
Division Prices

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PRODUCER PRICE INDEX FOR RAIL TRANSPORTATION IN GERMANY

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Preface

Railways used to be a state-owned monopoly in Germany before 1994, when the market was liberalized and the federal authorities Deutsche Bundesbahn (railway in the former FRG) and Deutsche Reichsbahn (railway in the former GDR) were transformed to Deutsche Bahn AG, an incorporated company, still completely controlled by the federal government. The market was also opened to private companies which can apply for licenses to carry out railway transportation. There are separate licenses for passenger and freight transport; furthermore, the rail passenger market is divided into long distance transportation – *Schienerpersonenfernverkehr (SPFV)* - which is always on own account without subsidies, and short distance transportation – *Schienerpersonennahverkehr (SPNV)* – which is ordered by public authorities that grant subsidies to the companies. Hence, it is necessary to split this paper into three different parts: Long distance rail passenger transportation, short distance rail passenger transportation, and rail freight transportation.

1 Long distance rail passenger transportation

1.1 Definition of the service being observed

According to NACE rev 2 49.10, “passenger rail transport, interurban” comprises

- rail transportation of passengers using railroad rolling stock on mainline networks, spread over an extensive geographic area
- passenger transport by interurban railways
- operation of sleeping cars or dining cars as an integrated operation of railway companies.

Regarding long distance rail passenger transport, the focus is on services “on mainline networks, spread over an extensive geographic area.” There is not a binding definition for long distance rail passenger transportation. However, prevailing characteristics are:

- transport on own account: rail transport companies conduct long distance passenger transportation on their own, without subsidies by governmental bodies for these transports.
- distance and timing: travelling distances over 50 km and travelling times over one hour are common.
- while securing short distance transportation is a task for the governments of the *Länder*, the federal government has the task to address the general public interest for long distance transportation.¹

¹ Art. 87e GG (*Grundgesetz* – the German “constitution”).

1.2 Pricing unit of measure collected

For long distance transportation, there has been no SPPI so far. However, if FSO Germany introduced it, it could capitalize on data already collected for the CPI. As basically no competition in this field exists,² only the monopolist *Deutsche Bahn Fernverkehr* has to be surveyed. At the moment, CPI price data is collected for the following units:

- most important travel relations for InterCity trains and InterCityExpress trains (44 each)
- season tickets
- night trains (2 most important relations)
- group tours
- special offers (e.g. “DeutschlandSpezial”: tickets for 29 € for travels within Germany not regarding the distance)
- the “BahnCard”, a special pass that allows the traveller to buy tickets with a 25% or 50% discount

For an SPPI, this would be not sufficient, because important B-to-B (and B-to-G) components are not included. There would be a need to survey the following units additionally:

- special tariff agreements for large customers (“*Großkundenabonnement*”)
- *BahnCard 100*, a pass granting unlimited access to the whole railway network for one year. It is mainly used by business customers and, therefore, not integrated in the CPI.
- contracts with the German army. Soldiers get travels to and from home during duty services for free, paid by the army.
- special contracts with touristic companies

1.3 Market conditions and constraints

1.3.1 Size of industry and latest developments

Despite deregulation in 1994, there has been no competition on the market so far. The monopoly of *Deutsche Bahn Fernverkehr* still prevails. Within 15 years, there have only been 8 attempts to enter the market. Only four services have continued which account for less than 1% of the market.³ The obstacles for entering the market seem to be very strong. The following hurdles have been mentioned:

- Large investments in rolling stock necessary⁴
- Low or negative margins – profits can only be gained in an integrated enterprise including network and short distance passenger transports⁵

² See DB AG (2009), p. 13; Netzwerk Privatbahnen (2009), p. 97.

³ Netzwerk Privatbahnen (2009), p. 97.

⁴ DB AG (2009), p. 14; this argument is challenged by Netzwerk Privatbahnen (2009), p. 100.

- Inflexible framework contracts with the network operator⁶
- Infrastructure deficits and misallocations.⁷

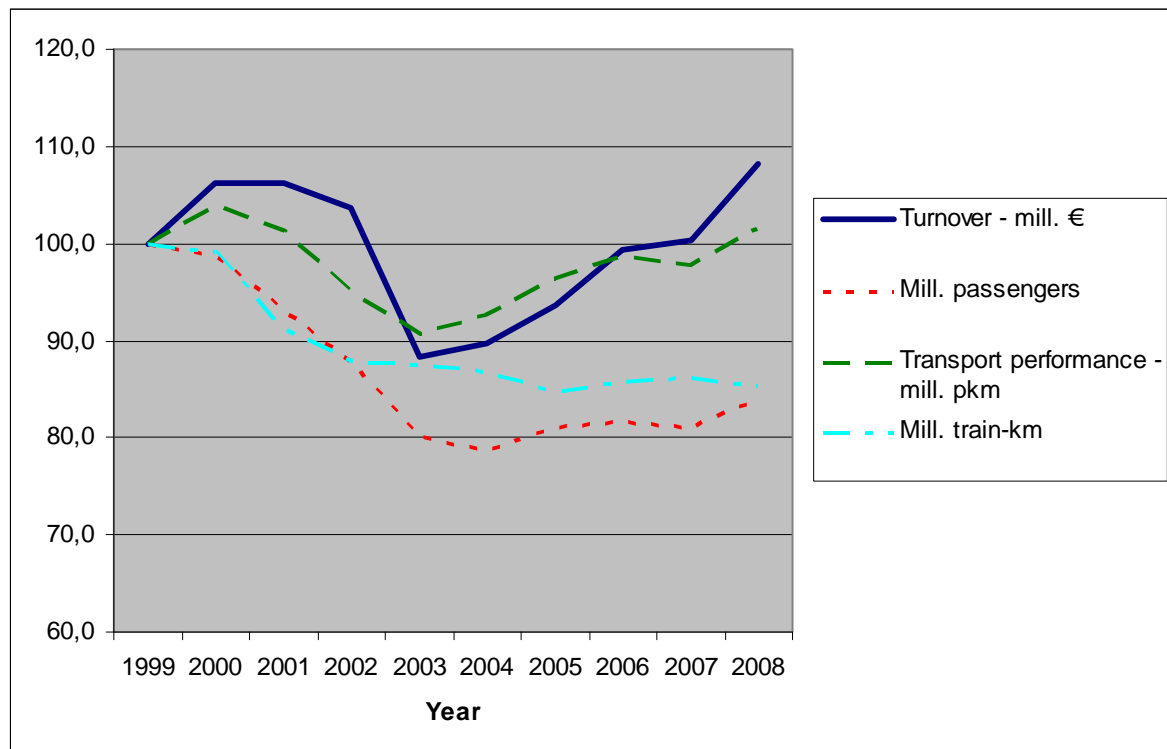
As no real competition exists, a look on the market and its developments tells us more about the business policy of *DB Fernverkehr* than of the characteristics of the market. The following table shows turnover, transported passengers, transportation performance (passenger-km), and train-kilometers (trkm) of *DB Fernverkehr* between 1999 and 2008; the figure displays the development of these numbers as indices (1999=100).⁸

Table 1: Indicators for long distance rail passenger services - absolute values.

	1999	2000	2001	2002	2003
Turnover - mill. €	3257	3463	3457	3378	2880
Mill. passengers	146,5	144,8	136,3	128,4	117,3
Transport performance - mill. pkm	34897	36226	35342	33173	31619
Mill. train-km	177,5	175,9	161,5	156,1	155,3

	2004	2005	2006	2007	2008
Turnover - mill. €	2922	3050	3234	3265	3523
Mill. passengers	115,3	118,7	119,6	118,7	123,2
Transport performance - mill. pkm	32330	33641	34458	34137	35457
Mill. train-km	154,1	150,5	152,2	152,8	151,6

Figure 1: Development of long distance rail passenger transport 1999-2008 (1999=100).



⁵ Netzwerk Privatbahnen (2009), p. 102ff.

⁶ Netzwerk Privatbahnen (2009), p. 112ff.

⁷ Netzwerk Privatbahnen (2009), p. 114ff.

⁸ Source: Business reports of *Deutsche Bahn AG*, 1999-2008.

The graph shows a sharp decline for all indicators in 2003. This was induced by the introduction of a new pricing system which was not accepted by the customers and the abandoning of the “InterRegio” trains that served medium-sized towns and rather short distances due to low margins. This is why train-km stay on such a low level; the increase in passenger-km shows that travelling distances on long distance trains have increased over the recent years.

1.3.2 Special conditions and restrictions

In this sub-sector, we have a monopoly that is still owned by the federal government. When setting up an SPPI, it is crucial to cooperate closely with the company. The existing relationship between FSO Germany and *DB Fernverkehr* in calculating the CPI should be helpful when setting up an SPPI.

The absence of competition fuels the question whether an SPPI for long distance rail passenger transport could be published or not. For communication reasons, it seems to be easier to publish only the CPI – which covers a large chunk of the market and gives most wanted information – and use the SPPI only for National Accounts and for the calculation of a total railway SPPI.

1.3.3 Record keeping practices

Data needed for an SPPI for long distance rail passenger transport are prices for actual services. They can be easily extracted from the normal financial accounting and the tariffs of the monopolist.

The CPI data, adjusted by VAT, is sufficient to tackle the B-to-C market when it comes to prices. For weights, it is necessary to derive new weights that take account of the B-to-B market as well. E.g., the share of 1st class passengers in the B-2-B market is significantly higher. As described in ch. 1.2., some more services need to be observed. Especially for military services and for touristic services, contract details and record keeping practices need further clarification and research before an SPPI can be set up.

1.4 Standard classification structure and detail related to the area

While ISIC (sector 4911) and NACE (sector 49.10) as well as its German version *Wz (Klassifikation der Wirtschaftszweige)* just list “Passenger Rail Transport, interurban” and do not offer more detailed sub-classes, the European product-based classification CPA contains some sub-segments. For long distance rail passenger transport, the following classes are relevant:

CPA:

49.10 Passenger rail transport services, interurban

49.10.1 Passenger rail transport services, interurban

49.10.11 Passenger rail transport services for sightseeing

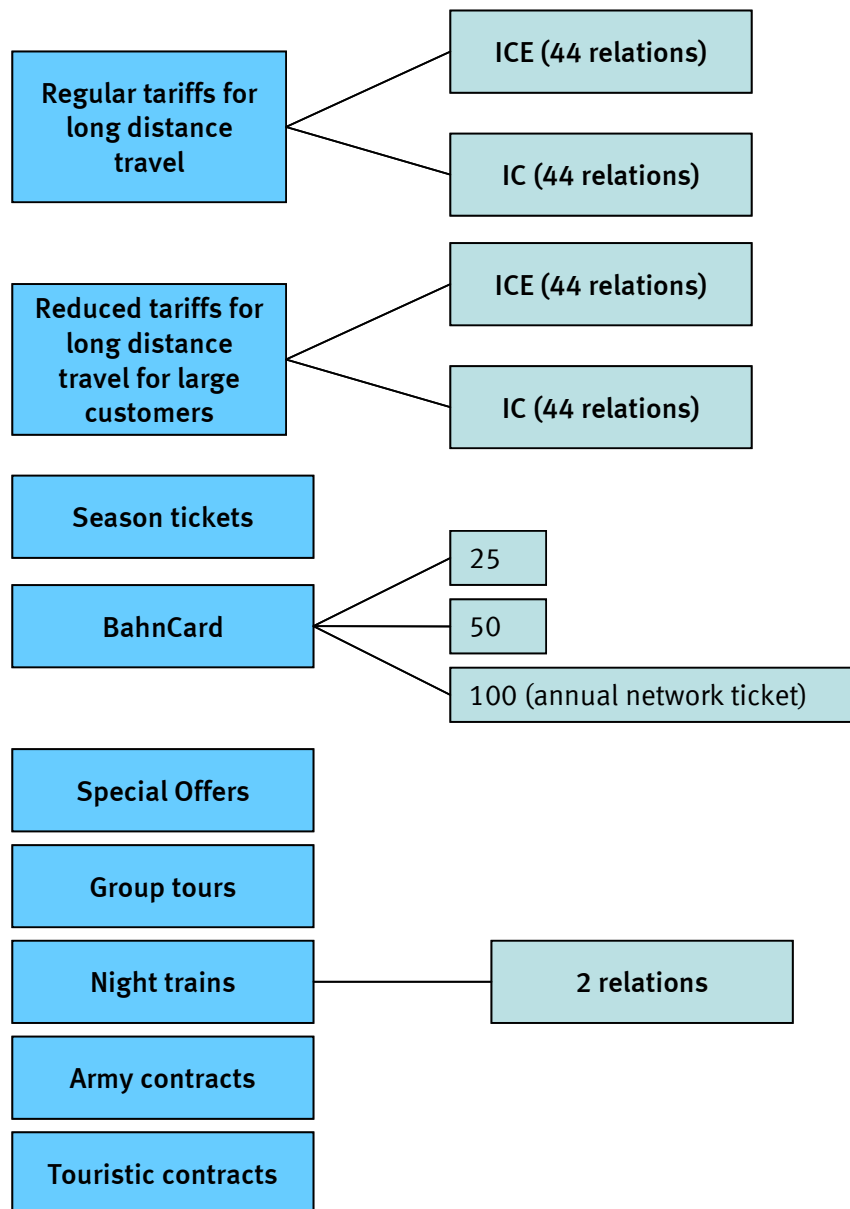
49.10.12 Other passenger rail transport services, interurban

1.5 Evaluation of standard vs. definition and market constraints

The standard classifications do not offer details that help to construct an SPPI for long distance rail passenger transport. At least, “sightseeing” gives the hint that it might be worthy taking a look at transports for touristic companies. It is not clear whether touristic rail tours with vintage locomotives (especially steam locomotives) form a part of the sector. As these are rare occasions, they are not regarded in the approach described. It focuses on different tariffs and the relations travelled as well as different customer groups.

While a lot of pricing data can be taken from the CPI, the weighting must be changed to a B-to-all weighting. The main characteristic alongside the SPPI could be structured, is the type of ticket or contract. A possible structure is given in fig. 2.

Figure 2: Possible structure of an SPPI for long distance rail passenger transport.



1.6 Pricing methods

At the moment, an SPPI in this area is just a concept, so there have been no pricing methods determined yet. However, those implemented for the CPI will be used for the SPPI, too, because the same data will be observed up to a certain extent. So, the following pricing methods are in place:

- Direct pricing of repeated services is the pricing method for all services besides group tours, army contracts and touristic contracts. *BahnCard*, season tickets, and special offers are easy to observe by taking a look at the tariffs. For the most important long distance train relations and for two night train relations, *Deutsche Bahn Fernverkehr* quotes an average price out of up to 20 tariffs. The weighting of these tariffs is fixed and was developed by FSO Germany. The same approach can be used for the reduced tariffs for large customers.
- Model pricing: This approach is used for group tours. The models, selected by FSO Germany, are priced by the respondent.

For the SPPI, it will be necessary to cover contracts with the army and touristic companies as well. For those services, contract pricing seems to be a good approach; however, this is subject to further research.

1.7 Quality adjustment methodology

For those services covered by the CPI, quality adjustment has been used so far only for regular tariffs. This happens in the case when a remarkable reduction in journey time takes place on a relation. This can happen by the opening of new high-speed railway lines (e.g. in 2006 between Munich and Nuremberg, reducing travelling time from 1:45 h to 1:02 h) or the upgrading of existing ones (Hamburg-Berlin, reducing travelling time from 2:15 h to 1:30 h). Another case for using quality adjustment was the introduction of trains with higher quality standards (replacement of IC trains by ICE). Quality adjustment is done by estimating the price difference between the old and the new service together with the respondent and a respective adjustment of the price of the previous period.

1.8 Evaluation of comparability with turnover/output measures

An SPPI as proposed in this chapter will be a perfect match to the turnover and output measures. This is simply because the market is a monopoly and all measures are based on the quotations of one single company. If there is more competition in the future, this will change, and methods have to be developed to include competitors in the index as well.

2 Short distance rail passenger transportation

2.1 Definition of the service being observed

Short distance rail passenger transportation is the remaining part of rail passenger transportation when long distance transportation is subtracted. In Germany, a legal definition exists for this service (translation by the author): “Short distance rail passenger transport is the generally accessible transportation of passengers in trains, which are predominantly determined to satisfy the traffic demand in urban, suburban or regional transportation. In case of doubt, this is the case if for the majority of the delivery tasks⁹ of a train, the total travel distance does not exceed 50 km or the total travelling time does not exceed one hour.”¹⁰ This definition is not very accurate and already incorporates some “doubt”. In practice, two major characteristics have been identified:¹¹

- The traffic has the attribute of being “*gemeinwirtschaftlich*”, i.e. it is unprofitable from a commercial point of view, but yields profits for the overall economy and society. Hence, the government pays companies a compensation for their losses. So, a part of turnover is granted by public authorities on behalf of the government – an important factor to consider when setting up an SPPI.
- Regarding passenger rail products, there are three categories of trains that are subsumed as short distance transport: *S-Bahn* (suburban trains on regular railway infrastructure), *Regional-Bahn* (regional trains, usually serving every station), and *RegionalExpress* (regional express trains, serving only selected stations with shorter travelling times).

To distinguish the sector (which is part of NACE rev 2, 49.10) from “urban and suburban passenger land transport” (NACE rev 2, 49.31), it is additionally necessary to take a look at the infrastructure used. In Germany, two types of regulations exist on which the provision of rail-bound infrastructure is based:

- EBO (*Eisenbahnbau- und Betriebsordnung*, railway construction and operation regulation) which is valid for “regular” railway infrastructure
- BOStrab (*Straßenbahnbau- und Betriebsordnung*, tramway construction and operation regulation), which is valid for infrastructure of tramways, elevated railways, underground railways etc.

The sector observed covers only such services that are (mainly) operated on infrastructure according to EBO.¹²

⁹ In German: “Beförderungsfall”; this is an abstract legal expression. In the case of passenger transport, every single passenger is a “delivery task”.

¹⁰ AEG (*Allgemeines Eisenbahn-Gesetz* – common railway act), §2 No. 5.

¹¹ Netzwerk Privatbahnen (2009), p. 21.

¹² “Mainly” is a necessary adjective, because there are some combined systems in Germany, where vehicles are employed on both EBO and BOStrab infrastructure (e.g. in Karlsruhe, Kassel, and Saarbrücken). Some services of these systems are clearly short distance rail passenger transport, e.g. the S4 of the Karlsruhe system, that uses

2.2 Pricing unit of measure collected

This is the main problem of an SPPI for short distance passenger rail transport. Quotation by Sven Kaumanns:¹³ “Hence, it has to be stated, that it is almost not detectable, with which product turnover on which market of public short distance transport is generated at all.”

What is the product of companies offering short distance rail passenger transport? They operate trains on fixed lines according to fixed schedules. The operation of these trains is ordered by public authorities (“*Aufgabenträger*” in German) on behalf of the *Länder*, which are responsible for short distance public transport. The authorities remunerate the railway companies for running the trains. Furthermore, passenger pay fares for travel tickets that are collected by the railway companies. Whether these fares are regarded as turnover or not, depends on the contracts between the authorities and the railway companies. Two types are common: Gross contracts (“*Bruttoverträge*”) and net contracts (“*Nettoverträge*”):¹⁴

- When a gross contract is applied, the public authority orders a certain service (fixed number of train kilometres, fixed service standards, certain level of punctuality) from the railway company. For this service, the authority grants a fixed fee to the railway, irrespective of the number of passengers transported. The railway company collects the passenger fare on behalf of the authority and passes it on directly to the authority; it is not regarded as turnover. So, when a gross contract is applied, the pricing unit is only the kilometric performance at a certain service level ordered by the authority.
- In the case of a net contract, the tickets for the passengers are sold by the railway company on own account. They are not passed on to the authority. Here, two sources of turnover have to be regarded: ticket fares for the passengers, and the grants for the service by the public authorities, which are, of course, lower compared to a gross contract. With a net contract, the height of turnover for the railway company is not guaranteed; ticket fares form a variable component and bear some risk. This should stimulate the railways to provide excellent service in order to attract as many customers as possible.

Because of the lower risk level, railways tend to prefer gross contracts.¹⁵ In order to assure the negotiated service level in gross contracts, the public authorities have incorporated so-called *boni* and *mali* clauses in the contract, i.e. the railways are paid according to the level of service reached. E.g., if punctuality of trains falls below an agreed minimum, the railway company gets less grants.¹⁶ From a price statistical point of view, this represents a quality-induced price change and therefore is not in focus of measurement.

BOStrab infrastructure in the cities of Karlsruhe and Heilbronn and about 80 km of EBO infrastructure between the cities.

¹³ Translated by the author; see: Kaumanns (2005), p. 1290.

¹⁴ Kaumanns (2005), p. 1286ff.

¹⁵ Netzwerk Privatbahnen (2009), p. 39.

It is necessary to mention that in many areas in Germany, public transport networks (*Verkehrsverbände*) exist that have the same tariff for the customers regardless the mode of public transport (railway, tramway, bus, subway,...) used. Here, remuneration and distribution of ticket fares to the different companies involved is subject to complex contracts. This needs a lot of further research in order to incorporate it in an SPPI, which is absolutely necessary as all metropolitan areas and many rural areas in Germany have these networks. This paper does not address related questions, as net and gross contracts are itself complicated enough; however, before implementing an SPPI, the problems associated with these networks need to be solved.

In conclusion, the pricing unit of measure for an SPPI for short distance rail passenger transport are train-km ordered by the authorities and, in the case of net contracts, ticket fares paid by the passengers.

2.3 Market conditions and constraints

2.3.1 Size of industry and latest developments

With the liberalisation in 1994, competition was introduced for short distance passenger transport as well. However, as such services are not profitable, the legislator introduced competition for the market, not on the market – i.e. railway companies compete for orders by public authorities to conduct traffic on certain railway lines. The common railway act intends to have calls for tenders for the services;¹⁷ however, until 2009, only 31.6% of all train-km have been subject of a competitive procedure like a call for tender.¹⁸ So, competition increases only slowly, as the public authorities do not have the capacities for tendering many services at the same time. Anyway, the share of private railway companies has increased steadily, but slowly over the last 15 years. In 2008, they accounted for 18.3% of all train-km; however, regarding transportation performance (passenger-km), they had a share of only 10%. This clearly indicates that the public authorities started competition with lines with an only small passenger volume. Especially the *S-Bahn*-networks – having large passenger volumes - have seen only few competition so far.¹⁹ The following main obstacles are identified for competition:

- over-compensation of *DB AG*-companies (too much money per train-km)²⁰
- financing of rolling stock during the worldwide financial crisis²¹
- for net contracts: monopoly of *DB AG* regarding the sales of passenger tickets.²²

¹⁶ Kaumanns (2005), p. 1286f.

¹⁷ AEG §15 Nr. 2.

¹⁸ Netzwerk Privatbahnen (2009), p. 32.

¹⁹ Netzwerk Privatbahnen (2009), p. 24f.

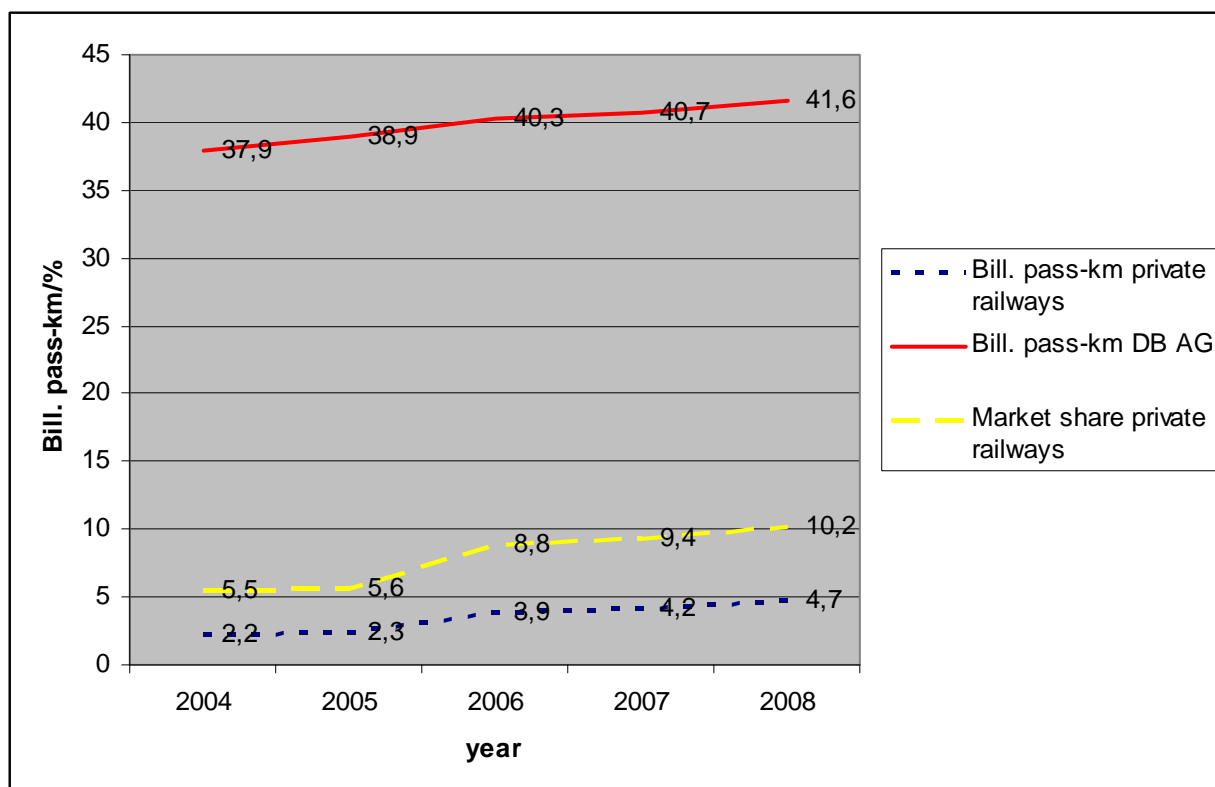
²⁰ Netzwerk Privatbahnen (2009), p. 42ff.

²¹ Netzwerk Privatbahnen (2009), p. 56ff.

²² Netzwerk Privatbahnen (2009), p. 58ff.

Despite some problems with competition, the liberalisation proved to be very successful regarding one main target of the railway reform, the generation of more transport volume on the railways. Between 2004 and 2008, transportation performance increased by 15.5%. Private railways were able to increase their share regarding transportation performance from 5.5% to 10.1% (see fig. 3).²³ When a line is subject to competition, private railways are very successful: Their market share in 2008, regarding train-km newly assigned by public authorities, was 72%. However, it will still take a long time until the complete market is subject to competition.²⁴

Figure 3: The short distance rail passenger market 2004-2008.



A last word should be said on turnover. 2006 is the only year for which a turnover figure can be calculated with the statistical data available; this will improve after the introduction of NACE rev 2 in service statistics. For 2006, according to FSO service statistics, turnover of NACE rev 1.1 60.1 (railway transportation) amounted to 16.6 bill. EUR. Long distance passenger transport was about 3.2 bill. EUR;²⁵ freight transport had a turnover of 4.2 bill. EUR.²⁶ Hence, short distance passenger rail transport should have accounted for a turnover of 9.4 bill. EUR.

²³ DB AG (2009), p. 15.

²⁴ An estimation by the private railways is the year 2034; the Netzwerk Privatbahnen, (2009), p. 32.

²⁵ See chapter 1.3.1.

²⁶ See chapter 3.3.1

2.3.2 Special conditions and restrictions; record keeping practices

One restriction already mentioned is the existence of public transport networks in many areas in Germany. The turnover distribution among its members is not known to FSO Germany so far and requires further research. However, the prices paid by private customers to this networks are part of the CPI, so some data is already available.

Another special condition is the existence of public authorities (*Aufgabenträger*) that order the rail transport services by the railways. They have all the data needed to track the price development for this part of the turnover: Contracts, lines, train-km, payments and so on. In Germany, 27 of such public authorities exist. Surveying them might be easier than surveying the railway companies, because they can replace old contracts with new ones for the same line; this is not possible for the railway companies that may lose the contract after a new competition round for the line. Additionally, they have all necessary information about passenger tariffs. So, short distance passenger rail transport might be one of the few cases where asking the customers grants better data than asking the producers.

2.4 Standard classification structure and detail related to the area

This is a little bit complicated. Short distance passenger transport seems to be somehow out of scope of ISIC 491 and NACE 49.1. ISIC 4911 and NACE 49.10 list “Passenger Rail Transport, interurban”; ISIC 4921 and NACE 49.31 are called “Urban and suburban passenger land transport“. But it is not sure whether they comprise short distance rail transport. The German classification Wz interprets it this way and attaches long distance transports to class 49.10 and short distance to class 49.31. The treatment is different in the product-based (international) classifications CPC and CPA. CPA 49.31.10 contains explicitly only “urban and suburban railway transport services of passengers”, excluding rail transport in rural areas; the only way to attach them is class 49.10.1 “passenger rail transport services, interurban“. So there is no special class for short distance passenger rail transports. The same applies for CPC.

In conclusion, it remains unclear where to put the sector. One can advocate for both solutions: NACE 49.10 and 49.31. However, there is no breakdown for such services provided; this is a task for the price statistician then.

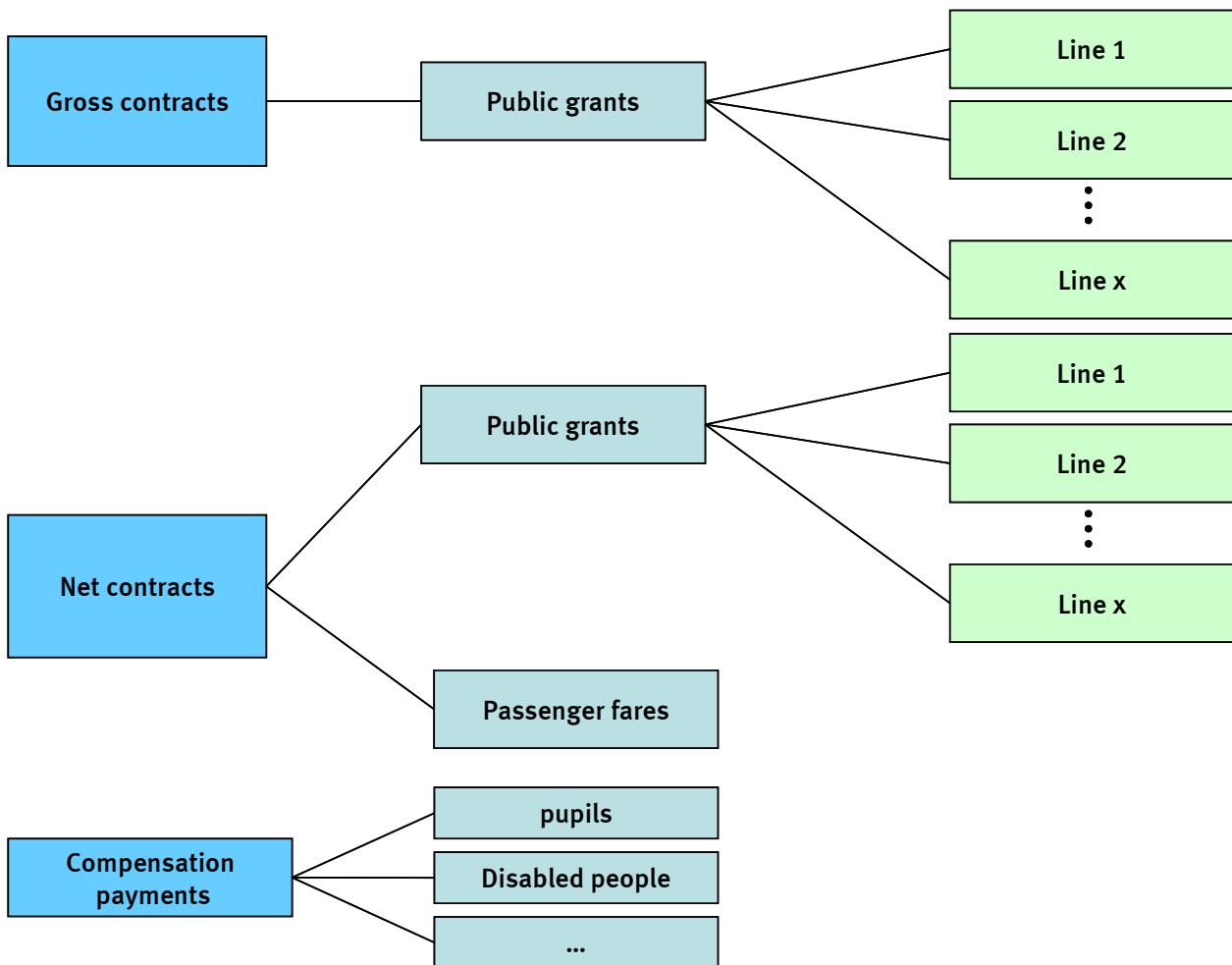
2.5 Evaluation of standard vs. definition and market constraints

As no standard classification exists, a new classification has to be developed for the SPPI. FSO Germany has not developed this SPPI yet, so this proposal is just a starting point from a desk point of view. Talks to railway companies and the public authorities as well as public transport networks are necessary to derive a practical classification.

A major distinction are the contracts between the railway company and the public authority: gross contracts or net contracts. For gross contracts, only the public grants need to be observed; net contracts need additionally observation of the passenger fares. These can be partly extracted from the CPI; information about B-to-B sales must be added. Other payments to be regarded (and not yet discussed in this paper) are compensation payments by law e.g. for the transport of pupils or of disabled persons.²⁷

So, a structure for the short distance rail passenger SPPI may look like fig. 4. It has to be remarked that the impacts of public transport networks have not been assessed yet; they might change the picture.

Figure 4: Possible structure for a short distance rail passenger SPPI.



²⁷ See Kaumanns (2005), p. 1286ff.

2.6 Pricing methods

The main pricing methods have not yet been decided upon; however, contract pricing and direct pricing of repeated services are most likely to be chosen.

- Contract pricing may be used for public grants and compensation payments. All the necessary information is laid down in contracts from which the respondents can extract the data. It is necessary to tackle all the price-determining characteristics. For the public grants, these may be:
 - o train-km
 - o duration of the contract
 - o gross or net contract
 - o schedule of the trains
 - o lines served
 - o equipment of rolling stock (climatisation, no. of seats, serving of food and beverages, information devices,...)
- Pricing of repeated services for passenger fares. They can be extracted from the CPI that calculates with the tariff of the German railways prices for travels over 20, 50, and 70 km, including different ticket products. Additionally, prices for B-to-B offers have to be included, as it is with long distance passenger rail transports.

2.7 Quality adjustment methodology

Quality adjustment will be a problem when contracts expire. New contracts always have different conditions: The number of train-km may have changed as well as the requirements for the rolling stock. In this situation, quality adjustment will require close collaboration with railway companies and public authorities.

2.8 Evaluation of comparability with turnover/output measures

The comparability is a large problem that this part of a railway SPPI will have. It is unclear at the moment where short distance passenger rail transport is to put. 49.10 or 49.31? At first, this is a problem of classification. Until it is solved, it is necessary to take a look at the business register where the railway companies are classified. This gives us a hint which class can be deflated with this SPPI.

3 Rail freight transportation²⁸

3.1 Definition of the service being observed

According to NACE rev 2 49.20, rail freight transport includes freight transport on mainline rail networks as well as short line freight railroads. Operation of railroad infrastructure and related activities are excluded. However, switching and shunting – which belong to those excluded related activities – are normal services offered by most of rail freight companies. Therefore, these activities form part of the index.

For the composition of an SPPI, rail freight transport services need to be divided into different segments, which are homogeneous in terms of price range and pricing mechanism. Here, an essential criterion is the position of the traction provider – the railway transport enterprise – vis-à-vis the consignor:

- The traction provider can directly enter into contact with the consignor and be responsible both for marketing and organising the transport and for providing the traction required – in which case it is a so-called *main haulage contractor*.
- It can also act as a sub-contractor, providing *traction services* for other railway transport enterprises or rail forwarding companies. That means it has a contractual relationship not with a consignor, but with another railway transport enterprise or a rail forwarding company. In that case it is referred to as a haulage subcontractor.
- It can make its locomotive including the driver available to other organisations. In that case it is no longer responsible for the execution of transport, but only for the provision of the locomotive and the driver.

That means that the marketing of transports vis-à-vis the consignors and the organisation of transportation are the criteria that enable us to divide the services into segments (see figure 5).

Three sections are presented, which have different billing modalities and price levels. Whilst the provision section is dominated by hourly or daily rates, traction services are billed per train operated or junction served, irrespectively of their actual utilisation; the services performed by a main haulage contractor are, in their turn, determined by such criteria as the number of wagons, the weight and the type of the freight to be carried, so that transports of different goods and different quantities over the same relation are priced differently.

²⁸ This chapter is mainly based on Goldhammer (2007).

Figure 5: Division of the rail freight transport market by marketing and organisation.

<div style="text-align: center;"> Organisation of transport </div> <div style="text-align: center;"> Marketing </div>	<div style="text-align: center;"> Own-account services </div>	<div style="text-align: center;"> Contracted services </div>
<div style="text-align: center;"> Own-account services </div>	<div style="text-align: center;"> Services as a main haulage contractor (block trains, wagonload traffic) </div>	<div style="text-align: center;"> Provision of locomotives and engine drivers (construction trains, shunting services) </div>
<div style="text-align: center;"> Contracted services </div>	<div style="text-align: center;"> Traction services </div>	

- As a rule, a main haulage contractor performs *conventional rail freight transport* services, including all kinds of transport other than combined transport.²⁹ They are divided by type of production: *Wagonload traffic* means that individual wagons or sets of wagons are picked up from different senders, joined into larger trains at marshalling yards and moved in a so-called main run to a different marshalling yard. The trains are split up there and the individual wagons or sets of wagons are delivered to the recipient. The second variety of conventional rail freight transport is *block train traffic*. In this case a complete train is moved from the sender to the recipient without additional shunting operations and changes in the sets of wagons.³⁰
- As for *traction services*, we can make a distinction between traction services for *intermodal transports* – i.e. for trains carrying containers or trailers, on the one hand, and *traction* provided for the operation of trains servicing wagonload or block train traffic, on the other hand. The second category also includes the servicing of individual junctions.
- As far as *provision* is concerned, construction and work trains provided for railway construction sites constitute the most important kinds of services offered. Here railway transport enterprises rent their locomotives and engine drivers (and sometimes also wagons) on an hourly or daily basis to track construction companies or railway infrastructure enterprises. Besides, customers are also billed for locomotive transfer charges, which are priced depending on the distance, and for the route cost incurred. *Shunting locomotives* are also made available according to this system.

The services included in rail freight transport and observed by the SPPI are summarised in fig. 6.

²⁹ See Fricke/Pfaffmann (2007), p. 11.

³⁰ See Bichler et al. (2005), p. 69.

Figure 6: Services in the three categories of rail freight transport.

Service as main haulage contractor	Block train traffic		Wagonload traffic
Traction services	Intermodal transport	Traction for block trains and wagonload traffic	Servicing of junctions
Provision of locomotives	construction train traffic		Shunting services

3.2 Pricing unit of measure collected

The pricing unit of measure depends on the different services laid down in the previous chapter:

- For services as main haulage contractor and for traction services, the transport itself is the unit of measure. FSO asks for the conditions of an individual transport laid down in a contract and its price in the reporting period.
- For provision, there are different pricing units: hours worked for the provision of locomotives and rolling stock; three models for transfer of locomotives (distance 100 km, 200 km, 300 km); and route models for determining the route costs. For track construction logistics, also a part of provision, the unit of measure is the unit-value €/tkm (tonne-kilometre).

3.3 Market conditions and constraints

3.3.1 Size of industry and latest developments

Since the liberalisation in 1994, competition has stimulated rail freight transports in a remarkable way. The first companies to compete with Deutsche Bahn AG were owned by municipalities and federal states, they had already existed prior to the railway reform. New competitors were private mid-sized railway companies founded after 1994, works railways, which extended their services to the public network, as well as international concerns and railway companies of other states, which acquired shares or established own traffic organisations in Germany.³¹ Originally, the admission tickets to the market were rail freight transportation niches operated by small carriers servicing certain corridors or specialising in one industrial branch.³² Some of them also cooperated with the former monopolist,

³¹ See DB AG (2002), p. 8; DB AG (2007), p. 10.

³² See D'Inca (2006), p. 8.

which brought them forward as well. For example, in early 2002 under the "Mora C" programme, which was launched to raise the efficiency of rail freight transport, 21 regional railway companies on behalf of DB Cargo took over the operation of 60 freight transport points, which would otherwise have been closed down. In the meantime this stimulation of competition, powered also by a rise in exports, has strengthened the position of rail freight transport vis-à-vis the other modes of transport. These so-called NE railways ("*nichtbundeseigene Eisenbahnen*"- "non-federation owned" railways as contrasted to the Deutsche Bahn AG which is still owned by the government) could increase their shares in the rail freight transport market to more than 20 %. Today, 59 companies compete with the former monopolist (today called DB Schenker Rail) on a market that accounted in 2006 for a turnover of approximately 4.2 bill. €. ³³ Increased competition does not necessarily mean a reduction of volume for the former monopolist: Between 2000 and 2008, railway transport performance increased by 40 %; DB Schenker itself could increase its transport performance by 20% ³⁴. In 2008, it accounted for 115,7 bill. tkm. Since 1999 railway traffic has been able to stop the long-term trend and to gain new market shares from other modes of transport. However, it remains to be seen whether the changes observed will endure, as the first half of 2009 has seen a sharp decline in rail freight transport due to the economic crisis.

3.3.2 Special conditions and restrictions

Rail freight transport services are offered by rail forwarding companies and railway transport enterprises. Whereas rail forwarding companies undertake to organise and market transports, but purchase the traction, i.e. the transport service as such, railway transport enterprises both provide transport services and undertake their marketing vis-à-vis the consignor. Railway transport enterprises are the real freight transporters; such activities as the organisation and marketing of transport services, however, can be undertaken by a rail forwarding company as well. In intermodal transport ³⁵ – this includes container transports and trailer shipments – organisation and marketing are done by so-called operators; as they also include other modes of transport in their transport chains and can submit transport prices only for the entire transport chain, they are not in the focus of the producer price index for rail freight transport. Instead, the focus is on railway transport enterprises and – in some cases – on rail forwarding companies.

³³ Own calculations based on the pre-survey for the SPPI.

³⁴ Netzwerk Privatbahnen (2009), p. 65, 67.

³⁵ intermodal transport –also often referred to as combined transport – „... is defined as transport of goods in load carriers, making successive use of different modes of transport with the goods themselves remaining in the load carriers (e.g. containers, swap bodies, trucks and trailers) ... during transshipment." Reim (2003), p. 328. The quotation is the translation of the German original.

3.3.3 Record keeping practices

Data needed for an SPPI for rail freight transport are prices for actual services. Under normal circumstances, they can be easily extracted from the normal financial accounting. But there are some issues that need further attention.

So far, bundling of logistic services plays no role for rail freight transport. Framework contracts for a bundle of transportations are more complicated, e.g. servicing of junctions: number of transported wagons and the junctions serviced can change every day. However, the contract stays the same; under these circumstances, it is more accurate to link the price to a certain contract than to a specified transport.

The level of organisation at which data items are collected differs from the phases of the survey. Phase I (production of the weighting pattern) needs overall figures that are usually kept at corporate level; in contrast, the pricing records needed for phase II (current price observation) are normally kept at the operational level. In some cases, this includes asking several subsidiaries of the company. The contact person may vary between the two phases: During the first phase, accountants are the ones to question; during the second phase, the marketing department that sets the price is the better target for our questionnaires.

3.4 Standard classification structure and detail related to the area

Different classification systems exist for rail freight transport.

- ISIC (sector 4912) and NACE (sector 49.20) as well as Wz just list “Freight Rail Transport” and do not offer more detailed subclasses.
- These are offered by the (international) classifications CPC and CPA. The classes CPC 6512 (Railway transport services of freight) and CPA 49.20 (Freight rail transport services) have several subclasses which group the transports according to vehicle and type of cargo. For the CPA, these are:

49.20 Freight rail transport services

49.20.1 Freight rail transport services

49.20.11 Railway transport services of freight by refrigerator cars

49.20.12 Railway transport services of freight by tanker cars, petroleum products

49.20.13 Railway transport services of freight by tanker cars, bulk liquids and gases

49.20.14 Railway transport services of intermodal containers

49.20.15 Railway transport services of letters and parcels

49.20.16 Railway transport services of dry bulk goods

49.20.19 Other railway transport services of freight

Price determining characteristics are included in that classification; however, national statistics concerning turnover do not use this classifications but NACE/Wz. Interestingly, the classification has similar categories as the one used for freight transport by road.

More details can be derived from transportation statistics, where the classification used is the Standard Goods Classification for Transport Statistics, 2007 (NST 2007). For every type of good, data about transportation volume and transportation performance is available. Additionally, transportation statistics offer data about the distance of transports, origin and destination.

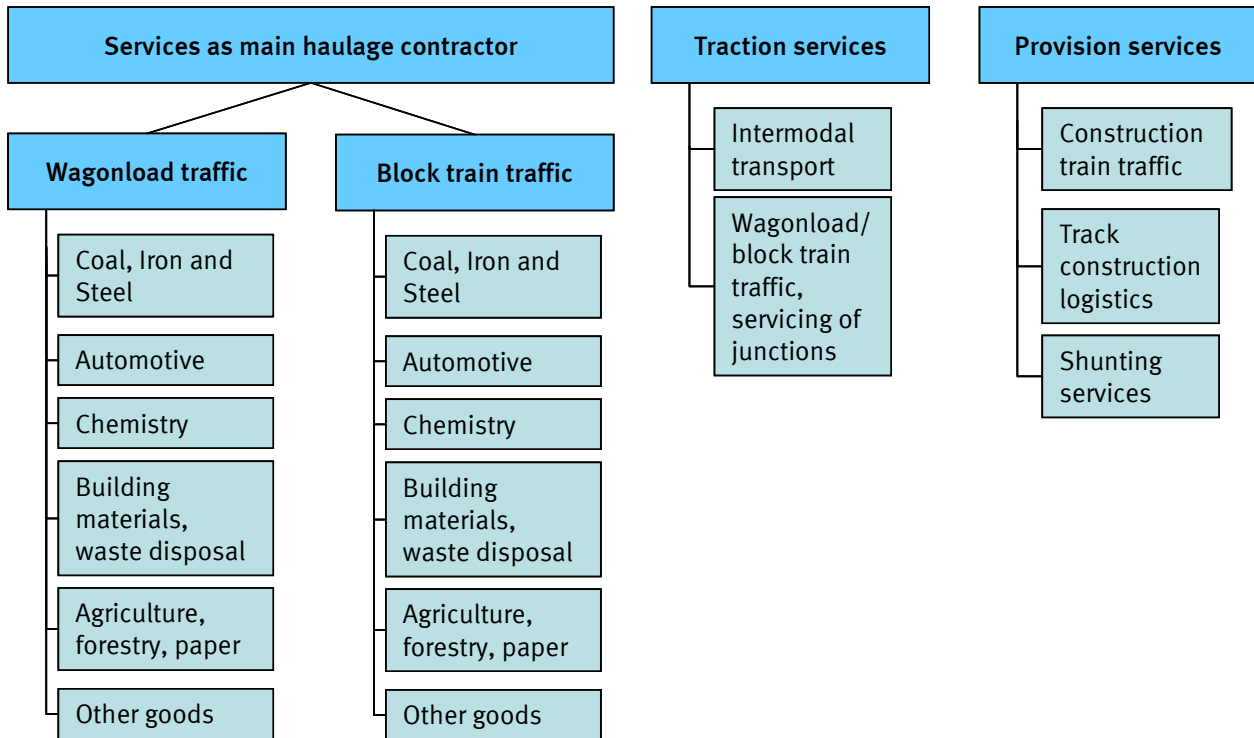
3.5 Evaluation of standard vs. definition and market constraints

Both CPC and NST 2007 cover some of the price determining characteristics. Additionally, transport statistics cover the relation between origin and destination, which has an important influence on the price, too. However, the well-known classifications have their drawbacks:

- NST 2007 covers only goods. It does not comprise the contractual relation between traction provider and consignor, which is a main price-determining characteristic. Furthermore, the type of vehicle is not considered. Neither are provision services.
- The detail offered by CPC does not reflect the German market properly. E.g., transports of letters and parcels are rarely seen on German railways, but form an own category; but transports of vehicles, which account for an important piece of the market, are just regarded as “other transport services”.
- Both standard classifications miss the production system. Of course, for matters of transportation statistics and measurement of turnover, it is not necessary to distinguish between wagonload traffic and block trains; however, for price statistics, it must not be missed, because both categories have different pricing levels.

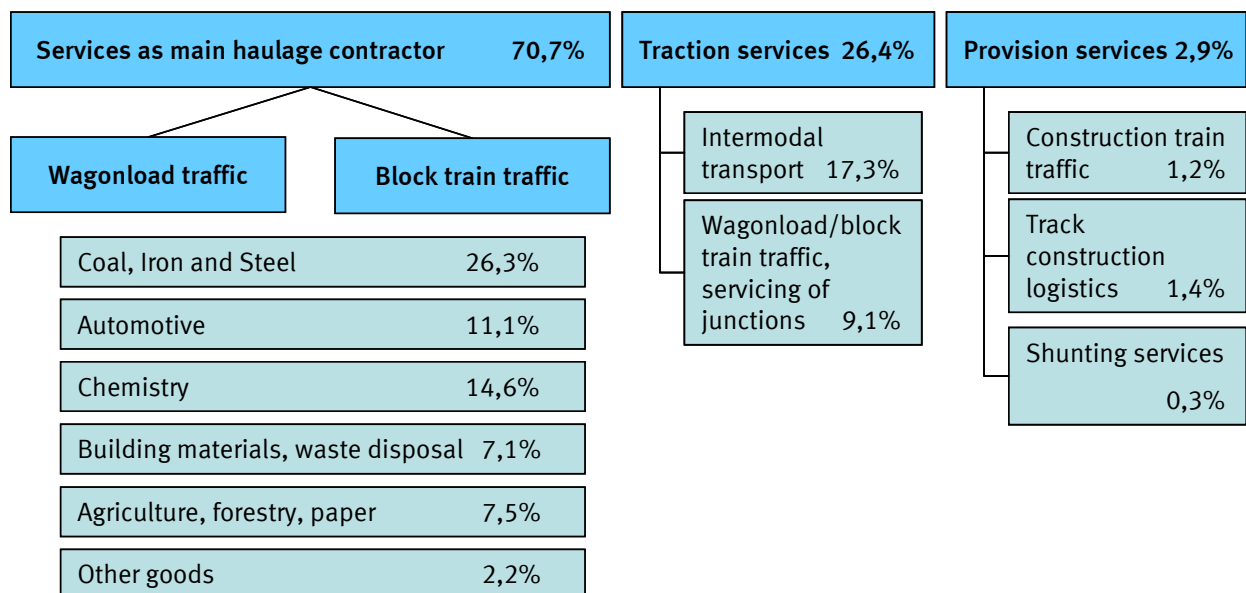
Hence, FSO Germany set up an own classification for rail freight transport, reflecting the market’s habit. It is based on the service categories identified in chapter 3.1 and is further broken down by submarkets that were identified by intense talks with sector experts, companies, and associations. Fig. 7 displays the classification used.

Figure 7: Classification used for the SPPI for rail freight transport.



The weighting pattern using this classification was calculated only with data from a survey conducted for this purpose by FSO Germany. Because there are only few companies in Germany carrying out rail freight transport, purposive sampling was used. The sampling universe consisted of those companies that have a permission for rail freight transport in Germany as listed by the Federal Railway Authority (*Eisenbahnbundesamt*). Additionally, several rail freight forwarding companies were surveyed as well. The sample comprised 82 companies; 72 of them stated the conduction of rail freight transport. The following weighting pattern was derived:³⁶

Figure 8: Weighting pattern of the SPPI for rail freight transport.



3.6 Pricing methods

Price collection for rail freight transport is done by using standardised paper questionnaire. The following pricing methods are used:

- The contract pricing method is applied for services performed by a main haulage contractor and for traction services. Accordingly, enterprises are requested to specify one transport service, which is regularly performed for a client, and to indicate the price charged for it. These are real transaction prices. The specification of the service must be very precise, so that price changes caused by a change in the service can be identified and excluded (quality adjustment) in order to measure the pure change in the price. The following price-determining characteristics are surveyed:
 - main haulage contractor
 - wagonload/block train traffic
 - market segment (e.g. coal/iron/steel, automotive, chemistry,...)
 - goods transported
 - wagon type and ownership of the wagons (private/leased or rented/own)
 - relation including the starting and destination stations
 - number of wagons
 - weight and length of the train
 - additional services included in the price and the inclusion of the transport of empty wagons
 - traction services
 - intermodal transport/traction for block trains or wagonload traffic/servicing of junctions
 - stations/junctions serviced
 - description of the service (this is a blank field on the questionnaire, asking respondents to describe the most important price-determining characteristics for this particular transport)
- For construction train and shunting services, pricing of repeated services is used. Here, the Federal Statistical Office exactly specifies one service and enterprises are requested to indicate the average price that could be achieved for this service in the reference period. This includes services such as the provision of different types of locomotives and wagons for construction train services, prices for driving locomotives to construction sites over different distances (100, 200 and 300 km) and the

³⁶ Due to confidentiality reasons, FSO Germany is not allowed to publish the share of wagonload traffic and block

provision of shunting locomotives. As route fees are separately charged for locomotives being moved to construction sites, the index also covers the changes in the route fees charged by DB Netz; here, model routes are used for which prices are determined in line with the current pricing conditions of DB Netz.

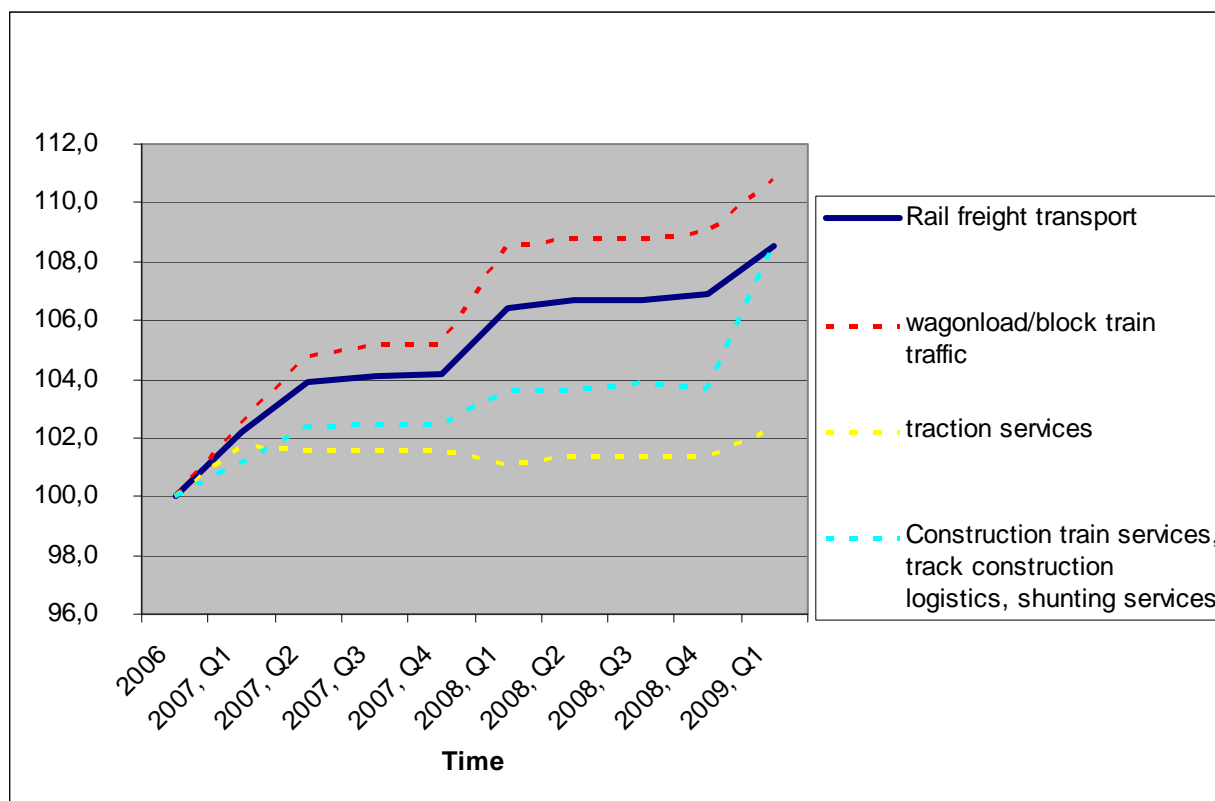
- For the small section of track construction logistics (basically including trains transporting ballast and sleepers from and to constructions sites), an activity which in this index is assigned to construction and shunting services, we use the unit value approach. As there are no recurring services here and models cannot easily be applied, respondents are requested to supply data on turnover and tonnage for ballast und the different types of sleepers; this information is used to determine a euro/tkm rate, which indicates price changes.

Price collection started in February 2007 and it also covered data for 2006. The producer price index was published for the first time in early 2008. With the chosen methodology, the SPPI yielded a high response rate (up to 97% without reminder) and its results are widely accepted by the public. The Index comprises 836 price quotations (387 for main haulage contractor services, 165 for traction, and 284 for provision). FSO Germany publishes an overall SPPI for rail freight transport and sub-indices for main haulage contractor services (declared as “wagonload/block train traffic”), traction services, and provision services (declared as “Construction train services, track construction logistics, shunting services”). The following results were calculated on a 2006=100 basis:

Table 2: SPPI for rail freight transport - values.

Year	Period	Rail freight transport	Of which...		
			wagonload/ block train traffic	traction services	Construction train services, track construction logistics, shunting services
2006	Whole year	100,0	100,0	100,0	100,0
	1st quarter	102,2	102,5	101,7	101,2
	2nd quarter	103,9	104,8	101,6	102,4
	3rd quarter	104,1	105,2	101,6	102,5
2007	4th quarter	104,2	105,2	101,6	102,5
	1st quarter	106,4	108,5	101,1	103,6
	2nd quarter	106,7	108,8	101,4	103,6
	3rd quarter	106,7	108,8	101,4	103,9
2008	4th quarter	106,9	109,0	101,4	103,7
2009	1st quarter	108,5	110,8	102,3	108,6

Figure 9: SPPI for rail freight transport in Germany - chart of development (2006=100).



3.7 Quality adjustment methodology

Quality adjustment methodologies are needed when quality changes in the recorded transports occur. There are several variables that can be changed: different weights, different relations, different wagons. And not all contracts can be treated in the same way: For traction services, enterprises get the same fee regardless the weight of the train which can be different from time to time; for wagonload and block train traffic, the payment is subject to the weight. But all those modalities are laid down in the contracts. So, when payments are subject to weights or number of junctions serviced, it is a good solution to tackle this situation with a model: The model is a real transaction that has taken place; it is then calculated with the contract's conditions. Then, the price quotation is not only an expert estimate, but a price that really would have applied if this special transportation case had taken place.

Another well-known subject for quality adjustment is the end of a contract from which a transportation price was recorded. Then a new, similar contract (i.e. from the same product group) has to be found, if possible from the same enterprise (*match-models method*).³⁷ To link price recordings of both contracts, several methods can be applied: The price change between the two periods can be imputed by the aggregate price change; or the prices of both transports are available in an overlap period. If such a situation occurs, the respondent is asked to state the quality-adjusted price difference between the old and the new contract.

³⁷ IMF (2004), p. 142ff.

So, many different methods can be applied for the same situation. However, there is not the one and only correct method for all situations; which one is applied, always depends on the case.

3.8 Evaluation of comparability with turnover/output measures

Because NACE did not have separate categories for rail freight and rail passenger transport until the last revision in 2008, there has been no turnover data produced for rail freight transport so far. The 2008 figures are the first to be split between passenger and freight transport, so turnover figures will be available for the first time. However, it can be expected that both figures won't be a perfect match. The major reason is the different sampling universe: service statistics use the business register, while price statistics use the list of rail freight transport licenses by the Federal Railway Authority and directories about rail freight forwarding companies. Because the business register does not allocate all companies with a rail freight transport license to the rail freight transport sector, and rail freight forwarding companies are classified as freight forwarders (NACE 52.29), the turnover covered by the SPPI will be different from the one covered by service statistics.

4 National Accounts Concepts and Measurement Issues for the Area Related to GDP Measurement

The National Accounts department of FSO Germany uses CPI and SPPI for deflation of rail transportation. For passenger transport, the CPI for COICOP³⁸ class 0731 "Passenger transport by railway" is used. This results in a bias, because the payments of the governmental authorities that order the transport are not considered. An SPPI for rail passenger transport would solve this problem.

For rail freight transport, the existing SPPI is used.

³⁸ COICOP = Classification of Individual Consumption by Purpose, 1999

5 Conclusion and Summary

Setting up an SPPI for rail transport is not an easy task. This is due to the breakup into three different categories with different legal backgrounds, markets, companies, and price determining characteristics. So far, a rail freight SPPI seems to have the most straight-forward approach of these three. It is in line with turnover measurement and just needs the application of the usual SPPI methodology. FSO Germany has introduced such an SPPI successfully in 2007/2008.

For passenger transports, things are different: a lot of data is already available at the CPI. In Germany, long distance passenger rail transport is a monopoly; so, there is only one company to talk to that is already used to deliver data to the FSO. The existing survey just needs to be expanded to cover B-to-B customers as well as the government.

Again, the situation is different for short distance passenger rail transport. First, it is amazing that this category cannot be properly classified with NACE, ISIC, CPC or CPA; they do not consider the existence of rail transport in rural areas. Then, customers – or, more exactly, those who pay for transportation – are not necessarily passengers, but public authorities that order transportation as a public service. So, the prices to be observed for an SPPI differ significantly from those surveyed for the CPI – it is public grants vs. passenger fares. Only for so-called net contracts, passenger fares need to be included. The impact of public transport networks have not been assessed yet, but that certainly might put more complexity in this statistics.

As a summary, an SPPI for rail transportation is not an easy task, but definitely worth the effort. Its existence will increase the quality of national accounts, as the CPI has wrong weights for long distance passenger transports, measures something completely different for short distance passenger transport and a data gap existed for rail freight transport. So – let's get it on!

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