs will usually not find a new purpose for their assets in the medium run. In Germany, the risk of losing the quasi-rents generated by dedicated assets in RRPS contracts is usually borne mainly by the TOC. The *Aufgabentraeger* has always the DB Regio AG with its excess capacity to jump in if a service provider prematurely finishes a contract, although this replacement might come at a higher price compared to the original contract.

It is in particular the need of new rolling stock, alongside with the customized equipment, which limits the possible mitigating effect of rolling stock leasing companies. There is a growing number of these leasing companies in Germany, but with small fleets compared to the UK. They can assume some of the risk of losing the quasi-rent, but they are not able to reduce it if the *Aufgabentraeger* ask for new rolling stock. Moreover, at the time of the conclusion of the contracts we scrutinise, the availability of car pools was quite limited, with Angle Trains being nearly the only provider.

In assessing the level of asset specificity we consider the number of annual train-km (BETRIEBSLEISTUNG) that the TOC is required to deliver. One multiple unit (consisting of two or three parts) runs about 100.000 train-km per year (Laeger, 2004,

126). The average contract of our sample thus requires 22 multiple units plus around 20 % as buffer. The higher the annual train-km and the amount of rolling stock to be deployed, the more difficult is it for the service provider to find a use for his assets at the same price in case of early termination of the contract. This measure addresses the level of dedicated assets (Joskow, 1987, 172)

As a second indicator for the asset specificity we use the time lag between the signing of the contract and the start of the services (ZEITSPANNE)[20]. In order to hand in a complete offer, the TOCs have to include details about the rolling stock they plan to deploy. They usually get these data from the manufacturers. When they get a legally binding contract they order the trains of a particular manufacturer. The production of the rolling stock can take several years, depending on the spare capacities of the manufacturer and the design features of the trainsets to be produced. We argue that the time span before the start of the services increases with the physical asset specificity or the degree of dedicated assets, either because there are very specific production requirements in terms of equipment and motorisation, or because the number of trains to be constructed is high.

[20] More precisely, we measured the time span between the publication of the election of the preferred service provider by the regional authority and the start of the services. There is usually a short time lag of several weeks between this publication and the signing of the contract.

We expect a further increase in asset specificity, if the franchised lines are part of an integrated regional transport association. Crucial aspects of these associations are

- Coordinated lines and timetables
- A common ticket and tariff system.

The physical asset specificity is raised by investments in ticketing systems and in the brand name of the regional transport association. While the investment in the particular ticketing system is usually a consequence of the contract, some *Aufgabentraeger* require the TOCs to invest a certain annual amount for the umbrella brand name of the association. According to our data, the expenses for distribution and marketing account for 3.6 % of the declared cost[21] of the bidders (n=11). A large proportion of these investments is lost in case of breach of contract. We use the Dummy VVB to test for this effect.

Some of the contracts in our sample exhibit a reduced specificity in the rolling stock, either because the *Aufgabentraeger* offer their own car pool or use other support for the rolling stock acquisition (cf. section 3.2.). This reduces the degree of the relationship-specific investments that the TOCs have to bear, as it means a shift of risk to the *Aufgabentraeger*. We expect the contract duration as a means of safeguarding specific investments of the TOCs to be shorter if the dummy FARZ is equal to 1[22]. The expected signs of our variables are summarized in table 6: We expect the number of annual train-km (BETRIEBSLEISTUNG) and the time-lag (ZEITSPANNE) to increase the asset specifity. They have a positive correlation with the contract duration. We anticipate this

[21] In tender procedures, the applicants are usually required to disclose their cost calculation to the regional authority.

[22] We regard the variable FARZ to be exogenous. The decision to use clauses which mitigate the risk of rolling stock finance is either taken because the state owns rolling stock and wants it to be used or it is a political decision or a mixture of both. The political decision is usually based on the intention to foster competition by decreasing the rolling

positive influence by the membership of the TOC in the regional transport association as well (VVB). On the contrary, we expect the public support for rolling stock (FARZ) to reduce the contract duration.

Table 6: Independent Variables and Expected Signs for the Estimation of the Contract Duration (LAUFZEIT)

BETRIEBSLEISTUNG: number of annual train-km	+
ZEITSPANNE: time lag between publication of the tender and start of the services [years]	+
VVB: member of regional transport association (Dummy)	+
FARZ: public support to mitigate asset specificity available (Dummy)	-
NACHFRAGE: information about the demand provided by the *Aufgabentraeger* (Dummy)	?

An interesting question is whether the uncertainty has an effect on the contract duration. When the development of important environmental factors becomes less predictable, the contract parties may think about changing the duration of the contract. According to transaction cost principles, this is mainly the interest of the TOCs, because they want to safeguard their specific assets. The crucial question is how the change of cost and revenues might influence the quasi rent of the TOCs. Increasing costs and/or decreasing revenues lead to a decreasing quasi rent and can lead to shorter contracts. On the other hand, if costs decrease and/or revenues increase, the TOCs might opt for longer contracts, as their quasi rent increases. Both developments of the quasi rent are possible.

stock financing risks. This decision is taken before the tender procedure on the political level. As there is not simultaneity with the design of the contract, FARZ is exogenous.

We try to find out whether the uncertainty influences the contract duration. As a proxy for the uncertainty we use the provision of information about the demand for the tendered services. We concentrate on the revenue side, as they are more unpredictable than the costs, mainly because usually the most important cost components are passed through and for others there are indexation mechanisms. The TOCs need the demand data for the bidding process as it determines the expected revenues, although it is to our knowledge not very detailed for most of the lines. The information is necessary for the bidding on gross cost contracts as well, as most of them reflect changes in demand in their incentive system. 69 % of the *Aufgabentraeger* (n=37) provide information about the demand, but with varying quality: some provide revenue or demand forecasts, others only simple passenger numbers. It is quite unusual for the TOCs to undertake demand studies at their own expense before a tender process due to the attached cost. We only know of two such studies. For our independent variable NACHFRAGE we simply asked if there was any information about the demand given to the bidders at all.

There are 37 observations in our sample to estimate the equation for the contract duration (LAUFZEIT). We estimate three models with an ordinary least square regression. The adjusted R-square of the best fitted model (model 3) is 0.45.

Table 7: Contract Duration - Result of the OLS Regression Model 1 (including VVB and NACHFRAGE)

Model 1	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	5,453	1,961		2,781	0,010
BETRIEBSLEISTUNG	0,597	0,357	0,301	1,672	0,106
ZEITSPANNE	1,229	0,522	0,423	2,353	0,026
FARZ	0,107	0,966	0,016	0,111	0,913
VVB	-0,832	1,142	-0,150	-0,729	0,472
NACHFRAGE	1,172	1,206	0,200	0,972	0,340
R	0,696				
R Square	0,485				
Adjusted R Square	0,390				
Std. Error of the Estimate	2,076				

Dependent Variable: LAUFZEIT

We find that NACHFRAGE has no significant effect. (model 1, table 7). VVB and BETRIEBSLEISTUNG are not significant at the 5 %-level either (model 2 and 3, tables 8-9). However, we expect the BETRIEBSLEISTUNG to have a significant influence with a higher number of observations. Currently, our sample obtains only 37 items with information of the properties that are necessary for the OLS regression. With 80 items, LAUFZEIT and BETRIEBSLEISTUNG are positively correlated at the 0.01-level (table 10). Unfortunately, we have only a limited number of contracts with information about VVB and FARZ.

Table 8: Contract Duration - Result of the OLS Regression Model 2 (including VVB)

Model 2	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	5,964	1,168		5,105	0,000
BETRIEBSLEISTUNG	0,656	0,354	0,301	1,852	0,073
ZEITSPANNE	0,278	0,498	0,415	2,569	0,015
FARZ	-1,571	0,739	-0,279	-2,126	0,041
VVB	0,565	0,844	0,084	0,669	0,508
R	0,710				
R Square	0,503				
Adjusted R Square	0,441				
Std. Error of the Estimate	2,093				
Durbin-Watson	2,200				

Dependent Variable: LAUFZEIT

Table 9: Contract Duration - Result of the OLS Regression Model 3

Model 3	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6,433	0,928		6,935	0,000
BETRIEBSLEISTUNG	0,635	0,350	0,291	1,814	0,079
ZEITSPANNE	1,298	0,493	0,421	2,634	0,013
FARZ	-1,606	0,731	-0,285	-2,197	0,035
R	0,705				
R Square	0,496				
Adjusted R Square	0,451				
Std. Error of the Estimate	2,076				
Durbin-Watson	2,225				

Dependent Variable: Laufzeit

The single most important independent variable is ZEITSPANNE (model 3). One reason might be that there is a further specificity aspect attached to this time lag before the start of the services: this time is normally used to train the employees. Especially the private competitors, who win a certain franchise for the first time, quite often follow a greenfield approach. They have to start their services from scratch in the particular area,

which also means that they have to hire new personnel. Sometimes, the attendants come from the prior operator, or else their training doesn't take a long time anyway. More problematic are the train drivers, because they need to have experience for the particular lines. We argue that ZEITSPANNE measures the time for the training of the drivers as well and hence is also a measure of human asset specificity.

Table 10: Correlations

		1.	2.	3.	4.	5.	6.	7.
1. LAUFZEIT	Pearson Correlation	1						
	Sig. (2-tailed)							
	N	81						
2. VOLLST	Pearson Correlation	0,233	1					
	Sig. (2-tailed)	0,052						
	N	70	70					
3. BETRIEBS-LEISTUNG	Pearson Correlation	0,431 (**)	0,013	1				
	Sig. (2-tailed)	0,000	0,913					
	N	80	69	80				
4. ZEIT-SPANNE	Pearson Correlation	0,537 (**)	0,278(*)	0,412 (**)	1			
	Sig. (2-tailed)	0,000	0,022	0,000				
	N	79	68	78	79			
5. VVB-	Pearson Correlation	0,051	0,524 (**)	-0,254	-0,070	1		
	Sig. (2-tailed)	0,752	,000	,110	0,661			
	N	41	41	41	41	41		
6. FARZ	Pearson Correlation	-0,298	-0,495 (**)	0,147	-0,132	-0,101	1	
	Sig. (2-tailed)	0,073	0,002	0,386	0,436	0,551		
	N	37	37	37	37	37	37	
7. NACH-FRAGE	Pearson Correlation	0,320(*)	0,506 (**)	-0,039	0,061	0,108	-0,691 (**)	1
	Sig. (2-tailed)	0,050	0,001	0,816	0,715	0,518	0,000	
	N	38	38	38	38	38	35	38

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Our estimation only explains 45 % of the variance of the contract duration. There are two possible reasons:

- We didn't manage to find all crucial proxies for the specificity of the investments: This is almost certainly true. Our independent variables are of a quite general nature and mainly measure – if at all – the physical asset

specificity and the level of dedicated assets. The variables might also be driven by factors other than asset specificity. The time span between the publication of the tender and the start of the operation is e.g. not only a consequence of the asset specificity but of the capacities of the industry and their utilisation. One element increasing the quasi-rent, which we could not measure, concerns the workshops. If a TOC commences operations in a subnetwork, it has to obtain a workshop for the different maintenance activities of the rolling stock that is unless it obtains these facilities in a neighbouring region. Even then new facilities might be necessary, as the location of the workshops has to be adjusted to the circulation plans of the trains. We didn't have the data to grasp this form of asset specificity.

- The contract duration is not adjusted to the asset specificity: this might be true in some cases. From a number of examples we know that not only economic rationale is behind the design of the contracts. There are always political decisions involved. This mainly refers to the service level and quantity, but might also affect the contract duration and the rolling stock to be employed. This may result in contracts which are of a too short duration given the assets to be deployed. Yvrande-Billon and Menard come to a similar conclusion for the first round of tenders in the UK (Yvrande-Billon / Menard, 2004).

The analysis of the contract duration confirms our hypothesis about the relationship/specificity of the rolling stock. ZEITSPANNE, which measures the time lag between the publication of a tender and the start of the services, is the best of our variables to explain this interrelation. The number of annual train-kilometres increases

the duration of a contract, while it is reduced in the presence of public support for the rolling stock.

3.4.3 Determinants of Contract Completeness

One strand of contract theory distinguishes between classical and relational contracts (Richter/Furobotn, 157f.). The analysis of classical contracts goes back to the work of Arrow and Debreu. In their ideal world, both contract parties have all relevant information about a transaction and the development of the relevant parameters. This allows the formulation of a contract which covers every contingency. In real life, contracts don't provide clauses for every possible occurrence and thus remain incomplete. This holds in particular for long-term contracts like the ones to be found in the German RRPS sector.

One reason for contracts to be incomplete is that not all the relevant contingencies can be foreseen at the time of signing. Another reason is that a large proportion of ex ante transaction costs are the costs in drawing up the contracts**.** According to Saussier, the costs for information, negotiation and re-negotiation are particularly affected by the search for a more complete contract (Saussier, 2000, 193). The gathering of the relevant information by both parties is only one costly element of the negotiation phase. During this phase, the contract parties face a trade-off between ex ante and ex post transaction costs: leaving aside contingencies and arrangements in the contract reduces the resources spent for designing the contract but raises the possibility of (costly) opportunistic behaviour during the contract phase.

Economic theory suggests that the contract parties put effort into the contract formulation until the related marginal costs equal the expected marginal benefits in

terms of less costly renegotiations (e.g. Crocker/Reynolds, 1993). In doing so, they deliberately leave the contract incomplete in order to save costs and choose the efficient level of incompleteness.

According to transaction cost principles, the marginal costs (MC) of formulating a contracts increase with the level of environmental uncertainty (our variable UNC). The environmental uncertainty itself is raised by the range of possible developments of supply and demand factors of the contracting parties. If the parties wish to immunize their contract against these developments, they have to identify possible future trends and scenarios and find mutual agreements about suitable responses. Saussier (Saussier, 2000, 193) and Crocker/Reynolds (Crocker/Reynolds, 1993, 128) also stress that the marginal costs of crafting a contract increase with the level of its completeness. They argue that the first contingencies to be accounted for in a contract are both the most important and best known ones. The more contingencies are added, the more the contract parties depart from a standard contract. With the growing hypothetical nature of the future development, it gets more costly to include the contingency in the contract.

The marginal benefits of more complete contracts are due to reduced possibilities of ex post opportunistic behaviour. Transaction cost principles suggest that the contract parties will search for possibilities to increase their share of the rent after the signing of the contract. These possibilities are diminished by tighter arrangements about the distribution of the future surplus from the contract. Crocker and Reynolds identify as a second source of marginal benefits from a more complete contract the reduction of the ex ante disincentive to invest. These marginal benefits depend as well on the asset specificity (SPE) of the transaction at stake (cf. figure 13). A higher asset specificity

moves the marginal benefit curve upwards from MB (SPE) to MB (SPE'), thus raising the efficient level of contractual completeness from c to c'.

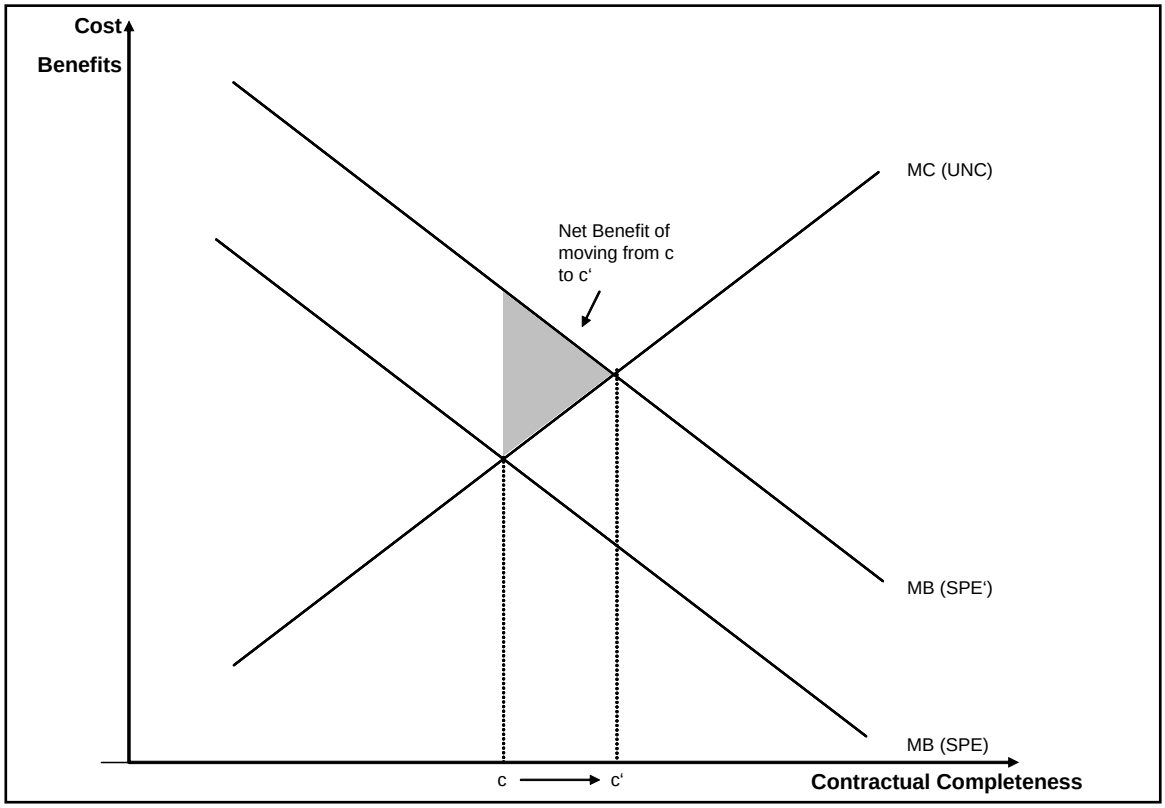

Figure 13: Contractual Completeness

Source: own figure following Saussier, 2000, 194.

Our empirical questions concerning the incompleteness of contracts are:

- How do the RRPS contracts vary in their level of completeness?
- What factors drive this completeness of the RRPS contracts?

A number of analyses have been dedicated to these questions. Crocker and Reynolds for example examined the degree of incompleteness in air force engine procurement (Crocker/Reynolds, 1993). The contracts for the supply of coal to Electricité de France by private rail companies was analysed by Saussier (Saussier, 2000). Both find that there are certain characteristics of the contract's subject and the development of the

market conditions that influence the incompleteness. Following Saussier (Saussier, 2000), we hypothesise that *the RRPS contracts are designed in order to achieve the efficient level of contractual completeness; this completeness depends on the asset specificity and the environmental uncertainty of the transaction involved.*

A contract is more complete the more possible contingencies it covers. We tried to identify and standardise elements of the contracts, which provide duties for future developments. More specifically, we searched for three different kinds of contractual provisions:

- Elements which make provisions for changes of the asset specificity involved.
- Elements which try to grasp the uncertainty of the transaction at source. An example would be the unforeseeable fluctuation of input factor prices.
- Elements which are based on the effect of uncertainty on the services to be delivered, i.e. on their quantity and quality.

In order to achieve this information we asked in our survey if the following crucial provisions are part of the RRPS contract:

- Possibility of a deviation from the originally agreed train-km (including caps)
- Compensation rules (fixed prices or calculation rules) for additional train-km ordered by the regional authorities
- Compensation rules for cancellation of services
- Compensation rules for changes of quality parameters
- Indexation of certain cost elements
- Existence of a penalty system

- Existence of a rewarding system (bonus-system)
- Threshold values for extraordinary dismissal of the contract
- Involvement of an external expert in case of contract adjustment
- Involvement of an arbitrator in case of a dispute.

One could argue that the latter two contract elements are overlapping to a large extent with the other contract clauses listed above and should therefore not be regarded as additional signs of contractual completeness. From our direct knowledge of contracts this is mostly not the case. External experts usually are assigned an optional controlling function if existing contract clauses are amended: e.g. if the TOC is asked to provide a new cost calculation under certain conditions, the *Aufgabentraeger* is allowed to have this checked by an external expert. The involvement of an arbitrator is less clearly defined. There are contracts with the general rule to address an arbitrator in case of any minor conflict. This clause could be regarded as competing with the other ones listed above or even be taken as a sign for incompleteness. Other contracts clearly define under which conditions an arbitrator is to be involved, what he is allowed to decide upon and what should be the basis of his decisions. These contracts are completed by the involvement of an arbitrator. Our impression is that the latter sort of contracts prevails and therefore we decided to consider the involvement of an arbitrator as a sign of contractual completeness.

The number of dimensions considered by us is quite high, as it reflects the heterogeneity of the services to be delivered. We generated our dependent variable VOLLST by adding 1 if the above mentioned clause was part of the contract, otherwise we added 0. Lower numerical values thus mean a less complete contract. The variable has a possible range from null to ten. We examined 37 contracts. As shown in figure 14, each contract

contains at least three of the above mentioned provisions. The most highly ranked contracts yield seven points. The provision of a penalty system contributed most of the points, as any contract contains penalty clauses. The second most important design characteristic is the threshold values for the extraordinary dismissal of the contract: 29 of our 37 contracts contained this quantified criteria. No premature cancellation of a contract has taken place so far, which might be interpreted as a consequence of the quantified thresholds. The involvement of an external expert in case of contract adjustment seems to be the least important contract component for the contract parties: it was only included in five contracts.

There are two caveats attached to our approach of creating an ordinal variable (Saussier, 2000, 197f):

- In simply adding the number of provisions that a contract contains, we consider all of these arrangements to be equally important. This is certainly not always the case. The provision to involve an arbitrator in case of dispute will e.g. for many contracts be less important than to have limits for the change of train-km. However, we have no hint about a suitable weighting of the provisions and assume that on average they are equally weighted.

- We don't consider variations within each of the provisions. This doesn't hamper our results in case of the 0/1-provisions (involvement of external experts and arbitrators). It is a more serious caveat in the other cases. Take for example the limits for changes of train-km by the regional authorities during the contract period. We do not know the magnitude of these possible changes. Small changes will not be very important, but above certain threshold, they will trigger (dis-)investments in rolling stock and thus affect the financial position of the

companies. As we have no or not enough data about the exact specification of the contract provisions, we have to leave it for now with a simple model.

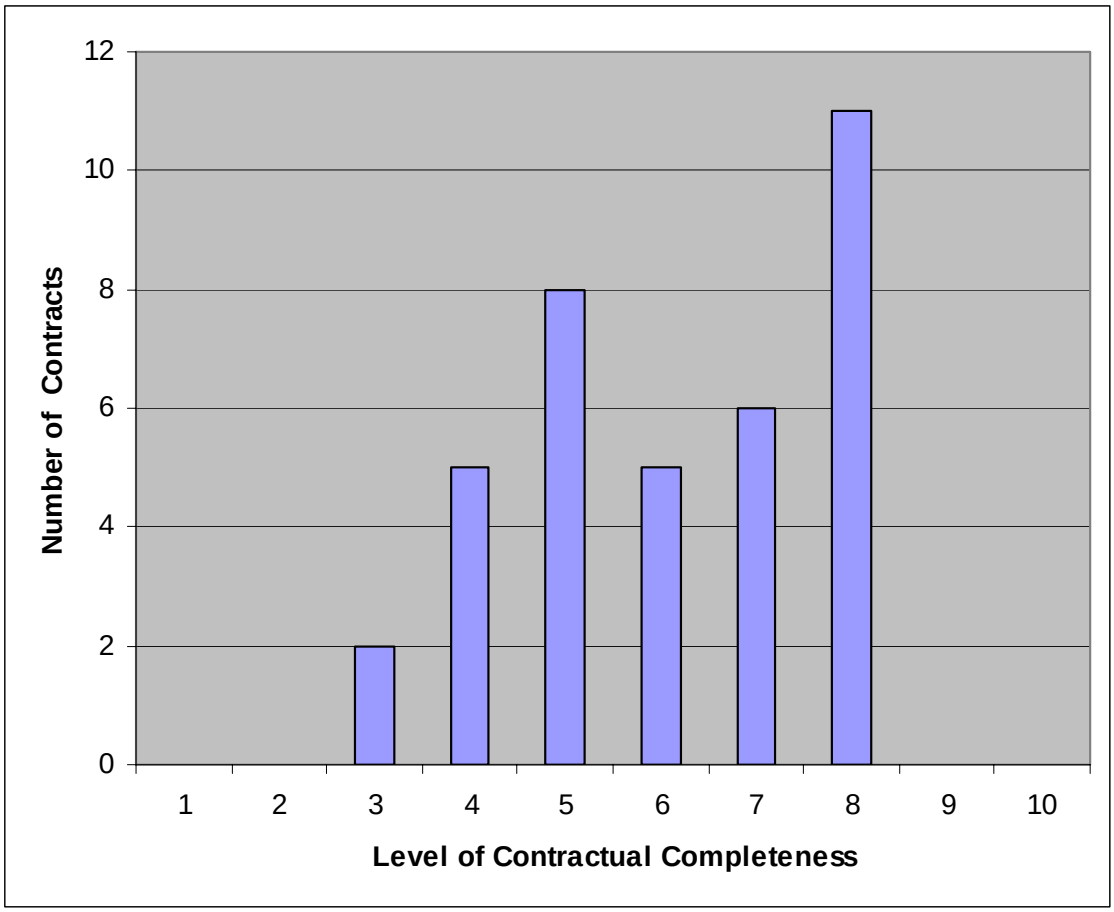

Figure 14: Number of Observations per Level of Contractual Completeness

Source: own figure.

The contractual completeness is constructed as an ordinal variable, but we can assume that the underlying decision is of a continuous nature (Crocker/Reynolds, 1993, 141). We use an ordered logit regression for the estimation of our dependent variable VOLLST.

We take the same proxies for the estimation of the duration of contracts (cf. 3.4.2) as we do for the asset specificity (BETRIEBSLEISTUNG, ZEITSPANNE, VVB). We expect the contract parties to put more effort into the design of their agreement and raise its completeness in order to avoid ex post opportunism if the asset specificity increases.

However, we leave aside the variable FARZ to avoid endogenity problems, as the instruments to mitigate asset specificity of rolling stock investment are partly contractual provisions themselves.

As a proxy for the uncertainty we use NACHFRAGE. We expect NACHFRAGE to have a positive influence on the completeness of the contracts, as it decreases the uncertainty. With a lower level of uncertainty, the marginal costs of contract crafting decrease. This leads to more complete contracts. All of our expected signs are summarised in table 11. We expect all of our independent variables to have a positive influence on the completeness of the contracts.

Table 11: Independent Variables and Expected Signs for the Estimation of the Contractual Completeness (VOLLST)

BETRIEBSLEISTUNG: number of annual train-km	+
ZEITSPANNE: time lag between publication of the tender and start of the services [years]	+
VVB: member of regional transport association (Dummy)	+
NACHFRAGE: information about the demand provided by the *Aufgabentraeger* (Dummy)	+

The inclusion of our independent variables leads to an improvement of the model which is significant at the 0.1 %-level. According to Nagelkerke's pseudo-R-square, the independent variables explain 73 % of the variance of VOLLST (cf. tables 14-15).

Table 12: Model Fitting Information for the Contractual Completeness (incl. BETRIEBSLEISTUNG)

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	124,721			
Final	79,541	45,180	4	0,000
Cox and Snell	0,705			
Nagelkerke	0,730			
McFadden	0,362			

Table 13: Parameter Estimates for the Contractual Completeness (incl. BETRIEBSLEISTUNG)

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[VOLLST = 3]	-10,253	1,977	26,904	1	0,000	-14,127	-6,379
	[VOLLST = 4]	-7,935	1,670	22,581	1	0,000	-11,207	-4,662
	[VOLLST = 6]	-5,392	1,413	14,567	1	0,000	-8,160	-2,623
	[VOLLST = 7]	-3,661	1,152	10,103	1	0,001	-5,918	-1,404
	[VOLLST = 8]	-2,133	0,989	4,651	1	0,031	-4,071	-0,194
Location	BETRIEBS-LEISTUNG	-0,053	0,289	0,034	1	0,854	-0,619	0,513
	ZEITSPANNE	-1,014	0,472	4,624	1	0,032	-1,939	-0,090
	[VVB = 0]	-5,348	1,291	17,163	1	0,000	-7,879	-2,818
	[VVB = 1]	0(a)	.	.	0	.	.	.
	[NACHFR. = 0]	-4,822	1,195	16,294	1	0,000	-7,164	-2,481
	[Nachfrage = 1]	0(a)	.	.	0	.	.	.

Link function: Logit. N=37

a This parameter is set to zero because it is redundant.

Both NACHFRAGE and VVB have the predicted signs (cf. tables 12 and 13). If the service contract for example requires the membership of a public transport association (VVB changes from 0 to 1), this has a positive influence on the contractual completeness (cf. the estimate of the location parameter in table 15). Among the three independent variables, VVB has the strongest influence on the contractual completeness. A look at the 95 %-Confidence interval of the β-coefficient, adding one unit to VVB (i.e. the membership in a public transport association is necessary), the possibility of a higher category of contractual completeness is raised by 2,481 to 7,164. BETRIEBSLEISTUNG has a small negative influence on the contractual completeness, but not at a significant level (cf. tables 11 and 12). Due to a lack of data, we can't make predictions about the influence of BETRIEBSLEISTUNG with a higher number of observations. But we have to concede the possibility that the degree of asset specificity is not adequately reflected in the design of the contract, in particular in its completeness.

Table 14: Model Fitting Information for the Contractual Completeness (excl. BETRIEBSLEISTUNG)

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	119,751			
Final	74,607	45,144	3	0,000
Cox and Snell	0,705			
Nagelkerke	0,730			
McFadden	0,362			

Table 15: Parameter Estimates for the Contractual Completeness (excl. BETRIEBSLEISTUNG)

		Esti-mate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[VOLLST = 3]	-10,217	1,968	26,962	1	0,000	-14,073	-6,360
	[VOLLST = 4]	-7,901	1,663	22,581	1	0,000	-11,159	-4,642
	[VOLLST = 6]	-5,367	1,414	14,404	1	0,000	-8,139	-2,596
	[VOLLST = 7]	-3,625	1,139	10,134	1	0,001	-5,857	-1,393
	[VOLLST = 8]	-2,092	0,971	4,646	1	0,031	-3,995	-0,190
Location	ZEITSPANNE	-1,051	0,416	6,369	1	0,012	-1,867	-0,235
	[VVB = 0]	-5,388	1,283	17,634	1	0,000	-7,903	-2,873
	[VVB = 1]	0(a)	.	.	0	.	.	.
	[NACHFRAGE = 0]	-4,840	1,194	16,438	1	0,000	-7,180	-2,500
	[Nachfrage = 1]	0(a)	.	.	0	.	.	.

Link function: Logit. N=37

a This parameter is set to zero because it is redundant.

The most striking result is the effect of ZEITSPANNE. We expected this proxy to increase the completeness of contracts, as the contracting parties wish to safeguard their investments with the asset specificity growing. Obviously, this is not the case. Our explanation is that the time lag between the publication of the contract and the start of the services has an additional aspect: ZEITSPANNE can also work to measure the uncertainty of a contract. The longer the time until the contract start, the more uncertainty there will be about important contract conditions. This in turn increases the cost of designing a more complete contract. This is in accordance with the findings of

Crocker and Reynolds (Crocker/Reynolds, 1993, 135). When estimating the degree of contractual completeness, the asset specificity of the investments and the uncertainty of the contract work in opposite directions, which is not the case with the contract duration (section 3.4.2). On the basis of our findings we have to assume that the uncertainty which is expressed by ZEITSPANNE outweighs the asset specificity that is measured by this variable.

Our hypothesis was that the contract parties strive for contractual completeness, which depends on asset specificity and environmental uncertainty. The results show the predicted influence of the membership in a regional transport association and the information about the demand. A surprising result is the influence of the time between the tender's publication and the start of the services. This time lag has a decreasing influence on the completeness of the contracts. The result qualifies the respective variable as a measure of environmental uncertainty.

3.5 Conclusions

The most striking characteristic of RRPS in Germany compared to the outstanding example of the UK is the variety of awarding procedures and contract designs. The heterogeneity is rooted in the fact that 33 regional authorities are responsible for the service contracts. Although the regionalisation of RRPS already took place in 1996, the process of convergence is progressing very slowly. The possibility of the *Aufgabentraeger* learning from each others experience is severely limited by a lack of official information on the awarding procedures, contracts, and results of tenders.

A first glance at the performance of the RRPS and the intermodal competition since 1996 reveals a success story: service level and quality were noticeably raised and as a

consequence traffic performance increased by more than 30 %. At the same time, some authorities realised cost savings of around 20 % with competitive tenders. The success of the regionalisation was partly triggered by growing intramodal competition: the share of DB Regio's competitors increased to 6.9 % (pkm) in 2005 and international companies entered the German market. Some public companies, owned by local authorities or federal states, have been present for a long time in the market and are now becoming serious competitors of the DB AG, partly with the help of venture capital. Unlike the development in UK and Sweden, no large bus operator entered the railway market, the main reason being that there is hardly any scheduled long-distance bus transport in Germany.

The flipside of the good results is the financing of the whole system. The increase in performance was paid for by the federal government with high subsidies for the RRPS. This allowed the Federal States to be rather slack in their procurement procedures. Not all of them strived to realise the cost savings reported above. They rather awarded long-term contracts to the DB AG without any element of competition, sometimes in exchange for additional infrastructure investments.

The freedom of the operators to specify their transport programme is quite restricted. Usually, there are tight service specifications, e.g. in terms of service frequency, rolling stock etc. For other supply side characteristics, call for tenders contain minimum requirements. The main possibility of TOCs of winning the franchise is to cut costs. But most of the costs cannot be influenced by the operators. There are differences for the cost of personnel, mainly between the DB and its competitors. The DB is frequently said to have personnel costs of 20 % above its competitors. Among most of the competitors, the personnel cost structure and level is not likely to differ significantly

due to the tight service specifications. A second reason for the harmonisation of personnel costs are the respective clauses, which enter in more and more contracts: the *Aufgabentraeger* require the bidders to pay minimum wages, usually based on some specific collective labour agreements. This development reinforces the importance of the rolling stock costs in the bidding process.

There is still a high share of gross cost contracts in Germany (around 30 %), albeit with a decreasing number. A reason for this is the usual integration of RRPS in public transport associations. This sharply cuts the possibilities of the TOCs to influence their fares. A further limitation is given by the long-distance passenger tariff of the DB, which usually have to be accepted by the RRPS operators for the through-ticketing. Moreover, the service providers are not totally free in their marketing activities. Given this environment, it might be efficient to not burden the revenue risk to the operators. But the whole system of tariff setting has to be questioned, as it often leaves no influence to the TOCs on what is usually one of the most important instruments of a commercial company.

As the remuneration itself exerts rather low incentives, bonus-malus-schemes are additionally used. Mainly penalties are stipulated for a failure to meet performance targets. In the absence of strong remuneration incentives it seems to be straightforward to counterbalance this with a reward or a penalty for changes in the ridership. But there are usually more possible facts causing penalties for the operator. We know of contracts which define seven different reasons for penalties. Some of those are likely to be unnecessary, if the TOCs could influence their revenues more freely, e.g. the number of seats. An additional possible drawback for the efficiency of the incentive schemes is the

lack of detailed cost and demand information that the authorities have. This can lead to inefficient and ineffective incentives.

On the cost side, cost pass through-arrangements are generally used, at least for infrastructure charges. Some contracts additionally provide automatic adjustment of franchise payments in case of rising energy or labour costs. But most of the contracts exhibit some fix-price components, so that the *Aufgabentraeger* can expect to benefit from possible productivity growth of the operator and reap these benefits at the tender stage.

The cost pass through-rules reduce the need to renegotiate contracts. Usually there are further clauses which stipulate possibilities and procedures for changes, in particular in terms of train-km and payments. Despite the differences between the contracts in Germany, these provisions have so far facilitated a stable system of RRPS services, with only one bankruptcy and no withdrawal of franchise occurring. This may not least be based on the fact that the regional authorities and the service providers are bound to develop a good working relationship during a long-term contract.

The service contracts differ markedly in terms of their length. They reach from two up to 15 years. Alongside with the purchase of new rolling stock, that is required by about half of the contracts, this leads to high financing risks that are usually borne by the TOCs. The *Aufgabentraeger* have developed instruments and contract clauses to influence the risk of opportunistic behaviour. We find that they use these instruments to reduce the quasi-rent of the TOCs. The contract duration is in general aligned to the degree of specific investments in rolling stock and the contract parties safeguard these assets this way, although there are a number of exemptions. Given the recent cost cuts, we expect an amplification of the deployment of used rolling stock, alongside with a

growing importance of private car pools. This development will be enforced by an increasing standardisation of the train-sets, e.g. by the use of platform concepts which dominate the production process of the automotive industry.

A major problem for the TOCs during the tender process is the difference of the contracts between different regions but also within the area of one *Aufgabentraeger*. We found that the contract don't only differ in terms of their length, the restrictions and risks imposed on the TOCs but also in the number of provisions for uncertain downstream and upstream markets or changes concerning the asset specificity. The contract parties trade off the costs and benefits of more complete contracts. They react with a rise of contract clauses to a higher specificity of the assets involved in order to safeguard these investments. If the uncertainty of the contracts decreases, the find it cheaper to craft more detailed contracts and will also increase their completeness.

For the future, the regional authorities have expressed their will to advance the contract design. They intend to put more emphasis on functional service specifications. We also expect an increase in the size of the tendered networks. A further development will be prompted by the cut of regionalisation funds which took place in 2006. One possible reaction of the regional authorities is to think about reducing costs, probably by giving more room to tenders instead of the direct awarding of services.

4 Rail Infrastructure Charging in the European Union

4.1 Introduction

Infrastructure pricing is a long established and controversial issue of European transport policy. The different approaches, which the European Commission (EC) has chosen over the years, reflect the heterogeneity of opinions across the member states, within the scientific community and among practitioners. The current trend towards marginal cost pricing for transport infrastructure for instance does not meet the suggestions of cost recovery aims as recognized in the Green Paper "Towards Fair and Efficient Pricing in Transport". The recent policy in the pricing of railway infrastructure is ambiguous in this respect. In directive 2001/14/EC, the general claim is the establishing of marginal cost pricing. But deviations are allowed for in the form of mark-ups on these costs.

The aim of this paper is threefold. The requirements for the charging of the track use, laid down in the above mentioned directive, are analysed. This is done by comparing them with standard tariff systems, which are usually deployed for transport infrastructure. In order to come to a conclusion, these standard tariff systems are evaluated, considering their effect on efficiency. The European Union member states were required to turn the content of directive 2001/14/EC into national law by March 15, 2003. A second objective of this chapter is therefore to see if the charges in the member states are in line with this requirement and the suggestions of economic theory[23]. Furthermore, they are scrutinized to find useful elements to improve existing tariff systems and create new ones. This is the third objective of this article.

[23] Infrastructure charging in Switzerland is considered although the country is no member state of the European Union. This exemption is made because Switzerland obtains a crucial geographical position in the European rail network.

This chapter concentrates on the access to the main facilities and their charges. The pricing for the use of the so-called service facilities in Annex II of directive 2001/14/EC is not considered. Hylen provides an insight into the access and charges of these facilities in five European countries (Hylen, 2001).

The structure of the article is as follows: The background is explained in section 4.2 by describing the cost components of the rail infrastructure and different principles of price setting. These principles are then evaluated. In section 4.3, the existing rail track charges of European Union member states are analysed on the basis of the previous section. After this, we analyse resent changes in the structure of the charging systems in section 4.4. Our recommendations for the creation and the amending of tariff systems are given in section 4.6, the last section concludes.

4.2 Objectives of Rail Infrastructure Charging Systems

The nature of rail infrastructure as a natural monopoly, the large amount of sunk costs among the assets and missing intermodal competition in at least some market segments raise the need to regulate the sector. Up to the 1990s, this was mainly done by internal regulation, i.e. the main national rail undertakings were public bodies. The public influence on the rail network is still of a severe kind in any European country, in moat cases leading to a public ownership of the infrastructure. The legislation of the European Commission refuses - with good reasons - to require a specific organisational structure and ownership of the infrastructure manager (IM). However, some conditions concerning open access, the price setting and slot allocation procedures have been laid down, but leave plenty of freedom for the national governments and the respective IMs.

This chapter examines the infrastructure charging systems across the EU15. It considers them on the background of economic and political objectives, taking into account the European Commission's policy on infrastructure pricing. In order to do this, it abstracts from the organisation of the IM and its implication on price regulation, focussing solely on the system of charges. The existing price systems are judged and recommendations are given without considering any regulatory framework. This limits the possibilities of evaluation, as the aim of welfare maximization does not only depend on the price system. The individual situation in each country, e.g. an integrated incumbent, requires further analyses, which is beyond the scope of this paper.

This chapter describes in a general form the cost components of the rail infrastructure and the implications for pricing systems (section 4.2.1). It interprets them in the light of the notions of the directive 2001/14/EC (section 4.2.2). In section 4.2.3, we identify economic aims of charging systems and then turn to standard pricing principles (section 4.2.4). They are analysed with respect to their ability to ensure the aforementioned economic aims. Recent developments of the charging systems are analysed in section 4.2.5. In section 4.2.6 we draw conclusions.

4.2.1 Components of Rail Infrastructure Costs

Railway infrastructure is used as an input for different services. Freight trains and passenger trains operate on it and further differentiations can be made within these market segments, as for instance single wagon load transport incurs costs and attracts demand different from trainload transport. These services – whether they are provided inside an integrated company or over the borders of two independent enterprises - partly share the same infrastructure, e.g. the track bed. The main problem in the definition of

cost-based pricing systems is that certain features of the infrastructure might be shared by one or more services.

If only a group, but not all TOCs that provide services on that tracks need a special piece of infrastructure, they generate so-called blockwise variable costs. E.g. only electric trains make use of the power supply facilities, diesel trains don't account for the costs generated by the wires etc. Indeed, the enforcement of the track bed for an axle-load above 22.5 t could be assigned to specific operators. These costs, once identified, are common only for the operators which transport heavy weights. Other costs, which are entirely common to all operators, can't be traced to any particular service or group of services. Thus, the costs of the slot provision depend not only on the traffic volume (q), but also on the characteristics of the infrastructure (z) and the suprastructure, i.e. the rolling stock (v). The variables are of an interdependent nature. The cost function can be described as (Rothengatter, 2003, 126)

$$\mathbf{C(z,q,v) = F_1\,(z,q,v) + F_2\,(z,q,v) + c(z,q,v)}$$

C denotes the total costs, F_1 the blockwise variable costs, F_2 the common fixed costs and c the variable costs. The proportions of F_1 and F_2 change over time: with an increasing time horizon, the common fixed costs turn into blockwise variable costs.

The main difficulties of charging systems result from allocating the common costs and the blockwise variable costs to the operators, as their nature prevents them from being distributed in an impartial way. Once the blockwise variable costs are identified, the problem is reduced, as they are to be distributed only between the members of the user group at stake, which is still difficult. The problem is aggravated by the high proportion of these costs – common and blockwise variable costs account for up to 90 % of the

total social costs of the rail infrastructure (Hylén, 2000, 2). This proportion applies if a short planning horizon is chosen, as done by EU legislation.

The remainder are the short run marginal costs (SRMC). They depend on any single train movement and can be attributed directly to a particular operator. According to the formula above, their level depends on the infrastructure, the suprastructure, and the number of train runs. Their determination requires detailed cost studies, which can comprise a variety of elements:

- Operating costs, that can be traced to a particular train movement, e.g. for personnel and signalling,
- Wear and tear costs for maintenance of the infrastructure,
- Costs for energy consumption (electricity), and
- Additional timetable planning and administration costs.

Renewal costs are a part of the marginal costs as well, although from a technical perspective, they can less easily be attributed to a certain train run. They are sometimes considered as part of the short run marginal cost as well.

If SRMC comprise external costs, like impacts on congestion, on the noise level and accident costs of other parties, they are referred to as short run marginal social costs (SRMSC). An additional externality, which currently attracts scientific attention, is the influence of rail transport on global warming. The specification of the relevant cost curves, which are necessary to establish equilibrium prices, is problematic. Although there is no European IM deploying a perfect SRMSC-pricing scheme, remarkable examples exist, notably in Scandinavian countries, covering some of the above mentioned components (see 4.3.1). Marginal cost studies were also carried out in

Austria and the UK. Most of these studies cover at least the wear and tear costs on some lines in the respective countries. Other components are of a less relevant proportion, like accident costs. Further marginal costs are rather easy to identify, e.g. the energy consumption costs, although meters on the traction vehicles are required.

Scientific attention is recently paid to the costs of scarceness of capacity. There are usually considered to be two types of these capacity costs, depending on the perspective (Nash, 2003, 6):

- Congestion costs, and
- Scarcity costs: opportunity costs of train operator B, who cannot run a train as they wish, because the slot has been given to operator A.

The expected congestion costs only arise on track sections with dense traffic, where it is more difficult for the IM to manage reactionary delays. They consist of the costs of time and energy imposed on other users of the network. If the infrastructure investment is done optimally, the revenues from an optimal congestion charge will in general cover the deficit that is otherwise incurred (Mohring / Harwitz, 1962). This finding only holds if there are constant returns to scale, which is usually not the case for railway infrastructure. Operators should be brought to consider these congestion costs in their process of scheduling. They are likely to influence the track choice if they are relatively high. The congestion costs can be estimated ex ante by means of models (on the basis of historic data) and assigned to the operators (Nash, 2003, 3).

Congestion costs have to be considered separately from the disruption costs, which are incurred by vehicle breakdowns etc. The latter should be elaborated and allocated ex post, as it is done in the UK and the Netherlands, on the basis of costs imposed to other operators.

Pricing of scarcity ensures that the service with the highest value gets the slot and is therefore most important for the timetabling and the slot allocation during operation. It should be applied as well for the adjustment of schedules in long-term franchises. A severe problem is that scarcity generally only appears on particular sections of the network, where a number of trains want to pass at particular times, serving different relations. Even if the capacity is only scarce for the particular section, the values of the complete train runs at stake have to be considered in allocating the slot.

If there is a possibility to charge for scarcity on the tracks, it should be ensured that the generated revenues are invested in infrastructure enhancement in order to provide an optimal capacity. To date, this question is solved in all EU15 countries by priority rules, which are usually accompanied by some kind of mediation in practice. As these priorities do not guarantee a welfare maximizing capacity allocation, new approaches are currently examined, e.g. second-hand trading (see Nash, 2002, 5), auctions (see Cox, 2002 and Borndoerfer et al, 2006), prices on the basis of long-term marginal costs (see Hylen, 1998) and definition of standard paths for each bottleneck if capacity has already been assigned (see Nash et al, 2003).

4.2.2 The European Policy on Rail Infrastructure Charges

The European Commission pursues with their railway policy the objective of fostering inter- and intramodal competition at a European scale. As far as pricing is concerned, the objectives are implemented in directive 2001/14/EC. This directive is the basis for the regulation of infrastructure charges in the member states. It suggests infrastructure charging systems which are based on SRMSC. The pricing policy currently pursued by the EC goes back to the Green Paper “Towards Fair and Efficient Pricing in Transport”

(CEC, 1995). These ideas were later amended in the White Paper "Fair Payment for Infrastructure Use" (CEC, 1998). In detail, the directive 2001/14/EC requires in Articles 7 and 8 for the charging of rail infrastructure the following:

- Charges are to be set at the cost directly incurred as a result of operating the train service.
- Costs that reflect scarcity of capacity during periods of congestion are allowed. A reservation charge for congested parts of the network is possible.
- Charges to cover external costs are allowed. However, if they increase the revenue of the IM, they may only be charged, if competing modes of transport apply these charges on a comparable level
- Mark-ups on the basis of efficient, transparent, and non-discriminatory principles can be applied to recover the total costs, if the market can bear this. For market segments, that are not able to pay these mark-ups, the charge should only cover the costs that are directly incurred by the train run.
- Higher charges can be set to cover the costs of investment projects on the basis of the long-run costs, if they increase the efficiency and/or cost-effectiveness.
- To prevent discrimination, the charges for equivalent uses have to be comparable and comparable services in the same market segments are to be subject to the same charges.
- Discounts are only allowed to give savings in administrative costs to the customers or to encourage the use of a specific infrastructure section for a limited time. In the latter case, the discount schemes have to be available for all users of this section.

The initial aim of the Green Paper cited above was to cover externalities with the charging systems of the different infrastructures. The details in the White Paper revealed the EC's intention to base infrastructure charging on the SRMC of their use (cf. section 4.2.4.). In contrast to the original ideas, the directive 2001/14/EC grants considerable flexibility for the definition of charging systems. The EC's intention to implement SRMC is quite obvious. At the same time it leaves much space for departures from these. Mark-ups are allowed for a number of cost elements. In the end, charges may well vary between SRMC and full cost including the cost of capital, i.e. a reasonable profit would also be allowed by the directive. A limit is set for services which can't afford the full costs: they must be offered a price at the marginal costs plus a reasonable profit. Additionally, the directive doesn't allow for the recovery of costs which have originally been covered by public funds (Kuehling et al., 2007, 11). In section 4.2.3, we will identify economic objectives which are usually pursued with regulated pricing systems. On the basis of these findings, we will analyse the most common infrastructure charging principles, in particular SRMC-pricing, in section 4.2.4.

4.2.3 Economic Objectives of Rail Infrastructure Charges

Under perfect competition, the price mechanism clears supply and demand of scarce resources. However likely a perfect competition in general may be, it certainly does not exist in the case of the rail infrastructure supply. The main obstacle for competition is the nature of the rail infrastructure as a natural monopoly. Together with a high proportion of fixed costs and a lack of intermodal competition in wide parts of the market, this leads to the need of regulation. In all of the EU-member states governments

influence the prices of the rail infrastructure slots, either in form of internal regulation or (direct or indirect) price regulation. In doing so, two economic aims of prices are to be considered:

Allocative Efficiency (static)

A price is allocatively efficient, if it maximizes social welfare. This is the case, if the price of a slot equals the marginal social costs respectively. It leads - in a static perspective - to the right number and the right quality of slots that the operators require to meet the demand of the final customers.

Allocative Efficiency (dynamic)

In order to maximize social welfare in a dynamic perspective, the prices for slots have to deliver the correct signals for investments and disinvestments. Capacities and services should be increased, where they create benefits greater than the costs. This refers to both the supply and the demand side. The IM should have the right incentives to build new lines, close the ones which generate too little revenue, or to deploy a new technology. The operators need the right signals from the price system to adjust their fleet to use the track capacity in an optimal way. This might for example lead to the replacement of cost-intensive high speed trains by slower vehicles. In order to create incentives for (dis)investment, it is crucial that a pricing system reflects the variable costs and the blockwise variable costs and links them to the respective user groups (Rothengatter, 2003, 126). A pricing system has to take account not only of the volume of transport and the infrastructure characteristics, but also of the suprastructure characteristics. To support the optimal (dis)investment decision from the social welfare point of view, the prices have to reflect the externalities as well.

Further conditions should be considered in the setting up of a pricing system. Transparency ensures that the railway undertakings know what they pay for and allows calculating different alternatives - a vital element of each commercial undertaking. Moreover, it helps the mutual understanding of the parties. If they know the elements of the price and what drives them, they have the ground to predict future changes. Finally, transactions costs should be considered while defining the prices for the slots, the allocation procedures and the funding of the IM. This includes the way in which the costs are measured and covered and the transaction costs entailed.

A good price system should not only incentivise the IM to provide the right amount of slots in the right quality. It should also lead to a minimal use of inputs in the production process and to choose the cost minimizing technology. Unlike in perfectly competitive markets, technical efficiency is not achieved automatically in the rail sector. A regulation regime that sets the prices exactly according to a proportion of the costs, will lead the IM to technical inefficiency, as he has no incentive for cost-reductions. The degree of technical efficiency that the IM realises cannot be predicted without the respective regulatory framework, therefore it is not considered in this paper. The same applies for quality. A monopolist may not offer its products in the optimal quality. It needs to be adjusted by the overall regulatory framework for the IM. The price can certainly provide incentives for some quality aspects, e.g. punctuality. But prices should generally be adjusted by the regulator, i.e. outside the tariff system. Therefore, this issue is not considered in this paper either.

4.2.4 Pricing Principles

Short Run Marginal Cost Pricing

Marginal costs are the costs which are incurred by an additional train run[24]. They include the components mentioned in section 4.2.1. Applying this pricing principle, it is ensured, that every train operator, whose willingness to pay covers or exceeds the marginal costs, can run their train. Each slot allocation will lead to a net benefit. As external costs are substantial (Nash, 2003, 5), they should be included in the infrastructure charge in order to achieve the maximum welfare.

SRMC-pricing minimises the exclusion of railway undertakings from the network and leads to allocative efficiency in a static perspective, i.e. if the capacity is fixed. A number of examples show that the implementation is, at least in a rough way, possible (cf. section 4.3), although the definition of the components of marginal costs may differ from country to country. Moreover, it finds acceptance among operators, due to the low costs it generates. These strong favourable arguments face serious caveats.

If marginal costs are considered only in the short perspective, they don't cover the costs of upgrading and new investments in infrastructure, leaving this as a serious problem for the development of the rail industry as a whole. The IM will not have the necessary funds for investments, nor will he have the incentives[25], as new lines would only increase the deficit in the regime of SRMC-pricing. The problem is aggravated by the lack of incentives for the IM to develop new cost-saving technologies, if he is regulated on the basis of marginal costs. He has no means to adjust prices to the demand of the

[24] The notion incremental costs is less frequently used in the context of rail, although it is more accurate.

[25] An exception are integrated rail companies with little competition on the downstream market. Given certain conditions they are able to cover the deficit of infrastructure investments with monopolistic earnings in the downstream market.

operators, as the prices are set irrespective of this demand. He cannot gain information for investment decisions through price variations.

In setting prices according to SRMC, little information about the vehicle characteristics is considered, as the block wise variable costs are fixed in this term. However, the SRMC vary with some vehicle characteristics and this should be considered in the charges, as it provides the operators with information for investment in rolling stock. As the marginal costs only form a small part of the total cost, dynamic allocative efficiency is hardly achieved by marginal cost pricing.

SRMC-pricing results in a deficit because of scale economies and a high proportion of fixed costs. This deficit will be partly covered, if externalities are considered in the pricing system. However, the charging for externalities should not be a financing instrument but rather guarantee allocative efficiency. It will in general not cover the deficit. It is not apparent to claim the charges for externalities to remain with the IM, one reason being that this would antagonize the IMs' incentives to reduce some of the externalities, namely for accidents, congestion and noise.

The deficit of the IMs is in European countries usually covered by the government with general taxes. This raises concerns about the equivalence in this system, as the tax payers will not necessarily benefit from the spending of their money for rail infrastructure. The possibility that subsidised train operators and/or the passengers benefit more from the subsidies than tax-payers lose is merely of a theoretical nature (Rothengatter, 2003, 125). This holds particularly because of distortions that taxes other than poll-taxes usually entail. If for instance the deficit of the IM is covered by income-taxes, this procedure drives the labour-costs of the very IM away from marginal cost pricing (Baumol & Bradford, 1970, 265). The processes of tax collecting and

distribution are to be considered if welfare maximization is to be achieved by SRMC pricing. Complex structures may be cost-intensive and consume a great deal of the tax income.

Apart from the costs of levying taxes, the central investment decision, which is usually linked to the deficit coverage by the government, leads to high information requirements as well. If users are only charged at the level of their marginal costs, it is not revealed whether their valuation of the tracks is as such that it justifies the total costs. This makes an appraisal of the project necessary, which faces serious information problems (Laffont / Tirole, 1994, 25).

Ramsey-Pricing

The aim of Ramsey-pricing is to maximize social welfare under the constraint of cost coverage. It considers the fact that the IM supplies different products. They can be defined from the demand-side and the supply-side. Rail infrastructure slots can be differentiated according to different regions, different times and different customers. Ramsey-pricing tries to find mark-ups for these products to cover the deficit that results from SRMC-pricing. The inverse elasticity rule is applied to define these mark-ups. The basic idea is to minimize distortions, but it implies cross-subsidisation between different products. According to this rule, the mark-up (as a percentage) on the marginal costs is reciprocally proportional to the price elasticity of the demand of the operators (while the profit is zero). A rough example in the railway sector is peak-load-pricing. Assuming,

that the elasticity of operators' demand is lower at peak-times, the infrastructure tariffs can be raised during these periods[26].

The rule holds for multiproduct-firms with no demand-dependencies between their products. This assumption has to be adjusted for the rail infrastructure provision, as slots for different trains (e.g. high-speed and regional trains in Germany) are partly substitutional. In this case, the mark-ups have to be adjusted, but the general tendency remains (Rodi, 1996, 96): Operators with low demand elasticity pay high mark-ups on the marginal costs.

A further adjustment of Ramsey-pricing is necessary for the rail industry, as the basic model does not consider substitutional competition from other modes. This is clearly the case in some segments of rail infrastructure, e.g. for freight transport. Under this assumption, the welfare maximization in the transport sector as a whole leads to the necessity to apply a form of Ramsey-pricing for any mode of transport (Braeutigam, 1979, 42). This proposition can hardly be carried out for a variety of reasons. A feasible solution ("partially regulated second best"), which leads to an additional loss of welfare, only considers price regulation of the monopolist. It leads again to the inverse elasticity pricing rule, with the restriction that mark-ups have to consider the cross price elasticities with respect to the competing products and thus are limited by their prices.

Ramsey-pricing in the textbook form can hardly be implemented (Tye / Leonard, 1983). The information requirements impose a restriction on every trial, notably the need to know the demand elasticities and cross demand elasticities for a variety of market segments. Operators are usually very reluctant to reveal their real willingness to pay, as

[26] The price elasticity of passengers is lower during peak times (van Vuuren, 2002). It can be supposed, that this is due to the high proportion of commuters and low proportion of recreational passengers. It is fair to assume a direct relation between the price elasticity of operators and their passengers.

it is subject to strategic behaviour (Quinet, 2003, 76). Demand curves are not easy to estimate, because of the interactions with other trains. The same holds for cost curves. Therefore, a rule of thumb should be applied, following the principle to "charge, what the market can bear". This is a rough but intuitive implementation of Ramsey pricing. It has to consider the marginal costs as minimal price.

Ramsey-prices are a second best solution, as they deviate from welfare maximisation. A set of second best prices is generated for the products of the IM. They achieve static allocative efficiency, but only under the constraint of deficit coverage. Prices are higher than marginal costs and the traffic volume is consequently lower than in a marginal cost pricing regime. The welfare generated depends on the demand and the design of the scheme, but it can be very different from the welfare gained by SRMC-pricing, e.g. if the price elasticity of the demand is high across the market segments.

Ramsey-pricing allows for a detailed price differentiation by the IM. If the elasticities are known and the differentiation is well done, price differences are to be expected between different regions, times and vehicles. But a differentiated system of prices of this type doesn’t automatically provide (dis-)investment incentives for vehicles and infrastructure, although it is designed to cover all infrastructure costs. Above all, Ramsey prices build upon marginal costs and therefore face the same information restraints as SRMC-pricing. It doesn’t exhibit enough elements to sufficiently incentivise the IM to invest in the right quality and quantity of the infrastructure. Thus, dynamic allocative efficiency is not automatically achieved by this pricing principle (Rothengatter, 2003, 126).

As a positive feature, equivalence issues favour pure Ramsey-pricing, as the non-users don't have to pay for the infrastructure and thus there are no costs of levying taxes incurred.

Fully-Distributed Cost Pricing

Fully-Distributed Costs (FDC) of a textbook form take the SRMC as a starting point. They cover the deficit by allocating the remaining costs according to selected parameters. Usual parameters are track-km, revenues, or the SRMC themselves (Rodi, 1996, 103), whereas FDC-pricing usually doesn't differentiate the demand according to different train products, regions or times of the day. The decision, which parameters are to choose, usually doesn't consider blockwise variable costs and is therefore purely arbitrary. This makes the implementation of FDC for railway infrastructure fairly easy and is tempting the decision makers to introduce them. But in its usual application dynamic allocative efficiency is not achieved. If FDC can be justified at all, it must be explainable as a compromise between static efficiency (Ramsey prices) and dynamic efficiency, especially as other goals, like quality, are not covered by the Ramsey optimisation.

As FDC deviates from marginal costs, static efficiency is not achieved either. FDC-pricing is Pareto-inferior to Ramsey-Pricing, as it doesn't take the demand elasticities into account[27]. If the common costs of the rail infrastructure are distributed according to the SRMC or the track-km, slots for feeder-lines and other parts of the secondary network will become very expensive. If the respective operators are priced off the

[27] In special cases, FDC can dominate Ramsey pricing with respect to dynamic efficiency.

network, all remaining services will have to bear a higher share of the common costs. In this way, particularly the FDC-pricing scheme can cause negative chain reactions.

Non-linear Tariffs

Non-linear tariffs - unlike SRMC-prices and Ramsey-prices - charge different prices per unit for different amounts of slots. The basic idea is to charge every slot with its marginal costs and to cover the resulting deficit with a fixed fee that the operator has to pay for a certain period of time ("entrance fee"). A huge variation of non-linear tariffs exists, including block tariffs. The simplest form is a two-tier tariff, consisting only of one fixed fee (no differentiation between users) and one variable component. The difficulty is to define the fix part in such a way that it doesn't influence the demand of the operators. Therefore, the fixed component must not be higher than the surplus of the marginal operator.

There are significant problems in meeting this condition, if the demands of the operators differ. This might for instance be the case in a market with a state owned incumbent and some small competitors. If the deficit covering fee is spread evenly across the operators, competitors are likely to be priced off the rails or the fixed fee can indeed establish a market entry barrier. A possible solution is the adjustment of the fixed fee for each operator or group of operators, leaving the variable unit-price unchanged. However, this approach might not meet the competition legislation in many countries because of discrimination. A two-tier system of the main German IM was rejected by the national competition authorities because of price discrimination. Therefore, it might be necessary to vary the variable parts of the price system as well, deviating from marginal costs. But

this doesn't necessarily prevent them from being discriminating from a legal perspective.

If there are detailed information about the demand curve of each group of operators towards the fixed part and the variable part, customized tariffs can be assigned. Depending on the elasticities, they lie between the basic multi part concept (identical fixed and variable parts for all users) and the Ramsey-prices (no fixed part).

As the regulation authority will find it very difficult to generate the necessary information, a system of self-selecting tariffs is a variation, which can be used in practice. Such pricing schemes can be observed in several end consumer markets in network industries, e.g. in the electricity and the telecommunication sector. A caveat of self-selecting tariffs is its reliance on the operator's demand. Users have to know their consumption pattern when choosing a tariff. The theory suggests that the social welfare increases with every new tariff-element (i.e. a variable and a fixed part) introduced, if the new variable part is smaller than all other variable parts, but as least as high as marginal costs (Borrmann / Finsinger, 1999, 225).

Non-linear tariffs are not designed to achieve static allocative efficiency. But they achieve it under the constraint of (partly) covering the deficit. However, if demand elasticities between operators are known, the exclusion of TOCs might be as small as in the regime of SRMC-pricing, thus reaching static allocative efficiency. This is not likely to be the case because of the lack of information. From the perspective of cost-recovering, this price regime is Pareto-superior to linear tariffs (SRMC- and Ramsey-pricing) and ensures a higher equivalence as linear tariffs, at least in the case of a producer - final consumer relationship (Borrmann/Finsinger, 1999, 225).

Multi-part tariffs are not necessarily based on marginal costs. They can consist of a fixed part and blockwise fixed parts and can as such contain information about the costs (Rothengatter, 2003, 126). On the other hand, they are able to consider the demand as well. From the perspective of dynamic allocative efficiency, this makes them the appropriate means to set prices on a final consumer market. If the demand is uncertain, self selecting multi-part tariffs can be deployed to gain information on the demand. In this case, the railway untertakings reveal information about their willingness to pay for certain products by choosing a tariff. This depends on the degree of variation between the different combinations of multi-part tariffs and the information the IM maintains to construct this tariff.

Setting prices for intermediate goods is more complicated, if the downstream market is not perfectly competitive. This is clearly the case for the railway sector with manifold complementary and substitutional relations between rather few operators. Welfare-maximizing price setting on the upstream market has to consider welfare effects of the final consumers. The price setting strategy is in this case to decrease the marginal costs of the downstream firms in order to lower downstream prices (Panzar & Sibley, 1989). As the Pareto-superiority of two-part tariffs does not necessarily hold for the case of imperfectly competitive downstream markets (Borrmann / Finsinger, 1999, 227) and the regulator is very unlikely to generate the information required, it is necessary to regulate both industries. Due to the complexity of relations and tariffs, an effective regulation of the fares and freight tariffs seems not to be feasible. Given the possible negative effects of a (simple) non-linear pricing scheme for railway infrastructure, the dynamic allocative efficiency is uncertain.

4.2.5 Conclusion

Pricing of transport infrastructure has generated scientific attention since the 1960s. There exist a variety of pricing principles. The analysis of the four standard pricing principles led to the following results:

- SRMC-pricing gains static allocative efficiency, but fails in a dynamic perspective and generates a deficit.
- Ramsey-pricing is a second best solution. It reaches static allocative efficiency under the constraint of deficit covering. Moreover, it needs a good deal of information. It provides not more (dis-)investment incentives than SRMC-pricing.
- The form of FDC-pricing that is usually deployed reaches allocative efficiency neither in a static nor in a dynamic perspective. But it ensures total cost coverage.
- Multi-part tariffs for intermediate goods can be designed to cover the total costs and are Pareto-superior to Ramsey-Prices and SRMC-prices, regarding allocative efficiency. This holds, if only the market for transport services is considered. The information requirements of the regulator or the operator (in the case of self selecting tariffs) are high. The different parts of the tariffs can be designed to reach dynamic allocative efficiency, again only considering the market for intermediate goods. Multi-part tariffs can lead to a welfare loss on the final consumer market.

We have only analysed the most important pricing principles. Further variations of these principles or totally different schemes are possible, which are not considered here.

Given the practical constraints of pricing principles, it has to be concluded that there is no optimal pricing system when it comes to implementation. The only scheme that can be ruled out is FDC-pricing, given its failure of reaching allocative efficiency in a static or dynamic perspective. But even this principle can be adjusted to realise better results than described here (see Rothengatter, 2003, 128).

A pricing system has to be adapted to the specific situation of the infrastructure manager, taking into account a number of parameters. It is very likely to be a mixture of all these principles. There will be no plain solutions, particularly because of some similarities of the pricing systems that have already been pointed out: SRMC-prices are one extreme of Ramsey-prices and a Ramsey-price for a path can be the result of multi-part tariffs, if you allow for an access fee of zero.

Directive 2001/14/EC doesn't entirely follow this result. It calls for marginal cost prices and allows mark-ups on top of them as well as higher charges for the funding of investment projects. The directive seems to leave no place for two-part tariffs with a fixed component, but Ramsey-prices would meet the requirements. In order to set up an infrastructure charging system based on Ramsey prices, an IM has to take into account the demand elasticities. He will, if the regulatory setting is right, make sure that the market segment at stake can bear the tariff. But it is unlikely that there will be no exclusion of operators.

Concerns have to be expressed about the directives' claim that the charges for "equivalent uses" have to be equal in order to prevent discrimination. For a Ramsey-pricing and multi-part tariffs to be successful, the IM has to carry out a detailed product-differentiation. It will in some cases be efficient to offer different prices to different market segments. It may well be that a certain path is offered to an intercity passenger

train at a different price than to a local passenger train, because the passengers and hence the TOCs have different demand elasticities. It may also be efficient to offer different passenger operators different tariffs on the same line. The legal interpretation of this clause of the directive has to prove whether it addresses only the use within one market segment, as stated in the same section, and thus represents no obstacle for the implementation of Ramsey prices and multi-part tariffs. In particular the use of multi-part tariffs must be put into question, as in Germany a two-part tariff system has been rejected by the Federal Office of Fair Trade.

4.3 Rail Infrastructure Charges in the European Union

The focus of this chapter is to analyse the track charges across the European Union in the light of the suggestions of the economic theory and the requirements of directive 2001/14/EC. For the overview, we use the following categorisation: First, we describe the charging systems of the IMs which claim to apply MC pricing. Then we look at the rest of the linear tariff systems. A number of countries have implemented multi-part tariffs. Their analysis will be the last step in this chapter.

All of the infrastructure managers of the EU15 (plus Switzerland), with the exemptions of Greece and the Republic of Ireland, have to date implemented a tariff system for their rail infrastructure. We carry out a detailed analysis only of the most outstanding: our choice searches for typical as well as exceptional charging systems in order to enhance the comparisons we draw. We try to enrich this chapter with facts from the remaining charging systems.

4.3.1 Marginal Cost Prices

4.3.1.1 Sweden and Finland

Sector Organisation

Sweden's rail network contains 12,800 km, of which 25 % are in private hands. It was the first country in Europe to carry out a radical railway reform. In 1988, the infrastructure was extracted from the former integrated monopolist Statens Järnvägar (SJ) and handed over to the public sector agency Banverket. This was to create the base for a non-discriminatory access. From 1992, non-commercial long-distance passenger services were tendered. Even before that, tenders of regional passenger transport started, carried out by the newly created County Public Transport Authorities. Interregional non commercial transport has been tendered since 2000 by the new national authority Rikstrafiken. The last important reorganisation in the Swedish rail sector took place in 2001, when SJ was split into three public limited companies, one for passenger transport (SJ AB), one for freight (SJ Green Cargo AB) and one holding for the real estates (Swedecarrier AB). They are all in the ownership of the government. The next step will be the creation of a Railway Inspectorate (Kirchner, 2003, 56) (Nilsson, 2002 and Alexandersson, 2002).

In Finland, infrastructure and transport are separated as well. The infrastructure has been owned since 1995 by Finnish Rail Administration (*Ratahallintokeskus*, RHK), which is a civil service department and subordinated to the Ministry of Transport and Communications. RHK is in charge of maintaining and developing the network and for safety issues. It has very few staff and contracts traffic control and maintenance work to VR Group Ltd, amongst others. VR Group Ltd was created in 1995 and is entirely state-owned. Like RHK, it is subordinated to the Ministry of Transport and Communications

(VR, 2003, 42). RHK is financed by the government, its budget has to be approved on a yearly base by the Finnish parliament.

Infrastructure Charges[28]

Sweden and Finland were the first European countries to introduce SMRC-prices. They are based on detailed cost studies. The tariffs[29] of Sweden and Finland exhibit similarities in their structure but show some differences in their height:

A circulation fee is charged in both countries:

- for freight transport in Finland € 0.001223 per gross tkm, in Sweden € 0.0003 per gross tkm, and
- for passenger transport in Finland € 0.001189 per gross tkm, in Sweden € 0.00093 per gross tkm.

To establish the marginal costs, a cost function of the following form was estimated (Thomas, 2002):

$$\mathbf{C_{it} = f(Y_{it}, U_{it}, z_{it}, e_{it})}$$

Where C_i denotes the maintenance (and renewal) cost for track section i at time t, Y_{it} is the length of section i. U_{it} denotes the utilisation level (in gross tons) and z_{it} is a vector of technical features of the infrastructure (e.g. the number of switches, age of track, …). The function takes no features of the vehicles that pass over it into account.

The fee for passenger transport and freight transport in Finland is similar, whereas the difference in Sweden shows that the freight vehicles cause much higher costs than

[28] The Infrastructure Charging Systems presented in this paper are from the year 2003. At this time, two years had passed after the enactment of the directive 2001/14/EU. This paper shows their reaction to the directive. Newer developments of the tariff systems are sketched in section 4.4.

[29] All of the tariffs described in this chapter exclude the use of stations and energy, unless indicated.

passenger vehicles. The cost functions allow no differentiation on the basis of vehicle characteristics, although they may be of a significant influence for the wear and tear. It is well known for instance, that tilting trains cause higher damages than other passenger trains.

There is a charge for environmental and accidental costs in Finland:

- € 0.000182 per gross tkm for electric freight transport
- € 0.000584 per gross tkm for diesel freight transport, and
- € 0.000098 per gross tkm for passenger transport.

These costs are separately accounted for in Sweden. The diesel charge, accounting for the emission of nitrogen oxides, is € 0.036 per litre for old passenger and freight vehicles and € 0.018 per litre for newer vehicles. In contrast to Finland, the charge is linked closer to the source of the externalities, i.e. the diesel. The accident charge, based on average costs, is € 0.118 per train-km for passenger transport and € 0.059 per train-km for freight transport.

In Finland, a supplementary charge for freight transport, € 0.19 per tonne of freight transported, is levied. The use of stations is included in the Finish charges. For passenger trains in Sweden, a charge for information on platforms and at stations has to be paid. It is € 0.00022 per gross tkm. This is reasonable, as information costs can easily be allocated to particular trains, although the reference to the gross weight is not straightforward.

There are now proposals in Sweden to add components which reflect scarcity and congestion costs as well as noise costs and a carbon dioxide tax. The same authors advocate the necessity to include re-investment/renewal costs in the actual tariff system

(SIKA, 2002), which would lead to a deviation from the current form of SRMC-pricing in Sweden.

4.3.1.2 The Netherlands

Sector Organisation

The rail restructuring process in the Netherlands started in 1992, when a vertical disintegration of Nederlandse Spoorwegen (NS) took place. Since then, the infrastructure management became independent from the operations. In 1996, NS became a public limited company, which is in 100 % state ownership. Several companies were established within the holding. NS Cargo was later integrated into Railion. In the same year, three government commissioned agencies had been established for the management of the tracks: NS Railinfrabeheer (construction and management), NS Verkehrsleiding (traffic management) and Railned (access, capacity allocation, safety). They initially were part of the NS holding in the division NS Railinfrastrust BV, which was then the owner of the infrastructure. Despite the formal connection to NS, they worked largely independent from the incumbent (Prognos, 2000, 53). In 2003, they were institutionally separated from NS and merged under the name Prorail, an agency which is subordinated to the Ministry of Transport, Public Works and Water Management. This is also responsible for safety issues, including the respective licensing.

For the long distance passenger transport, NS has been awarded an exclusive concession until 2010. A performance contract for this segment was signed, including a price regulation for the passenger tickets. Liberalisation is starting in the regions. Of the 32

regional lines, 25 were put out to tender in 2002. Three types of access rights are distinguished (Kirchner, 2003, 51):

- Access to the above mentioned regional passenger transport is possible for domestic and international operators maintaining an operating and a safety license.
- Access for domestic and international freight operators is open to the designated network.
- Access for occasional passenger transport is treated similarly.

Rail Infrastructure Charges

Fees for the use of the tracks in the Netherlands have been introduced in 2000. The system is structured very simply. Charges are levied according to the train-kilometres. The charges differ for

- passenger transport (basic charge),
- freight transport (reduced charge) and
- Deadhead runs (no charge).

The tariff system is designed to cover the marginal costs, consisting in daily and major maintenance, traffic management, and use of stations (Prognos, 2000, 56 and IMPROVERAIL, 2002, 177f). If rivalry for a path cannot be resolved by its price and the priorities deployed in the timetabling process, an auctioning process will decide over the final allocation.

A transition phase is foreseen until the marginal costs are totally covered by infrastructure charges. It will last until 2005 for passenger transport and until 2007 for freight transport. The increase in charges is stipulated as follows:

Table 16: Dutch Charging Parameters

€ per train-km	**2003**	**2004**	**2005**	**2006**	**2007**
Passenger Transport	0.5594	0.7459	0.9324	0.9324	0.9324
Freight Transport	0.3357	0.5221	0.7459	0.8391	0.9324

Source: Prognos, 2000, 56.

4.3.1.3 Conclusion

SRMC-pricing is applied in Sweden, Finland and the Netherlands. The Swedish and Finish tariff systems are based on detailed cost studies for the wear and tear components, deriving the marginal costs from the total cost function (e.g. Nilsson, 2003). The charges show that a form of averaging of these costs is deployed, as there is no variation between different parts of the network and only a distinction between passenger and freight trains in the two Scandinavian countries.

The Netherlands are claimed to deploy a marginal cost pricing as well. The charge is based on train-km rather than on gross tkm as in Sweden and Finland. This is unusual in the light of the existing studies (Link 2003 gives an overview) (we could not find any for the Netherlands), as wear and tear are identified to be an important component of the marginal costs. They in turn are driven by the weight of the trains.

Given that the average weight of a passenger train is usually far less than 1,000 t, the charges in the Netherlands are higher than in both Nordic countries. There are significant differences in the level of charges between those two countries as well: the passenger circulation fee in Finland is more than four times higher than in Sweden, although in Sweden a mark-up for the financing of the Öresund-Bridge is included. The difference is mainly due to the fact that only the Finish tariff system includes renewal costs. Differences for price components between countries can also be generated by different input prices, standards and geographical conditions. Moreover, the definition of the track maintenance may differ between these countries.

4.3.2 Cost Covering (Linear) Tariffs

4.3.2.1 Austria

Sector Organisation

The Oesterreichische Bundesbahnen (OeBB) are an integrated public corporation. The accountings and the management of the infrastructure division OeBB Netz and the train operation division are separated. The current Austrian government went a step further and carried out an institutional separation. The newly founded OeBB-Infrastruktur Betrieb AG, which is in 100 % ownership of OeBB Holding AG works as the IM: it provides, operates and maintains the rail network. It is also responsible for operational schedules and shunting.

Around 90 % of the 6,000 km of tracks are in the hands of OeBB Netz. A special feature is the network at the Hungarian border, which is jointly owned by OeBB and the Hungarian Railways. To finance new investments in the public network, a state owned

rail infrastructure financing company (*Schieneninfrastruktur-Finanzierungs-GesmbH*, SchIG) was founded. It receives lump sum payments of OeBB Netz.

Access to the network is open for EU15 freight transport and for domestic operators. The access is subject to an operating license and a safety license. Moreover, a reciprocal access is granted to other countries. Owing to the only recently established open access, OeBB still maintains a very dominant role in the Austrian rail freight and passenger market. Six small domestic and two foreign operators are on the tracks, some of them have been running trains since years. The activity takes place mainly in the freight market, as the passenger market remains rather closed to competition (Kirchner, 2003, 37).

Rail Infrastructure Charges

For the tariff system of OeBB, a marginal cost study was carried out (Munduch et al., 2002), which led to a wear and tear component (for maintenance only) of € 0.001 per gross tkm. Further components of the tariff system are:

- a circulation fee per train-km, which varies for the six different line categories between € 0.60 and € 2.50,
- a discount for single load freight transport of € 0.30 per train-km, and
- a scarcity component of € 0.50 per train-km for two relations going into Vienna, each of which applying for 05:00h-09:00h and 15:00h – 19:00h

4.3.2.2 Switzerland

Sector Organisation

The Swiss rail network is 5,063 km long. 3,652 km have a gauge of 1435 mm. Approx 3000 km of the network are in the ownership of the Schweizerische Bundesbahnen AG (SBB). With an average of 128 trains per day and section it is Europe's most heavily travelled rail network. The market share of the performance in passenger transport reached 21.3 % in 2001 (Litra, 2003). The Bern-Loetschberg-Simplonbahn AG (BLS) owns 245 km of the tracks, among them an important north-south corridor. The rest is owned by smaller companies. They have a private status, but all of them are in the hands of public authorities (cantons) (IMPROVERAIL, 2002, 216).

In 1996 started the restructuring of the SBB, which then was part of the public administration. The accounting of infrastructure and transport were separated. A new railway law implemented the regionalisation of the services in public interest. The cantons could now tender services which require subsidies. 1999 saw a further restructuring of the SBB. It became a public limited company. SBBs governance structure was changed into the divisions infrastructure, passenger transport and freight transport and it was discharged of its liabilities (Brenck, 2003, 317f).

The Federal Office of Transport (*Bundesamt fuer Verkehr,* BAV) regulates the open access and safety. It defines the framework for the infrastructure pricing system (IMPROVERAIL, 2002, 216). The passenger tariff system is agreed upon by SBB and the federal government. The infrastructure tariffs for passenger transport are set by the BAV, whereas the infrastructure managers are free to set the prices for freight carriers.

Rail Infrastructure Charges

In Switzerland, the infrastructure tariff for the tracks of Schweizerische Bundesbahnen AG (SBB) and Bern-Loetschberg-Simplonbahn AG (BLS) consists of two parts (all prices exclude VAT):

- The minimum charge:
    - Freight trains pay for maintenance € 0.0065 per gross tkm and € 0.26 per train-km for the operation.
    - Passenger trains pay € 0.016 per gross tkm for maintenance and € 0.26 per train-km for the operation.
- The contribution margin:
    - Franchised passenger transport pays a fixed percentage of its revenues as a contribution margin. This percentage is defined by the regulation body for each franchise.
    - Non-franchised passenger transport pays € 0.0018 per km.
    - Freight transport pays € 0.003 per net ton-kilometre on the SBB infrastructure and 0.0023 per gross-tkm on the BLS infrastructure. On this network, slow freight carriers (v_{max} < 60 km/h) pay an extra fee. Both the contribution margin on the BLS- and on the SBB-network are currently paid by the federal government.

The average prices per train-km are € 1 for regional passenger transport, € 1.7 for long-distance passenger transport and € 1.2 for freight transport (Brenck et al., 2003, 299f). Slow trains on the BLS-network pay a capacity charge which seems to be based on a standard path, although there is no extra fee for fast trains. The minimum charge was

elaborated as marginal costs of using an average standard modern infrastructure (IMPROVERAIL, 2002, 226).

4.3.2.3 Germany

Sector Organisation

The German rail infrastructure consists of 40,000 km of tracks, 36,600 km thereof are owned by the DB Netz AG. The Deutsche Bundesbahn was formally privatized in 1994, when it merged with Deutsche Reichsbahn, the former integrated monopolist of German Democratic Republic. It was relieved of its liabilities and four divisions for infrastructure, freight transport, regional passenger transport, and long distance passenger transport were created. In a second stage of the reform, these divisions were transformed into public limited companies in 1998, which have operated under the roof of the strong holding structure of Deutsche Bahn AG since then. Now a fifth company joins them, which is responsible for stations and services. A third stage of the reform was planned, in which the transport companies should de facto be privatised in a going public. As the realisation of this basic idea of the German rail reform is currently insecure, the holding remains in 100 % federal ownership. 1996 saw a shift in the responsibilities for the regional passenger transport, which presently accounts for approx. 54 % of the rail passenger transport. A regionalisation was carried out and regional authorities were allowed to tender public services. They define the quality and quantity of the services they order[30].

[30] For an analysis of the reform see chapter 2. For tenders of regional rail passenger services see chapter 3.

The access to the rail infrastructure of DB Netz AG is open in compliance with directive 91/440/EC.

Rail Infrastructure Charges

A non-discriminating linear tariff system, the TPS 2001, has been set up by DB Netz, after the previous two-part tariff TPS 98 was found to be discriminating by the Federal Office of Fair Trade. The current price system is rather differentiated and sets the price of a slot in three steps (see figure 15) (DB Netz AG, 2003):

- setting a base price depending on line categories,
- multiplying a product factor and
- multiplying and/or adding additional factors.

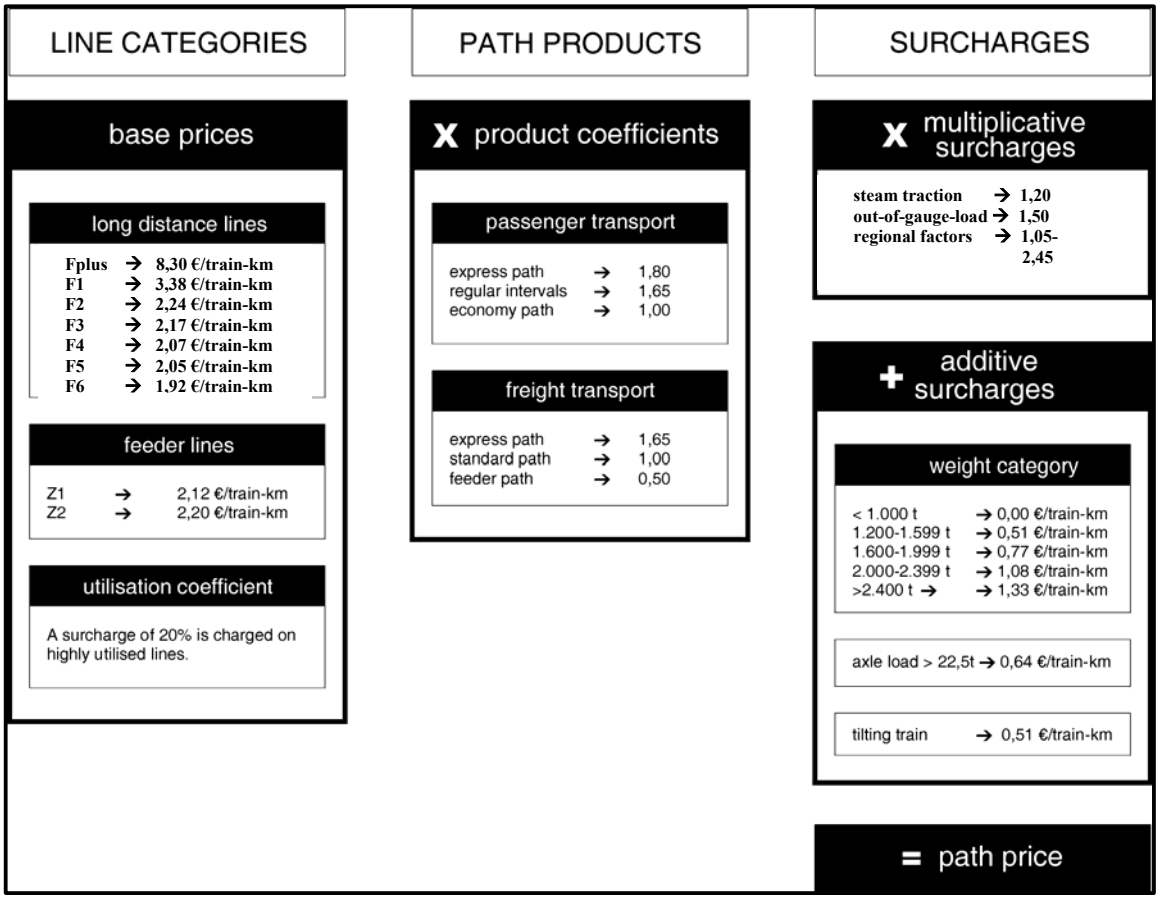

Figure 15: The German Infrastructure Charging System in the Year 2003

Source: own figure, on the basis of Deutsche Bahn AG (2003).

Line Categories and Product Categories

The line categories reflect the technical equipment of the line as well as its functional role in the network. The categories stretch from lines which allow a speed above 280 km/h (Fplus), to basic lines which allow only a maximum speed of 50 km/h. The most important indicator for the technical quality is the maximum velocity. The line categories reflect the costs of the infrastructure. Furthermore, a surcharge of 20 % is levied on lines with a high demand in order to spread the traffic geographically.

The product categories reflect the priority of a path for route planning and delay management, and the mean velocity of the path:

- Express paths are fast and direct paths between metropolitan areas. These paths are of highest priority in timetable planning and available for both freight and passenger transport.
- Standard paths are available for all freight trains and are used for long-distance transport. Because of the low priority, there are few choices in timetable planning and therefore little flexibility for the train operator.
- A feeder path is a freight path, which is connected to a standard or express path. It is provided only for the distribution or collection of wagons.
- The regular-interval path is available only for (regional and long-distance) passenger transport.
- Economy tariffs are aimed at non regular transport. It is the intention of the DB Netz AG to provide an access facility for railway undertakings, which cannot afford the other tariffs.

Additive and multiplicative surcharges apply:

- Out-of-gauge load: Trains exceeding the regular gauge entail higher planning expenses. Therefore a coefficient of 1.5 is multiplied on the line charge.
- Gross train weight over 1,200 t: This wear and tear indicator increases in four categories up to 2,400 gt: The additional surcharge for a train of 1,200 – 1,599 gt is 0.51 €. It increases in three steps to 1.33 € for trains that weigh more than 1.399 gt.
- Regional factors vary between 1.05 and 2.45 and apply only for regional passenger transport.).

- Lines which can bear axle-loads of over 22.5 t need a superstructure above normal German standards. Trains exceeding this axle-load cause additional costs and are charged an extra 0.64 € / train-km.
- For tilting trains, an extra fee of 0.51 €/train-km is levied.

If the price system and priorities in timetabling do not solve the rivalry for a certain path, the infrastructure manager tries to mediate between the railway undertakings. The ultimate solution is a bidding process.

The tariff system of the DB Netz AG is characterised by a supply-side and a demand side price differentiation. The supply side differentiation relates the price which has to be paid per track-km to the quality of the assets. The main indicator is the maximum speed. There are nine different categories for regional and long-distance lines, compared to six categories in Belgium and Austria and only two in Denmark. In Germany, the tariff generally increases with the maximum speed. This rule doesn't apply for the feeder lines (Z1 and Z2), the argumentation of DB Netz AG being that the traffic on these lines is too sparse to further reduce the price. This argument indicates a fully distributed cost approach in the tariff setting, where (a part) of the fixed costs is distributed among the user of a line. The price difference between the categories F3 and F4 underlines this. Both allow for the same speed, but F3 contains lines for mixed traffic, which usually require higher infrastructure investments. The price spread between the lines is rather low (€1.92 - €3.38 per train-km), given the fact that only one line is categorized Fplus (€ 8.30 per train-km). A major redistribution of traffic is not likely to be caused by this spread. The surcharge for highly utilised lines leads to a further variation of the base price. It can be interpreted as a Ramsey-element of regional price differentiation. The capacity-surcharge in Austria is more differentiated, as higher

prices apply during the two daily peak-periods on busy lines. Even more sophisticated is the capacity surcharge in Belgium, with the additional possibility to vary from day to day.

The demand-side price differentiation in Germany is particularly interesting for not regular passenger transports and freight transports. Operators can choose between different products, according to their preferences for priorities in the planning process and during operation. It must be noted, that the overall scheduling priorities of the DB Netz AG don't only depend on the path product but mainly on the railway law and its directives. Therefore, the advantages of a more expensive path-product might be very small and it can be considered as a means to differentiate consumers' willingness to pay. As such, it is a Ramsey element.

Several surcharges apply. A charge for the weight is levied only from 1200 t on, which indicates that there is no marginal cost related element for trains under this limit. The regional factors were introduced in 2003. The DB Netz AG explains the high difference of charges between the regions with the different cost structures and the capacity utilisation. In their argumentation, a less used capacity in the regional networks needs higher charges, thus following a fully distributed cost approach. The regional factors were much criticised at its introduction. The German states which are in charge for ordering regional rail passenger transport services complained about the absolute height of these charges, as they now account for up to 50 % of the total cost of the services. The funds to buy these services stem from the federal government and are earmarked for public transport. For political reasons, it is very difficult to cut the service level in the regions. Therefore, the price elasticity of the regions is low. Thus, the regional factors can be seen as a further application of Ramsey-pricing.

It is frequently argued, that the tariffs for the regional sections of the German network cross-subsidise the long-distance lines for passenger transport[31]. Applying a normative definition of internal subsidisation, the price for the regional tracks must exceed the marginal production costs to avoid cross-subsidisation. As there are no cost studies for the German rail infrastructure available, we can only make comparisons with other European countries. The highest MC in Europe (in Finland and Austria) are at about € 0.001 per gtkm, which is little compared to the cheapest train run on a long-distance line for passengers (€ 1.92 per train-km). This makes a cross-subsidisation unlikely[32]. A look at the balance sheet of the DB Netz AG reveals that around 60 % of their revenues are generated by regional transport, which corresponds with around 60 % of the total annual train-km that are demanded by regional rail passenger services. The long-distance passenger transport generates a higher part of the revenues than justified by their share of the total annual train-km, the freight transport pays less. From this perspective, the infrastructure charges privilege the freight transport, which is in accordance to the German political aim to increase the market share of the rail freight transport.

As a result, a path-km for regional passenger trains costs roughly between two and over ten € per train-km (depending on the region) and for freight trains (with less than 1200 t and less than 160 km/h) between approx. one and € 4.5 per train-km. The maximum price for a long-distance passenger train path – apart from the new and highly equipped relation Koeln-Frankfurt is € 7.3. Thus, paths for regional passenger transport can be more expensive than for long-distance transport. This might be incurred of FDC- or

[31] Note that Ramsey-pricing is the economic rationale for cross-subsidisation.

[32] There is also a lack of data to test for cross subsidization based on stand alone costs: according to this definition, DB Netz AG is not internally subsidized, if the stand-alone costs of all subsets of products are higher or equal than

Ramsey-pricing. Compared to other countries, the application of a weight-dependent parameter only from 1200 t leads to high prices for wagon load transport (higher than € 1.05). This is likely to drive these carriers off the rails, as the maximum HGV-toll on roads will be at € 0.17 per km.

4.3.2.4 Conclusion

In Austria, Belgium, Denmark, Portugal, Switzerland, and Germany, the prices are not (only) marginal cost-based. This leads to a partial closure of the gap between the income of the IM and its costs, compared to the countries presented in section 4.3.1. But in all of these countries public financing is also used for the infrastructure.

The IMs of Austria and Switzerland have elements in their charging systems which are based on gross tkm and thus driven by SRMC. In Germany, the charges are generally paid per train-km, although there is a weight-based charge for extra-heavy freight trains. All of the three countries allocate a part of the infrastructure costs on the basis of train-km, which follows a fully distributed cost approach, where common and block-wise fixed costs are quite arbitrarily distributed.

All three of the IMs reflect scarcity of capacity in their prices, but in different ways:

- In Germany, a surcharge is levied on heavily travelled routes.
- The same holds for Austria, but with a higher proportion of the surcharge. Additionally, the surcharge is also time-dependent.
- In Switzerland, a node charge applies for passenger transport. For heavily used nodes, the charges are higher.

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their infrastructure charges (Borrmann / Finsinger, 1999, 143). Moreover, the definition assumes zero profit of the IM (it is actually negative) and no demand interdependencies, which is not true for any two parts of a network.

A different approach to reflect scarcity is planned in Belgium. The IM intends to implement a coefficient T (currently set to 1), which considers the duration of the train journey in relation to the standard speed defined for the specific line. This is in line with the method suggested by Nash et al. to charge for the use of capacity (Nash et al, 2003), as the capacity that a certain train uses can only be measured in relation to the speed of the other trains on that route. It would partly reflect the opportunity costs of the IM which cause TOCs deviating from the ideal of speed harmonised transport.

A higher charge at peak times can be interpreted as Ramsey-element, as the elasticity of the passengers is usually lower during these periods. This is an appropriate measure if more than the incremental costs of a train run have to be covered. A surcharge on certain lines can be seen from the same perspective: for passenger transport, there are for most of the routes only limited intramodal alternatives, as the networks are usually not very dense compared to the road network. This should limit the elasticities of the TOCs when ordering their train paths.

4.3.3 Non-Linear Tariffs

4.3.3.1 Luxembourg

Sector Organisation

The Societé Nationale des Chemins de Fer Luxembourgeois (CFL) owns 617 km of track (CFL, 2003). The former state monopolist is the only infrastructure manager and the only provider of rail passenger transport in Luxembourg. Different laws transformed the RU from 1995 – 1999 into a public limited company with separated divisions for freight, passengers, infrastructure, and finance (CFL, 2003 and Eiro, 2003). In doing so, directive 91/440/EEC was accomplished, whereas Luxembourg was part-time exempted

from implementing all sections of the first railway package (Kirchner, 2003, 118). The state holds by far the majority of the companies' shares, further owners are Belgium and France.

The internal market is open for domestic freight and passenger operators (CEIS, 2001). International freight access is permitted to operators from the EU15 according to the EU directives. Moreover, access is granted on the basis of reciprocity.

Rail Infrastructure Charges

The tariff system in Luxembourg is composed of three elements (CFL, 2003, 35ff):

$$\text{Tariff} = A + B + C$$

- A fixed access charges per path and timetable period (A), usually € 155.30 (standard path).
- An usage component B = a*b*c*d, depending on the base price of € 1.479 (a), the length of path (number of km) (b), a factor for the gross weight (c), ranging from 0.6712 to 1.841, and a factor for the train type (d), ranging from 0.6126 (combined freight) to 1.0507 (passenger railcar).
- A congestion element for time bands on sections of the network which have been declared congested. The element C = e*f*g depends on the base price of € 15.28 (e), and the length of the congested section in km (f). There is also a rigidity-factor (g), which reflects the rigidity of the particular path in the timetable, which the operator and the IM have agreed upon. This factor ranges from 1 (< 3 min) to 2 (> 60 min).

4.3.3.2 United Kingdom

Sector Organisation

The British rail industry was among the first to carry out a railway reform in Europe (1992 - 1994), and it was done in the most unique way. The result was the privatisation of the whole sector which was completed by the going public of the infrastructure manager, Railtrack plc, in 1996. This company, which held the network license, was responsible not only for the traffic control and the maintenance but also for the development of the network with all the necessary investments. In 2001, Railtrack was put into public administration. After one year, in October 2002, the network licence was given to Network Rail. Network Rail now works, in his own view, as a private sector company limited by guarantee, but with no shareholders and for the good of its members and the public. There are two categories of members, stakeholder organisations and public members with special interests in the railway sector. They include individual representatives of operators, employees, passenger groups and finance and construction companies. The Strategic Rail Authority[33] (SRA) was a special member. Network Rail came into being in 2001 and is responsible for the long-term development of the rail sector. It is directed and guided by the Department of Environment, Transport and the Regions. In its function as a member of NR, it has the right to remove all other members in case of financial failure. The Office of the Rail Regulator (ORR) was involved in setting up the legal framework of Network Rail by a mix of licence and contractual obligations. The IM now owns the infrastructure and is capable to trade in its own name.

[33] The SRA was wound up in 2005 and its tasks were transferred to the Department for Transport.

In the passenger transport, the way of competition for the tracks was chosen, with increasing, but generally very restricted possibilities for competition on the tracks ("moderation of competition")[34]. Franchises are tendered by the SRA and a proportion of the fares is regulated by this authority as well (referring to 39 % of the TOC's revenues in 2000). The franchises are awarded for a period of five to eight years, although deviations from this rule can be observed. In the franchise conditions, the public subsidies and their development are specified as well as the passenger service requirements. By 2001, four passenger operators controlled 19 of the 25 franchises and 80 % of the revenues (Preston, 2002, 1). Ten franchises are long-distance services. In freight, the access is open in the freight sector. There are currently five carriers offering services.

Rail Infrastructure Charges

The tariffs for passenger services in the UK are negotiated between Network Rail (the new IM) and the Office of the Rail Regulator (ORR) before bids are sought. The initial idea of the tariff system was to charge operators for the avoidable costs they cause and let them pay for the common costs according to their ability to pay (Nash et al, 2003, 2). They hence contain a Ramsey-element. The avoidable costs, which equal the incremental costs in the case of one train run, were further split up into (Dodgson, 1994, 207):

- Usage-related costs: Track usage (incl. wear and tear and renewal), traction current, and peak charges.

[34] There are now considerations how to introduce more competition, see e.g. ORR, 2003.

- Directly attributable fixed costs: the long-run avoidable costs that arise from a particular operator using the tracks, i.e. the fixed costs that would be avoided without this operator using that part of the network.

Three types of common costs are distinguished (Dodgson, 1994, 207):

- costs for the use of specific sections of the network: applies only if the section is used by more than one operator,
- costs that can only be attributed to a geographic areas, e.g. costs of power boxes, and
- network costs: the remainder of the common costs.

This resulted in the following average structure of the passenger transport charging system for the first review period (1997 - 2001) (Nash et al, 2003, 2):

- 8 % variable charges, most of it for electricity and
- 92 % fixed charges, independent of any train movement:
    - 37 % of the total charge to cover the long term incremental cost of capacity for the designated operator,
    - 43 % of the total charge as a contribution margin to cover the common costs: about half of this (arising at the zonal level) determined on the basis of planned train-km and the other half (arising at national level) determined on the basis of budgeted revenue.
    - 12 % of the total charge to cover the costs of stations and depots, distributed between the respective operators, on the basis of output measures.

The variable charges are derived by means of a bottom-up approach, which estimates the variable costs, i.e. the maintenance and renewal costs, of the different asset elements (track, structures, signals, and electrification). These are in the next step allocated across all vehicles using the respective assets, taking into account the damages that different vehicles cause (Thomas, 2002).

The average charge per train-km for passenger transport was about € 8 (£ 5) in 2001 (Preston, 2002, 2). The charge can usually be changed at the end of a control period. If changes catch a franchisee during their contract period, the SRA has to account for the entailed surcharges (in the case of increased charges) or receives the difference from the operator (in the case of charge reduction).

A performance regime was introduced alongside these charges. The infrastructure manager has to compensate the operators for delays, which are not caused by them. On the other hand, the infrastructure manager gets rewards for a performance over the historical benchmark.

This system was criticised in several ways (e.g. Nash, 2003b, 3ff):

- the variable part was to low due to an underestimation of the wear and tear costs,
- no incentive of efficient use of peak capacity,
- no incentive for the infrastructure manager to extend capacity,
- no incentives to replace low value services with higher ones, and
- no congestion and scarcity costs (opportunity costs) considered.

These problems were partly tackled at the end of the first review period, when changes were introduced. The variable part of the track charges was increased, and congestion

costs were specified by network section and time. They are based on historical data and reflect 50 % of the identified congestion costs.

Furthermore, the charges for freight carriers are now subsidized by the SRA and only consist of a variable part, but include long-term costs for the capacity.

4.3.3.3 Conclusion

The following countries have chosen tariffs, where the price per unit changes with the amount of the ordered km: Luxembourg, the UK, Italy, Spain, and France. The UK is an outstanding example, as – applying a franchise system – the sector organisation is different from the other ones. Therefore there is no doubt about the non-discriminating nature of the fixed part of the tariff in the UK. A further unique feature of the British charging system is that it is mainly based on costs, which were analysed by a bottom-up approach. The distribution is relatively easy, as most of the sub segments of the network are only used by one operator. The fact that passenger services are nearly only provided by franchises also facilitates the distribution of common costs on the basis of budgeted revenues, as they are derived during the franchising process. It is quite straightforward to assume that a higher willingness to pay goes alongside with higher revenues, although this alone says nothing about the demand elasticity.

Charging systems in the UK and Luxembourg reflect the types of trains. In the UK, more deteriorating rolling stock is charged higher charges, while in Luxembourg there may well be a demand driven product differentiation behind this element of the charging system. Freight trains have to pay fewer charges, a fact that possibly reflects their smaller willingness to pay for train paths.

In both countries, the fixed charge accounts for a large proportion of the tariff. This is problematic in Luxembourg, as it works as an entry barrier. The multi-part tariff of France (see annex 3) is also likely to have deteriorating effects on competition, but for slightly different reasons. There is a reservation charge per path-km and timetable period, which is of little significance for the total level of charges. There is also a small monthly access charge, which accounts for around 4 % of the overall charge. It increases with the number of paths requested on a specific line, but with a decreasing effect: operators which buy more paths per month pay fewer fixed access charges per path. It is possible that this is not compliant with the directive 2001/14/EC.

4.4 Recent Developments of the Charging Systems

In this chapter we cast a short view on the recent development of the infrastructure charging systems analysed so far. We consider in particular the changes of the structure, but in important cases also in the level of the charges. The aim is to detect a convergence or a harmonisation of the systems.

The structure of the Finish charging system has not been changed in general. The circulation fee has been stable over the years, but the part for external costs has been raised for freight transport. This part is now called “infrastructure tax”. In the future, it can be used to charge a higher charge in order to cover more of the infrastructure costs. At the moment, Finland is in general still applying a marginal cost based pricing system. However, on the line from Kerava to Lahti, there is a charge of € 0.005 per gross tkm applied to recover a part of the recent investments.

In Sweden, the infrastructure charges are by law marginal cost based. Since 2003, the system has been made simpler, as there is no more difference between freight and

passenger transport. The train path fee is a new small fee which has been introduced to cover the administrative costs of infrastructure allocation (around € 0,025 per train km). The structure of the Dutch charging system, which had been very simple in 2003, has been changed. There is still a km-based basic charge, which has been reduced compared to five years ago. It is designated to cover the traffic management costs. A second element has been added to the tariff system to explicitly cover the wear and tear costs. This element is - in accordance of our critique of the 2003 system - based on ton km. With these specifications, one can still consider the tariff system of being marginal cost based.

In Austria, the tariff system is still linear, but additional elements have been introduced. The most outstanding innovations are different possibilities for surcharges or discounts:

- There is the possibility for surcharges and discounts depending on the type of traction that is used.
- There are surcharges to be paid for delays beyond pre-defined thresholds.
- There are discounts to establish incentives for more rail transport on two lines.
- There are discounts and surcharges which differentiate between market segments.

The most interesting novelty, which is new in the European context, is the discount to attract more traffic. On one line, this discount reaches even € 1.59 per train-km.

In Switzerland, a new element to cover the costs of tunnels longer than 30 km is levied. Discounts now only apply for combined transport. The Federal Office of Transport has introduced a scheme to reduce externalities of rail noise. Bonuses are granted for the use of more silent brakes. The scheme is handled outside the tariff system.

The infrastructure charging system of the DB Netz AG in Germany has also remained rather stable in level and structure over the last years. The prices of six line categories have been raised by 6 to 27 %. Remarkably, the use of two line categories is now cheaper than five years ago. Two additional elements have been introduced:

- In addition to the utilisation coefficient (20 %) there is now a capacity surcharge of 50 % on certain lines, if the rolling stock in use cannot go faster than 50 km/h.
- A performance regime has been introduced. Both TOCs and the infrastructure manager have to pay € 0.10 per minute of delay which they cause.

The tariff systems in Luxembourg and in the UK remained nearly stable in their structure during the last years.

The structures of the tariff systems we scrutinized have not been subject to major changes during the last five years. This is as such a positive sign for the users, as they wish to have a stable base for the planning of their business, mainly in terms of their level, but also in terms of the structure. On the other hand one has to reiterate the broad heterogeneity of the tariff systems. Anything is possible in the EU between social marginal cost based charging and full costs, and between one and two part tariffs. Seven years after the enactment of the directive 2001/14 the limited changes during the last years and the big differences that prevail in infrastructure charging prove that the European legislation has been of little influence.

4.5 Comparisons and Recommendations

General Observations

The sheer establishing and publishing of a tariff system in most of the scrutinized countries has to be emphasised as a positive development. Some of these publications are accompanied by a network statement, as required by directive 2001/14/EC. It contains the conditions of infrastructure access. All infrastructure charging systems are - in varying degrees - linked to the physical utilisation of the tracks. The demand is generally not sufficiently taken into account. The level of prices and their structure differ significantly, as shown in the examples in figures 16 and 17[35].

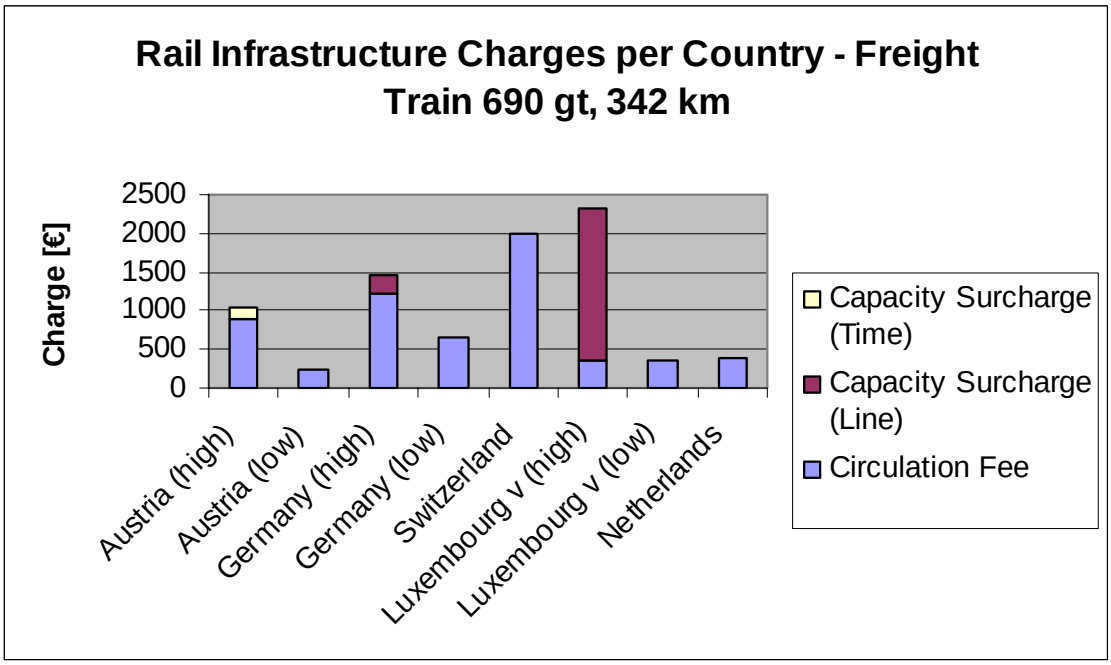

Figure 16: Exemplary Freight Train Run in Five Countries, Varying Line Categories and Utilisation Factors

Source: own calculations.

[35] We use an exemplary train with weight of 690 gross tons (gt) and a path of 342 km.

As shown in figure 16, for the particular type of train under consideration, the level of charges can well vary between around € 200 in Austria and around € 2,400 in Luxembourg. It is depending on the exact route, the time of the day and further segmentation criteria. This variation even leads to large possible differences within a single country. Our train pays in Luxembourg only a minimum charge of around € 400. This price can be raised sharply by a regional capacity surcharge.

Some of the differences between the countries can certainly be traced back to the prices for input factors, like wage level and density of the network. The bulk of the difference is due to different cost covering aims in the countries. The structure of charges also makes a big difference. If two part-tariffs apply, like in Luxembourg, even short distance transport may be costly per km (figure 17). This turns into the opposite for long haul trains.

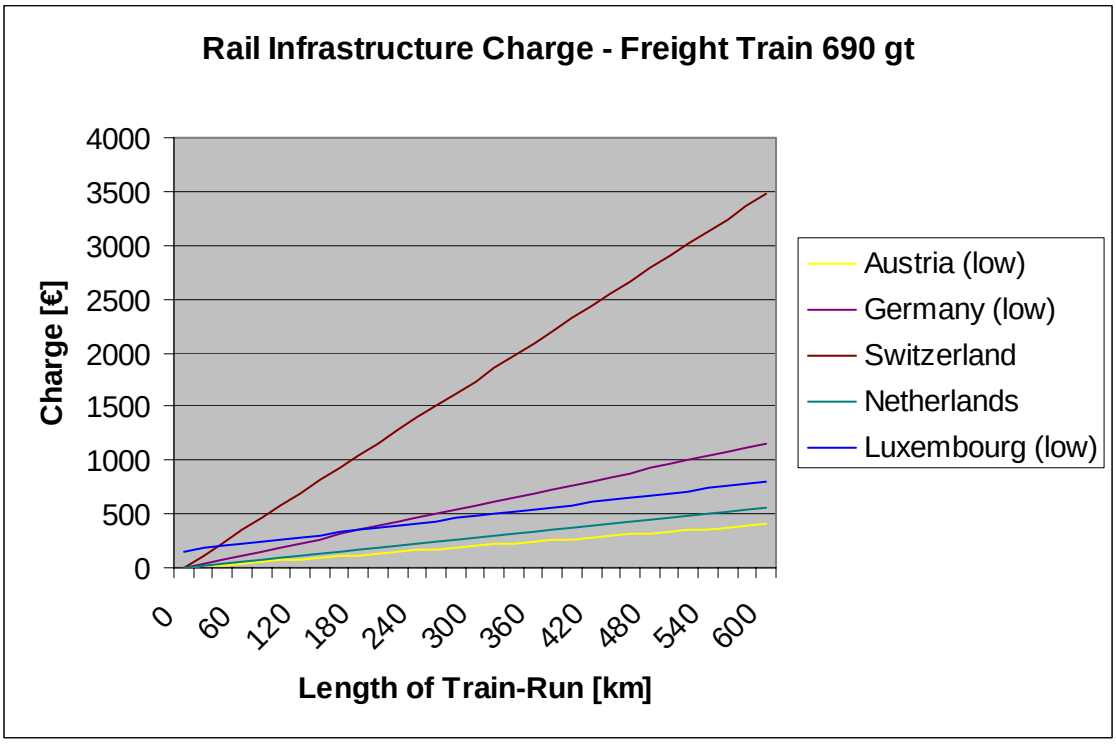

Figure 17: Exemplary Freight Train Run in Five Countries (Cheapest Possibility)[36]

Source: own calculations.

Nine of the 16 IM have chosen a linear tariff. Two have no tariff system at all. Three of them are mainly based on SRMC. Within each of these countries, the respective charges are equal for all types of assets, although some studies found different results for different types of line (Thomas, 2002). There is remarkably little variation, given that marginal costs differ with the type of infrastructure and of rolling stock. Some externalities are charged for, but noise is not considered and should be a subject of further studies – as proposed in Sweden. Still unsolved is the crucial problem of congestion costs, although there are several attempts, which mostly charge higher prices for busy sections and/or peak times. An additional possibility is on trial in the UK, where the congestion charge is based on historical data, and in Belgium and Switzerland

(BLS network), where the time difference between the train run and a pre-defined standard path is charged.

Other charging systems show less signs of SRMC-pricing: the weight of the trains is not considered, notably Denmark, France, Germany (only from 1,200 t) and the Netherlands, although it is claimed that the tariff system of the latter is designed to cover the SRMC in 2006. For freight transport this means that - anything else being equal - single wagon load transport is likely to be priced off the rails, if its low weight is not reflected in the tariff. For ecological reasons, price reductions for freight transport are granted in most of the countries (exemptions are Sweden, Netherlands, Belgium, Luxembourg, Portugal, Spain). The only country to add a surcharge for freight transport is Finland. Some of the reductions apply only for single wagon load transport (Austria, Germany), the others for any freight transport. The form of reduction depends on the motivation behind it. A compensation for positive external effects on the environment (diverting freight transport from the road) can be assumed in Switzerland and the UK, where the government compensates the IM for the reductions. In other countries, the reduction is likely to reflect the competition from road transport and thus the price elasticities of the demand.

Four countries deploy a two-part tariff, the French RFF even choose a three tier tariff. Additionally, freight operators are charged an access fee in Denmark. The fixed components come in various ways. In the UK, they are fixed for each operator for the term of the franchise. In Luxembourg and Italy, there is an access fee per path and timetable period. Spain and France also charge an access fee and additionally a reservation fee. The latter is dependent on the train-km ordered, but has to be paid

[36] Note: The tariff for the train run in Luxembourg contains an access fee of € 155.30 per timetable period. It is assumed implicitly, that this is the only train run of this operator during this period.

irrespective of the actual usage[37]. The reservation fee may reflect to a certain extent timetabling costs or shadow costs for other railway undertakings. If capacities are scare, reservation fees should always be charged. They are problematic if enough capacity is available, as they may work as a market exit barrier and prevent the paths from being used in the most efficient way.

Recommendations

Most of the countries use some form of distributed cost pricing.[38] In section 4.2.4, we have ruled out fully distributed cost pricing, as it doesn't lead to an efficient allocation of the slots nor provides efficient investment in the long run. Moreover, multi-part tariffs are ruled out by taking the EC legislation into account.

Therefore we advocate for a linear charging system based on the Ramsey principle. It should consider usage costs and demand. Marginal cost should constitute the minimum price and should be amended by prices for externalities that can be determined with a reasonable effort. Short run marginal cost prices should account not only for wear and tear, but also for renewal costs. The Finish example proves that this is possible. If a line can't cover its SRMC (including renewal costs) in the long term, it should be closed down, unless network effects suggest that it accounts for coverage of the fixed costs by carrying traffic to other lines.

If the deficit of the IM is dissatisfying, it has to be a serious option to increase the prices or to abandon lines, as most of the European networks suffer from sparse traffic. The IMs and the regulatory bodies should be aware of the SRMC of the lines, as they are

[37] The IMs of Germany, Switzerland, and Denmark apply cancellation fees. This is another form of a reservation fee.

[38] Only the British IM reaches a total coverage of its costs by the selling of train paths and other infrastructure access rights.

crucial for pricing and (dis)investment decisions. When applying SRMC prices, they should be differentiated, taking into account infrastructure and vehicle characteristics. This claim will become more important if current tendencies to include noise in the charging systems become relevant.

Taking into account the directive 2001/14 and the aims of the European transport policy, SRMC are likely to apply for freight transport on underutilized lines, as there is significant competition in the freight transport markets with low earnings. Demand-based mark-ups have to be implemented wherever it is possible to achieve coverage of the fixed costs. A tariff system that is defined in such a way would be in line with directive 2001/14/EC.

We identified a variation of most of the charging systems according to the time of track use. Most of the differentiation refers to the time of the day. Belgium is an exception, where the prices vary between some weekdays and seasons. This should be the way ahead in other countries as well.

Ramsey pricing suggests a further modulation of the distance-related pricing. In all countries, the charges increase with the length of the path. This may well reflect marginal costs of the train run. Apart from Italy, the infrastructure tariff doesn't take the specific relation of the service into account, although the demand elasticities certainly vary according to origin and destination. Furthermore, a pricing per relation could account for competition from other modes. The distance-related linear increase of infrastructure prices is very likely to be counterproductive in passenger transport. This holds e.g. for relations with competition from aviation. The possibility to take the plane increases the price elasticity of demand. For example is the elasticity of passenger for the relation Paris-Marseille -1.0 (travel-time 3 h, 2001) and for the relation Paris-Nice -

1.5 to -2 (travel time 6.5 h, 1999) (Quinet, 2002). One would expect the price of the train path not to increase linearly with the distance, as the substitutional competition from the plane gets fiercer. This means in turn that the willingness to pay of the train operators doesn't increase linearly with a growing distance.

There is also a case for the above mentioned mark-ups during daily peak-times. Studies of travel behaviour in the Netherlands show an elasticity during morning peak-hours of -0.68 and during off-peak time a value of -1.37[39] (van Vuuren, 2002, 104).

A good measure to target the level of the operators' willingness to pay is to charge according to the capacity of the train (in passenger seats or maximum payload of the respective train). This element of the Spanish tariff system is a good complement to the charging of particular train classes, like in Luxembourg. A double deck train type generates more revenue to the train operator than a one deck train and therefore raises their willingness to pay.

A charging system should comprise provisions for the case that one of the two contract parties causes a delay. This is the rule on the European networks, as a view on the punctuality statistics reveals. We found two ways to deal with this situation. In Luxembourg, the TOC specifies not only the destination time, but also a rigidity factor applied to this. This factor reflects the value that punctuality generates for the TOC. The higher this valuation, the more it has to pay for a train path. In the UK, an incentive regime leads to penalty payments for that contract party, which is responsible for delays. The regime in Luxembourg applies ex-ante, the one in the UK leads to ex-post payments, if trains are unpunctual. A good charging system should provide both

[39] These values have not been generated from the same data sets. Although they cannot be compared directly, the tendency is obvious.

elements, although the first one (as applied in Luxembourg) will certainly complicate the timetabling process.

4.6 Conclusion

This paper advocates a form of Ramsey-pricing although there are information problems and a welfare loss from a static perspective, compared to a plain marginal cost scheme. The analysis of four standard pricing systems shows, that no pricing system is generally Pareto-superior. Multi-part tariffs are most likely ruled out by directive 2001/14/EC. None of the tariff systems in the EU15 is able to solve capacity problems in a satisfying way. This is done by priority rules for slot allocation during the timetabling and during operations. As long as infrastructure prices are not able to account for scarcity, pricing is of limited relevance for the capacity allocation and also for investment decisions. This is an important field for further research.

Not only economic objectives are pursued with an infrastructure tariff system. An eclectic and varying mix of social, regional, ecological, public finance and other aims is usually burdened on the railways. The stakes of governments of different geographical level in the rail sector and their often unspecified and changing objectives make the railways a business that is hard to manage, particularly with the public interest it usually perceives. It is therefore most important to reduce the day-to-day influence from governments. For the IM to become sufficiently independent means to establish clear and transparent relationships between the infrastructure provider and the government. They should be foreseeable in the long run. An important step forward would be the definition of a cost coverage ratio to be achieved by the IM. Once these relationships and the regulatory framework are clear, a tariff system that matches these requirements

can be developed to make the IM deliver the optimal services in the most efficient way. To enhance this development, it is crucial to regulate the charges, but leave a degree of freedom about the structure and the level of the tariff system to the IM, alongside with the possibility to gain some profit. This incentive will lead to a maximum effort to meet the demands of its customers.

Annex 1: Our Questionnaire

Sehr geehrte Damen und Herren,
das Fachgebiet für Wirtschafts- und Infrastrukturpolitik der TU Berlin beschäftigt sich im Rahmen seiner wissenschaftlichen Forschung mit der Vertragsgestaltung im SPNV. Zwar ist die zentrale Bedeutung des SPNV allgemein anerkannt, es besteht aber ein erhebliches Defizit an empirischen Informationen über Einzelheiten der Vertragsgestaltung und ihre Auswirkungen.
Die Ihnen vorliegende Umfrage soll helfen, dieses Informationsdefizit abzubauen. Die Ergebnisse werden zu rein wissenschaftlichen Zwecken verwandt. Die Daten werden vertraulich behandelt und nicht weitergegeben. Die Verwendung der Daten für Veröffentlichungen erfolgt ausschließlich in anonymisierter Form, die keinerlei Rückschluss auf einzelne Verträge oder Aufgabenträger zulässt.
Bei Fragen wenden Sie sich bitte an Herrn Benedikt Peter (bp@wip.tu-berlin.de, 030/31423690) oder Prof. Dr. Andreas Brenck (ab@wip.tu-berlin.de, 030/31425377).
Wir stellen Ihnen die Auswertung der Umfrage natürlich gerne zur Verfügung. Am Ende des Fragebogens finden Sie eine entsprechende Abfrage.
Herzlichen Dank für Ihre Unterstützung!
Benedikt Peter

Für welche Verkehrsverträge gelten Ihre Angaben?
Falls Sie als Aufgabenträger bislang mehrere Ausschreibungen bzw. Preisanfragen durchgeführt haben, so wurde Ihnen die entsprechende Anzahl Fragebögen gesandt. Falls Sie bei diesen Vergaben Verträge nutzen, die weitgehend standardisiert sind, ist es natürlich nicht notwendig, alle Fragen für jeden Vertrag zu beantworten. Es besteht die Möglichkeit, den Fragebogen nur einmal komplett auszufüllen und nur die Fragen 1-7, 29-31 und 33-34 für jeden Vertrag zu beantworten.
Bitte geben Sie in diesem Fall hier an, welchem Verkehrsvertrag wir die allgemeinen Angaben zur Vertragsausgestaltung entnehmen können:

Bitte beantworten Sie aber zu jedem Netz/in jedem Fragebogen die Fragen 1-7, 29-31 und 33-34.

Grunddaten

1. Für welches Netz, welche Strecke gelten Ihre Angaben?

2. Wann wurde die Vergabeentscheidung veröffentlicht (MM/JJ)?

/

3. Zeitpunkt der Betriebsaufnahme (MM/JJ)?

/

4. Welches Verfahren wurde angewendet?

☐ freihändige Vergabe, offener Teilnahmewettbewerb ☐ offene Ausschreibung
☐ freihändige Vergabe, beschränkter Teilnahmewettbewerb ☐ beschränkte Ausschreibung

5. Ungefähre durchschnittliche Betriebsleistung p.a. im Vertragszeitraum

   Mio. Zug-km

6. Voraussichtliche Laufzeit des Vertrages?

   Jahre

7. Wie viele Gebote wurden abgegeben?

Vertragscharakteristika

8. Ist die SPNV-Leistung in ein übergreifendes Nahverkehrskonzept eingebunden?

   ☐ Verkehrsverbund ☐ Tarifverbund
   ☐ Landestarif ☐ Integraler Takt
   ☐ regionaler Nahverkehrsplan ☐ Sonstiges:

9. Beinhaltet der Vertrag einen Ausschreibungsfahrplan? ☐ ja ☐ nein

10. Fahrzeuge

    a. War die Neubeschaffung von Fahrzeugen vorgeschrieben? ☐ ja ☐ nein

    b. Gab es Vorgaben zum Mindest-/Durchschnittsalter d. Fahrzeuge? ☐ ja ☐ nein

    c. Ist die Nutzung eines Fahrzeugpools vorgesehen? ☐ ja ☐ nein

       Wenn ja, ist die Nutzung obligatorisch? ☐ ja ☐ nein

    d. Gibt es Regelungen zum Umgang mit dem rollenden Material

       nach Vertragsende (Wiedereinsatz-, Restwertgarantie etc.)? ☐ ja ☐ nein

    e. Gab es eine direkte finanzielle Unterstützung für die Fahrzeuge? ☐ ja ☐ nein

11. War das Angebot von Zusatzleistungen/ -optionen vorgeschrieben[40]? ☐ ja ☐ nein

12. Waren Nebenangebote laut Verdingungsunterlagen ausgeschlossen? ☐ ja ☐ nein

13. Welchen Gestaltungsspielraum hatten Bewerber bei folgenden

    Angebotsbestandteilen?

Aspekt	exakte Vorgabe	Mindeststandard	keine Vorgabe
Tarifhöhe	☐	☐	☐
Fahrkartensortiment	☐	☐	☐
Anerkennung von Tarifen Dritter	☐	☐	☐

[40] Zusatzleistungen sind in den Verdingungsunterlagen definiert. Sie gehen über das Regelangebot hinaus. Der Aufgabenträger behält sich vor, diese Zusatzleistungen tatsächlich in das Betriebsprogramm aufzunehmen.

Durchgängige Abfertigung für Langstrecken ..... ☐ ..... ☐ ..... ☐
Vertrieb ..... ☐ ..... ☐ ..... ☐
Marketing ..... ☐ ..... ☐ ..... ☐
Taktfrequenz ..... ☐ ..... ☐ ..... ☐
Fahrzeiten ..... ☐ ..... ☐ ..... ☐
Bedienzeiten (erste/letzte Fahrt) ..... ☐ ..... ☐ ..... ☐
Haltepunkte ..... ☐ ..... ☐ ..... ☐
Anschlusssicherung ..... ☐ ..... ☐ ..... ☐
Personal im Zug ..... ☐ ..... ☐ ..... ☐
Einrichtung/Ausstattung der Züge ..... ☐ ..... ☐ ..... ☐

Erlös-Seite

14. Die erzielten Erlöse erhält zu ca.

    % das EVU % der Aufgabenträger

15. Sieht der Vertrag eine automatische Anpassung der Tarife vor? ☐ ja ☐ nein

    Wenn ja, ist die Anpassung
    ☐ vertraglich fixiert (etwa jährliche Steigerungsrate)?
    ☐ an Indizes gekoppelt? Als Indizes werden verwendet: ,

16. Besteht ein Zusammenhang zwischen Bestellerentgelten bzw.

    Ausgleichszahlungen und den erzielten Erlösen? ☐ ja ☐ nein

    Wenn ja, welche der folgenden Regelungen ist im Vertrag enthalten?
    ☐ Aufgabenträger partizipiert anteilig (ca. %) an einer Überschreitung der prognostizierten Erlöse
    ☐ Aufgabenträger partizipiert ab einem Schwellenwert anteilig (ca. %) an einer Überschreitung der prognostizierten Erlöse
    ☐ Aufgabenträger leistet anteilig (ca. %) Ausgleichszahlungen bei einer Unterschreitung der prognostizierten Erlöse
    ☐ Aufgabenträger leistet ab einem Schwellenwert anteilig (ca. %) Ausgleichszahlungen bei einer Unterschreitung der prognostizierten Erlöse
    ☐ Aufgabenträger garantiert einen gewissen Mindesterlös (vollständiger Ausgleich)
    ☐ Sonstiges:

17. Geben die Aufgabenträger Garantien für die Tarifergiebigkeit? ☐ ja ☐ nein

18. Enthält der Vertrag spezielle Regeln für das Verkehrsmengenrisiko (Pkm)? ☐ ja ☐ nein

    Wenn ja, welche der folgenden Regelungen ist enthalten?
    ☐ Garantierte Mindest-Pkm (z.B. auf Basis zur Verfügung gestellter Nachfragedaten)
    ☐ Anpassungsregelungen für Änderungen im SPFV-Angebot
    ☐ Sonstiges:

19. Falls eine Aufteilung der Erlöse über einen Verkehrs- bzw. Tarifverbund stattfindet:

    - Der Vertrag garantiert einen Mindesterlös ☐ ja ☐ nein
    - Der Vertrag sieht Ausgleichszahlungen vor ☐ ja ☐ nein

- Der Vertrag enthält Garantien für den Erlös je Pkm ☐ ja ☐ nein

Kosten-Seite

20. Sind für einzelne Kostenarten pauschale Erhöhungen (z.B. Prozentsatz p.a.) des Bestellerentgelts vorgesehen, die also unabhängig von der tatsächlichen Kostenentwicklung sind? ☐ ja ☐ nein

    Wenn ja, für welche Kostenarten trifft dies zu?

    ☐ Trassenpreise ☐ Stationspreise
    ☐ Preis für Bahn-Strom ☐ Dieselpreis
    ☐ Personal ☐

21. Werden einzelne Kostenarten als durchlaufende Posten behandelt? ☐ ja ☐ nein

    Wenn ja, für welche Kostenarten trifft dies zu?

    ☐ Trassenpreise ☐ Stationspreise
    ☐ Preise für Bahn-Strom ☐ Dieselpreis
    ☐ ☐

22. Führen Kostenänderungen (bei nicht durchlaufenden Posten) zu einer Anpassung der Bestellerentgelte? ☐ ja ☐ nein

    Wenn ja, um welche Kostenarten handelt es sich und mit welcher Gewichtung gehen sie in die Bestimmung des Bestellerentgelts ein? Existieren Schwellenwerte für die Anpassung?

☐ Lohnkosten	ca.	%	Schwellenwert existiert:	☐ ja	☐ nein
☐ Energiekosten	ca.	%	Schwellenwert existiert:	☐ ja	☐ nein
☐ Fahrzeug-Preisindex	ca.	%	Schwellenwert existiert:	☐ ja	☐ nein
☐ Trassenpreise	ca.	%	Schwellenwert existiert:	☐ ja	☐ nein
☐ Stationspreise	ca.	%	Schwellenwert existiert:	☐ ja	☐ nein
☐ Bahn-Strom	ca.	%	Schwellenwert existiert:	☐ ja	☐ nein
☐	ca.	%	Schwellenwert existiert:	☐ ja	☐ nein

Anreizsysteme

23. Werden die folgenden finanziellen Anreizsysteme verwendet? Welchen ungefähren Anteil an den jährlichen Bestellerentgelten können die Zahlungen maximal annehmen?

    ☐ Malus-System maximaler Anteil: %
    ☐ Bonus-Malus-System maximaler Anteil: %

24. Für welche Leistungsmerkmale sind Bonuszahlungen vorgesehen?

    ☐ Steigerung der Nachfrage ☐ Qualitätsindex
    ☐ Erhöhung Pünktlichkeit ☐
    ☐ ☐

25. Für welche Leistungsmerkmale sind Maluszahlungen vorgesehen?

    ☐ Zugausfall ☐ Pünktlichkeit

☐ Anschlusssicherung
☐ Sauberkeit von Fahrzeugen
☐ Personalpräsenz in Zügen
☐ Verkehrsleistung (Pkm)
☐ Qualitätsindex allgemein
☐ Sitzplatzangebot
☐ Sauberkeit von Stationen
☐ Personalpräsenz an Stationen
☐ Anzahl Fahrgäste
☐ Qualitätsindex aus Kundenbefragung
☐
☐

26. Welchen ungefähren Anteil an den jährlichen Bestellerentgelten haben die Kosten der Kontrolle der Vertragseinhaltung für den Aufgabenträger (AT)?

%

Vergabeverfahren

27. Wurden mehrere Zuschlagskriterien verwendet? ☐ ja ☐ nein
Wenn ja, um welche Kriterien handelte es sich und wie war die (ungefähre) Gewichtung?

☐ Veranschlagte Bestellerentgelte..... % (Gewichtung)
☐ Qualität und Anzahl der Fahrzeuge ..... % (Gewichtung)
☐ Anzahl Personal..... % (Gewichtung)
☐ Marketingkonzept..... % (Gewichtung)
☐ Übernahme finanzieller Risiken durch das Land ..... % (Gewichtung)
☐ Veränderung des Bestellerentgelts aufgrund möglicher Leistungsänderungen..... % (Gewichtung)
☐ ..... % (Gewichtung)
☐ ..... % (Gewichtung)

Gebotsgestaltung

28. Welche Informationen über die Nachfrage wurden den Bietern zur Verfügung gestellt?

☐ Verkehrszählungen der DB AG
☐ Sonstige allgemeine Verkehrszählungen (etwa durch Tarif- oder Verkehrsverbund)
☐ Allgemeine Nachfrageprognosen
☐ Netz-/Streckenspezifische Nachfrageprognosen
☐ Sonstiges:

29. In welchem Umfang unterschieden sich die Erlösprognosen der Bieter?

Im Vergleich zum beauftragten Unternehmen (= 0%) wichen die anderen Bewerber wie folgt in ihren Erlösprognosen ab:

	Höhere Erlösprognose				**Niedrigere Erlösprognose**		
Relative Abweichung im Vergleich zum beauftragten Unternehmen	mehr als +20%	+10% bis +20%	0% bis +10%	0%	0% bis -10%	-10% bis -20%	mehr als -20%
Anzahl der Unternehmen (ohne Beauftragten)							

30. In welchem Umfang unterschieden sich die kalkulierten Kosten der Bieter?

Im Vergleich zum beauftragten Unternehmen (= 0%) wichen die anderen Bewerber wie folgt in ihren kalkulierten Kosten je Zug-km ab:

	Höhere Kostenkalkulation				**Niedrigere Kostenkalkulation**		
Relative Abweichung im Vergleich zum beauftragten Unternehmen	mehr als +20%	+10% bis +20%	0% bis +10%	0%	0% bis -10%	-10% bis -20%	mehr als -20%
Anzahl der Unternehmen (ohne Beauftragten)							

31. Welchen ungefähren durchschnittlichen Anteil hatten die folgenden Komponenten an der Kostenkalkulation des beauftragten EVU?

Trassenpreise	ca.	%
Stationspreise	ca.	%
Energiepreise	ca.	%
Fahrzeugkosten (Leasing bzw. Abschreibung)	ca.	%
Personalkosten	ca.	%
Gemeinkosten	ca.	%
Marketing / Vertrieb	ca.	%

Vertragsanpassungen

32. Anpassungsklauseln im Verkehrsvertrag

Die folgenden Fragen betreffen Vertragsanpassungen, etwa wenn sich die Rahmenbedingungen von langfristigen Verkehrsverträgen ändern.

a. **Abbestellungen / Mehrbestellungen:** Enthält der Vertrag folgende Elemente?

☐ Obergrenzen für Leistungsänderungen (☐ während der Vertragslaufzeit / ☐ pro Jahr)
☐ Recht des AT auf einseitige Mehrbestellungen (unterhalb der Obergrenze)
☐ Festpreise für Mehrbestellungen
☐ Kalkulationsvorgaben für Mehrbestellungen
☐ Einseitige Kündigungsrechte des Aufgabenträgers
☐ Einseitige Kündigungsrechte des EVU
☐ Kompensationsregeln für Abbestellungen

b. **Qualitätsänderungen**: Enthält der Vertrag folgende Elemente?

☐ Recht des AT, einseitig Qualitätsänderungen zu verlangen
☐ Festpreise für Qualitätsänderungen
☐ Kalkulationsvorgaben für Qualitätsänderungen
☐ Kompensationsregeln für Qualitätsänderungen

c. Änderungen der **finanziellen Konditionen**: Enthält der Vertrag folgende Elemente?

☐ Spezifizierte Bedingungen für das Verlangen von Nachverhandlungen, etwa
  ☐ Unterschreiten eines Mindesterlöses
  ☐ Überschreiten von Kostenprognosen (mit/ohne Schwellenwert)
  ☐ Wegfall komplementärer Nahverkehrsleistungen
  ☐ Wegfall komplementärer Fernverkehrsleistungen
  ☐ Unterschreiten definierter Verkehrsleistungen (Pkm)
☐ Obergrenze für die Höhe der Änderung

d. **Generalklauseln**: Enthält der Vertrag folgende Elemente?

☐ Generelle Kalkulationsvorgaben
☐ Einschaltung von Sachverständigen bei Vertragsanpassungen
☐ Einschaltung eines Schlichters im Streitfall
  Wenn ein Schlichter vorgesehen ist, welche Instanz ist benannt?
  ☐ Gremium EVU und AT ☐ Sonstiges:
☐ Beschränkung von Vertragsstrafen (maximaler Anteil am Bestellerentgelt? %)
☐ Recht auf außerordentliche / fristlose Kündigung, wenn <u>quantifizierte</u> Zielvorgaben (evt. nachhaltig) nicht erreicht werden, insbesondere wenn
  ☐ Verkehrsleistungsvorgaben (Pkm) nicht erreicht werden
  ☐ Vorgaben zur Pünktlichkeit / zum Zugausfall nicht erreicht werden
  ☐ Vorgaben zur sonstigen Qualität nicht erreicht werden

33. Wie oft bzw. in welchem Umfang kam es zu folgenden Anpassungen des Vertrages?

Nach Vertragsabschluss wurden

- Nicht vorgesehene Leistungskürzungen in Höhe von ca. % durchgeführt
- Nicht vorgesehene Mehrbestellungen in Höhe von ca. % durchgeführt
- Qualitätssteigerungen vereinbart: ☐ mehrmals ☐ einmal ☐ nie
- Qualitätssenkungen vereinbart: ☐ mehrmals ☐ einmal ☐ nie

Nach Vertragsabschluss wurde

- das Bestellerentgelt (über die Preisgleitklausel hinaus) um % gesenkt
- das Bestellerentgelt (über die Preisgleitklausel hinaus) um % erhöht
- -mal ein Schlichter eingeschaltet

<u>Leistungsänderung durch die Vergabe</u>

34. Wie hat sich das Angebot gegenüber der Leistung im letzten Jahr vor der Vergabe verändert?

a. Einsparungen an Bestellerentgelten

Es kam zu einer Einsparung pro Zug-km von ca. %

b. Leistungsänderung

Es kam zu einer Leistungsänderung (Zug-km) von ca. %
Es kam zu einer Nachfrageerhöhung (Pkm) von ca. %

c. Das EVU hat über den Vertrag hinaus ohne Zuzahlung ca. Zug-km p.a. angeboten.

d. Qualitätsveränderung:

- Pünktlichkeit: Die durchschnittliche Pünktlichkeitsquote hat sich

  um ca. Prozentpunkte verbessert
  um ca. Prozentpunkte verschlechtert
  ☐ ist gleich geblieben
- Laut Fahrgastbefragungen o.ä. hat sich die wahrgenommene Qualität

deutlich verbessert	verbessert	nicht geändert	verschlechtert	deutlich verschlechtert
☐	☐	☐	☐	☐

Zusendung der Auswertung

Wünschen Sie eine Zusendung der Auswertung? ☐ ja ☐ nein

Wenn wir die Auswertung an Sie persönlich senden sollen, möchten wir Sie bitten, uns Ihre Kontaktdaten anzugeben:

Name: Adresse:

Ergänzende Hinweise / Kritik

Wenn Sie der Meinung sind, dass der Fragebogen wichtige Aspekte der Vertragsgestaltung im SPNV nicht bzw. nicht hinreichend ausgeleuchtet hat, wären wir Ihnen für entsprechende Hinweise außerordentlich dankbar.

VIELEN DANK FÜR IHRE MÜHE !

Annex 2: Descriptive Statistics of the Most Important Variables

	Number of Obser-vations	Answer: Yes	Mean	Minimum	Maximum	Std. Deviation
Betriebsleistung in Mio. km	88		3,556	,1	37,8	5,8620
Laufzeit des Vertrages in J.	89		9,37	2	19	3,795
Zeitspanne von Auftragsvergabe zum Betriebsbeginn in J.	84		1,5527	,00	4,92	1,06109
Anzahl Gebote	63		3,35	1	19	2,707
Auftragswert in Mill.€	31		711,4087	2,50	4600,00	1168,49511
Preis/Zugkm	28		7,9729	,53	15,59	3,18507
Betreiberwechsel	77	44	,57	0	1	,498
SPNV-Leistung in Verkehrsverbund?	46	36				
SPNV-Leistung in Tarifverbund?	46	33				
SPNV-Leistung mit Landestarif?	41	9				
SPNV-Leistung mit integralem Takt?	41	27				
SPNV-Leistung in regionalem Nahverkehrsplan?	41	24				
Fahrzeuge-War Neubeschaffung vorgesehen?	44	23				
Fahrzeuge-Vorgaben zum Mindest-/Durchschnittsalter?	43	32				
Fahrzeuge-Ist die Nutzung einen Fahrzeugpools vorgesehen?	42	8				
Fahrzeuge- Wenn ja, ist die Nutzung obligatorisch?	18	4				
Fahrzeuge-Gibt es Regelungen zum Umgang mit dem rollenden Material nach VE?-	31	2				

	Number of Obser-vations	Answer: Yes	Mean	Minimum	Maximum	Std. Deviation
Fahrzeuge - Gab es eine direkte finanzielle Unterstützung für die Fahrzeuge?	36	6				
War das Angebot von Zusatzleistungen/-optionen vorgeschrieben?	37	14				
Waren Nebenangebote laut Verdingungsunterlagen ausgeschlossen?	34	12				
Die erzielten Erlöse erhält zu ca. ..% das EVU-	41		72,93	0	100	44,455
Die erzielten Erlöse erhält zu ca. % der Aufgabenträger-	41		27,07	0	100	44,455
Sieht der Vertrag eine automatische Anpassung der Tarife vor?	33	2				
Besteht ein Zusammenhang zwischen Bestellerentgelten bzw. Ausgleichszahlungen und den erzielten Erlösen?	35	16				
Aufgabenträger partizipiert anteilig an einer Überschreitung der prognostizierten Erlöse	40	4				
Aufgabenträger partizipiert ab einem Schwellenwert anteilig an einer Überschreitung der prognostizierten Erlöse	40	1				
Aufgabenträger leistet anteilig Ausgleichszahlung bei einer Unterschreitung der prognostizierten Erlöse	40	0				
Aufgabenträger leistet ab einen Schwellenwert anteilig Ausgleichszahlung bei einer Unterschreitung der prognostizierten Erlöse	40	0				
Aufgabenträger garantiert einen gewissen Mindesterlös (vollständiger Ausgleich)	40	2				

	Number of Obser-vations	Answer: Yes	Mean	Minimum	Maximum	Std. Deviation
Enthält der Vertrag spezielle Regeln für das Verkehrsmengenrisiko (Pkm)?	31	5				
Garantierte Mindest-Pkm (z.B. auf Basis zur Verfügung gestellter Nachfragedaten)	33	0				
Anpassungsregelungen für Änderungen im SPFV-Angebot	33	3				
Der Vertrag garantiert einen Mindesterlös	22	0				
Der Vertrag sieht Ausgleichszahlungen vor	25	9				
Der Vertrag enthält Garantien für den Erlös je Pkm	25	1				
Sind für die einzelnen Kostenarten pauschale Erhöhungen der BE vorgesehen?	39	4				
Werden einzelne Kostenarten als durchlaufende Posten behandelt?	43	38				
Trassenpreis	38	38				
Stationspreis	38	37				
Preis für Bahn-Strom	28	0				
Dieselpreis	28	0				
Werden einzelne Kosten als durchlaufende Posten behandelt oder gibt es pauschale Erhöhungen des Bestellerentgeltes für diese?	39	36,00				
Führen Kostenänderungen (bei nicht durchlaufenden Posten) zu einer Anpassung der Bestellerentgelte?	37	33				
Enthält der Vertrag ein Malus-System	43	29				
Enthält der Vertrag ein Bonus-Malus-System?	44	30				
Gibt es eine Obergrenze für Leistungsänderungen?	43	29				

	Number of Obser-vations	Answer: Yes	Mean	Minimum	Maximum	Std. Deviation
Festpreis für Mehrbestellungen	42	19				
Kalkulationsvorgaben für Mehrbestellungen	42	22				
Einseitiges Kündigungsrecht des Aufgabeträgers	42	26				
Einseitiges Kündigungsrecht des EVU	42	16				
Kompensationsregeln für Abbestellungen	42	19				
Recht des AT, einseitig Qualitätsänderungen zu verlangen	42	17				
Festpreis für Qualitätsänderungen	42	0				
Kalkulationsvorgaben für Qualitätsänderungen	42	14				
Kompensationsregeln für Qualitätsänderungen	42	13				
Einschaltung von Sachverständigen bei Vertragsanpassungen	42	4				
Einschalten eines Schlichters im Streitfall	42	15				

Annex 3: Infrastructure Charges in France

Sector Organisation and Regulation

The Société National de Chemins de Fer (SNCF) was split up in 1997 while creating the Réseau Ferré de France (RFF) and transferring the debts to this new entity. The former integrated monopolist maintained the transport divisions and its name. RFF and SNCF are two public companies, of which the infrastructure manager is heavily influenced by the government (IMPORVERAIL, 2002, 128). Moreover, the mutual relationship between the two entities is so strong that the separation between infrastructure and transport is mainly concerning the accounts (Prognos, 2000, 37). RFF is formally responsible for new construction and for the maintenance and operation of the 33,000 km of track. The RFF commissioned these tasks to the SNCF and is as such mainly a contractor with only 150 employees. This role applies also for new investment, where the initiative comes from the SNCF and is finally approved by the national or regional government, which usually has to subsidise new constructions (IMPROVERAIL, 2002, 129). The financial streams between RFF and SNCF are subject to yearly negotiating processes. RFF gets access charges from SNCF but has to pay the operator for the maintenance and the operation of the network and new constructions. It has to be argued that the access charges are not independently generated by the tariff system, but the system itself is negotiable. So far, RFF has always been a net payer, the deficit being paid by the government (IMPROVERAIL, 2002, 129). As the government always covers RFF's deficit, there is no incentive for the infrastructure manager to reduce costs or raise tariffs.

The SNCF is the only major operator in France, although there is open access for domestic operators according to directive 91/440/ECC. Some BELIFRET members

have been granted access to the respective corridor. Apart from that, the one-stop-shop, which has been set up in the Ministry of Transport has not yet issued safety and operating licences in the absence of a rail regulation body (Kirchner, 2003, 43). In the regions, there is no sign of competition either, although they are entitled to define the necessary passenger services and set the respective tariffs. Even those of the regional governments, which own the necessary rolling stock, only negotiate with the SNCF on the services to be delivered. The existing few services of private operators are subcontracted by SNCF (Hylén, 2001, 30). The tariffs of passenger services on national level have to be approved by the government, whereas the freight tariffs are not regulated.

Tariffs and Slot Allocation

The RFF has not sufficient resources to carry out the capacity allocation. Moreover, the SNCF is appointed by law to exercise this work and to control the traffic (Hylén, 2001, 30). If there is a conflict, e.g. with public services, grandfathering applies. The Transport Ministry can intervene in these conflicts as it has a wide ranging right to determine the slot allocation (IMPROVERAIL, 2002, 136)

- in the case of public services,
- if it is useful for the deficient utilisation of Infrastructure, or
- if the respective service will finance new investment or upgrading.

The political influence is also present in the laws on which the tariff system is based. It is legally fixed, that the fees should take into account (IMPROVERAIL, 2002, 137):

- the infrastructure costs,

- the situation on the transport markets,
- the requirements of the optimal network use, and
- the intermodal competition.

The tariff system for the utilisation of infrastructure consists of three parts (IMPROVERAIL, 2002, 137):

- A fix access charge (see below),
- A reservation fee for circulation, which is independent from the use of track, and
- A circulation fee, dependent on the actual use in terms of train-km, gross weight and transport type.

The total amount of infrastructure charges is stipulated in advance for each year. The same applies for the weightings of the three components (IMPROVERAIL, 2002, 136). The share of the access charge was e.g. reduced for the year 2001 from 11 % to 4 % (Quinet, 2002). There is also a fee for the use of passenger stations levied and traction current has to be paid separately (€ 0.214 per train-km). A reservation fee for the use of station has been introduced recently.

These fees differ according to the section of the network the train is using. There are four categories of lines, which are subdivided into twelve subcategories, which take into account the demand on the respective lines. The basic categories are (RFF, 2003).

- Suburban lines (A,B),
- Major intercity lines (C, D),
- Other lines (E), and
- High-speed lines (N).

A further differentiation of the circulation fee applies depending on the time of the train run (RFF, 2003):

- Normal times: 04:30h to 06:30h, 09:00h to 17:00h, 20:00h to 00:30h.
- Peak times: 06:30h to 09:00h, 17:00h to 20:00h and
- Weak times: 00:30 to 04:30h.

The charges for some line categories are composed as follows. Table 1 shows that there is a large difference between access fees and reservation fees of the lines

Table: Tariff System of the RFF (fraction)

Price in €		Line Categories		
		B: Suburban lines with average traffic	**C: Major intercity lines with average traffic**	**N1: High speed lines with high traffic**
Access fee[41] (per path-km and Month)		373.124	3110.000	4475.912
Reservation fee (per path-km and timetable period)	Normal time	1.244	0.082	9.780
	Peak time	2.488	0.082	11.544
	Weak time	0.622	0.000	4.813
Usage fee (passengers) (per train-km)	0.806			
Usage fee (freight) (per train-km)	0.235			

Source: RFF, 2003

[41] All fees exclude taxes.

With the beginning of 2003, a variation of the access fee was introduced for some line categories. On the network segments A, B and N the access fee depends on the number of paths per month, which are reserved in the respective category. The modulation factor M reaches from 0,03 (for 10 paths per months or less) to 1,5 (for more than 1000 path per month). So it is more expensive to reserve more paths on a specific segment[42]. This modulation decreases the overall usage fee per path for a higher number of path.

A further decrease of the access fee is granted, if the operator signs a contract for more than five years. This reflects the infrastructure manager's preference for medium-term security of its planning and investment processes. Freight trains, which run more than 300 km or whose speed is 70 km/h or higher, only pay 60 % of the access fee, which leads to a decrease of fast and long-haul freight transport (RFF, 2003).

[42] In the tariff system, there is no definition of a path given. It can be assumed that it is a standard time window for each line category. In this case, the variation of the access fee would reflect the usage of total capacity.

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