



Incentive-based Governance of the Swiss Railway Sector

**A study of the performance incentives
created by the financing of the railways**

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List of Acronyms

AEG	Allgemeines Eisenbahngesetz
BAV	Bundesamt für Verkehr
BEG	Bayerische Eisenbahngesellschaft
BEVVG	Bundeseisenbahnverkehrsverwaltungsgesetz
BEZNG	Bundeseisenbahnneugliederungsgesetz
BIF	Bahn-Infrastruktur-Fonds
BLS	Bern Lötschberg Simplon
BNetzA	Bundesnetzagentur
BV	Bundesverfassung
CHF	Swiss Franc
DB	Deutsche Bahn
DBGrG	Gesetz über die Gründung einer Deutsche Bahn Aktiengesellschaft
EBG	Eisenbahngesetz
EIBV	Eisenbahninfrastruktur-Benutzungsverordnung
ERTMS	European Rail Traffic Management System
EU	European Union
EUR	euro
FABI	Finanzierung und Ausbau der Bahninfrastruktur
FinöV	Bundesbeschluss über Bau und Finanzierung von Infrastrukturvorhaben des öffentlichen Verkehrs
GVVG	Güterverkehrsverlagerungsgesetz
KAV (Verordnung)	Verordnung über die Anteile der Kantone an den Abgeltungen und Finanzhilfen im Regionalverkehr
KFEV	Verordnung über die Konzessionierung und Finanzierung der Eisenbahninfrastruktur
LSVA	Leistungsabhängige Schwerverkehrsabgabe
LuFV	Leistungs- und Finanzierungsvereinbarung
LV	Leistungsvereinbarung
MinVG	Mineralölsteuerverwendungsgesetz
NEAT	Neue Eisenbahn Alpentransversale
NS	Nederlandse Spoorwegen
NZV	Netzzugangsverordnung
ÖBB	Österreichische Bundesbahnen
PBG	Personenbeförderungsgesetz

PPP	Public Private Partnership
PSO	Public Service Obligation
PÜG	Preisüberwachungsgesetz
RegG	Regionalisierungsgesetz
RER	Regional ExpressNet
RoLa	Rollende Landstrasse
SBB	Schweizerische Bundesbahnen
SKE	Schiedskommission im Eisenbahnverkehr
SNCB	Société Nationale des Chemins de fer Belges
SPNV	Schienenpersonennahverkehr
TOC	Train Operating Company
UKV	Unbegleiteter Kombiniertes Verkehr
UVEK or DETEC	Federal Department of the Environment, Transport, Energy and Communications
VAT	Value Added Tax
VBZ	Verkehrsbetriebe Zürich
VöV	Verbandes öffentlicher Verkehr
ZVV	Zürcher Verkehrsverbund

1. Introduction

The question of how the Swiss railway system should be organised and financed has been debated in Switzerland for over the past 20 years. Parallel with, but independently from, the debate in the European Union (EU), Switzerland has sought to make its railways financially more sustainable while at the same time ensuring that its performance stayed at its current high level, and was even improving, where possible.

With the so-called *Bahnreform* 1 in 1999, the main Swiss railway company Schweizerische Bundesbahnen (SBB) was corporatized and unbundled at accounting levels. Moreover, companies were given non-discriminatory access to each other's infrastructure, and the freight transport sector was liberalised. In the subsequent years, the second phase of railway reform encountered significant difficulties. Ultimately, it was rejected by Parliament in 2005, and the government was invited to reconsider its proposals and to resubmit them in a piecemeal fashion. The so-called phases 2.1 and 2.2 have since been enacted, placing the Swiss railway sector on a more even footing with the railway undertakings of other European countries.

Important parts of the original ambition for phase 2 of the railway reform, in particular the question of railway financing, remain unrealised, however. In early 2012, the government, in response to a popular initiative, proposed a new, simplified and more stable way to finance the Swiss railway infrastructure, in the form of a single railway infrastructure fund (called BIF for *Bahn-Infrastruktur-Fonds*), covering operations, maintenance and development of the infrastructure. This legislative initiative, called FABI (for *Finanzierung und Ausbau der Bahninfrastruktur*), is currently being discussed in Parliament, will probably be subject to a popular vote in 2014, and should be enacted in 2017.

The purpose of this study is to contribute to the present debate, yet on a more fundamental level. In particular, we want to offer a more conceptual analysis, grounded in new institutional economics, of the relationship between the way the different parts of the Swiss railway system are financed on the one hand and the overall performance of the sector on the other. Our broad research question is as follows: ***how should the Swiss railway sector be financed in order to achieve the highest possible level of performance?*** And, perhaps more importantly, if the current system of railway financing is simplified, or altered, can the current level of performance nonetheless be maintained? More precisely, we seek to answer the following research questions in this study:

- What is the current financial incentive structure governing the present-day public transport system in Switzerland?
- How do these financial incentives affect the behavior of the relevant actors of the system?
- How do these incentives shape the performance of the Swiss public transport system (via the behavior of the relevant actors) and what are the related risks and sensitivities?
- What would be the performance of a changed financial incentive structure?
- What are the ideal incentive mechanisms, given various performance objectives for public transport policy in general and railway services in particular?

We will answer these questions by reducing, in a number of steps, the complexity of the problem to the point where we can map the main relationships between incentives and performance, to the extent that these incentives result from the various financing

mechanisms. While this implies a significant simplification of the problem, the alternative is to end up with a mapping that has so many elements that no real insight is gained.

At the end of our analysis, we will be able to determine how the current financing mechanisms incentivize (or not) the behaviour of the Swiss railway system, and what changes could be made to these current incentive mechanisms so as to improve the system's performance without increasing its costs.

In what follows, the law and practice of the current Swiss system will be described in chapter 2, followed by a discussion of the law and practice in comparable other European countries in chapter 3. In chapter 4 we will introduce the specific performance goals we are using for the purposes of our analysis. Chapter 5 is devoted to the core of our study, namely the mapping of the current situation, followed by an evaluation of various proposed reforms in chapter 6. Chapter 7 concludes and offers some recommendations for the future.

2. The financing of the Swiss railway system

In this section, we will discuss the existing financing mechanisms of Switzerland's national and regional rail, as well as of regional passenger transport by bus. After a brief introduction, we will begin with the transport companies: long distance passenger transport, cargo transport and regional (public) transport. In section 2.1 we will consider the mechanisms in place to finance the railway infrastructure.

Art. 87 of the Swiss Constitution¹ gives the Confederation the exclusive competence to legislate in the area of the railways. However, to the extent that these railways are not “of national importance”,² the Confederation shares this authority with the cantons and the municipalities under general principles of subsidiarity.³ As we will see below, the financing of the Swiss railways is defined by two opposing tendencies. On the one hand, there is a long tradition of federalism in Switzerland, which means that lawmakers will generally prefer governance structures that give the cantons significant power and responsibility.⁴ On the other hand, and during the past few decades, there has been increasing pressure from the electorate to achieve a meaningful shift towards transport by rail, especially when it comes to Trans-Alpine cargo transport. This is a task that is generally considered as requiring significant Federal intervention. As a result, we might summarise the next two sections by saying that these two trends together explain the core of the additional complexity of the Swiss railway system, when compared to the financing mechanism of comparable countries. First, however, we will turn to each of these financing mechanisms.

2.1 The financing of train operating companies

Looking at the total state expenditure on rail transport, the importance of the problem and the Federal nature of the financing mechanisms used is immediately apparent. Of the CHF 1,061 million of tax money spent on subsidies for Train Operating Companies (TOCs) in 2010, according to calculations by the *Bundesamt für Statistik* (Federal Statistical Office), only CHF 545 million came from the Confederation.⁵ However, this is still a significant sum given that this does not include any expenditure on rail infrastructure, and given that the total Federal budget for 2010 amounted to approximately CHF 60 billion.

In what follows, we will take a systematic look at the financing of the Swiss TOCs. Depending on how one counts, there are as many as 50 companies active in Switzerland.⁶ Some of these own the infrastructure they use, others do not. Some are government-owned, others are not. Some are large, others are very small. Some are active in both the passenger and the freight markets, others are active in only one or the other. In order to gain a better understanding of the financing of the Swiss railway sector, we are going to have to look at each of these categories in turn, considering each time to what extent government money is involved, where that money comes from, by what mechanism it is conveyed, and based on which criteria. In so doing, we will leave the financing of railway infrastructure for another section. The same goes for regional buses. It is also worth noting that the exact amounts of

¹ *Bundesverfassung* (BV, 1999), Consolidated Statutes 101.

² Cf. art. 49(3) *Eisenbahngesetz* (EBG, 1957), Consolidated Statutes 742.101.

³ Cf. art. 43a and 44 BV.

⁴ Cf. art. 5a, 43a and 47 BV.

⁵ *Eisenbahnrechnung 2009*, table 1.

⁶ In its *Eisenbahnrechnung 2009*, the BFS considered 57 companies, but several of those are subsidiaries of SBB or BLS. Cf. p. 16.

money involved are not particularly interesting at this point. Instead, we are interested in how and why these amounts vary, as well as in their rough relative proportions. For this reason, it can occasionally happen that the amounts cited refer to different years, usually for reasons of data availability. This does not affect their usefulness for the present study.

For the entire transport sector – passengers and cargo – some useful data can be obtained from the Railway Accounts that are prepared each year by the *Bundesamt für Statistik*. Based on this source, we can compare the amounts of subsidy paid to the TOCs with the revenue they obtain from their customers. The result is that in recent years the subsidy has amounted to about 20% of the latter amount:

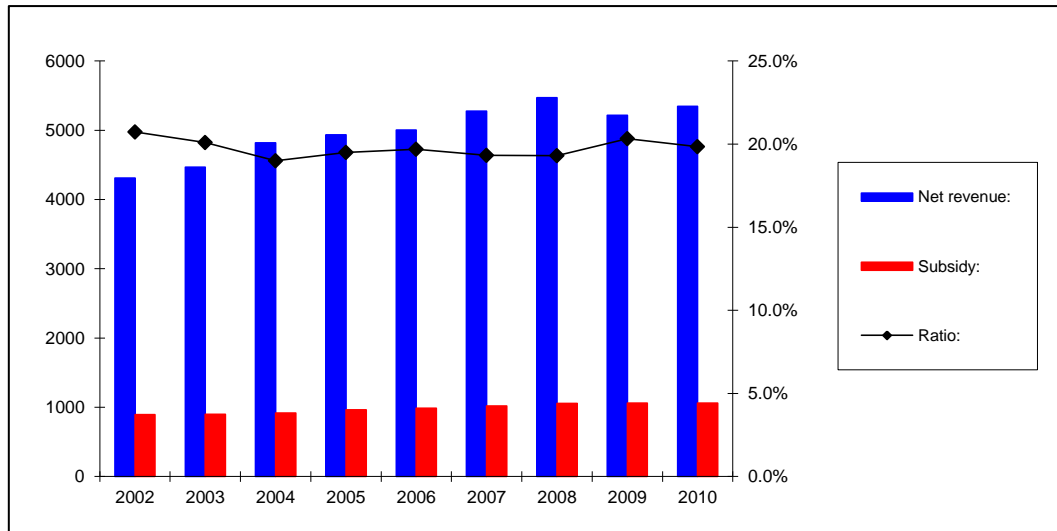


Figure 1 The relative size of income sources for the Swiss railway sector as a whole

2.1.1. Fernverkehr (Passengers)

The Passenger Transportation Act 2009 (hereafter: Personenbeförderungsgesetz - PBG) gives the right to offer passenger transportation services first and foremost to the Confederation.⁷ The Confederation has the exclusive right to carry out a regular passenger service on the Swiss railway network, unless another legal act (“*anderer Erlass*”) or an international agreement⁸ says otherwise. The most obvious such *Erlass* is, of course, the concession.⁹ The *Schweizerische Bundesbahnen* (hereafter: SBB) are the instrument of the Confederation that carries out the activities of the Confederation in the railway sector, organised, since 1999, as a public law company¹⁰, albeit one whose structure has many similarities to an ordinary public limited company. SBB is to be managed “on sound business principles”¹¹ and its shares are held exclusively by the Federal Government. As a practical matter, SBB operates on the railway market based on the instructions given by the Federal Government pursuant to its authority under the SBB-Act (“*SBB-Gesetz*”).

⁷ Cf. art. 4 *Bundesgesetz über die Personenbeförderung* (PBG, 2009), Consolidated Statutes 745.1.

⁸ Cf. for example the Treaty of 27 July 1852 between the Swiss Confederation and the Grand Duchy of Baden concerning the continuation of the Baden railways on Swiss territory, Consolidated Statutes 0.742.140.313.61.

⁹ Cf. art. 6 PBG.

¹⁰ Cf. *Bundesgesetz über die Schweizerische Bundesbahnen* (SBB-Act, 1998), Consolidated Statutes 742.31.

¹¹ “*Die SBB sind nach betriebswirtschaftlichen Grundsätzen zu führen.*” Art. 3(3) SBB-Act.

Even though the SBB-Act allows the Federal Council to sell shares to third parties¹², this has not occurred so far. This, combined with the fact that SBB owns a significant part of the Swiss railway infrastructure and the fact that it inherited all the rights and most of the obligations of its pre-1999 incarnation¹³, means that there continues to be a significant amount of entanglement between the company, the transport authority (*Bundesamt für Verkehr*, hereafter: BAV)¹⁴ and the government Department of the Environment, Transport, Energy and Communication (hereafter: UVEK).¹⁵ If we limit ourselves to financial entanglements, the most obvious example is the on-going problems with the company's pension fund, which continues to cause cash flow problems for the company, causing the Swiss Federal Assembly to vote it a one-time CHF 1,148 bn subsidy in 2011.¹⁶

Such company-wide problems aside, SBB long-distance passenger transport is able to break even, financially. In the areas of interregional and international transport ("*Personenfernverkehr*"), revenue from passengers exceeds the costs of transporting them.¹⁷ At the moment, there are no other companies offering long-distance passenger transport in Switzerland, following the demise of Cisalpino AG in 2009 – itself a 50/50 joint venture between SBB and Trenitalia. In its strategic goals for SBB for the period 2011-2014¹⁸, the Federal Council has determined that the *Personenfernverkehr* segment should achieve a profit of CHF 276 million and a free cash flow of CHF 177 million by 2012.¹⁹

Given that the segment of *Personenfernverkehr* is financed entirely through transactions between SBB and its customers, it is important to consider to what extent there are constraints on SBB's freedom in this regard. It appears that there are essentially three limitations.

First of all, under the *Leistungsvereinbarung* – i.e., performance contract – between SBB and the government²⁰, the company is required to carry out a pricing policy that, on the one hand, ensures “*an appropriate degree of co-financing by the users*”²¹, and on the other hand achieves the best possible modal split between road and rail.²² The extent to which SBB achieves these goals is monitored by UVEK/BAV as part of the ordinary regulatory and oversight process, and ultimately by the Government and Parliament as part of the evaluation of every four-year performance contract.

Secondly, there is the competition authority, the *Wettbewerbskommission*. However, this agency will not normally intervene in the railway sector because art. 3 of the *Kartellgesetz*

¹² Art. 7(2) SBB-Act.

¹³ Art. 24(1) SBB-Act.

¹⁴ *Bundesamt für Verkehr*. Cf. art. 10(2) *Eisenbahngesetz* (1957). This agency should not be confused with the *Schiedskommission im Eisenbahnverkehr*, which has a much more modest role as arbiter in infrastructure access cases. Cf. *Verordnung des UVEK über die Schiedskommission im Eisenbahnverkehr*, Consolidated Statutes 742.122.7.

¹⁵ *Departement für Umwelt, Verkehr, Energie und Kommunikation*.

¹⁶ SBB-Act, amendment of 18 March 2011, BBl 2011 2741.

¹⁷ SBB 2010 *Finanzbericht*, p. 18, table 2, which shows all public funds that were received by the company in 2010.

¹⁸ Cf. art. 7a SBB-Act. The most recent three editions are available on the website of the UVEK [here](#).

¹⁹ Par. 2.3. Cf. SBB 2010 *Geschäfts- und Nachhaltigkeitsbericht*, p. 63.

²⁰ Cf. art. 8 SBB-Act.

²¹ Art. 7(5) *Leistungsvereinbarung* 2011-2012.

²² Art. 13 *Leistungsvereinbarung* 2011-2012.

(1995)²³, its enabling statute, says that the general competition laws are pre-empted by sector-specific legislation.²⁴

Finally, there is the *Preisüberwachungsgesetz* (PüG 1985).²⁵ This statute, which acts as a complement to the general competition law, authorises an official known as the *Preisüberwacher* or Price Supervisor (art. 3(1)) to keep an eye on the price development in industries where the degree of competition in the market is significantly less than perfect.²⁶ Art. 13 PüG lists the five factors that the Price Controller takes into account when examining the permissibility of a price increase:

- The price development on comparable markets;
- The necessity of achieving appropriate profits;
- The development of costs;
- The particular performances of the enterprise;
- The particular conditions in the market.

While the supervision of the Price Supervisor is not as specialised as the work of the BAV, he does intervene in the railway sector from time to time. It has been argued that the Price Supervisor defends the interests of rail passengers without sufficient attention for the tax payers who have to pay for any shortfall in the budget of the railways.²⁷ As part of the debate over *Bahnreform 2.2*, the Swiss Parliament is currently debating the proper role of the Price Supervisor in the railway sector.²⁸

2.1.2 Cargo

Turning to the cargo segment, it is clear that there are many different ways to structure the analysis. After all, the cargo transport market consists of a number of important sub-markets, with greatly different characteristics and financing mechanisms. In what follows, we will focus on that part of the revenue from the Petroleum Tax that is devoted to the rail cargo transport market. In the next subsection we will discuss regional transport, which also includes some funding for regional cargo transport.

To begin with, we should observe that the cargo sector, like *Personenfernverkehr*, is not as such subsidised in any structural way. The revenue obtained from customers is approximately the same as the costs of providing the service.²⁹ Whatever was said in the previous section about the freedom of SBB to determine its own pricing structure applies equally to the cargo market.³⁰ There are, however, certain additional financing mechanisms, which are intended to

²³ *Bundesgesetz über Kartelle und andere Wettbewerbsbeschränkungen* (KG, 1995), Consolidated Statutes 251.

²⁴ An exception that is not important here is the authority of the competition authority to clear mergers in the same way that it does so in other sectors. Cf. *Verordnung über die Kontrolle von Unternehmenszusammenschlüssen* (VKU, 1996), Consolidated Statutes 251.4.

²⁵ *Preisüberwachungsgesetz* (PüG 1985), Consolidated Statutes 942.20. Cf. Klaus (2009).

²⁶ Cf. art. 2 and 12 PüG.

²⁷ Cf. Kern (2011).

²⁸ Cf. *Neue Zürcher Zeitung*, December 7, 2011, ‘*Preisüberwacher soll nicht ausgehebelt werden: Der Nationalrat wendet sich bei der Bahnreform 2 gegen einen Beschluss des Ständerats*’.

²⁹ Cf. SBB 2010 *Finanzieller Lagebericht*, p. 7, which shows a loss of CHF 64 million for the freight segment. For the future, the Federal Council has invited SBB to return its international cargo business to profitability by 2013, while the (more costly) segment of domestic *Wagenladungsverkehr* is merely asked to avoid losses in the medium term. Cf. Strategic Goals 2011-2014, par. 2.6 and 2.5, respectively.

³⁰ One difference is that passenger transport companies have to operate based on a transparent pricing system, cf. art. 15 PBG. This obligation does not apply to the cargo transport market.

allow the Federal Government to carry out its duty under art. 84 BV to promote transalpine rail transport.³¹ Most importantly, art. 21 and 22 of the *Mineralölsteuerverwendungsgesetz* (MinVG)³² provide that money is taken from the tax on petroleum and used to lower the market price for combined transport.³³

To be precise, what is done is that the MinVG money is used to negotiate concessions with TOCs, including, but not limited to, SBB, for accompanied and unaccompanied combined transport.³⁴ (In German these are known respectively as *Rollende Landstrasse* - RoLa and *Unbegleiteter Kombiniertes Verkehr* - UKV.)

In 2010, the amounts were as follows:

- Total subsidy for combined transport: CHF 200 million³⁵, including:
 - SBB Cargo: CHF 22.4 million,³⁶
 - Hupac: CHF 64.2 million;³⁷
 - An unknown additional sum to the dominant company in the RoLa segment, RALpin.³⁸
- Subsidy for non-Transalpine cargo transport: CHF 15 million;
- Total MinVG subsidy: CHF 215 million.

It is interesting to observe that the total amount of subsidy has remained constant since about 2005, while the average rate of subsidy is to be reduced each year under art. 8(2) GVVG (*Güterverkehrsverlagerungsgesetz*), meaning that over that period the rate of subsidy has decreased only enough to make up for the increase in volume.³⁹ The basic method used to negotiate these contracts is benchmarking, where the BAV attempts to force the laggards to match the productivity gains achieved by other companies.⁴⁰ In its policy document for the

³¹ A topic not mentioned in the text is the additional subsidy granted in 2011-2012 to compensate for the strength of the Swiss Frank against the Euro. Under this temporary programme BLS Cargo, SBB Cargo International, Crossrail and TX Logistik received CHF 11.2 million in December 2011 and CHF 21 million in January 2012.

³² *Bundesgesetz über die Verwendung der zweckgebundenen Mineralölsteuer* (1985), Consolidated Statutes 725.116.2.

³³ Cf. also *Bundesgesetz über die Verlagerung des alpenquerenden Güterschwerverkehrs von der Strasse auf die Schiene* (GVVG, 1999), Consolidated Statutes 740.1.

³⁴ The following is based on the 2008 evaluation document of all Federal grants and subsidy programmes, BBl. 2008, 6229. For the individual railway programmes, cf. BBl. 2008, 6682 and further.

N.B. These periodic evaluations by the Federal Council are mandated by art. 5 of the *Subventionsgesetz*, cf. *Bundesgesetz über Finanzhilfen und Abgeltungen* (1990), Consolidated Statutes 616.1.

³⁵ Cf. BFS, Beiträge und Darlehen des Bundes zugunsten des öffentlichen Verkehrs. ([Link](#))

³⁶ SBB 2010 *Geschäfts- und Nachhaltigkeitsbericht*, p. 18. This is actually a significant increase compared to 2009 (CHF 10 million) and 2008 (CHF 13 million).

³⁷ Hupac 2010 Annual Report p. 34. As of 1 January 2011, SBB Cargo and Hupac carry out their international activities in a new joint venture, SBB International, of which SBB owns 75% and Hupac owns 25%. As of the end of 2010, SBB owns 23.85% of the shares of Hupac.

³⁸ As of January 2011, RALpin has taken over the RoLa connection between Basel and Lugano from Hupac, making it the only remaining player in the RoLa segment. Cf. Hupac 2010 Annual Report p. 10. SBB, BLS and Hupac each own approximately 33% of the shares in RALpin.

³⁹ BFS statistics ([link](#), Table 6.2.4) show an average increase in net tkm transported across the Alps by way of combined transport of 3.36% per year between 2005 and 2008, the last year for which data are available. For 2011, the BAV expect to have about CHF 180 million available for transalpine combined transport and about CHF 35 million for non-transalpine combined transport. Cf. the 2011 *Offertverfahren* documents for the two sub-programmes. ([Link 1](#) and [link 2](#).)

⁴⁰ 2008 evaluation, p. 6685.

year 2011, the BAV lists the following factors as influencing its determination of the maximum subsidy per shipment and per train:

- The expected volumes of transport;
- The general development of prices in rail and road;
- The expected development of productivity;
- The Euro/CHF exchange rate;
- The development of revenue and costs;
- The financial means available (to the BAV).⁴¹

Note that the maximum subsidies listed (eg. CHF 75 per UKV shipment or CHF 3,080 per Rola train) are just that: a maximum. The actual subsidy that the company will receive depends on the amount it is expected to need to breakeven, and will differ from company to company, and from contract to contract.⁴²

Even though this section focuses mainly on the financing mechanisms that are currently being used, it is useful to note that, until recently, the money from the *Mineralölsteuer* (fuel tax) was also used for an indirect subsidy on combined transport: a subsidy toward the price of the train paths that are necessary to carry out combined transport. The Federal Government contracted with the infrastructure companies for a discount that applied to combined transport only. The legal basis of this endeavour, other than art. 84 Constitution, was the *Kombiverkehrsverordnung* (Intermodal Transport Ordinance, 1988).⁴³ Based on this regulation, the UVEK reduced the rate per gross tkm by CHF 0.002 in 2000⁴⁴, which was reduced to CHF 0.0015 per gross tkm in 2002.⁴⁵ In addition, the government provided a *Deckungsbeitrag*, a margin contribution, similar to the one paid by the TOCs as part of their access charge under art. 20 NZV - *Netzzugangsverordnung* (Network Access Ordinance, 1998).⁴⁶

Note, however, that the infrastructure companies had to arrange the amount of the mark-up by agreement with the government⁴⁷, while amounts paid by the passenger transport companies under by art. 20 NZV was either fixed in the regulation or decided by the concessioning authority for each year.

During the discussions over *Bahnreform 2*, it became clear that it was considered undesirable to maintain this subsidy. In a 2008 policy briefing, the BAV gives a detailed explanation⁴⁸:

- While the original intention was to support the most efficient TOCs in the combined transport segment only through the train path price subsidy⁴⁹, this has never materialised, causing unnecessary complexity in the system;

⁴¹ Bundesamt für Verkehr, August 2010, *Offertverfahren alpenquerender kombinierter Verkehr* ([Link](#)), par. 5.

⁴² Cf. art. 12 and 16 BGFV.

⁴³ *Verordnung über die Förderung des kombinierten Verkehrs und des Transportes begleiteter Motorfahrzeuge* (VKV, 1988), Consolidated Statutes 742.149. This measure was repealed by art. 19 BGFV.

⁴⁴ Art. 2(a) of *Verordnung des UVEK über die Bemessung der Trassenpreisverbilligung im kombinierten Verkehr* (2000), Consolidated Statutes 742.149.4. This measure was repealed by art. 19 BGFV.

⁴⁵ *Verordnung des UVEK über die Bemessung der Trassenpreisverbilligung im kombinierten Verkehr* (2002), Consolidated Statutes 742.149.4. This measure was repealed by art. 19 BGFV.

⁴⁶ *Eisenbahn-Netzzugangsverordnung* (NZV, 1998), Consolidated Statutes 742.122.

⁴⁷ Art. 2(b) of *Verordnung des UVEK über die Bemessung der Trassenpreisverbilligung im kombinierten Verkehr* (2000), Consolidated Statutes 742.149.4. This measure was repealed by art. 19 BGFV.

⁴⁸ BAV, “*Änderung der Verordnung des UVEK über die Bemessung der Trassenpreisverbilligung im kombinierten Verkehr: Begleitdocument für die Anhörung*”, Doc. No. 714/2008-04-29/259. ([Link](#))

⁴⁹ Cf. BBl 1999, 6297.

- The subsidy was fixed per tkm, without any opportunity to examine whether the recipient (or the ultimate intended beneficiary, the TOC) actually needed the subsidy, should higher than expected volume occur;⁵⁰
- Given that the equivalent subsidy for wagon-load transport had already been abolished in 2008, there was an inefficient incentive for customers in favour of combined transport;
- Abolishing the train path price subsidy would make the system cheaper to administer.

For these reasons, as of 2010 the entire direct state support for combined transport runs through the subsidies provided by the state to the TOCs using the money from the *Mineralölsteuer*. Whereas in the past, the maximum total sum of CHF 220 million per year was divided 160/60 between direct and indirect subsidies⁵¹, now the entire sum goes to the former, with about CHF 180 million reserved for transalpine transport, and CHF 35 million for non-transalpine transport.⁵²

Before, the amounts were approximately:

	Transalpine	Non-Transalpine
Direct subsidy	130	25
Indirect subsidy	50	10

Table 1 Subsidies before Bahnreform 2

Now, the amounts are approximately:

	Transalpine	Non-Transalpine
Direct Subsidy for Combined Transport	180	20
Direct Subsidy for other Cargo Transport		15

Table 2 Subsidies after Bahnreform 2

However, at the same time, the *Deckungsbeitrag* was abolished for all cargo transport.⁵³

2.1.3 Regionalverkehr (Passenger trains and buses)

While the Federal Government bears the sole financial responsibility for the main transport routes through Switzerland⁵⁴, the *Personenbeförderungsgesetz* (Passenger Transportation Act) divides the financial burden for regional passenger transport equally between the Federal Government and the cantons.⁵⁵ In this section, the financing mechanisms for regional passenger trains will be examined more closely. To begin with, we note that in 2010 there was about CHF 800 million in federal funding for regional passenger rail, and CHF 2.2

⁵⁰ Cf. 2008 evaluation, p. 6685, Isenmann (2010), *op cit*, p. 44.

⁵¹ Cf. BBl. 2007, 4416 and 4503.

⁵² Cf. the 2011 BAV *Offertverfahren* documents for the two sub-programmes. ([Link 1](#) and [link 2.](#))

⁵³ Cf. art. 20(4) NZV, which entered into force on January 1, 2010.

⁵⁴ Art. 28(3) PBG. The statute speaks of “commissioned regional transport”, art. 28(1) PBG.

⁵⁵ Art. 33 PBG.

million for car shuttle trains⁵⁶, a category we will also treat in this section, in addition to the funds provided by the cantons and the municipalities.

While art. 28 PBG says that the Federal Government and the cantons together foot the bill for public service obligations in regional transport, the former may not contribute to urban transport or to transport without *Erschliessungsfunktion*.⁵⁷ The *Erschliessungsfunktion* is defined by art. 3 PBG as the establishment of a connection between a town and the rest of the country.⁵⁸ As noted, art. 33 PBG sets the relative burden for the financing of regional passenger train transport of Confederation and cantons at 50% each, whereby the relative share of each canton is to be determined by Federal regulation. This regulation, the KAV⁵⁹, is the first piece of legislation we will now discuss, followed by a brief introduction to the distribution of the financial burden within the cantons and an analysis of what this means for individual rail and bus lines.

2.1.3.1 Distribution of costs among the cantons

The KAV regulation calculates the share each canton has to pay of the subsidy paid for regional rail in its territory according to a number of steps. Art. 6(1) defines the two key statistical variables that govern the calculation:

- The relative population density of each canton relative to Switzerland as a whole, taken as an inverse (IBD), and
- Each canton's length of railway track per inhabitant, counting only the track that is used for regional railway transport, and taking it relative to 100% level, which is set by the Regulation at 0.3 m. per inhabitant. (IBL)

Under art. 6(1), they receive a weight of 0.7 and 0.3, respectively, to calculate the Structural Index of each canton for the purposes of its share in the cost of regional passenger trains, SI(A).⁶⁰ This means that SI(A) is almost zero for *Basel-Stadt*, which has more than 5,000 inhabitants per km² and where the entire railway network is either devoted to long-distance transport – which is the sole responsibility of the Confederation – or urban transport – which is the sole responsibility of the canton.

In art. 6(2) of the Regulation, this structural index is normalised into a 0 to 1 range, according to the following formula: $MSI(A) = \frac{600\% - SI(A)}{600\%}$. In other words, *Basel-Stadt* with its

SI(A) of zero gets an MSI(A) of 1. At the other end of the scale, Graubünden, which has a population density more than seven times lower than the Swiss average, and where essentially all rail is regional, ends up with an MSI(A) of zero.

The MSI(A), in turn, is used as an input variable in art. 3(1) KAV, where it is elevated to the third power and multiplied by 0.525425. Adding 0.2 gives each canton's share in the costs of regional passenger transport, which ranges from 71% for *Basel-Stadt* to 20% for

⁵⁶ Cf. BFS, Beiträge und Darlehen des Bundes zugunsten des öffentlichen Verkehrs. ([Link](#))

⁵⁷ Art. 28(2) PBG.

⁵⁸ Cf. art. 5 *Verordnung über die Personenbeförderung* (2009, VPB), Consolidated Statutes 745.11.

⁵⁹ *Verordnung über die Anteile der Kantone an den Abgeltungen und Finanzhilfen im Regionalverkehr* (KAV, 1995), Consolidated Statutes 742.101.2.

⁶⁰ As opposed to SI(I), the structural index for infrastructure costs, whose calculation is also governed by the KAV.

Graubünden.⁶¹ The net effect is that more densely populated cantons pay a larger share due to the inclusion of the IBL variable, but pay less because – for a given size of the canton and a given length of track – greater density means a higher IBD and a lower contribution. That is why Aargau, for example, pays only 39% of the costs of its regional passenger rail service, despite having 218 inhabitants per km² (compared to 195 for Switzerland as a whole): it has a lot of regional rail, including the intercantonal connections with Basel and Zürich, the costs of which are attributed to the cantons involved based on a formula which they are to agree amongst themselves.⁶²

2.1.3.2 Distribution of cantonal costs among the municipalities

While an exhaustive survey of the financing mechanisms used within each canton⁶³ is outside the scope of this study, it is useful to look at a number of different cantons, with different characteristics, in order to see whether there is any noticeable trend. We will assume that the most important differences between the cantons are their population density and the question of whether there is a clear urban centre.

We will first take the north-western canton of Aargau as an example, which has a population density that is above the Swiss average, but whose inhabitants travel predominantly to urban centres outside the Canton. Pursuant to art. 5(1)(a) of the Aargau Public Transport Act (hereafter: ÖVG)⁶⁴, the Canton may participate in the concessioning of transport services together with the Confederation. It may also concession additional services⁶⁵ and it may offer subsidies in order to lower prices.⁶⁶ For all of these transport services, 40% of the costs are born by the municipalities.⁶⁷

The relevant decree⁶⁸ defines two factors: the *Bedienungsfaktor* or service factor, and the inhabitants' factor, which together determine the cantonal share of the costs of public transport. It should be emphasised that this decree applies to the entirety of the cantonal public transport expenditure, as long as the initiative comes from the Federal Government or the canton. When the initiative comes from the municipality, from a regional planning board, or from a private organisation or person, the canton of Aargau will only help out with the financing by way of exception, and even then for no more than 25%.⁶⁹

In Geneva, on the other hand, almost half of the canton's 465,000 inhabitants live in the *Ville de Genève*. This means that the distribution of costs issues that we analysed above for Aargau are much more important in Geneva.⁷⁰ Given the disproportion of power and wealth between the City of Geneva and much of the rest of the canton, it makes sense that the cantonal

⁶¹ Cf. KAV, Annex I, which gives the percentage for each canton based on the data of the end of 2007.

⁶² Art. 33(4) PBG and art. 7 KAV.

⁶³ Cf. art. 33(5) PBG.

⁶⁴ *Gesetz über den öffentlichen Verkehr* (ÖVG, 1975), Aargau Consolidated Statutes 995.100.

⁶⁵ Art. 5(1)(b) ÖVG.

⁶⁶ Art. 8 ÖVG.

⁶⁷ Art. 6(1) ÖVG.

⁶⁸ *Dekret über die Beteiligung von Kanton und Gemeinden an den Kosten des öffentlichen Verkehrs* (ÖVD, 1997), Aargau Consolidated Statutes 995.150.

⁶⁹ Art. 5(2) ÖVG.

⁷⁰ Plugging some plausible numbers into the formula used by Aargau, I ended up with a share of 87% for the City of Geneva and 13% for the other municipalities.

legislature would prefer to finance the operation of the cantonal Public Transport system largely out of the cantonal budget.⁷¹

In Zürich, another canton with a high population density and a clear urban centre, the Canton and the municipalities each bear one half of the costs of the public transport system.⁷² The share of each municipality is determined by its share of the Canton's weighted number of departures (80%) and its share in the total tax revenue of all the municipalities (20%).⁷³ Compared to Aargau, however, Zürich has a much more detailed weighting system.⁷⁴ Also, each municipality's total contribution is placed within limits based on its tax revenue, with Zürich city and Winterthur being limited at 10% of their total tax revenue, municipalities that only enjoy the minimum level of coverage being limited at 3% and all other municipalities at 6%.⁷⁵

To put some numbers to this, the canton of Zürich, in its 2011 budget, spends CHF 195.3 million on public transport out of a total budget of about 13 billion. The city of Zürich, on the other hand, spends about CHF 623 million on public transport⁷⁶, compared to a total budget of CHF 7 billion, while Winterthur contributes CHF 15.8 million to the ZVV, the *Züricher Verkehrsverbund*⁷⁷, out of a total budget of 1.15 billion, meaning that neither city is in any immediate danger of approaching the 10% maximum.

In Graubünden, which is the most sparsely populated canton in Switzerland, the Canton takes on 100% of the cantonal share of the Federally co-funded railways.⁷⁸ However, for railways and other public transport services that are not Federally co-funded, the Canton can get involved if it considers this service in the public interest of one or more municipalities, in which case its share amounts to 20% - 55% of the costs.⁷⁹ The rest is paid for by the municipalities that are directly concerned, based on an apportionment they can decide amongst themselves.⁸⁰

Basel-Stadt, which also received scant attention in section 1.1.3.1, above, has a very simple system: the Canton pays for the cantonal share of the Federally co-funded railways, as well as for any other transport services it sees fit to order, while the three municipalities each pay for the transport services they order in addition to those already funded by the Canton.⁸¹

⁷¹ Cf. *Loi sur les Transports publics genevois* (LTPG, 1975), Geneva Consolidated Statutes H 1 55, and *Cahier des charges relatif à l'utilisation du domaine public en vue de l'exploitation des Transports publics genevois* (CCTPG, 1989), Geneva Consolidated Statutes H 1 55.04. Note that there are some municipal contributions to the infrastructure budget: *Loi sur le réseau des transports publics*, Geneva Consolidated Statutes H 1 50.

⁷² Art. 26(2) *Gesetz über den öffentlichen Personenverkehr* (PVG, 1988), Zürich Consolidated Statutes 740.1.

⁷³ Art. 27(1) PVG.

⁷⁴ Art. 4 *Verordnung über die Gemeindebeiträge an den Verkehrsverbund (Kostenverteiler-Verordnung, 1988)*, Zürich Consolidated Statutes 740.6/

⁷⁵ Art. 2 *Kostenverteiler-Verordnung*.

⁷⁶ This amount includes both the city's contribution to ZVV and its expenditure on the urban transport company VBZ.

⁷⁷ Cf. art. 10-29 PVG.

⁷⁸ Art. 15(1) and (2) *Gesetz über den öffentlichen Verkehr* (GöV, 1993), Graubünden Consolidated Statutes 872.100.

⁷⁹ Art. 15(3) GöV.

⁸⁰ In case they are unable to reach an agreement, the cantonal government will decide for them based on each municipality's number of inhabitants and financial strength. Art. 36(2) and 15(3) GöV.

⁸¹ Art. 9 *Gesetz über den öffentlichen Verkehr* (2004), *Basel-Stadt* Consolidated Statutes 951.100.

In Bern, which has a clear urban centre but a much lower population density, there used to be a system similar to the one in Zürich. However, since 2001, only the weighted number of departures matters for the municipality's contribution, where it is noteworthy that departures "towards a centre" count twice as high as departures "toward the countryside".⁸² This is true even if that centre is in a different canton, as long as the passenger can reach it within 30 minutes (45 minutes if it is a "main centre") without changing trains.⁸³

In sparsely populated Uri, finally, the municipalities that are directly concerned take on 10% of the cantonal share of the costs of the Matterhorn-Gotthard-Railway and 30% of all other public transport services.⁸⁴ When more than one municipality is directly concerned, their respective share is based on the number of inhabitants (55%), the number of stops of said transport service (25%) and the municipality's number of jobs (20%).⁸⁵

Having thus considered seven of Switzerland's 26 cantons, we can tentatively conclude that the most common systems appear to be a simple apportionment according to one or more weighed variables, and an apportionment for each rail or bus line separately. Which of the two the canton will choose depends, as one would expect, on the extent to which the cantonal transport network is interconnected, as well as on the number of lines that need to be paid for. When the network is highly dense, with significant interconnectedness, it needs to be centrally managed even if not all tasks are assigned to the same company. In that case, the most sensible solution is to have the canton and each municipality simply contribute a certain percentage of the cost of the network.

In Zürich, for example, the ZVV (*Zürcher Verkehrsverbund*) administers a total public transportation budget of about CHF 950 million, while its income from ordinary sources is only about CHF 575 million, a sum that already includes CHF 3 million in funding from neighbouring cantons⁸⁶ and CHF 20 million in Federal funding. This leaves the ZVV short by about CHF 375 million, which has to be divided evenly between the Canton and the municipalities.⁸⁷ The actual transport services in the Canton are provided by eight "partners", ranging from SBB to PostAuto Schweiz, and from the *Verkehrsbetriebe Zürich* (VBZ) to the Winterthur bus company, as well as a number of smaller transport companies. Each of these companies operates any number of urban and regional services, so taking ZVV out of the equation only makes the picture eight times more complex without removing the need for a pooled allocation.

In a place like Uri, on the other hand, regional public transport is much simpler. The Canton only has about 35,000 inhabitants to begin with, and the majority of those live along the banks of the river Reuss or the *Vierwaldstättersee*. So all the Canton has to do is a) make sure that the main SBB trains also stop occasionally at the smaller stations⁸⁸, b) take care of the train connection from Göschenen – where the main through-going trains enter the Gotthard

⁸² *Verordnung über die Beiträge der Gemeinden an die Kosten des öffentlichen Verkehrs* (KBV, 1995), Berne Consolidated Statutes 762.415.

⁸³ Art. 5(3) KBV. The difference between a "centre town" and a town that is a "main centre", is that the latter has more than 100,000 inhabitants (i.e. Berne), while the latter has between 30,000 and 100,000.

⁸⁴ Art. 2(1) *Verordnung zum Verkehrsgesetz* (1997), Uri Consolidated Statutes 50.5115.

⁸⁵ Art. 10(2) *Verkehrsgesetz* (1996), Uri Consolidated Statutes 50.5111 and art. 3 *Verordnung zum Verkehrsgesetz* (1997).

⁸⁶ Cf. art. 12 PVG (ZH).

⁸⁷ As we have seen, in 2011 the canton's share is CHF 195 million, i.e. somewhat more than half.

⁸⁸ N.B. These stops are still part of the long-distance network, meaning that they do not have to be paid for by the canton.

tunnel – further south to Andermatt and the canton of Wallis behind it and c) arrange for a bus connection to the smaller valleys.⁸⁹ These three things, including the dozen or so individual bus services that make up category c), can easily be arranged separately without creating an excessively complex system and without burdening any individual municipality unfairly.

2.1.3.3 Regional rail (individual lines)

An important problem for regional passenger rail companies is described in SBB's 2010 Annual Report. On page 23 we read: “SBB trains were running at full capacity on many routes during peak times with demand outstripping the number of seats available, and average capacity utilisation over the whole day saw a modest increase. In 2010 it stood at 31.9 % for long-distance services (2009: 30.7 %) and just 19.5 % for regional services (18.9 %).”⁹⁰ In order to help cover the losses created in regional rail, SBB and other railway companies rely on public subsidies.

At the Federal level, the legal basis for the involvement of the Confederation is, as discussed above, art. 28 PBG. In the original languages, the key phrase is “*die laut Planrechnung ungedeckten Kosten*”, or in French: “*les coûts non couverts selon les comptes planifiés*”. In other words, the subsidy cannot exceed the costs that are “not covered” by revenue based on the financial planning made in advance. This *Planrechnung*, in turn, has to meet the requirements specified in art. 35-39 PBG and in the Regulation enacted by the UVEK pursuant to art. 35 PBG⁹¹, meaning that the company has to keep its different segments separate in its books, so that cross-subsidisation can be prevented. Obviously, not every government involvement is by way of subsidy; the Confederation can also provide loans, with or without market-consistent interest rates, and guarantees.⁹²

At the cantonal level, the statutes that we have discussed so far are generally the same statutes that also authorise the canton to enter into contracts with private parties for the provision of passenger transport services. Perhaps the most detailed is the Public Transport Act of *Basel-Land*.⁹³ Not only does it mandate that subsidised railway companies have to be managed according to sound business principles⁹⁴, which is a rule found in many cantonal statutes, as well as in Federal law⁹⁵, but they also have to take advantage of any possibilities for “self-help”⁹⁶, meaning ancillary business ventures which are in direct connection with the operation of a public transport service.⁹⁷ Such side ventures may not, however, compete with the public transport system and any shortfall in such a venture may not be covered by the

⁸⁹ Not to mention the *Schiffahrtsgesellschaft Vierwaldstättersee*, which connects the cities in Uri that are on the lake.

⁹⁰ SBB 2010 Annual and Sustainability Report, p. 22.

⁹¹ *Verordnung des UVEK über das Rechnungswesen der konzessionierten Unternehmen* (RKV, 2011), Consolidated Statutes 742.221.

⁹² Art. 34 PBG.

⁹³ *Gesetz zur Förderung des öffentlichen Verkehrs* (1985), *Basel-Landschaft Consolidated Statutes* 480.

⁹⁴ “*Die Unternehmen (...) sind (...) verpflichtet, ihren Betrieb nach wirtschaftlichen Grundsätzen zu führen*”. Art. 5(2) *Gesetz zur Förderung des öffentlichen Verkehrs*.

⁹⁵ Cf. art. 3(3) SBB Act, for example.

⁹⁶ Art. 5(2) *Gesetz zur Förderung des öffentlichen Verkehrs*.

⁹⁷ “*Nebengeschäfte [die] in direktem Zusammenhang mit dem Betrieb einer Linie des öffentlichen Verkehrs stehen*”. Art. 5(3).

canton.⁹⁸ Moreover, a service may not be recognised as entitled to subsidy if the only reason why it cannot turn a profit is a lack of operational efficiency.⁹⁹

Being thus authorised to contract with the railway companies, the Confederation and the cantons enter into negotiations for specific routes. To the extent that the TOC is not owned by the state directly, that almost always means a counterparty that is somehow part of the SBB group, or otherwise owned to a significant extent by SBB. A few examples:

- THURBO AG, in North-East Switzerland, is owned 90% by SBB and 10% by the canton of Thurgau.
- RegionAlps AG, in Wallis, is owned 70% by SBB, 12% by the canton of Wallis and the remaining 18% by *Transports de Martigny et Régions*, which owns some of the infrastructure that RegionAlps uses.
- Zentralbahn AG in the area around the *Vierwaldstättersee*: SBB 66%, BAV: 16.1%, Obwalden and Nidwalden: 16.8%, Engelberg municipality: 1%.
- TILO SA in Ticino and neighbouring Italy is a 50/50 joint venture between SBB and Trenitalia.
- Bus Ostschweiz, which runs a number of bus lines in and around Altstätten in the canton of St. Gallen, is owned for 30.6 % by SBB

As we have seen above, in most Swiss cantons, a regional *Tarifverbund* (transport unit) stands between the government and the actual transport companies.¹⁰⁰ Altogether, there are 16 such organisations, plus the Z-Pass system that connects the ZVV-region with the regions surrounding it (i.e. A-Welle in Aargau, Flextax in Schaffhausen, Ostwind in Thurgau and St. Gallen and the *Tarifverbund Zug* in Zug to the south.). Some of them are coterminous with a single canton, while others cover only a part of a canton, like the Berner Oberland, or several cantons.

The purpose of these *Tarifverbünde* is to take over some of the duties of both the government and the companies. On behalf of the former, they may act as contracting authority or at least agency that supervises compliance with the contract. On behalf of the latter, the *Tarifverbund* tends to be the face of public transport towards the public, selling tickets for the whole network, regardless of which TOC actually operates each line, as well as providing information and receiving complaints.

A special kind of regional passenger rail transport are the car shuttle trains that operate in a few places in Switzerland, connecting difficult to reach valleys with the rest of the country. The Matterhorn-Gotthard Bahn operates such a service between Realp in southern Uri and Oberwald in Wallis as well as, in winter, between nearby Oberalp and its hinterland in Graubünden. To help keep this service affordable, it received CHF 2.4 million in subsidy in 2009.

Having dealt with the financing of the operations side of public transport in Switzerland in some detail, it is time to consider the financing of the infrastructure.

⁹⁸ Art. 5(3).

⁹⁹ “*Mangel an betriebswirtschaftlicher Effizienz*”. Art. 5(2).

¹⁰⁰ The main exceptions are the cantons of Wallis, Ticino and Uri. In Ticino, the S-Bahn Ticino is run as a joint venture between SBB and the Italian Trenitalia, with the buses run separately, while in Wallis and Uri, too, public transport is sufficiently simple to make it feasible for both passengers and government to treat with the companies directly. Glarus is also without a *Tarifverbund*, but is considering joining Ostwind.

2.2 The Financing of rail infrastructure in Switzerland

In what followings, the financing mechanisms for rail infrastructure in Switzerland will be discussed starting with the standard model that is used for the costs of infrastructure maintenance, for small improvements and for the operational costs of managing the infrastructure. Subsequently, we will turn to the special case of FinöV and to the ongoing discussion about the proposed reform of the financing mechanism for rail infrastructure.

2.2.1 The standard model

Infrastructure operations, maintenance and small investments are funded in much the same way as the operations of the railway. Much of what has been said about that topic above applies equally here, albeit with slightly different numbers. Instead of receiving operating income from passengers and cargo customers, the infrastructure companies are paid by the TOCs, in the form of access charges. Unlike SBB-cargo and SBB passenger transport, however, SBB-infra is not expected to break even on access charges alone, since that would make rail travel inefficiently expensive.¹⁰¹ Instead, it receives CHF 150 million per year from SBB-Real Estate¹⁰² and a substantial additional sum (approx.. 1.7 Bio. CHF per year) under the performance contract (LV or *Leistungsvereinbarung*) from the Federal treasury.¹⁰³

Under art. 18-23 of the Track Access Regulation (NZV, 1998)¹⁰⁴, the access charge paid by the TOCs consists of a basic price and compensation for additional services.¹⁰⁵ The basic price, in turn, consists of the “minimum price”¹⁰⁶ and a *Deckungsbeitrag*, a mark-up that is intended to cover part of the fixed costs of the system.¹⁰⁷ The minimum price is fixed by the BAV based on energy usage, maintenance costs, and the TOC’s share in the costs of the safety systems, railway stations, etc. The mark-up is fixed by the contracting authority, having heard all stakeholders, at least 18 months before the start of the new timetable for contracted transport, and at the start of the concession based on a proposal from the infrastructure company for other concessioned transport.¹⁰⁸ Cargo transport companies do not pay a margin contribution.¹⁰⁹ In addition to the minimum price and the margin contribution, the BAV can award a “noise bonus” for TOCs that use low-noise breaking systems.¹¹⁰ This bonus amounts to CHF 0.005 per axis-km in passenger transport, and CHF 0.01 otherwise, and is deducted from the access charge.¹¹¹ Art. 21 and 22 NZV, finally, list which services are and are not included in the access charge, whereby the infrastructure company may charge a (non-discriminatory) price for the latter.

¹⁰¹ That is to say inefficient from the perspective of society as a whole, taking into account the interactions between the markets for various modes of transport, and their respective externalities.

¹⁰² Cf. Par. 2.8 of the Strategic Goals for SBB for the period 2011-2014, *op cit*, art. 15(3) of the [Leistungsvereinbarung 2011-2012](#) and p. 18 of the 2010 SBB *Geschäfts- und Nachhaltigkeitsbericht*.

¹⁰³ In addition, SBB Infra receives contributions from the Federal Infrastructure Fund, cf. *Infrastrukturfondsgesetz* (IFG, 2006), Consolidated Statutes 725.13. However, this money is for urban public transport, cf. art. 1(2)(c) IFG, which is why it will not be discussed in this paper.

¹⁰⁴ *Netzzugangsverordnung* (NZV, 1998), Consolidated Statutes 742.122.

¹⁰⁵ Art. 18(1) NZV. Cf. also art. 9b EBG.

¹⁰⁶ *Mindestpreis*, cf. art. 19 NZV.

¹⁰⁷ Cf. art. 20 NZV.

¹⁰⁸ Art. 20(2) NZV.

¹⁰⁹ Art. 20(4) NZV.

¹¹⁰ Art. 20a NZV.

¹¹¹ The difference is explained by the fact that a significant amount of Federal subsidy was awarded in the past for the implementation of new break systems in passenger transport.

The system that will come into effect in January 2013 will have a lot more variable elements:

- The minimum price will be differentiated based on whether train path is on- or off-peak.¹¹² The same goes for the price paid for electricity;¹¹³
- The minimum price will be differentiated based on the required quality of the train path, which is determined based on whether the train path is for (a) concessioned long distance passenger transport, (b) other concessioned passenger transport, (c) non-concessioned passenger transport or (d) for freight and other trains;¹¹⁴
- There will be a surcharge of CHF 2 per stop for stops on tracks with mixed transport, that is to say passenger transport of different speeds, to compensate for the fact that on such tracks stops reduce the capacity of the network;¹¹⁵
- In addition to the minimum price per train-km, there will be a minimum price per gross tonne-km;
- The minimum price per gross tonne-km will be differentiated on the basis of the quality of the rolling stock used, in order to reduce wear and tear of the infrastructure.
- The minimum price per tonne-km will be CHF 0.003/Btkm higher for trains using fossil fuel traction on an electrified line;¹¹⁶
- Dangerous goods trains will pay a surcharge of CHF 0.02 per axle-km in order to defray the additional costs of handling such transport;
- The noise bonus is increased and further differentiated between different breaking systems;¹¹⁷
- The mark-up for concessioned passenger transport will be calculated as a percentage of transport revenue;¹¹⁸
- In addition to the differentiation based on the time of day already noted above, the price of electricity will also be differentiated based on whether the train in question is equipped with recuperation breaks.¹¹⁹

For SBB, the overall picture is as follows, with the total revenue from access charges in blue and the total expenditures of SBB-Infra in red (see Figure 2, next page). In 2010, the SBB's total revenue from access charges was CHF 772 million, compared to a total expenditure of CHF 3,380 million. For the next largest infrastructure company, BLS Netz, the equivalent amounts were CHF 69.7 million and CHF 355 million.

As with the subsidies provided to TOCs, the cantons and the municipalities are asked to contribute to the costs of infrastructure operations, maintenance and investment in regional railways.¹²⁰ Railways of national importance are financed solely by the Confederation, while railways for urban and "excursion transport" are not to be paid for with Federal money.¹²¹ Art. 51(2) EBG (*Eisenbahngesetz*) lists the purposes to be served by the government's involvement, other than the general upkeep of the infrastructure at a rate appropriate for the demands of traffic and the technological development:

¹¹² Art. 19a NZV, version applicable in 2013, AS 2011, p. 4331-4338.

¹¹³ Art. 20a NZV, 2013 version.

¹¹⁴ Art. 19a(2) NZV, 2013 version. For the Lötschberg- and Gotthard-tunnels, the multiplication factors are slightly higher. Cf. art. 19a(3).

¹¹⁵ Art. 19a(4) NZV, 2013 version.

¹¹⁶ Art. 19a(5)(a) NZV, 2013 version.

¹¹⁷ Art. 19b NZV, 2013 version.

¹¹⁸ Art. 20(1bis) NZV, 2013 version.

¹¹⁹ Art. 21(2) NZV, 2013 version.

¹²⁰ Art. 49(1) *Eisenbahngesetz* (EBG). The amount is about CHF 250 million per year.

¹²¹ Art. 49(3) and (2), respectively.

1. An appropriate opening up of the country (“*angemessene Grunderschliessung*”)
2. Regional policy, particularly the support for disadvantaged regions
3. Considerations of spatial planning
4. Environmental considerations
5. The needs of the disabled.

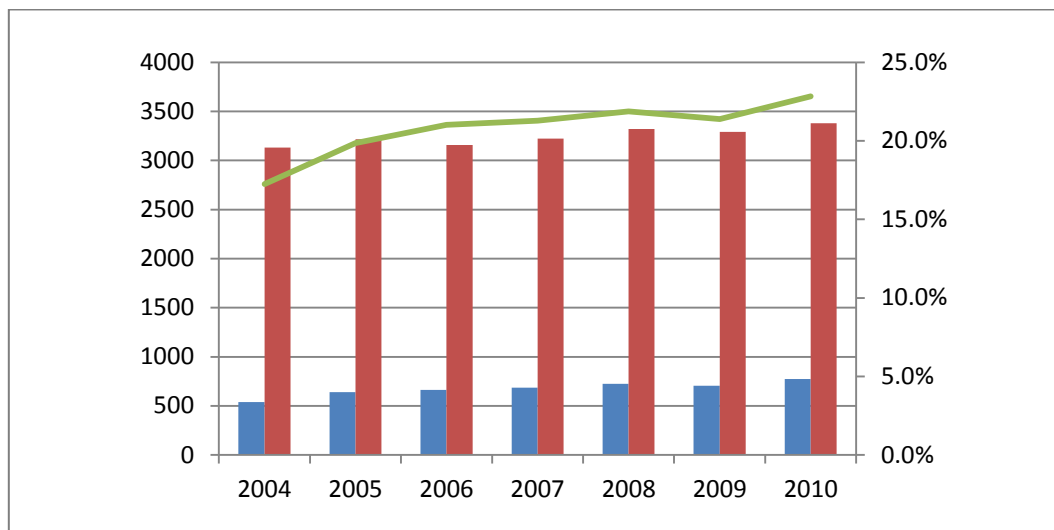


Figure 2 SBB-Infra: Revenue from access charges, total expenditure, and the ratio between these two

The overall share of the money spent on rail infrastructure for regional transport that is paid for by the local authorities is 45%¹²², with the contribution of each canton again being established by the *KAV-Verordnung*.¹²³ This regulation gives a formula similar to the one for operations, except with somewhat different coefficients, which result in a somewhat different range. While for operating costs the range varied from 20% for Graubünden to 71% for *Basel-Stadt*, the share of the costs borne by the cantons ranges from 15% for Graubünden to 87% for *Basel-Stadt*. Overall, the main difference is that population density is less important for infrastructure co-financing and the rail density more so. Within each canton, the municipalities tend to be asked to contribute in the same way as they do for the operating subsidies.¹²⁴

The Performance Contract between SBB and the Federal Government ties this CHF 1.65 billion subsidy¹²⁵ to a number of measurable targets, although it should be noted that for a number of targets the current contract omits an actual target, preferring instead to merely observe SBB’s performance in this area. Insofar as it concerns SBB-Infra, there are targets for safety (cf. art. 16 LV and the Annex), to be precise:

¹²² Art. 57(1) EBG.

¹²³ *Verordnung über die Anteile der Kantone an den Abgeltungen und Finanzhilfen im Regionalverkehr (KAV, 1995)*, Consolidated Statutes 742.101.2.

¹²⁴ Note that the relative importance of regional rail infrastructure in the total network is much smaller than the share of regional rail transport in the transport market, meaning that the contributions from the cantons are going to be much smaller as well, in absolute terms. Uri, for example, contributed CHF 945,000 to the investment program of the Matterhorn-Gotthard Bahn in 2010, which was its only contribution to rail infrastructure investment that year. In that same year, the canton of Zürich invested about CHF 200 million in public transport.

¹²⁵ This is the amount for 2011. CHF 510 million concerns the operation and maintenance of the infrastructure, and CHF 1.14 billion is for investments. It seems unnecessary to discuss the difference between a grant and an interest-free loan with conditional repayment. (Cf. art. 32(1) LV 2011-2012.)

- There have to be less than 0.19 collisions and 0.05 derailments per million route km;
- The number of level crossings that are not in conformity with the *Eisenbahnverordnung*¹²⁶ has to be reduced to 55 in 2011 and 35 in 2012.

For availability and quality (cf. the Annex):

- The percentage of route km where buses have to be used to transport the passengers instead, due to scheduled disruptions has to stay below 12%;
- The number of disruptions caused by infrastructure resulting in a delay of more than 3 minutes has to be below 108 per month per route km;
- The number of rail failures has to be fewer than 15 per km of main track; and
- The number of times the “level for immediate intervention”¹²⁷ is exceeded has to stay below 350 times per year per 100 km of main track.

For use of the network (cf. the Annex), there are targets for:

- The number of route kilometres sold per month (164 million);
- The revenue obtained that way (CHF 855 million); and
- The density of use (96 route km per km of main track per month).

And for productivity (art. 20 and the Annex), the contract specifies targets for:

- The productivity-targets are the costs of traffic management and energy supply per route kilometre (CHF 2.45);
- The costs of maintenance per 1,000 gross tkm (CHF 7.30);
- The costs of replacing the track superstructure per metre of railway (CHF 2,260); and
- The efficiency of the subsidies, measured in CHF of subsidy per route kilometre (CHF 3.10).

With regard to SBB-Infra, it should be noted that if it fails to carry out the Contract correctly, including a failure to meet the targets set, the BAV can order appropriate measures to remedy the problem, and it can also reclaim some of the public money paid.¹²⁸

It is important to remember that this Performance Contract applies only to SBB. As was already noted earlier, SBB does not control the entire Swiss railway network. For this reason, the Swiss Federal government and the cantons also subsidise maintenance and investment for non-SBB railways. In 2010, this concerned a total amount of CHF 626.9 million.¹²⁹ The legal basis for these subsidies is not the SBB-Act and the *Leistungsvereinbarung*, but rather the concessions agreed between the Federal Government and the railway companies.¹³⁰

Consequently, the financing of SBB can be represented graphically as follows:

¹²⁶ *Verordnung über Bau und Betrieb der Eisenbahnen* (EBV, 1983), Consolidated Statutes 742.141.1.

¹²⁷ “Überschreitungen der Soforteingriffsschwelle”

¹²⁸ Cf. art. 35 LV and art. 22(4) *Verordnung über die Konzessionierung und Finanzierung der Eisenbahninfrastruktur*, (KFEV, 2009), Consolidated Statutes 742.120.

¹²⁹ CHF 192.5 million for operation and maintenance and CHF 434.4 for investments. Cf. BFS, Beiträge und Darlehen des Bundes zugunsten des öffentlichen Verkehrs. ([Link](#))

¹³⁰ Cf. art. 5 EBG. Notice that the Federal Government’s assessment of the “public interest” criterion of art. 6(1)(a) EBG might be different than that of a canton, so that it is still possible that the cantonal government will grant a concession to an infrastructure company. However, this will normally be a rather unlikely scenario, especially since it would have to involve a railway infrastructure that is not expected to break even. Cf. art. 6(1)(b) EBG.

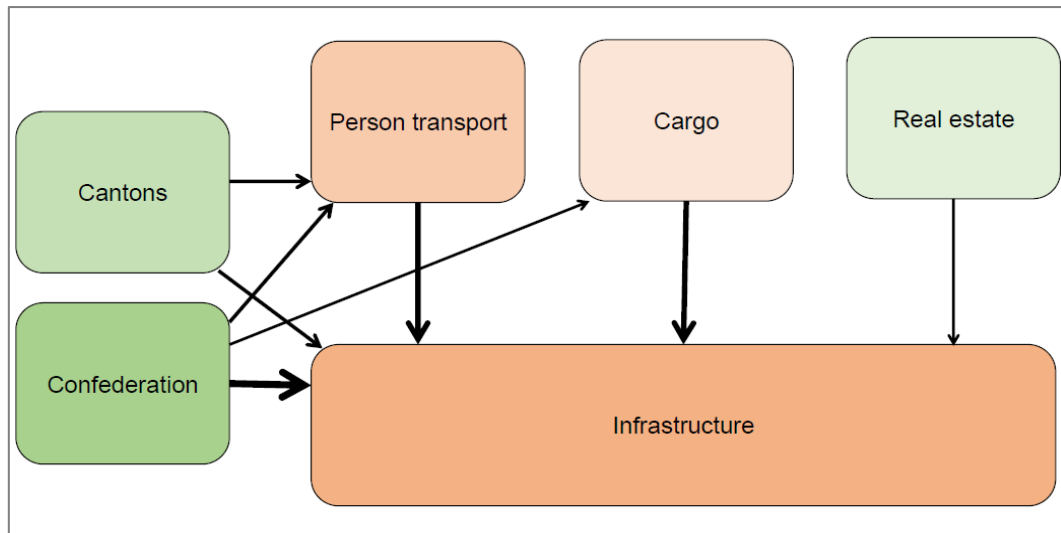


Figure 3 Financing of SBB

Following this discussion of the financing mechanisms for the core existing infrastructure and smaller extensions, we will now consider the mechanisms developed in recent decades for so-called large-scale projects.

2.2.2 FinöV

The history of FinöV (in German: *Finanzierung von Infrastrukturvorhaben des öffentlichen Verkehrs*) goes back to 1994.¹³¹ At that time, there were grave concerns about the economic impact of the so-called “Alps-Initiative”. The source of these concerns did not just come from the possible impact of this decision on the country’s trade relations with the EU, but also focused on the sheer costs of the idea. Moving all transalpine cargo transport from the road to the rails was always going to be an expensive proposition. Most importantly, it would require the fulfilment of a long-kept wish: More Big Tunnels. The plan, as it was ultimately put to the people in 1998, involved three new tunnels: the 34.6 km-long Lötschberg tunnel¹³², 57 km-long Gotthard tunnel and the 15.4 km-long Ceneri tunnel. The latter two will complete the easterly connection, while the Lötschberg and the existing Simplon tunnel are the key links further west. Together, these links would form the *Neue Eisenbahn Alpentransversale* (NEAT). Total costs: CHF 24.3 billion.¹³³

To pay for all of this, a fund was established for the Financing of Planned Infrastructure for Public Transport (FinöV).¹³⁴ This fund does not have legal personality; it is still part of the government. However, its accounts are kept separate from the government’s accounts, and the government’s discretion in the financing and spending of the fund is limited.

¹³¹ N.B. Some projects that are now a part of FinöV, like Bahn 2000, predate the 1994 Alps Initiative referendum.

¹³² Preparation for this tunnel had already begun after its approval by referendum in September 1992, but it was subsequently added to the reformulated NEAT project.

¹³³ I.e. CHF 19.1 billion at 1998 prices, recalculated into 2011 prices using the specially developed NEAT-*Teuerungsindex*. Cf. *Bundesbeschluss über die Anpassung des NEAT-Gesamtkredits*, BBl. 2008, 8555.

¹³⁴ Art. 196 point 3 sub 3 of the Constitution.

On the income side, the Constitution fixes a number of revenue sources that should – over the total running period of the fund – be enough to cover the costs of the NEAT and the other projects that are to be financed by the fund.¹³⁵

The revenue from the blanket heavy traffic tax under art. 196 point 2 of the Constitution, until such time as the LSVa (*Leistungsabhängige Schwerverkehrsabgabe*) entered into force, was to be used for FinöV,

- a) Up to 2/3 of the LSVa revenue flows into FinöV;
- b) Up to 25% of the costs of NEAT could be financed from the petroleum tax (cf. art. 86(3)(b) Constitution);
- c) Up to 25% of the costs of NEAT, Bahn 2000, and the link with the European High-Speed Railway network can be financed through the capital markets;
- d) The VAT can be increased by 0.1%-point compared to the rate fixed by art. 130 Constitution;
- e) Supplementary financing through private or international organisations is also authorised.

While this gives the Federal Council some freedom of manoeuvre, as evidenced by the use of language such as “up to 2/3” and “the Federal Council can use”, the magnitude of the projects in question mean that maximum use of sources b), c) and e) will probably be unavoidable, and that these sources will make up a significant part of the project financing. In 2010, the Fund received CHF 968.4 million in LSVa revenue, CHF 319.5 million from the petroleum tax and CHF 315.6 from the VAT, for a total of CHF 1.6 bn.¹³⁶

On the expenditures side, the Constitution gives the government more freedom, because obviously this side of the ledger will depend greatly on the planning of the various projects, which will have to be adjusted from time to time as the projects progress. It only says that the main lines have to be fixed by the Federal Assembly in an Act of Parliament, while the start of each phase of a project, and more generally the schedule, are decided by the Federal Council.¹³⁷

The details of the working of FinöV are laid down in its *Reglement*, adopted by the Federal Assembly.¹³⁸ These rules of procedure give the Federal Assembly the responsibility for annually deciding how much money goes to each project.¹³⁹ It also approves each year’s accounts *ex post*.¹⁴⁰ The *Reglement* also clarifies the relationship between the debts taken on by the fund and the Constitutional rules on budget discipline.¹⁴¹ Given that the Fund is part of the Federal Government, and that any debts of the fund are therefore legally indistinguishable from any other kind of government debt, any debts taken on by the Fund count towards the government’s debt and budget deficit.¹⁴² By the same logic, loans from the government to the

¹³⁵ Botschaft vom 1. Dezember 1997 über das Reglement des Fonds für Eisenbahngrossprojekte, BBl 1998 I 339. Apart from NEAT, art. 196 point 3 sub 1 of the Constitution states that the fund is to be used for the Bahn 2000 project, the connection between East- and West-Switzerland and the European High-Speed Railway network and the reduction of railway noise throughout the Swiss railway network.

¹³⁶ Cf. BFS, Beiträge und Darlehen des Bundes zugunsten des öffentlichen Verkehrs. ([Link](#))

¹³⁷ Art. 196, point 3, sub 4 of the Constitution.

¹³⁸ *Verordnung der Bundesversammlung über das Reglement des Fonds für die Eisenbahngrossprojekte* (1998), Consolidated Statutes 742.140, cf. art. 196, point 3, sub 3, final sentence of the Constitution.

¹³⁹ Art. 3.

¹⁴⁰ Art. 8.

¹⁴¹ Art. 126 Constitution and art. 13-18 *Finanzhaushaltsgesetz*.

¹⁴² Art. 5 of the *Reglement*.

Fund do not count. However, such “advances” may not total to a sum higher than CHF 8.6 bn (in 1995 prices).¹⁴³

In 2010, the Fund actually ran an operating surplus. Compared to the CHF 1.6 bn in cash inflow, it spent CHF 1,277 million on NEAT, CHF 34 million on Bahn 2000, CHF 8 million on the new project on the Future Development of Rail Infrastructure¹⁴⁴, CHF 98 million on the connection with the European High-Speed Railway network and CHF 140 for noise reduction, resulting in an operating surplus of CHF 47 million. However, after the payment of CHF 204 million in interest to the state and third parties, the financial position of the Fund deteriorated by CHF 157 million.

As we shall see in the next section, FinöV is a unique arrangement. While some of the benchmark countries have infrastructure funds as well, none of them have guaranteed revenue sources like the Swiss. The only question is whether it might not be preferable to make the Fund even more independent from the government, for example by turning it over to the companies doing the actual work, SBB and BLS,¹⁴⁵ or at least to a legally separate entity with limited liability. This is a question that requires further consideration of the incentives created by the current system as well as these alternatives, and it will therefore be deferred until chapter 5, below.

2.2.3 Developments since 1998

The first development since 1998 was already mentioned above: other projects – or in some cases collections of projects – were brought into FinöV as well: Bahn 2000, the connection with the European High-Speed Railway Network, and the project aiming at reducing railway noise throughout the network. In 2009, the legislature added the Future Development of Rail Infrastructure project, which is in many ways a continuation of Bahn 2000.

Recently, the government has proposed making the FinöV-system permanent, and turning it into the primary mechanism for infrastructure maintenance and construction in Switzerland. Initially, the suggestion was that it would be entitled to all the revenue sources that are currently devoted to that goal, including the sums spent from the Federal and Cantonal Treasuries, as well as new funds coming from an increase in the access charges, and from the repeal or the reduction of the road commuter’s tax deduction (*Fahrkostenabzug*) for Federal direct taxes. This last reform would also help to put commuters on an even footing, regardless of their means of travel.

The most recent development is that, on January 18, 2012 the government finalized its proposal. Compared with the initial drafts, the government now proposes that the cantons should be asked to fund the public areas of the railway stations within their jurisdiction on their own, with the Federal government taking on the sole funding of other infrastructure, including the infrastructure of private regional railways. Regarding the *Fahrkostenabzug*, the government suggested enacting a maximum amount rather abolishing the deduction altogether. Finally, the government decided on some changes in the exact amount of the

¹⁴³ Art. 6(2).

¹⁴⁴ *Zukünftige Entwicklung der Bahninfrastruktur (ZEB)*. Cf. the *ZEB-Gesetz*, Consolidated Statutes 742.140.2, which entered into force on 1 September 2009. This project, like Bahn 2000 and the noise reduction project, is not strictly speaking a large railway project (“*Eisenbahngrossprojekt*”), but rather a large collection of smaller projects. Cf. art. 4 of the Act.

¹⁴⁵ Within NEAT, the Westerly Lötschberg-Axis was built by BLS and the Easterly Gotthard-Axis by SBB.

Federal contribution to the new fund, and limited the contribution to the fund from the petroleum tax in time to the moment when the old FinöV-debt would be fully paid back, at which time the use of that money will be reconsidered.

Once Parliament and the government agree on a text, having heard all relevant stakeholders, it will be put before the people as an alternative to the people’s initiative “*Für den öffentlichen Verkehr*”, which Government and Parliament declined to support because they considered it too far reaching.

2.3 Conclusion

The most important differences and similarities between the four sectors can be summed up as follows:

Long distance	Cargo	Regional	Infrastructure
Only SBB	Open Access	Concessions for many different companies	Concessions for many different companies
Profit	Break-even	Loss making	
No subsidy	Subsidy for combined transport	Subsidy for budgeted losses	Subsidy for budgeted losses and FinöV
<i>Deckungsbeitrag</i> -component of access charge about 12% of revenue	No <i>Deckungsbeitrag</i>	<i>Deckungsbeitrag</i> -component of access charge about 13% of revenue	

Table 3 Financing of the different segments

It is particularly useful to note the similarities between the financing of regional transport and the financing of infrastructure operations. As described above, in infrastructure the track access charges – the actual price charged to customers – only covers about 20-25% of costs. While exact data are not available in the absence of separate accounts for SBB’s regional transport operations, we can safely assume that regional rail is not quite that loss making. Still, as long as the sector is structurally unable to break even, the problem of how to make up for those losses is substantially similar to the problem of how to finance the operational losses of the infrastructure manager.

Before we proceed to the incentives created by the financing mechanisms discussed so far, we will first consider how certain other countries have elected to finance their railway sectors.

3. The Financing of the Railway Industry in Four Benchmark Countries

Having considered the financing of the railway industry in Switzerland in some detail, it is useful to consider some other ways that it might be done. An obvious place to look for alternatives is in other countries whose railway sector shares key commonalities with the Swiss one, either because of shared operational challenges or shared institutional background.

This, of course, requires identifying the key operational challenges of rail transport in Switzerland, as well as the essential factors of that country's institutional framework. Only a few should suffice. For the former, what comes to mind is mountains, as well as more generally the fact that Switzerland has a densely used network with high demand for both passenger and goods transport, a network with a number of potential bottlenecks. As for the legal context, the key fact about Switzerland is that it is a Confederacy, with significant power for the cantons.

While there is no country quite like Switzerland, there are countries in Europe that share at least some of these characteristics. Austria has the same problems with Transalpine rail that Switzerland does. Belgium and, to a lesser extent, Germany are both federal states with a significant amount of decentralisation. And the Netherlands shares with Switzerland the high demands on its network, especially when it comes to moving goods to and from the port of Rotterdam, and moving passengers through the densely populated Randstad area.

In what follows we will try to outline the financing mechanisms of the railways in each of these four countries. While the goal is, of course, to do so in a manner that allows for easy comparison as much as possible, the more important goal still is to mine for suggestions, for ideas that could be implemented in Switzerland. That is why in each section the comparison with Switzerland is more important than the comparison with the other benchmark countries.

3.1 The Financing of the Railway Industry in Germany

The German Basic Law makes rail fundamentally a shared competence between the *Bund* and the *Länder*.¹⁴⁶ However, this rule has an important exception. In an intriguing bit of backwards reasoning, the Basic Law gives the Federal Government the exclusive competence in all matters to do with the railways that it owns.¹⁴⁷ So rather than making the Federal Government competent to own or regulate certain kinds of railways, the competence to regulate depends on the ownership of the railway, which is not constitutionally restricted. Deutsche Bahn (DB) is, of course, 100% owned by the German Federal Government.¹⁴⁸

At the federal level, the key statutes are the ones passed as the Railway Reform Act of 27 December 1993,¹⁴⁹ including:

- The *Bundeseisenbahnneugliederungsgesetz* (BEZNG);
- The Act establishing Deutsche Bahn AG (*Gesetz über die Gründung einer Deutsche Bahn Aktiengesellschaft* – DBGrG);

¹⁴⁶ Art. 74(1)(23) GG.

¹⁴⁷ Art. 73(1)(6a) GG. This exception even extends to federally controlled railways with minority shareholders.

¹⁴⁸ We might speculate what the consequence would have been of the recent takeover by DB of Arriva, which also owns a number of regional railways Germany, except that the European Commission made its approval of the acquisition conditional on the sale of Arriva Germany. Cf. European Commission Non-opposition to a notified concentration (Case COMP/M.5855 — DB/Arriva), OJ C 276/01, dd. 13.10.2010.

¹⁴⁹ *Eisenbahnneuordnungsgesetz*, BGBl. I S. 2378.

- The Act on the federal railway administration (*Bundeseisenbahnverkehrsverwaltungsgesetz – BEVVG*);
- The Act on the Regionalisation of Public Regional Transport (*Regionalisierungsgesetz – RegG*)¹⁵⁰; and
- The General Railway Act (*Allgemeines Eisenbahngesetz – AEG*).

These statutes currently contain the following provisions that are relevant to the financing of the industry:

- 1) The BEZNG takes care of the merger between the East- and West-German railways, creating the Federal Railway property, which is to be run on sound economic principles and whose losses come at the expense of the Federal budget.¹⁵¹ Moreover, by separating the Federal Railway Property and DB, the government attempted to create a railway company unburdened by the debts of the past. For this reason, the old railway pension fund, the unprofitable lines and the pre-1994 railway personnel are part of the Railway Property but not of DB, with the employees being rented out to DB at a rate equivalent to what DB pays its newer employees who do not enjoy civil servant status.
- 2) Deutsche Bahn AG is established by the DBGrG, which immediately splits it up into at least four distinct subsidiaries: Regional Passenger Transport, Long-Distance Passenger Transport, Freight and Infrastructure.¹⁵² None of these companies can be wholly or partially privatised except after authorisation by statute.¹⁵³ To keep an eye on DB, as well as the other German railway companies, the BEVVG establishes a federal railway office (*Eisenbahn-Bundesamt*)¹⁵⁴ in the Transport ministry for more technical matters, while placing the main regulatory responsibility with the independent federal network authority (*Bundesnetzagentur*).¹⁵⁵
- 3) The fourth of the 1993 statutes, the Regionalisation Act, places the primary responsibility for regional passenger transport with the *Länder*.¹⁵⁶ It observes that it will often be necessary to rely on public service obligations to achieve the socially desirable level of service¹⁵⁷ and contributes billions of euros each year of federal petroleum tax money to the *Länder* in order to help them pay for such PSOs.¹⁵⁸ To be precise, the amount on offer is EUR6.675 million in 2008, with an annual increase of 1.5% each year until 2015.
- 4) The AEG, finally, sets up the German railway sector along the familiar lines of the EU railway packages, with a legal separation between infrastructure and transport but no full separation.¹⁵⁹ All railway companies are independent from the Federal Government, although the *Länder* are permitted to control certain companies.¹⁶⁰ Under § 12 AEG, TOCs pay an access charge, an “*Entgelt*” to the infrastructure company, an obligation that is further outlined in the 2005 *Eisenbahninfrastruktur-benutzungsverordnung*.¹⁶¹

¹⁵⁰ *Gesetz zur Regionalisierung des öffentlichen Personennahverkehrs*

¹⁵¹ § 16 BEZNG

¹⁵² § 25 DBGrG.

¹⁵³ Art. 87e(3) GG and § 2 (3) DBGrG. The majority of the shares of the infrastructure company must always remain with the Federal Government. Art. 87e(3) GG.

¹⁵⁴ § 2 and 3 BEVVG.

¹⁵⁵ § 4 BEVVG.

¹⁵⁶ § 1 RegG.

¹⁵⁷ § 4 RegG.

¹⁵⁸ § 5 RegG. Cf. also art. 106a GG.

¹⁵⁹ § 9 AEG.

¹⁶⁰ § 8 AEG.

¹⁶¹ *Verordnung über den diskriminierungsfreien Zugang zur Eisenbahninfrastruktur und über die Grundsätze zur Erhebung von Entgelt für die Benutzung der Eisenbahninfrastruktur* (EIBV, 2005), BGBl. I S. 1566.

As a result, there are three main connections between the various government entities and the sector: firstly, there is the power of the government as shareholder, which is necessarily rather limited given German company law, secondly, there is its power as a regulator (mostly exercised at the Federal level by the BNetzA - Bundesnetzagentur), and finally there is the power of the government through the contracts it makes with the various railway companies.

For the *Länder*, these contracts will normally be the tendered contracts for local passenger rail. The Federal Government, on the other hand, contracts with the infrastructure branch of DB – DB Netz AG – about investments in the network¹⁶², the most important of which being the 2009 *Leistungs- und Finanzierungsvereinbarung* (LuFV), which runs until the end of 2013 and involves a Federal investment of EUR 2.5 bn per year as well as between EUR 1.5 and 1.75 billion of annual expenditure by DB and the other infrastructure companies.

The transport companies, finally, contract with the infrastructure companies for access to the network. While this access has to be non-discriminatory¹⁶³, it is not free.¹⁶⁴ On both counts, further rules are laid down in the *Eisenbahninfrastruktur-Benutzungsverordnung* (EIBV).¹⁶⁵

To sum up, money flows:

- From the transport companies to the infrastructure companies (“*Entgelt*”);
- From the Federal government to the infrastructure companies (BEZNG, LuFV);
- From the Federal government to the *Länder* (RegG);
- From the *Länder* to the infrastructure companies;
- From the *Länder* to the regional passenger transport companies (RegG);
- From customers to transport companies.

In 2010, this resulted in EUR 8.6 bn in Federal railway spending. Apart from the EUR 2.5 bn in LuFV spending, the biggest single category is the EUR 5.26 bn the government spent to cover the losses of the Federal railway network, for which it is liable under § 16 BEZNG. These amounts are in addition to the EUR 6.9 bn spent under the RegG.

At the level of the *Länder*, the situation is relatively consistent from one *Land* to another. Consider the *Land* Bavaria. In 2010, it received EUR 1.03 bn in Federal funding under RegG. At the same time, it spent EUR 883 million on its wholly owned subsidiary *Bayerische Eisenbahngesellschaft* (BEG) and EUR 131.5 million on various railway-related investments. BEG, however, does not run any trains itself. Instead, it contracts with railway companies to carry out the actual service. In 2010, it granted new concessions to DB for the Werdenfeld-network connecting Munich with West-Tyrol, while granting the Munich-Rosenheim-Kufstein/Salzburg connection to Veolia. So, every year a number of lines are up for tendering.

About half the *Länder* have a single “*Aufgabenträger*” (transport organisation authority) of this nature, be it the *Land* itself or a fully owned subsidiary body of some sort, like the BEG in Bavaria. In the other *Länder*, the power to tender regional passenger lines is delegated to

N.B. while these charges are formally within the purview of the *Bundesnetzagentur* and the administrative courts, the civil courts have been known to get involved under § 315 BGB, which deals with contracts where the price is set unilaterally. Cf. K. Otte (2011), ‘Control of Infrastructure Charges on the Basis of Efficient Costs’, paper presented at the 1st Transportnet Seminar on Rail Regulation, Lyon, 9 November 2011.

¹⁶² Cf. *Gesetz über den Ausbau der Schienenwege des Bundes* (BSWAG, 1993), BGBl. I. S. 1874.

¹⁶³ § 14(1) AEG.

¹⁶⁴ §12 AEG.

¹⁶⁵ *Verordnung über den diskriminierungsfreien Zugang zur Eisenbahninfrastruktur und über die Grundsätze zur Erhebung von Entgelt für die Benutzung der Eisenbahninfrastruktur* (2005), BGBl. I. S. 1566.

collaborative bodies of municipalities. In all cases, however, a significant part of the funding comes from the *Land*-level, who in turn get a significant part of their funding from the Federal government under the RegG.

Compared to Switzerland, it is clear that Germany is taking advantage of the fact that its constituent parts are much bigger than the Swiss cantons. There is no reason why even the smallest *Land* should not have the institutional capacity to negotiate with a giant like DB. This is reflected in the fact that Deutsche Bahn Regio AG is present in all (non-city) *Länder*, but does not have a monopoly in any of them. Many *Länder* express a preference for tough tendering procedures, as well as for having a number of different companies provide SPNV-services.¹⁶⁶ So where Switzerland has jointly-ordered regional railway services, in Germany the *Länder*, or even their subdivisions, act as the sole contracting authority.

Another important difference is the absence of designated investment funds like the Swiss FinöV. This can lead to commitment problems, as we have already seen with the German part of the NEAT project.¹⁶⁷ Agreeing to fund something is one thing, actually funding it is something quite different, especially if parliamentary control changes hands in the meantime.

Finally, a difference that is not immediately financial in nature is the difference in power between DB and SBB. The German Federal government appears to lack an instrument to force DB *Fernverkehr* to set specific goals, similar to the *Leistungsvereinbarung* and the Strategic Goals in Switzerland. In Germany, such a thing only exists for the infrastructure sector. Germany also lacks a company like BLS, which is a domestic competitor for SBB in any number of areas.¹⁶⁸

In short, we can summarize the money flows in Germany as follows:

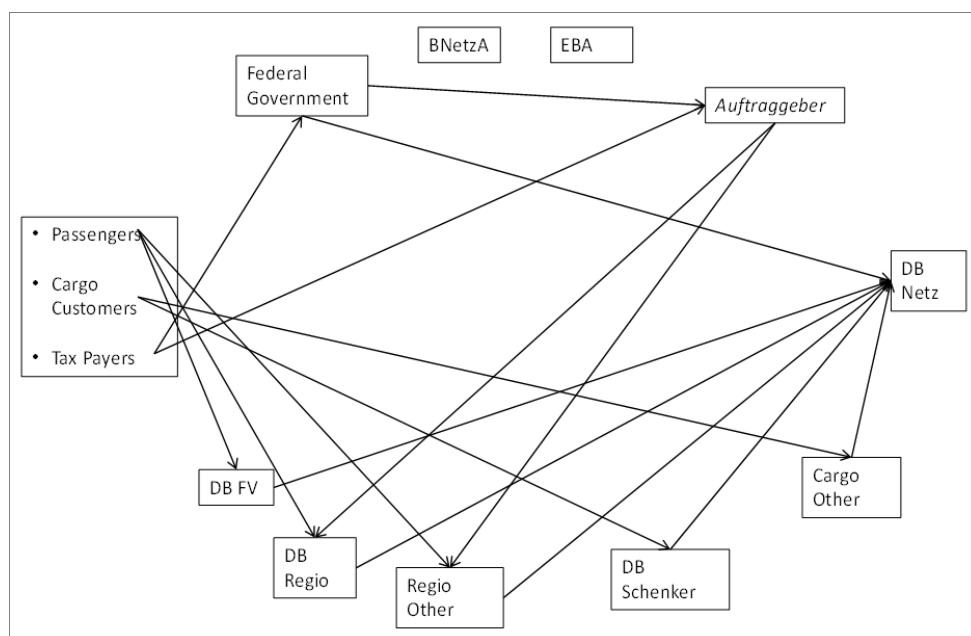


Figure 4 Money flows in Germany

¹⁶⁶ SPNV stands for *Schienepersonennahverkehr*.

¹⁶⁷ Cf. Neue Züricher Zeitung, 21 Juli 2011, '[Deutschland fehlt Geld für Bau des NEAT-Zubringers](#)'.

¹⁶⁸ Note, for example, that SBB and BLS were each given the responsibility for the construction of one of the main NEAT-Axes.

3.2 The Financing of the Railway Industry in Belgium¹⁶⁹

In Belgium, the regions (Flanders, Wallonia and Brussels) are generally responsible for transport matters.¹⁷⁰ However, the law deliberately does not list the railway system among the transport matters for which the regions are competent, though it does mention regional and urban transport. Instead, the Federal government is competent in the area of rail, and the law simply commands that the railways and the regional and urban transport companies shall collaborate in order coordinate and promote public transport.¹⁷¹

For this reason, the financing of the railway system is almost entirely federal as well. An interesting exception is the recent attempt by the regions to gain influence over railway policy by offering to pre-finance certain projects that they consider to be particularly important. However, for the time being that seems to involve only relatively small amounts of money, in the order of magnitude of several tens of millions of euros per year. As a result, the national railway company SNCB still very much acts like a government instrumentality, having “delegated board members” and “government commissioners” appointed by the crown, and carrying much of the responsibility for setting and carrying out government policy in the railway industry.¹⁷² Predictably, it is not necessarily a matter of immediate concern if the railway company runs at a loss for a decade or two.

The most important statute is the 2006 *Loi relative à l'utilisation de l'infrastructure ferroviaire*¹⁷³, or Law Regarding the Use of Railway Infrastructure. This is the statute that transposes the relevant directives on railway open access. As such, it makes all the right noises about non-discriminatory access and contracts between TOCs and the infrastructure manager that provide all the right incentives (art. 24). This statute will provide an adequate basis for open access, as soon as the Belgian authorities decide to introduce such a thing.

In the meantime, the more important statute is the 1991 *Loi portant réforme de certaines entreprises publiques économiques*¹⁷⁴, the Law Reforming certain Public Economic Enterprises. Under this statute, certain semi-public entities, including the SNCB, were turned into public law plcs (art. 37). Their main legal relationship with the state, other than the share ownership, was to be by way of a *contrat de gestion* (art. 3-6), a management contract (hereafter: contract). Title V, VIII and IX of that statute deal specifically with SNCB Holding, Infrabel and SNCB, respectively. The latter refers to the train operating branch of the company, which is why we will refer to it as SNCB (TOC), for clarity. Since these contracts specify the most important sums that flow from the state to the railway companies each year, we will now consider each of them in turn.

¹⁶⁹ This chapter describes the situation prior to the sixth constitutional reform announced in October 2011. This reform strengthens the positions of the regions in a number of ways. However, it cannot be fully evaluated until it has been turned into binding legislation.

¹⁷⁰ Cf. art. 6(1)(X) Bijzondere Wet tot Hervorming der Instellingen/Loi spéciale de réformes institutionnelles (BWHI, 1980), Stb. 1980, p. 9434.

¹⁷¹ Art. 6(1)(X)(3bis)(3) BWHI: “*Une concertation associant les Gouvernements concernés et l'autorité fédérale concernée a lieu pour (...) coopération entre les chemins de fer, d'une part, et les sociétés de transport urbain et vicinal, d'autre part, en vue de la coordination et de la promotion du transport public.*”

¹⁷² It is telling that the Flemish minister for public transport, in her [2010 policy letter for 2010-2011](#) speaks of “*een ambtelijk topperleg tussen de topambtenaren van de top van de NMBS-groep en de top van het beleidsdomein MOW*” (p. 35), i.e. a meeting between high-level civil servants from the top of the SNCB-group and the top of her department.

¹⁷³ Official Journal 23.01.2007, p. 2837.

¹⁷⁴ Official Journal 27.03.1991, p. 6155.

Under art. 73 of the contract between SNCB (TOC) and the Belgian state, the core exploitation subsidy is EUR 879 million per year.¹⁷⁵ However, in 2009 and 2010, the amount was increased by EUR 6 million and EUR 10 million, respectively, to compensate for the decrease in the investment subsidy. In those same years, a sum of EUR 51.3 million and EUR 61.9 million was deducted again to account for the fact that SNCB does not have to pay the *Bedrijfsvoorheffing*, the pay-as-you-earn income tax.

The contract then continues to list the sums that are to be paid because of specific government programmes, such as the various subsidies for commuters (art. 74), for low income families (art. 78), for young people (art. 79) and for certain people who have free access to the Diabolo airport trains to Brussels Airport (art. 80). All of these subsidies are meant to indemnify the company, nothing more nothing less. The SNCB should, theoretically, be completely indifferent as to whether these programmes exist or not.

Something slightly different is going on with the subsidies of art. 75-77. Under art. 75 of the contract, SNCB receives about EUR 10.5 million per year towards the costs of operating the Regional ExpressNet (RER) around Brussels. This subsidy, too, is meant to be a break-even proposition; SNCB is to report to the ministry each year on the costs and benefits generated by the RER, so that the actual subsidy can be adjusted accordingly. We conclude that no effort is made to generate any incentives toward efficiency here. The same goes for the other two projects that are similarly subsidised: the domestic stops of high-speed trains (art. 76) and the Antwerp-Noorderkempen line (art. 77).

Continuing our analysis of the contract between SNCB (TOC) and the Belgian state, we find the core sum of investment subsidy in art. 65: about EUR 346 million for 2010. However, that amount was subsequently reduced by EUR 146 million to about EUR 200 million. The investments in question will normally be in rolling stock, including the introduction of ERTMS. Fascinatingly, in case of delay of an investment project, the money not used is to be transferred to the Fund for Investments in Railway Infrastructure, the independent entity created in 2005 that inherited the bulk of the railway debt, as well as an equivalent share of the industry's assets.¹⁷⁶

Infrabel also enjoys an exploitation subsidy, but theirs comes with more strings attached. From 2010 onwards, the core sum is about EUR 126.5 million (art. 74 of their contract), which is adjusted in much the same way as the equivalent subsidy for SNCB (TOC). However, there is an additional sum of \pm 3.5 million that depends on the ability of Infrabel to keep the number of delay-minutes that are attributed to it within the predetermined limit of 180,000 – 260,000 minutes. Additionally, there is EUR 1.3 million for RER (art. 75),¹⁷⁷ and sums to indemnify Infrabel for its financial outlays under the Diabolo project (art. 78) and the Liefkenshoek RailLink (art. 79). Both are PPP projects run by Infrabel.

¹⁷⁵ [Contrat de gestion SNCB 2008-2012 - Version consolidée du 18/11/10 après deuxième avenant](#). The amount mentioned, and all subsequent amounts, are inflation-indexed estimates that can be adjusted from year to year.

¹⁷⁶ Cf. art. 70 of the Contract between SNCB (TOC) and the state. The most recent such transfer of € 125 million for all three branches of SNCB combined, was fixed by [Royal Decree of 19 December 2010](#), Official Journal 2010, p. 82145.

¹⁷⁷ There are also sums to indemnify Infrabel for its financial outlays under the Diabolo project (art. 78) and the Liefkenshoek RailLink (art. 79). Both are PPP projects run by Infrabel. However, that money is simply taken out of the investment subsidy (art. 63 and 64).

On the investments side, the starting point is Infrabel's 2008-2012 investment plan (art. 54 and Annex II), which is translated into an annual investment programme (art. 55). These are paid for from the RER-fund, which was created in 2003 for the express purpose of funding the RER-programme, as well as from the usual investment subsidies.¹⁷⁸ Obviously, the RER money is only spent on the RER programme (art. 61). For 2010, the contract budgets a contribution from the RER fund of EUR 314.7 million. The general investment subsidy for 2010 is about EUR 785 million (art. 62). Notably, art. 65 of the contract goes into the phenomenon of pre-financing by the Regions. For 2010, this concerns a total sum of EUR 90 million, which is tied to certain projects that the Regions are willing to pay to promote. The contract specifies that these sums will be repaid starting 2013.¹⁷⁹

Other provisions of possible interest are the request by SNCB for an increase in its equity of EUR 205 million for the benefit of investments in the High Speed Rail network (art. 70 of the Infrabel contract), a *bonus/malus* scheme for the construction of the Amsterdam-Brussels High-Speed Rail line (art. 71) and, as for SNCB (TOC), the provision that savings due to delays are to be transferred to the Fund for Investments in Railway Infrastructure (art. 72).

SNCB Holding, finally, is to receive an exploitation subsidy of EUR 167 million per year (art. 78 of its contract with the state), as well as EUR 19.5 million for security (art. 79), EUR 12.3 million for training of staff (art. 80)¹⁸⁰ and a sum for e-ticketing (art. 83).

Regarding the RER-fund, the contract specifies that it is to be filled gradually by the state until it reaches a level of EUR 2.17 bn (art. 66). For the period of the contract, the contribution is set at EUR 210 million per year. It also puts SNCB Holding in charge of managing the fund (art. 67), with ample reporting requirements, of course. The Holding is permitted to use EUR 16.7 million (2010) for RER-investments in its area of responsibility, such as the improvement of train stations, etc. (art. 68).

The share of the Holding company in the general investment subsidy is EUR 157 million (art. 69). As for the other two companies, the contract provides that savings due to delays are to be transferred to the Fund for Investments in Railway Infrastructure (art. 75).

Subsequent to the writing of these contracts, the Fund for Investments in Railway Infrastructure was dissolved.¹⁸¹ Its assets – several billion euros worth of railway infrastructure – were transferred back to Infrabel, while its debts were transferred to the state. Presumably, this means that the surpluses that were to flow into the fund under the contracts of the three companies now flow back to the Treasury.

Compared to Switzerland, the Belgian system is extremely centralised and monopolistic. SNCB is still the only passenger company, while its competition in the goods sector is hardly impressive. This does not appear to be considered particularly undesirable by the State. While the Regions, particularly Flanders, are trying to gain a greater say in the running of the railways, so far they seem to be mostly unsuccessful. The result is that it is impossible for the

¹⁷⁸ Cf. art. 61 and 62 of the Infrabel contract. Note that the RER-fund is not fully independent. In 2008, for example, the government took money out of the fund to cover its budget deficit. The some of the details of the fund are specified in the contract between SNCB Holding and the State, cf. below.

¹⁷⁹ This provision is replicated in art. 73 of the contract between SNCB Holding and the State.

¹⁸⁰ All SNCB personnel is managed by the Holding company, so all staffing related expenses are incurred there.

¹⁸¹ Royal Decree Concerning the Restructuring of the Fund for Investments in Railway Infrastructure, 28 September 2008, Official Journal 02.10.2008, p. 52606.

Belgian state to use competitive tendering as a means of creating incentives. Moreover, the non-competitive contracts negotiated with SNCB contain virtually no *bonus/malus* incentive agreements.

There appears to be just one investment fund in Belgium, the RER-fund, aimed at improving the connection between the capital and the surrounding area. However, this fund is nowhere near as well-protected as the Swiss FinÖV fund, it has no legal personality and no capacity to borrow.

We can summarize the Belgian situation as follows:

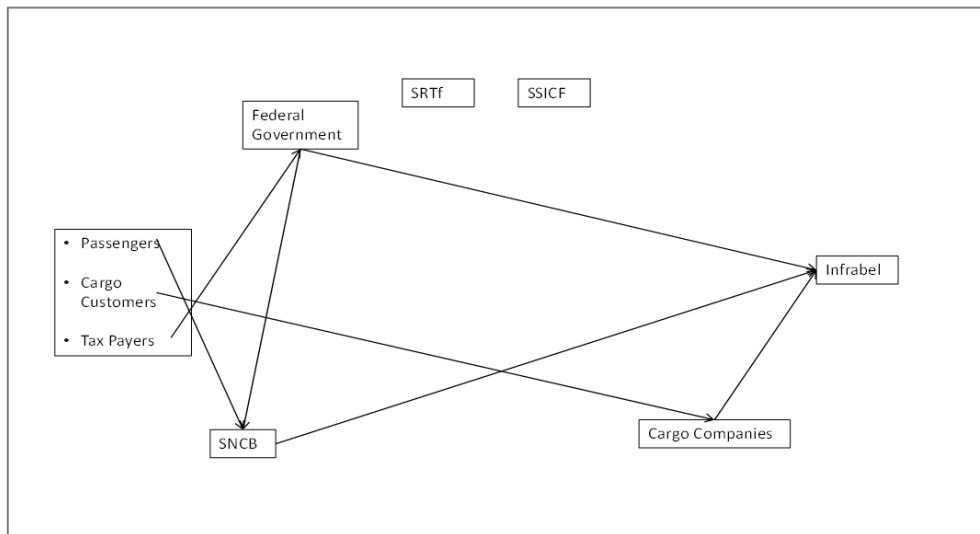


Figure 5 Money Flows in Belgium

3.3 The Financing of the Railway Industry in the Netherlands

Unlike the other benchmark countries, the Netherlands is a unitary state. For this reason, the Constitution is entirely silent on the vertical distribution of power over the railways or any other area. Instead, the Provinces and Municipalities are generally assigned responsibilities in specific statutes passed by Parliament. One such provision is art. 20 of the *Wet Personenvervoer* (2000)¹⁸², which makes the Provinces the contracting authority for all non-rail public transport, and gives the Minister for Transport the authority to make them – or other local authorities – responsible for regional railway lines as well. The Minister has used this possibility for essentially all regional rail lines, leaving only the so-called “core network” under his direct control. The rest of public transport is handled by the 18 bodies collectively known as the “OV-authorities”.¹⁸³

¹⁸² Official Journal 2000, 314.

¹⁸³ Cf. for example *Besluit aanwijzing vervoersdienst provincie Overijssel regionaal openbaar vervoer per trein*, Staatscourant 2006, 128, which delegates the authority to contract for the operation of the Zwolle – Kampen railway line to the executive of the province of Overijssel. The railway line between Almelo and Mariënberg, on the other hand, was placed under the authority of the Region of Twente rather than the Province.

This *Wet Personenvervoer* is the passenger transport part of the transposing legislation. The overarching statute is the *Spoorwegwet* (2003), i.e. the Railway Act.¹⁸⁴ On the goods side, there is no specific statute, since that sector is not governed by concessions.

The financial relationship between government entities and the train operating companies is twofold. On the one hand, the government still owns the most important TOC in the passenger market, NS, meaning that it occasionally receives a handsome dividend.¹⁸⁵ On the other hand, the concessions for passenger transport will often involve a financial contribution in order to compensate the company for any universal service obligations it may have to take on as part of the contract. On the goods transport side, neither of these factors applies: the former NS Cargo is now a subsidiary of DB, and there are no concessions and no universal service obligations.

In the passenger market, not all concessions are tendered. Under art. 62 *Wet Personenverkeer*, a competitive tender is mandatory for all cases where a Province has been appointed as contracting authority under art. 20(3) of that Act. For the core network, however, a transition period is still in place. Instead of tendering competitively, the contract is automatically granted to NS until 2015.¹⁸⁶ The concession for Fyra, on the other hand, was won by NS in a competitive procedure.¹⁸⁷

As part of its obligation under the concession for the core network, NS passengers has to pay a price to the state: EUR 10 million in 2009 and 2010, EUR 20 million in 2011 and 2012 and EUR 30 million in 2013 and 2014.¹⁸⁸ Moreover, art. 21a of the concession states that NS can incur a fine of no more than EUR 2.75 million per year if it fails to meet its targets in the areas listed in art 9(2), that is to say security, punctuality, capacity, and miscellaneous quality, particularly cleanliness and provision of information. The exact targets, however, are not specified in the concession, but are formulated by NS in its *vervoersplan*, i.e. its transport plan, which it writes after consultation with consumer representatives, the infrastructure company, and representatives of local governments. The Minister for Transport may veto those parts of the plan that implement art. 9 of the concession, including the targets for the criteria of art. 9(2).¹⁸⁹

The concession also specifies the prices NS may charge to consumers. Over and above the inflation correction, NS may pass on any increase in the infrastructure charges it has to pay, but only to the extent that the difference between revenue and infrastructure charges stays the same (art. 15(4)). If the charges fall, this is to be passed on to consumers as well (art. 15(5)).

With the exception of the aforementioned Fyra-contract, the other rail concessions are not going to be quite so lucrative for the government. Such concessions will normally involve a net expenditure for the contracting authority. To help the provinces pay for this, the national

¹⁸⁴ Official Journal 2003, 264.

¹⁸⁵ In 2010, NS paid out € 196 million in dividends to the state, € 41 million of which came from operational profit, and € 155 million from the sale of Strukton, a company that builds and maintains rail infrastructure.

¹⁸⁶ Cf. art. 67 *Wet Personenvervoer*, which grants the concession for the core network to NS until 1 January 2015.

¹⁸⁷ Fyra is the domestic part of the High-Speed rail link from Amsterdam to Paris, i.e. the Amsterdam-Rotterdam HSL link. It should be noted that, in retrospect, this procedure was not entirely successful. The overly optimistic assumptions underlying the bid by NS and KLM have caused Fyra to be massively loss-giving.

¹⁸⁸ Art. 3, *Besluit tot wijziging van de vervoersconcessie voor het hoofdrailnet*, 21 June 2010.

¹⁸⁹ Art. 7(3) Concession.

government subsidises them under the 2005 *Wet BDU Verkeer & Vervoer*.¹⁹⁰ This subsidy, however, is meant to cover any manner of public transport related cost, and is not directly tied to the expenditures incurred, but rather to the amount of money available and the characteristics of the Province compared to other Provinces.¹⁹¹ In other words, it should not affect the Provinces' incentive to drive a hard bargain.

Like the passenger transport companies, the infrastructure companies operate on the basis of a concession.¹⁹² Contrary to popular belief, there is in fact more than one such company. The ordinary railway infrastructure is managed by ProRail, the descendant of the old NS infra. ProRail also manages the Dutch part of the High-Speed rail connection to Brussels and Paris and, in practice, all regional railway lines. However, the Betuwe-line, a special-purpose goods railroad connecting Rotterdam with Germany, is managed by KeyRail, a 50% subsidiary of ProRail, with the other 50% being owned by the ports of Rotterdam (35%) and Amsterdam (15%).

ProRail has a concession just like NS does, including five mandatory performance indicators.¹⁹³ Just like with NS, these indicators have to be turned into exact targets in a plan, the "*beheersplan*" or management plan, which is written after consultation with stakeholders and is open to veto by the Minister for Transport. The only difference is that ProRail is not exposed to penalties in case of failure to achieve the performance targets.

Art. 62 and 63 Railway Act gives some rules for the access charge. For example, the charges can be no higher in any given year than the expected costs of managing the infrastructure (art. 62(1)), although exceptions are possible to discourage use of certain infrastructure when it is being used at or near capacity, or to reduce environmental externalities (art. 62(3)), or to avoid disruptions and to generally improve the performance of the railway system (art. 62(5)). Negotiations between infrastructure company and TOC about the applicable chargers are only permitted under strict supervision of the regulator (art. 63).

Investments in infrastructure are funded from the annual government budget. However, to smooth out the outlays of the state, there is an Infrastructure Fund that acts as a go-between.¹⁹⁴ In 2010, for example, the fund received EUR 8.6 billion from the budget of the Ministry for Transport, and spent EUR 3 billion of that sum on investments in rail infrastructure, while for 2011 the budget has a contribution of EUR 8.3 billion and an investment in rail of EUR 2.4 billion. However, this fund is entirely a budgeting device. It has no legal personality, and is completely under the control of the Minister for Transport, who has the final say on all its outlays.

Comparing the Netherlands to Switzerland, it is noteworthy that the Dutch system still displays a significant degree of decentralisation, despite the fact that the country is not otherwise Federally organised. Presumably, this is because purely practical considerations have led the decision makers to prefer such a model, meaning that the provinces are

¹⁹⁰ *Wet Brede Doeluitkering Verkeer en Vervoer*, Official Journal 2005, 28.

¹⁹¹ Cf. art. 2 *Uitvoeringsregeling en Beleidsregel BDU Verkeer en Vervoer*, Staatscourant 2005, 70, where the Minister establishes the exact formula to be used. The key factors are the number of households and the density of these households.

¹⁹² Art. 16 *Spoorwegwet*

¹⁹³ Two of which, the cleanliness of the train stations and the adequacy of the information provided to travellers, overlap with the performance indicators of NS. Especially the latter has been a problem in the past.

¹⁹⁴ Cf. *Wet Infrastructuurfonds*, Official Journal 1993, 319.

considered sufficiently knowledgeable and capable to handle the tendering process. Even though Dutch Provinces do not always have the best reputation, they are left to fend for themselves contracting with companies like Arriva and Veolia.

As in Germany and Belgium, the multi-annual framework for investments in infrastructure is not translated into a multi-annual source of funding for those investments. Even if the investment plan has been approved, the funding still has to be secured from year to year.

More than Switzerland, Germany or Belgium, the Dutch Ministry for Transport is trying to commit NS to specific targets, and to provide them with financial incentives to meet those targets. However, much work remains to be done in this respect, if for no other reason than that a maximum annual fine of EUR 2.75 million may not deter a company with a 2010 total profit of EUR 150 million. Something similar goes for the fines imposed by the regulator: the amount tends to stay limited to one or two million euros. What is more, as long as NS continues to be 100% government owned, this whole business of fines appears somewhat artificial.

As in Belgium, what is missing is competition on the rails, at least for passengers. This option appears to be politically disfavoured; meaning that, for now, competition will be limited to competition for the market outside the core network.

We can summarize the Dutch situation as follows:

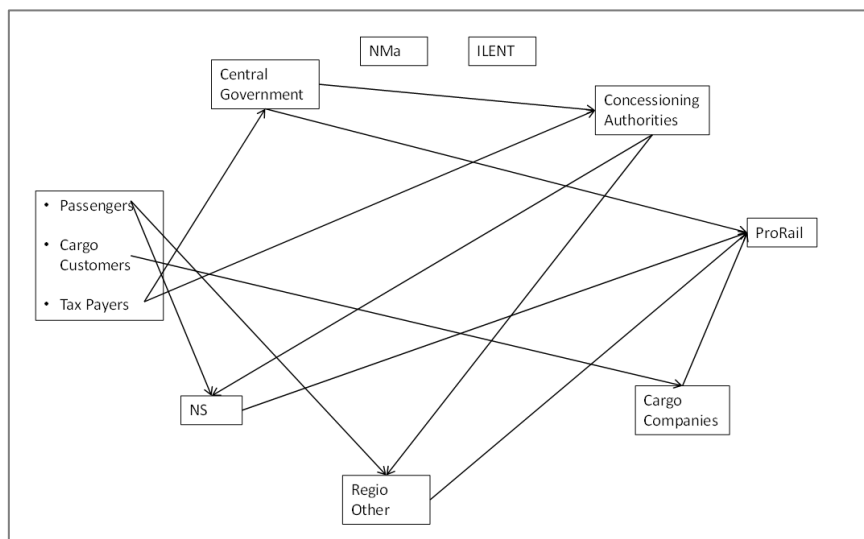


Figure 6 Money Flows in the Netherlands

3.4 The Financing of the Railway Industry in Austria

Art. 10(1)(9) of the Austrian *Bundes-Verfassungsgesetz*, i.e. Federal Constitutional Act, makes the Federal Government responsible for transport policy in general and the railways in particular. The key railway statutes are the *Eisenbahngesetz* (1957)¹⁹⁵, i.e. the Railway Act, and the *Bundesbahngesetz* (1992)¹⁹⁶, the Federal Railways.

¹⁹⁵ BGBl. Nr. 60/1957.

¹⁹⁶ BGBl. Nr. 825/1992.

Most notable, for now, is how § 12 of the *Eisenbahngesetz* divides the responsibilities. Where before the Federal Government ran the railways essentially by itself, this provision devolves some important responsibilities to the governments of the *Länder* or still further down. We can summarise by saying that the municipal governments are responsible for most matters concerning non-public railways (§ 12(1)), the *Länder* are responsible for *Nebenbahnen* and *Straßenbahnen*, i.e. railways of lesser importance¹⁹⁷ and trams (§ 12(2)), and the Federal Minister for Transport is responsible for the *Hauptbahnen*, i.e. the railways of particular importance, while also being responsible for administering certain aspects of rest of the system, particularly safety measures (§ 12(3)). In practice, this system has led to Österreichische Bundesbahnen (ÖBB) continuing to run the *Hauptbahnen*, while a number of smaller companies have won or kept concessions for the *Nebenbahnen*.¹⁹⁸

The *Bundesbahngesetz*, on the other hand, deals mostly with the ÖBB. Its internal organisation (Holding, Passengers, Goods, and Infrastructure) as well as a number of other companies, is established in that statute (§§ 2-34a).

Turning our attention to the financing of the railways in particular, we find the first leg of the triangle between TOCs, Infrastructure company and state in § 67-70 of the *Eisenbahngesetz*, the access charge. Considering the rules each in turn:¹⁹⁹

1. The charge is based on the costs created directly by the use of the infrastructure by the TOC;
2. It can, however, be increased in times and places of limited capacity;
3. It can be increased for new railways that allow for a higher efficiency on the part of the TOC, if such a railway could not be constructed without the higher charge;
4. It can be increased if the charge as calculated under the previous three points is not enough to cover all costs, as long as no category of railway use is prevented that would occur if the charge were based on direct costs only;
5. The charges may be averaged over a certain period and differentiated for different kinds of railway use and different moments in the day;
6. The charges are to be non-discriminatory;
7. The rules for access charges must contain elements that provide both the TOC and the infrastructure company with incentives to avoid disruptions and to increase performance.

As in the Netherlands, the law explicitly states that the access charge is not to be negotiated by the TOC and the Infrastructure Company without supervision by the regulator, *Schienen-Control*.²⁰⁰ Moreover, under § 46 of the *Bundesbahngesetz*, the Federal Minister for Transport has veto power over the charging system.

The other two legs of the triangle are governed by the *Bundeseisenbahngesetz* and its counterpart for the private sector, the *Privatbahngesetz* (2004).²⁰¹ The Federal Minister for Transport can contract with ÖBB or with private companies for railway services of general

¹⁹⁷ § 3 of the *Eisenbahngesetz* formally defines *Nebenbahnen* as all railways that are not *Hauptbahnen* or *Straßenbahnen*. *Hauptbahnen* are defined as high-speed railways and railways that have been designated as being of particular importance by the Federal Minister for Transport.

¹⁹⁸ Some of the private railway companies have operated their railway continuously since before the creation of the ÖBB. Stern & Hafferl, the largest of the private railway companies, is an example.

¹⁹⁹ The following bullet points each correspond to the subsection of § 67 of the same number.

²⁰⁰ Cf. § 76-80 *Eisenbahngesetz*.

²⁰¹ BGBl. I Nr. 39/2004.

interest.²⁰² As in the other three benchmark countries, the details are governed by Regulation 1370/2007.²⁰³ To the extent that the *Länder* want to do the same, they can do so under their authority to award concessions.

The construction of ÖBB-infrastructure is funded by the ÖBB itself, first and foremost. However, the Federal Government can provide subsidies for maintenance, planning and construction.²⁰⁴ Moreover, to the extent that the costs of operating the infrastructure cannot be covered by the expected income from the TOCs, even with reasonably prudent management, the Federal Government will provide additional subsidies.²⁰⁵ Such subsidies are to be fixed in the form of contracts with a duration of six years²⁰⁶ which, in the case of subsidies for operation, are also to contain an agreement as to improvements in quality.²⁰⁷ Subsidies for infrastructure projects that are of particular regional interest can be made conditional on equal participation of the *Land* or other local entity concerned.²⁰⁸ All of these sums, of course, have to be budgeted each year before they can be spent.

Private railway companies can ask for an investment subsidy on much the same terms, although the statute seems to contemplate a somewhat more modest approach to cost control programmes and other such plans.²⁰⁹ There, too, the subsidy can be made conditional on equal participation by the *Land* that is particularly interested.²¹⁰ In the end, though, the EUR 38 million that Tyrol, for example, spent on the railways in 2010 is dwarfed by the more than one billion euros spent by the Federal Government.

In comparison with Switzerland, the Austrian approach is a model of simplicity and flexibility. The Federal Government is entirely in charge of who does what, not needing even a change in the law to designate a given railway *Haupt-* or *Nebenbahn*. On that point they have the same system as the Netherlands. Moreover, when it comes to construction of infrastructure, they have a powerful instrument of co-financing, which shares financial responsibility without sharing decision-making power. Such railways of particular regional interest are not “jointly ordered”, they are only “jointly paid for”. When it comes to concessions for *Nebenbahnen*, however, the *Länder* are on their own.

The company they often end up negotiating with is the incumbent, ÖBB. To be sure, its share of the market is steadily falling, but it continues to enjoy a protected status in both law and practice.²¹¹ While there are domestic competitors of considerable pedigree, none of them has any semblance of a chance of really challenging ÖBB in the foreseeable future. As for

²⁰² § 48-49 *Bundesbahngesetz* and § 3 *Privatbahngesetz*.

²⁰³ Regulation 1370/2007 on public passenger transport services by rail and by road and repealing Council Regulations (EEC) Nos 1191/69 and 1107/70, OJ dd. 3.12.2007, L 315/1.

²⁰⁴ § 42(2) *Bundesbahngesetz*. Note that it is not required to do so, which is why, at the moment, ÖBB has a ratio of long-term debt to equity of 11.2. The comparable number for SBB is 2.0, for DB it is 1.7 and for SNCB it is 2.2.

²⁰⁵ § 42(1) *Bundesbahngesetz*

²⁰⁶ § 42(3) *Bundesbahngesetz*

²⁰⁷ § 42(4) *Bundesbahngesetz*

²⁰⁸ § 44 *Bundesbahngesetz*

²⁰⁹ Cf. § 42(5)-(7) *Bundesbahngesetz* and § 4(1) *Privatbahngesetz*. The latter is on a number of points more modest in its demands.

²¹⁰ § 4(2) *Privatbahngesetz*.

²¹¹ As to the former, cf. for example § 51 *Bundesbahngesetz*, which states that ÖBB-*Infrastruktur* does not need a concession for the construction and operation of *Haupt-* or *Nebenbahnen*.

foreign challengers, Austria has not yet made the step that the Netherlands made of selling the cargo division of its incumbent to a foreign company.

The financial relationship between ÖBB and the state is relatively informal, modern-sounding statements of principle notwithstanding.²¹² There seems to be no attempt to set hard goals for quality, much less to create financial incentives for their achievement.

We can summarize the Austrian situation as follows:

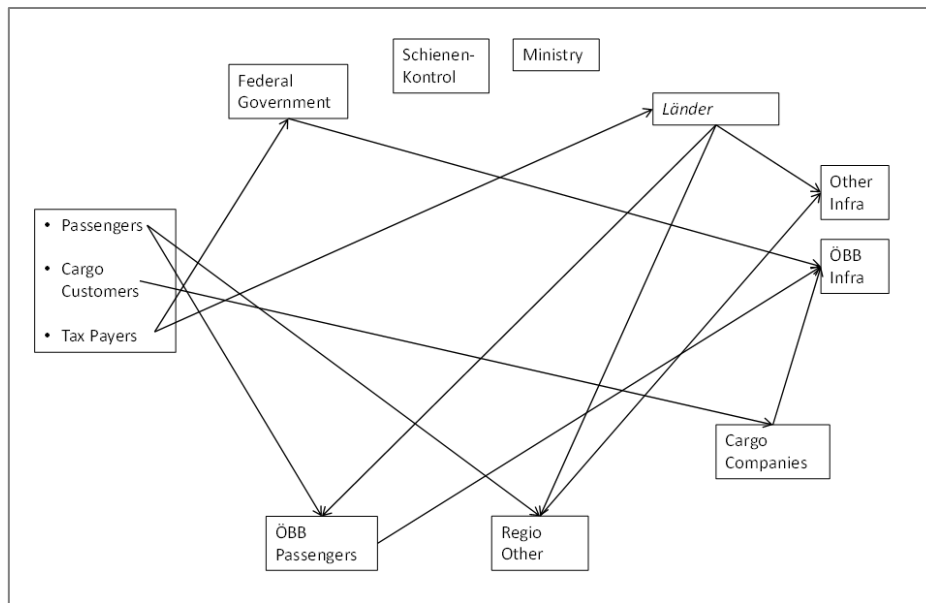


Figure 7 Money Flows in Austria

3.5 Conclusion

Taking all four of these countries together, the fact that stands out most is that the level of devolution in the railway sector varies greatly from country to country, but without correlating with the overall level of federalism in each country. Having a highly decentralised system of government has not prevented Belgium from assigning responsibility for the railway sector almost exclusively to the Federal Government, while the Netherlands with its highly centralised system of government has devolved responsibility for regional rail to the provinces and other regional entities. In none of these four countries is the division of power over the railways fixed in the Constitution,²¹³ so we must assume that this decision was made pragmatically, based on an assessment of what would be in the best interest of the sector and of the country.

Another noteworthy fact is that none of these countries have an infrastructure fund similar to FinöV in Switzerland. Instead, they tend to rely on the normal government budgeting process, including multi-annual financial planning, for railway infrastructure funding. Also – and unlike Switzerland – all four benchmark countries fund the railway sector predominantly from national tax revenue, even when regional governments act as contracting authorities.

²¹² Cf. § 54 *Eisenbahngesetz*.

²¹³ Although the Belgian *Bijzondere Wet tot Hervorming der Instellingen/Loi spéciale de réformes institutionnelles* can only be amended if a majority in each language group agrees.

Finally, we can tentatively conclude that there is a tendency towards performance contracts. Outside Switzerland, we observed such contracts in Germany and the Netherlands, as well as to a limited extent in Belgium. Of these three however, only the Netherlands has a system of performance contracts that is as far reaching as the Swiss system.

The most important differences and similarities between the five countries can be summed up as follows:

	CH	DE	BE	NL	AT
G-> TOC	SBB state owned	DB state owned	SNCB state owned	NS state owned	ÖBB state owned
		Some competition in long distance			Competition in long distance from Westbahn
	Performance contract for SBB			Performance contract for NS	
	Cargo open access				
	Concessions for regional rail	Concessions for regional rail		Concessions for regional rail	Concessions for regional rail
	Regional rail Federally co-funded	Regional rail predominantly Federally funded	Regional rail Federally funded	Regional rail predominantly nationally funded	Regional rail locally funded
G-> Infra	SBB state owned	DB state owned	SNCB state owned	ProRail state owned	ÖBB state owned
	A number of other infra companies.	A number of small other infra companies.			A few other small infra companies.
	Performance contract for SBB	Performance contract for DB	Some performance elements in the contract with SNCB	Performance contract for ProRail	
	FinöV		RER		
TOC -> Infra	Access Charges				
	Lärmbonus	Environmental differentiation and scarcity charges permitted by art. 7 of Directive 2001/14			

Table 4 Comparison among countries

In order to understand the incentives created by these financing mechanisms, as well as to evaluate their effect on the performance of the sector, we will now develop a qualitative model of the incentives of railway financing mechanisms.

4. Performance

Having considered, in the previous two chapters, how the Swiss and European railway sectors are financed, we now turn to the question of what that money is meant to buy. The answer is, of course, that it is meant to buy a performing railway system, but when is a railway system performing? While this is ultimately a political question that is decided through the democratic process, it is certainly possible for us to examine which performance goals political actors have tended to single out.

In what follows, we will start by surveying the performance indicators used in performance contracts in Switzerland, Germany and the Netherlands. Next, we will discuss the Boston Consulting Group's European Railway Performance Index, which was published for the first time in September 2012. The aim of this index is to establish a basis for comparing different countries' railway systems by using a few basic indicators. While our analysis will not rely on quantitative measures of performance, it is useful to consider which indicators were selected and why. Subsequently, we will discuss the five performance goals that we will focus on in the remainder of this report: the price level for railway customers, the level of subsidy paid to the railway sector, the intensity of use of the infrastructure, punctuality, and safety. In each case, we will quickly define the performance goal in question, and note the performance of Switzerland and the benchmark countries in this area.

4.1 Performance Contracts

As noted above, the question of how we should understand performance is to a large extent a political one. A key question is which aspects of performance political decision makers choose to prioritise. A useful starting point for studying that question is to look at the performance contracts governments have concluded with railway undertakings in the past. As we shall see, these contracts are highly inconclusive for our purposes, for example because they often focus on a wide array of performance goals without really prioritising among them. Moreover, it is inherent in the nature of a performance contract that the government should emphasise those performance goals that would not be sufficiently incentivised by the customers of the railways, suggesting that the goals included in the contract would only give a partial answer to the question of how to define performance.

In the remainder of this section, we will first discuss which performance indicators the Swiss government has singled out since it first started giving "performance instructions" in the 1970s. Subsequently, we will look at the performance contracts used in the Netherlands and Germany, before drawing some brief conclusions.

4.1.1 Switzerland

The idea of a carefully discussed and designed set of goals for SBB was first conceived in the 1970s, at a time when the company found itself in ever greater financial difficulties.²¹⁴ In 1979, the government proposed a number of measures to improve the situation.²¹⁵ Particularly relevant for the present paper is that they decided to adopt a *Leistungsauftrag* (performance mission), which was an instruction and not yet an agreement because, prior to

²¹⁴ For a complete history of this period, cf. Steinmann (2010).

²¹⁵ Cf. *Botschaft über den Leistungsauftrag 1980 an die Schweizerischen Bundesbahnen* of 24 October 1979, BBl. 1980, p. 306-354.

the enactment of the current SBB-Act in 1998, the SBB was a government agency that was directly controlled by the government.²¹⁶ Nevertheless, from the start the purpose was to give SBB a significant say in the formulation of these goals, because they were intended as a step towards a more business-like management of the organisation.²¹⁷

The content of the *Leistungsauftrag* 1980-1984 reflected the background against which it was adopted. It focused almost entirely on financial goals, listing the extent to which various segments were permitted to run a deficit and whether they were permitted to reduce supply in order to improve the financial results in that segment. For example, regarding long-distance passenger transport the *Leistungsauftrag* simply told SBB to break even “in the long run” by applying an appropriate system of pricing and supply.²¹⁸ For the general cargo segment, the target was even stricter: break-even by 1984.²¹⁹ In other segments, the goal was mainly to not let things get worse without cutting service. This *Leistungsauftrag* was replaced by a new one in 1981, but this new Instruction still focused entirely on financial goals.²²⁰ The third Instruction, for the period 1987-1992, was even less specific. It did, however, for the first time say something more detailed about the service expected of SBB. Regional passenger transport was normally expected to involve at least an hourly service.²²¹ Because of delays in the adoption of the first phase of the railway reform, this Instruction was renewed in 1994 for another three years.²²² In 1998, there was one final Instruction, valid for that year only, which still contained only financial performance goals.²²³

Under the new regime introduced by the first phase of the railway reform, the *Leistungsvereinbarungen* only gradually became more specific. The agreement for 1999-2002 included the following performance goals:

- Overall financial break-even (art. 3, 9 and 12). Services that could not be provided in a manner that would allow SBB to break even were only to be provided based on a subsidised concession;
- Safety (art. 4). SBB is instructed to maintain at least the present [1998] level of safety;
- Coordination between regional and country-wide passenger transport (art. 7(2));
- In the area of cargo transport, there is attention for productivity and quality (art. 8(1));
- The quality of the infrastructure (art. 11);
- Interoperability with neighbouring countries (art. 11(4));
- Best possible capacity management (art. 13);
- Productivity of the infrastructure (art. 14).

²¹⁶ Cf. art. 1 of the SBB-Act of 1944, BBl. 1944, Vol. I, p. 609-615.

²¹⁷ Cf. *Botschaft* of 24 October 1979, *op cit*, p. 313.

²¹⁸ Art. 2.

²¹⁹ Art. 6. At the same time, the subsidy in that segment was to be reduced from CHF 175 million in 1980 to CHF 75 million in 1984.

²²⁰ Cf. *Botschaft über den Leistungsauftrag 1982 an die Schweizerischen Bundesbahnen* of 13 May 1981, BBl. 1981, Vol. II, p. 469-527.

²²¹ Cf. *Botschaft über den Leistungsauftrag 1987 an die Schweizerischen Bundesbahnen* of 27 November 1985, BBl. 1985, Vol. III, p. 658-745.

²²² Cf. *Botschaft über die Rechnungen und den Geschäftsbericht der Schweizerischen Bundesbahnen für das Jahr 1993 sowie über die Verlängerung des Bundesbeschlusses über den Leistungsauftrag 1987* of 20 April 1994, BBl. 1994, Vol. II, p. 1249-1275.

²²³ Cf. *Botschaft zum Voranschlag und zum Leistungsauftrag für das Jahr 1998 der Schweizerischen Bundesbahnen und zu einem Bundesbeschluss über die Änderung des Bundesgesetzes über die Schweizerischen Bundesbahnen* of 22 October 1997, BBl. 1997, Vol. IV, p. 1365-1399.

Apart from the financial goals, none of these performance goals were operationalized, in the sense of being defined in a way that allowed them to be measured directly. Safety, for example, can be measured based on the number of derailments, or the number of injuries caused by the railways, or in a number of other ways. In 1998, however, this choice was still left to SBB.²²⁴

The second agreement, for 2003-2006, came with a list of performance indicators, meaning variables by which the performance of the company in certain respects was to be measured.²²⁵ In fact, there were as many as 30, divided into four categories: Finances, Market, Processes and State of the Network. They were connected to the performance goals as follows²²⁶:

- Finances:
 1. SBB-Netz must at least break even (cf. art. 13 agreement);
 2. SBB must comply with the payment framework set up under art. 17 of the agreement;
 - 3.-7. SBB must seek to optimise its productivity and the use of its network (cf. art. 7, 9, 14 and 15 of the agreement).

- Market:
 - 8.-10. SBB-Netz must sell as many train paths as possible, for the highest possible revenue (cf. art. 14 of the agreement.²²⁷);
 11. SBB is incentivised to achieve the best possible modal shift in cargo by the use of gross tonne kilometres as a performance measure for SBB-cargo. (Cf. art. 9(1) of the agreement);
 - 12.-13. Concern the efficiency with which SBB uses the subsidies it receives, measured as operating subsidy per km of track and operating subsidy per train path km. (Cf. art. 7 and 9(2) of the agreement);
 14. Is the performance indicator of customer satisfaction. (Cf. art. 7 of the agreement).

- Processes:
 - 15.-16 Concern the intensity of use of the network. (Cf. art. 14(1) of the agreement);
 17. Concerns the degree of interoperability within the network and with neighbouring countries (Cf. art. 12(5) of the agreement), measured as a % of interoperability goals achieved;
 18. Is the number of required improvements to the network that were achieved. (Cf. art. 12 of the agreement.)

- State of the Network:
 19. Punctuality, which is of course an aspect of quality; (Cf. art. 7 of the agreement.)
 - 20.-21. Safety (cf. art. 3 of the agreement), as measured by the number of derailments and the number of dangerous situations during operation;
 - 22.-23. Quality of energy delivery (cf. art. 7 of the agreement), as measured by the number of disturbances and the total number of minutes delay caused thereby;

²²⁴ Notice that, under art. 8(2) of the SBB-Act, SBB is required to report to Parliament about its performance. However, the law does not say that this *Rechenschaftsbericht* has to include hard data on performance targets.

²²⁵ Cf. art. 18(1) *Leistungsvereinbarung* 2003-2006 and Annex 15.

²²⁶ The numbering follows the numbering of the performance indicators in Annex 15 of the agreement for 2003-2006.

²²⁷ Note however that art. 15(1) of the agreement states that the price of train paths must be lowered, if possible, which is difficult to reconcile with the use of total revenue from the sale of train paths and revenue per km of track as performance indicators.

- 24.-25. Quality of signalling (cf. art. 7 of the agreement), as measured by the number of disturbances and the total number of minutes delay caused thereby;
- 26.-27. Interruption due to construction (cf. art. 7 of the agreement), as measured by the number of cases where the track was cleared later than planned, and the total number of minutes delay caused thereby;
28. The number of places where, other than for reasons of construction, trains had to drive slowly (cf. art. 7 of the agreement), as measured by the number of cases;
29. Safety of the tunnels (cf. art. 3 of the agreement), measured as the % of tunnel length in compliance with all safety standards;
30. Accessibility for the disabled (cf. art. 7 of the agreement), measured as the % of stations and stops accessible to the disabled.

In this way, every performance goal specified by the performance agreement 2003-2006 was linked to one or more measurable performance indicators, which in turn were at the heart of SBB's reporting to the government.

For the 2007-2010 period, the system of performance indicators was significantly simplified, partly by using fewer quantitative performance indicators – replacing others by points to be reported on qualitatively – and partly by giving simpler definitions for the quantitative measures that were retained:

- Safety:
 1. Collisions involving a train (number);
 2. Derailments involving a train (number);
 3. Unsecured railway crossings (number);
 4. Number of people that had a railway accident while accessing the railway system (number).
- Usability of the network:
 5. % of time that the network was available;
 6. Number of “delay-minutes” due to infrastructure disruptions;
 7. Number of “delay-minute” due to disruptions in the safety systems.
- Optimal use of the network:
 8. Total number of train path kilometres sold;
 9. Detailed report on train path kilometres sold;
 10. Revenue from access charges in millions of CHF.
- Productivity:
 11. Operational productivity (CHF of revenue per train path km);
 12. Maintenance productivity (Maintenance per gross tonne km);
 13. Productivity of superstructure renewal (CHF of expenditure per km of track);
 14. Subsidy-efficiency (Operational subsidy per train path km).

Finally, for 2011-2012²²⁸, the number of performance indicators was extended again, this time to 19. Moreover, they were defined more precisely in the agreement itself. The categorisation of the 2007-2010 agreement was retained, as were the points for quantitative reporting. The following indicators were now taken into account:

²²⁸ The agreement currently in force lasts for only two years, so as to bring the starting date of future agreements in line with the financial planning cycle of the Federal Parliament. Cf. Preamble, par. 2.

- Safety:
 1. Collisions involving a train (number per million train path km per month);
 2. Derailments involving a train (number per million train path km per month);
 3. Unsecured railway crossings (number);
 4. Number of people that had a railway accident while accessing the railway system (number per month).

- Usability of the network:
 5. % of train path km that had to be replaced by buses because of planned disruptions;
 6. Number of disruptions caused by infrastructure leading to a delay of more than 3 minutes (per month);
 7. Number of passenger-delay-minutes at 13 key stations (counting only delays exceeding 3 minutes);
 8. Number of rail failures per km of main network;
 9. Number of rail breakages per km of main network;
 10. The number of times the “level for immediate intervention”²²⁹ is exceeded per 100 km of main track;
 11. The number of rail rejections and deformations per 100 km of main track;
 12. Accessibility for the disabled, as measured by the % of stations where all platforms are high enough to allow level entry to and exit from the train, and where the platforms are accessible without stairways.

- Optimal use of the network:
 13. Total number of train path kilometres sold;
 14. Revenue from access charges in millions of CHF;
 15. Efficiency of network usage, as measured by the number of train path km per km of main network.

- Productivity:
 15. Cost of operation, as measured by the cost of telecommunication and energy per train path km;
 16. Maintenance costs per gross tonne km;
 17. Cost of infrastructure renewal, including modernisation and optimisation but without extensions to the network per 1,000 gross tonne km;
 18. Cost of superstructure renewal (Type I) in CHF of expenditure per m. of superstructure;
 19. Subsidy-efficiency (Operational subsidy per train path km).

The proposed performance contract for the 2013-2016 period applies the exact same list of indicators.²³⁰

It follows that we can summarise the Swiss experience with the *Leistungsvereinbarungen* (agreement on performance) as follows: initially, responding to the financial difficulties of the sector, policy makers set mainly financial performance goals and targets for SBB and its segments. This practice continues to this day, with the current agreement – in combination with the strategic goals – still setting financial targets for the different segments of SBB.²³¹

²²⁹ “Überschreitungen der Soforteingriffsschwelle”

²³⁰ Cf. BBl. 2012, p. 4077-4096.

²³¹ Cf. art. 7 and 15(3) of the 2011-2012 agreement and par. 2.1-2.9 of the Strategic Goals for 2011-2014. The Strategic Goals are adopted by the government pursuant to art. 7a SBB-Act, which was introduced in 2009.

Presumably, this will continue as long as the Swiss state continues to have a significant ownership share in the company, although we might speculate that there will be less need to make these financial goals explicit as the company becomes more profitable.²³²

For the non-financial goals, the distinction between goals and indicators is clearer, and the choice of indicators more difficult. That is why explicit indicators were initially omitted altogether, and frequently changed in the last three agreements. The idea is to find indicators that create the correct incentives for performance, a goal that is frustrated by having performance indicators that measure things SBB cannot sufficiently influence, or by having so many indicators that their effect becomes diffuse.²³³ The last three agreements do not seem to differ very much in that regard. Instead, the main change is the extent to which they leave room for SBB to work out the details. The current agreement and the 2003-2006 agreement are very similar as for this, with the 2007-2010 agreement being somewhat of an outlier.

When it comes to regional transport – and especially regional transport not provided by SBB – the fixed costs of setting up a system of performance monitoring may be prohibitive. In Switzerland, the BAV has been charged with setting up a system of performance monitoring for the benefit of the cantons.²³⁴ It should be noted, however, that these performance indicators serve a somewhat different purpose.²³⁵ Their intended effect on the performance of railway undertakings is more indirect. Instead, their primary purpose is to act as an aid for cantons in their contracting with the railway undertakings, by allowing them to verify whether the bids they receive are actually realistic, and vice versa what it would be realistic for them to from the railway undertaking. In those cases where the obligation of the public authority to make good any losses is more open-ended, these performance indicators can help detect whether it might be worth taking a closer look at a particularly poor performer. A system of bonuses and penalties is possible²³⁶, but as of yet rarely used.

The performance indicators actually selected by the BAV, together with the cantons, the railway undertakings and the organisation of public transport undertakings VöV (*Verbandes öffentlicher Verkehr*), mainly concern performance in the sense of productivity, that is to say the ratio of outputs to inputs, rather than those outputs per se. There are 19 altogether:

- 1.-5. Total costs per train km, per offered seat km, per productive hour, per passenger-km and per passenger;
- 6.-10. Total revenue per train km, per offered seat km, per productive hour, per passenger-km and per passenger;
- 11.-15. Total subsidy per train km, per offered seat km, per productive hour, per passenger-km and per passenger;
16. Intensity of use, as measured by the ratio of passenger-km to train km;
17. Average speed, by the ratio of the number of train km to that of productive hours;
18. Timetable-efficiency, as measured by the ratio of the number of timetabled hours to the total number of productive hours;²³⁷
19. Gross profit margin, as measured by the ratio of revenue to total costs.

²³² Cf. the example of *DB* in Germany.

²³³ Cf. the literature review below.

²³⁴ Cf. *Verordnung über die Abgeltung des regionalen Personenverkehrs* (ARPV, 2009), SR 745.16.

²³⁵ Cf. BAV (2008), *Leitfaden Kennzahlen RPV*.

²³⁶ Cf. art. 26 ARPV.

²³⁷ The difference between a timetable hour and a productive hour is that the latter also includes the train's turnaround time, when it is standing still at the platform. In other words, this performance indicator measures how "relaxed" or "tight" the timetable is.

4.1.2 The Netherlands

In the Netherlands the process of defining suitable performance indicators for the purposes of defining the performance expected of the railway companies distinguishes two steps: In the first step, the concession defines a number of performance goals. In the second step, the railway undertaking consults with stakeholders and formulates an annual plan that describes what it means to do to comply with its obligations under the concession. This plan includes a specification of how the performance goals are operationalized, and what the target values are for each performance indicator. Some parts of the plan, including the section on performance indicators, are open to a veto by the minister.²³⁸ The plan can also identify and operationalize additional performance goals, but so far that does not appear to have happened.

In practice, there are two concessions that are particularly important: the concession for passenger transport on the “core network”, that is to say those parts of the network that have not been designated as regional railways under art. 20(3) Passenger Transport Act²³⁹, and the concession for the management of the rail infrastructure. Both concessions currently run from 2005-2015, and are held by NS and ProRail, respectively. We will discuss each in turn.

The concession held by NS contains four main performance goals:

1. Security of travellers and employees.²⁴⁰ Under art. 9(3), the concession mandates that one of the sub-indicators here has to be the probability that a traveller will meet a conductor;
2. Punctuality;
3. Availability of seats and general transport capacity;
4. Service level, both at the station and in the train, specifically the level of cleanliness of stations and trains and the adequacy of the information provided to travellers.

In the current (2011) Passenger Transport Plan, these goals are operationalized as follows:

1. Security:
 - a) Customer opinion regarding security on the train and at the station;
 - b) Probability of meeting a conductor, as measured by the number of rounds performed every 30 minutes.
2. Punctuality:
 - a) Customer opinion regarding punctuality;
 - b) Arrival punctuality, as measured by the percentage of trains that arrive with a delay of no more than 5 minutes;
 - c) Passenger punctuality, as measured by the percentage of passengers that arrive at their station of destination with a delay of no more than 5 minutes. Transferring passengers are only counted as “on time” if they achieved their connection.²⁴¹

²³⁸ Cf. for example art.7(3) of the Concession for Passenger Transport on the Core Network, currently held by NS. A similar rule is found in art. 4(2) of the Concession for the Management of the Network, currently held by ProRail.

NB, the Minister for Transport is not the only contracting authority. For regional passenger transport, there are a number of local contracting authorities, who do not apply the procedure described in the text.

²³⁹ *Wet Personenvervoer* (2000), Stb. 2000, 314.

²⁴⁰ The Dutch term “veiligheid” is deliberately translated as “security” rather than “safety” here, in order to emphasise that this goal does not concern safety from accidents, but rather safety from crime.

²⁴¹ NS Passenger Transport Plan 2011, p. 27.

3. Availability of Seats:
 - a) Customer opinion regarding availability of seats during peak hours;
 - b) Probability of a seat during peak hours;
4. Information provision:
 - a) Customer opinion regarding information about disruptions;
 - b) Customer opinion regarding availability of staff at the station;
 - c) Customer opinion regarding availability of staff on the train;
 - d) Quality of information provision on the train, measured by the percentage of disruptions where an announcement was made on the train;
 - e) Quality of information provision at the station, measured by the percentage of disruptions where an announcement was made at the station.
5. Cleanliness:
 - a) Customer opinion regarding cleanliness of trains and stations;
 - b) Cleanliness of trains and stations as evaluated by NS itself.

The customer opinion indicator that is a part of each category is based on a survey that is administered continuously and reported each quarter, based on approximately 78,000 administered questionnaires per year.²⁴²

Trends over time can only be identified to a limited extent, given that the current concession is the first one of its kind. For this reason, the only available trend is in the implementation given to the concession by the Passenger Transport Plans. At that level, we observe that:

- In the category punctuality, the indicator of “arrival punctuality” used to be defined with a 3-minute limit as well as a 5-minute limit. The former was abandoned as of 2008, officially because the 5-minute definition was generally accepted practice in Europe.
- In that same category, the indicator “passenger punctuality” was only introduced as a performance indicator as of 2011, although it was measured for some years before. Because the percentage of trains operated is an element of this indicator, it was abandoned as a separate measure.²⁴³
- In the category “availability of seats”, NS used to define a performance indicator based on the ratio of the number of seat-km to passenger-km during peak hours. This indicator was abandoned as of 2008, when it was replaced by the probability of a seat indicator currently being used. The explanation given was that the latter was more sophisticated, giving a better indication of customer needs.²⁴⁴

For the infrastructure manager ProRail, the concession contains the following goals:

1. The availability and reliability of the rail infrastructure;
2. The cleanliness, accessibility and security of the railway stations;
3. The quality of ProRail’s intervention in case of disruptions;
4. The quality of the capacity allocation;
5. The quality of information supply.

In the current (2011) Network Management Plan, these goals have been operationalized as follows²⁴⁵:

²⁴² NS Passenger Transport Plan 2011, Annex I, p. 45.

²⁴³ NS Passenger Transport Plan 2011, p. 25-26.

²⁴⁴ NS Passenger Transport Plan 2009, p. 30.

²⁴⁵ Cf. ProRail Network Management Plan 2011, p. 18 and Annex I.

1. The availability and reliability of rail infrastructure:
 - a) The percentage of the planned number of train paths that has been allocated;
 - b) Disruption time, as defined by the percentage of time that the infrastructure is unavailable due to disruptions;
 - c) Maintenance time, as defined by the percentage of time that the infrastructure is unavailable due to scheduled maintenance.
2. The cleanliness, accessibility and security of the railway stations:
 - a) Customer opinion regarding cleanliness;
 - b) Customer opinion regarding security:
 - i. By day;
 - ii. At night.
 - c) Accessibility is measured as the extent to which accessibility measures, as defined in the accessibility plan, have been carried out as planned;
3. The quality of ProRail's intervention in case of disruptions:
 - a) The percentage of denied train paths where the operator has been able to use part of the path requested;
4. The quality of the capacity allocation is measured as the percentage of train path requests that have been met;
5. The quality of information supply is operationalized as the customer satisfaction score regarding information about disruptions.

These indicators have all been in use since the entry into force of the current concession. The only change since 2005 is that the performance indicator of “% success of the plaintiff in cases brought against ProRail with the Railway Regulator”, which was a part of the category “quality of capacity allocation”, was dropped in 2009.²⁴⁶

4.1.3 Germany

In Germany, there is a *Leistungs- und Finanzierungsvereinbarung*, a performance and financing agreement, but it applies only to the infrastructure companies, i.e. to DB Netz, to DB Station & Service and to DB Energie. The rationale for this is that the long-distance passenger transport and cargo transport subsidiaries of DB do not receive public money²⁴⁷, while the concessions that DB Regio has in regional passenger rail transport contain own performance incentives. In other words, DB Fernverkehr is disciplined only by the market.

The current agreement, covering the period of 2009-2013, is the first of its kind. For the infrastructure companies, it gives seven main performance indicators (§ 13.2):

1. DB Netz: Theoretic loss in travel time, calculated as the additional travel time caused by an “infrastructure shortcoming”²⁴⁸ that lasts for more than 180 days, added over the entire network. N.B. this indicator does not depend on the number of trains or the number of passengers on the affected part of the network;²⁴⁹
2. DB Netz: Number of “infrastructure shortcomings”, again including only those problems that last more than 180 days;²⁵⁰

²⁴⁶ Cf. ProRail Network Management Plan 2009, p. 12-13.

²⁴⁷ Note that this has not stopped the Swiss, British and Dutch governments from imposing performance requirements on their long-distance passenger transport companies.

²⁴⁸ The German original has “Infrastrukturmangel”.

²⁴⁹ Cf. Annex 13.2.1 par. 1 of the 2009-2013 agreement.

²⁵⁰ Cf. Annex 13.2.1 par. 2.

3. DB Netz: Functionality of Platforms (DB RegioNetz), which is measured as the weighted average for all railway platforms of²⁵¹:
 - a) 0.4 points if the platform is 76 cm high or higher. 0.32 points if the platform height is at least 55 cm, and 0 points otherwise;
 - b) 0.4 points if the platform can be reached without climbing stairs, 0 points otherwise;
 - c) Up to 0.2 points for the extent to which the platform and the station offer shelter against the weather.
4. DB Netz: Assessment of Station Quality (DB RegioNetz), which is measured by grading a long list of elements for every train station, as well as through customer surveys;²⁵²
5. DB Station & Service: Functionality of Platform, measured the same way as (iii), above;
6. DB Station & Service: Assessment of Station Quality, measured the same way as (iv), above;
7. DB Energy: Reliability of Supply, measured as the % of the time energy was unavailable at a given section of the network.

Because this is the first agreement of its kind, it is too early to identify any kind of trend, although the Federal Government has already indicated that it is studying the possibility of adding “capacity” as an additional performance indicator.²⁵³ For short-term “infrastructure shortcomings”, the Federal Government intends to continue to rely on market-based incentives alone.²⁵⁴

4.1.4 Conclusion

It is clear that all of these plans have one performance element in common: punctuality.²⁵⁵ Directly or indirectly, all these public authorities seem eager to incentivise the railway undertakings in question to promote punctuality. To be sure, the manner in which this is done differs greatly from country to country, if for no other reason that some of the performance contracts discussed here are agreed only with the infrastructure company, while others are aimed at both infrastructure and operating companies, or at integrated railway undertakings. However, for the purposes of the present chapter we simply take note of the fact that political actors throughout Europe tend to identify punctuality as a key performance goal.

When it comes to other performance goals, there is less consensus. However, we can probably ascribe the absence of safety among the performance goals chosen in Germany and the Netherlands to the assumption that the railway undertakings already have a sufficient incentive in this regard, due in part to the incentives created by these countries’ railway safety regulators. Another performance goal that appears often enough to be noteworthy is the capacity or output of the railways, in terms of the amount of passenger-km and tonne-km produced.

With this in mind, we will now consider which performance goals were singled out for the European Railway Performance Index.

²⁵¹ Cf. Annex 13.2.2. The weighing is based on the size of the station in question.

²⁵² Cf. Annex 13.2.4.

²⁵³ Deutscher Bundestag, Drucksache 17/5689, reply of the government to a question of the fraction of B’90/Greens, regarding the *Leistungs- und Finanzierungsvereinbarung Schiene*, p. 3.

²⁵⁴ *Ibid.*, p. 2.

²⁵⁵ Note that Belgium, which is not discussed separately here, has a bonus/malus element in the management contract of Infrabel that seeks to incentivize it to improve punctuality as well. Cf. chapter 3.2, above.

4.2 The European Railway Performance Index

In September 2012, the Boston Consulting Group published the first annual European Railway Performance index (hereafter: Duranton et al. (2012)). To the extent that is relevant here, the purpose of that study was to propose and calculate a relatively straightforward, objective measure of railway performance analogous to the Liberalisation Index developed by IBM and DB.²⁵⁶ Just like the Liberalisation index tends to emphasise the developments in the law over the developments on the ground in order to achieve an objective, replicable measure of liberalisation, Duranton et al. (2012) decided to focus on just a few measure of performance, making sure to focus on measures for which data were available.

At a first approximation, the Performance index consists of three dimensions, which are weighted equally:

- Intensity of use as a measure of efficiency;
- Quality of service;
- Safety.

Next, the performance of each railway system along each of these dimensions is measured using two or more performance indicators, which are again weighted equally.

- Intensity of use:
 - Passenger-km/inhabitant;
 - Tonne-km/inhabitant.
- Quality of service:
 - Punctuality (regional passenger transport);
 - Punctuality (long distance passenger transport);
 - % of the passenger traffic that is high-speed;
 - Price.
- Safety:
 - Accidents/train-km;
 - Fatalities/train-km.

For each of these indicators, each country's score is scaled on a 10-point scale, and then the scores are added together to calculate the index. In their report, Duranton et al. identify three groups among the countries they considered:

- Tier 1 (score of 6 or higher): Switzerland, France, Germany, Sweden and Austria;
- Tier 2 (score of 4.5 – 6): Finland, Great Britain, the Netherlands, Czech Republic, Spain, Belgium, Italy, Luxembourg, and Norway;
- Tier 3 (score below 4.5): Ireland, Slovakia, Slovenia, Romania, Lithuania, Latvia, Poland, Hungary, Portugal, and Bulgaria.²⁵⁷

The report then continues to compare the scores of different countries with their score on the Liberalisation index, with their governance model and with the amount of public expenditure.

²⁵⁶ The most recent edition, of 2011, is available at http://www.deutschebahn.com/site/shared/en/file_attachments/position_papers/study_rail_liberalisation_index_2011_complete_version.pdf. (Last visited on 24 October 2012)

²⁵⁷ Duranton et al. (2012), p. 7. Note that the study acknowledges that the index is biased towards larger countries and weighs passenger transport more heavily than freight, which may explain the low score of at least some of the countries in tier 2 and 3.

The results show no correlation with liberalisation or governance model chosen, and a positive correlation between performance and public expenditure.

4.3 Price

The price paid by railway passengers is one of the two inputs into the railway system, the other one being the subsidies paid by the public sector, which is discussed below. As such, price is negatively correlated with performance: the lower the price, for a given level of output or a given set of outcomes, the higher the system's performance.

Of course, in any railway system, and even more so in the Swiss system, there are almost as many prices as there are customers. Passengers differ in the routes they travel, in their use of various discount offers, the system through which they purchase their ticket (*Direkter Verkehr* (direct sale), a regional line or through a *Verkehrsverband* (combined sale)), etc., while cargo customers differ according to the quantity they ship, whether the contract is directly with the cargo company or through an intermediary freighter, and according to the kind of transport (*Wagenladung*, accompanied or unaccompanied combined transport).

All of this makes it illusory to speak of “the” price of rail transport. This is all the more true because the balance between the railways' two main sources of funding is a policy question that has to be decided by political decision makers in each country, and in Switzerland even in each canton.²⁵⁸ Nevertheless, all else equal an increase in the (weighted) average level of prices denotes a loss of performance.

The average price level, of course, is a performance indicator that can be observed. For passenger transport, for example, Switzerland and our benchmark countries have performed as follows:

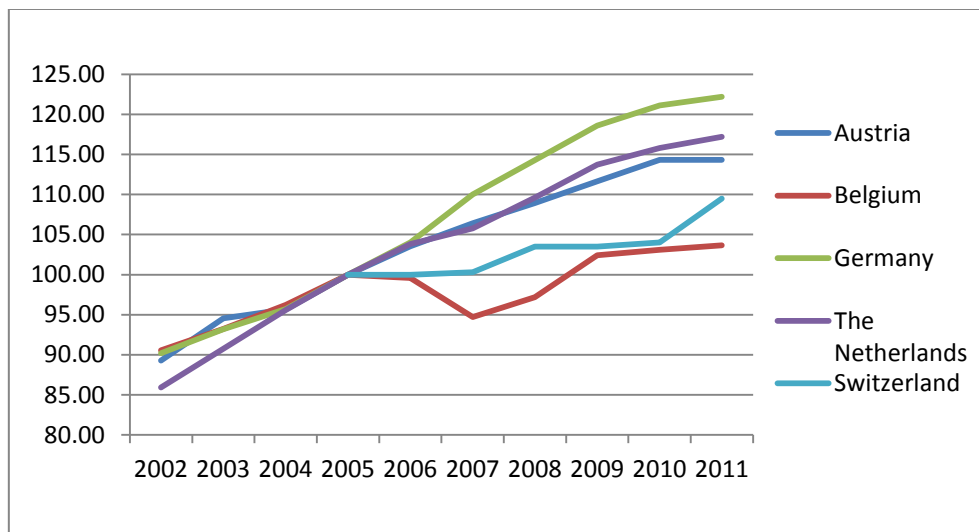


Figure 8 Harmonised Index of Consumer Prices: Passenger Rail Transport (2005 = 100)

²⁵⁸ Hence the occasional concern about the interventions of the Price Controller in the railway market, cf. par. 2.1.1, above.

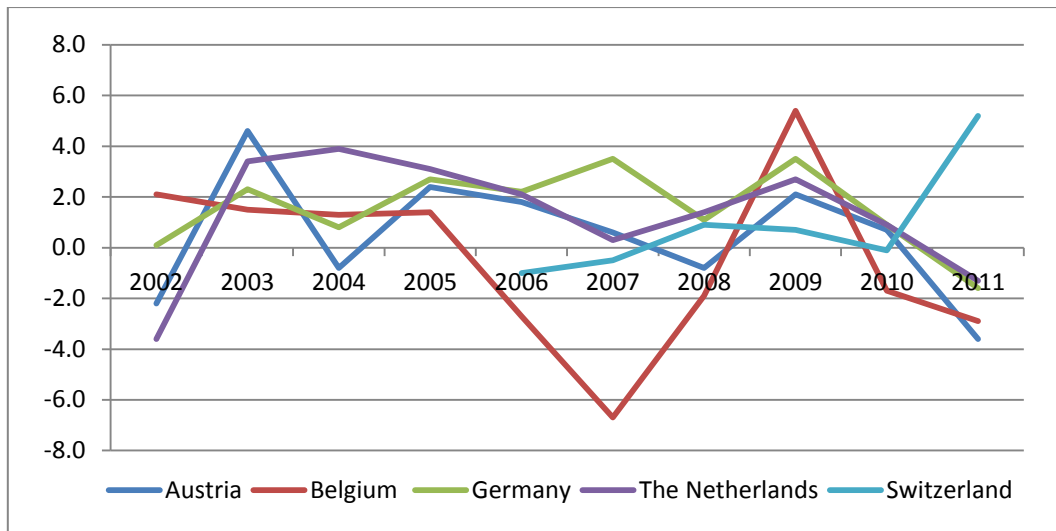


Figure 9 Harmonised Index of Consumer Prices: Price Change for Passenger Rail Transport minus the overall rate of inflation

4.4 Level of Subsidy

As discussed in the previous section, the level of subsidy granted by public authorities to the railways is the other half of the story of the inputs into the railway system. It can be viewed as the price paid by the tax payer for the services provided by the railways, presumably in return for the positive externalities associated with the industry. Like with price, the performance of the railway system is inversely proportionate to the level of subsidy, all else equal.

As discussed in chapter 2, subsidies are paid by a variety of public authorities through a variety of different financing mechanisms. However, since our research focuses on the financing and performance of the railway industry in the aggregate, we can simply consider the total level of subsidy paid by all public authorities added together.

4.5 Intensity of Use

By intensity of use, we mean the output of the system defined at the most basic level: the number of passenger-km and tonne-km “produced”. At times, it will be convenient to consider the total intensity of use of the railway system as the product of two components: the total number of km travelled by the trains on the network multiplied by the average number of passengers or tonnes of cargo per train.

Informally, we can say that these components represent the intensity of use of the network by the trains and the intensity of use of the trains, although this approximation obviously ignores the question of how efficiently the rolling stock is used, i.e. the number of train-km per train per year, which is also an important aspect of cost efficiency.

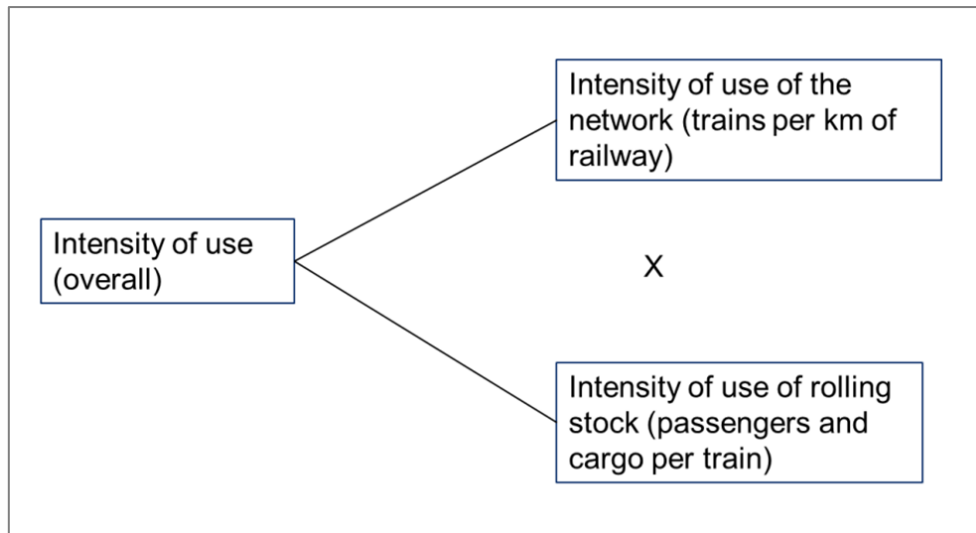


Figure 10 Intensity of use (complex version)

Of course, for any given railway system there is a variety of reasons why the intensity of use should be higher or lower, even if we relate the output to the length of the network. For example, it is plausible that the intensity of use does not scale proportionately with the length of the network – i.e. that a network that is twice as long will tend to produce more than twice as many passenger-km, or perhaps less than twice as many – also, each railway system is located in a country with unique characteristics that influence the intensity of use of the system, including the demographic characteristics of the population, the topography of the network and the geography of the country. Finally, the intensity of use of the railway network will depend on the level of taxation imposed on competing transport modes. For these reasons, a direct comparison between countries of the number of passenger-km per km of rail or the number of tonne-km per km of rail is only of limited use. Instead, intensity of use can be operationalized in terms of growth, as was done with price earlier.

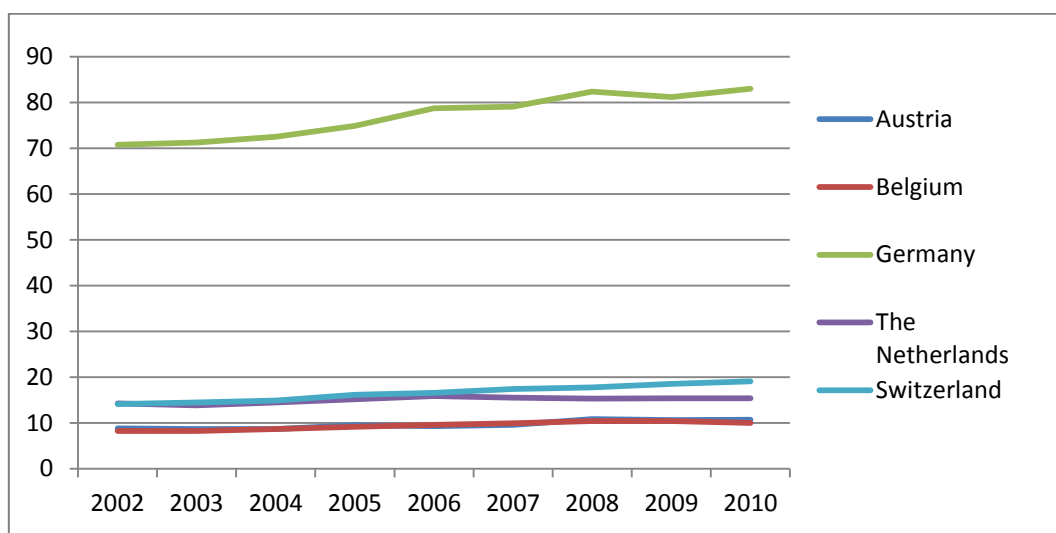


Figure 11 Passengers on rail (billions of pkm)

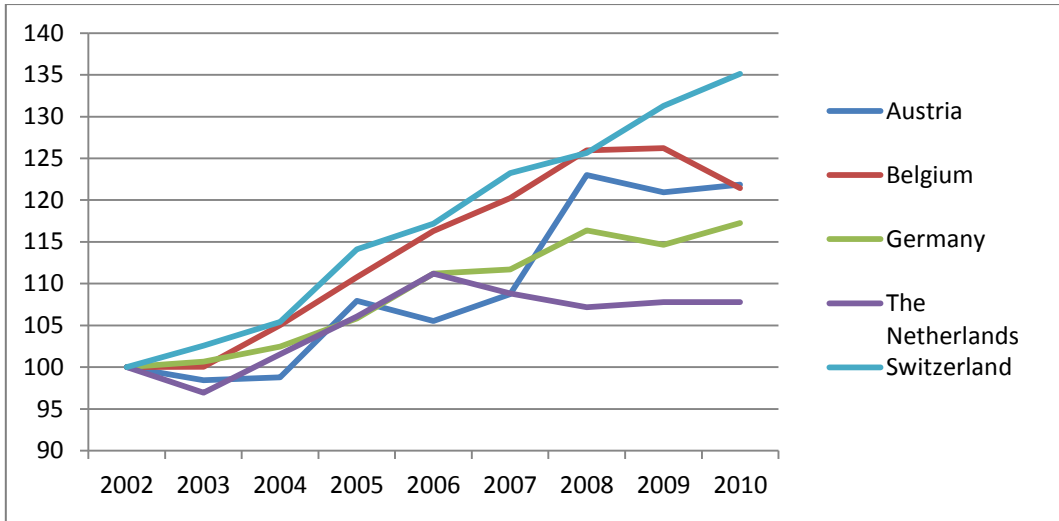


Figure 12 Passengers on rail, index (pkm, 2002 = 100)

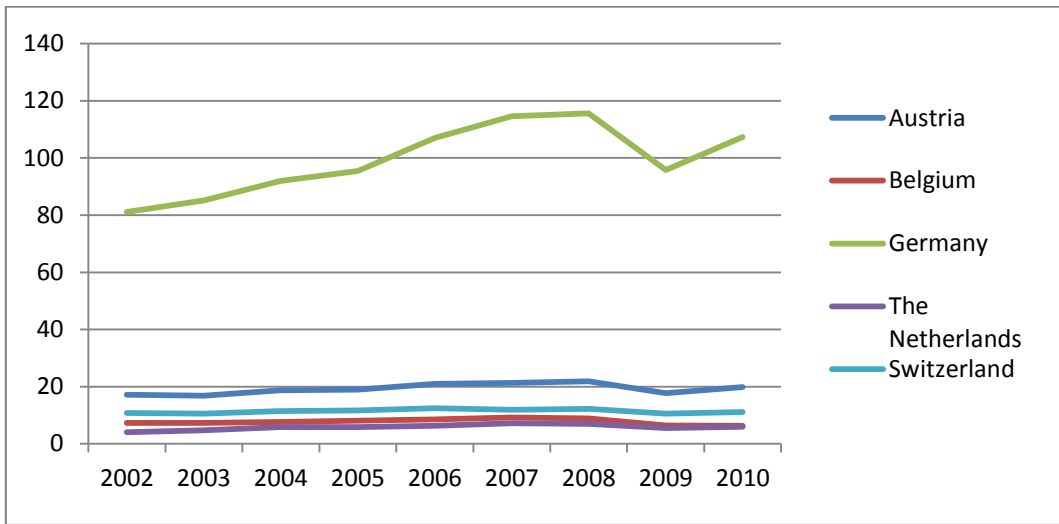


Figure 13 Freight on rail (millions of tkm)

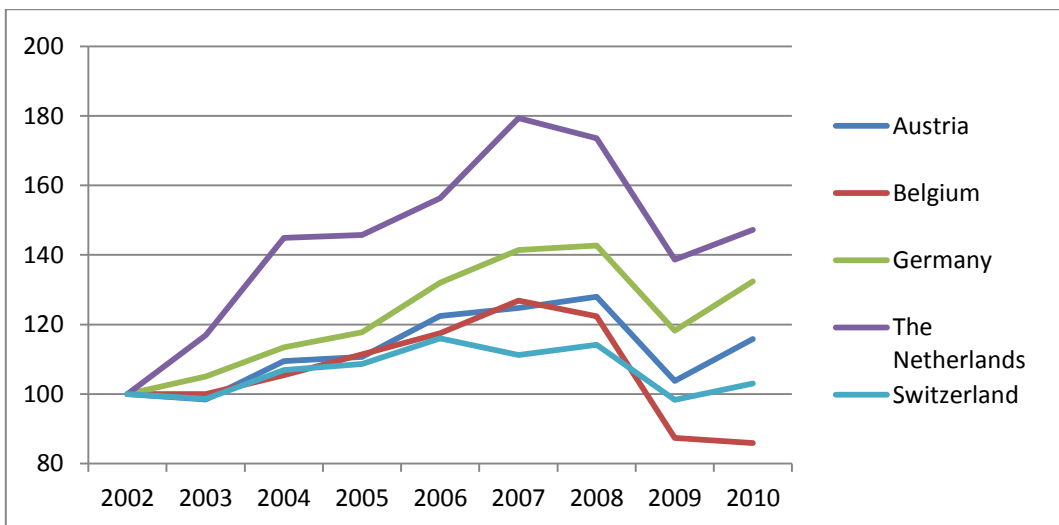


Figure 14 Freight on rail, index (2002 = 100)

Note, however, that the operationalization of performance goals is not necessary for our research, because we are not carrying out any statistical analysis. The above data are provided for informational purposes only.

4.6 Punctuality

Punctuality was already singled out in our survey of existing performance contracts in section 4.1, above. It is the performance goal that is mentioned most often by policy makers and passengers alike, while it is also an important aspect of performance in the freight transport market. As explained before, this does not necessarily mean that it is the most important performance goal in the railway industry, but it does explain why we chose to include it here.

When it comes to operationalizing punctuality, traditionally railway actors have looked at the punctuality of trains, i.e. the (weighted) percentage of trains that arrives more than 3 or 5 minutes too late at their destination. More recently, there has been a shift towards measuring the punctuality of passengers instead, the difference being that even a small delay for a train can cause a major delay for passengers if it causes them to miss their connection.²⁵⁹

In this context it is often overlooked that punctuality is also important in the freight sector. To be sure, the margin for error is usually larger – interviews suggest that a freight train that arrives within about 15 minutes of its scheduled arrival time would normally be considered on time – but it is clear that punctuality is highly valued by freight customers. Those customers who manage their business on the basis of some version of Just In Time management rely on the railways to deliver their cargo at the time when it is needed, and in any event freight customers demand delivery at the time when they have made arrangements for the cargo to be unloaded.

Given that the latter category make up the majority of freight customers, the cargo TOCs do have an alternative method for delivering punctuality that passenger TOCs do not have: in cases where it turns out to be impossible to deliver the cargo at the time that was originally agreed upon, freight customers tend to accept a high degree of predictability as a reasonable second-best solution. That is to say, the damage caused by poor punctuality can often be mitigated if the cargo TOC is able to warn its customer in advance that there will be a delay, and if it is able to inform its customers early enough of the new arrival time. For freight customers much more than for passengers good information can act as a substitute for punctuality, rather than as a separate aspect of performance.

4.7 Safety

Like punctuality, safety is a relatively uncontroversial choice for a performance goal to focus on. As we have seen, it is included in some way in many performance contracts concluded by governments, and it accounts for fully 1/3 of each country's score on the European Railway Performance Index. It is usually operationalized in terms of the relative number of accidents, fatalities and injured people, although a further distinction can be made between injuries to passengers, injuries to railway personnel and injuries to third parties. As can be seen from this graph, the safety of the Swiss railway system is comparable to that of our benchmark countries:

²⁵⁹ Cf. Brons & Rietveld (2007).

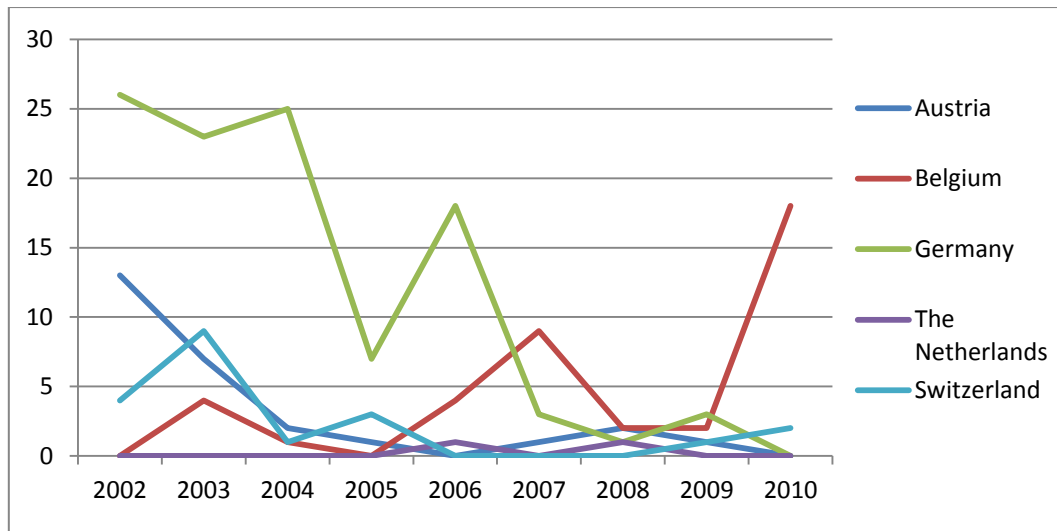


Figure 15 Rail Fatalities (Number of railway passengers killed in accidents involving railways)

4.8 Conclusion

The five performance goals singled out here reflect our understanding of the priorities in the railways, based also on the interviews we conducted with Swiss railway experts. That is not to say that there are no other performance goals of importance, on the contrary. One might plausibly argue for the inclusion of the railways' environmental performance, concern for which has led the Swiss authorities to introduce the noise bonus, for example. Likewise, we omitted customer satisfaction as a performance goal, despite the ample attention given to this issue by practitioners.

The reason why we focus on only five areas of performance is that here, as throughout our research, we attempt to keep the analysis as simple as possible, so as to make it as clear as possible. Including more performance goals simply introduces more repetition, while at the same time the occasional difference in analysis between the performance goals makes it harder to draw clear conclusions. Limiting ourselves to five achieves the best balance between keeping our analysis tractable and making sure it is a sufficiently realistic model of reality.

As for the question of why these five, the answer is that for the reasons explained above they are each important in their own right, and often included by practitioners in performance contracts and other studies of railway performance. Moreover, between them they form a relatively complete whole; all important trade-offs between performance areas are included.

In the next chapter, we will propose a model of the way the performance of the railways in these five areas is affected by the financing mechanisms in place in Switzerland.

5. A Model of Incentives

In this chapter, we will first discuss the incentives created by the financing mechanisms described in chapter 2, taking some time to consider to what extent these incentives are “financial” in nature. Next, we will turn to the task of “bringing order to chaos”, i.e. of modelling these incentives into something that can be used as the basis for policy making. We will do so by creating a separate model for each of the five performance objectives described in the previous chapter, namely (1) price, (2) level of subsidy, (3) intensity of use, (4) punctuality, and (5) safety.

5.1. General considerations about incentives

To recall, the purpose of this study is to contribute to a better (financial) incentivization of rail performance. Consequently, we should only take into account those (financial) incentives that will actually make a difference in terms of behaviour. For example, as we will discuss in greater detail below, railway undertakings and infrastructure companies are required to obtain an operating permit for each piece of infrastructure or rolling stock. While the consequences of failing to obtain such a permit are obviously financial in nature, corresponding (safety) incentives are not properly part of our study, and we will thus not include them in our modelling.

A more difficult question is what to do with financing mechanisms that affect the behaviour of actors much more than a narrow self-interest based analysis would suggest, for example by way of obligations. In order to account for such situations, we will discuss and apply the literature on compliance theory, which considers a variety of reasons why people comply with rules, including, but not limited to, the realisation that the benefits of compliance exceed the costs.

Once we have thus developed an understanding of the various incentives that are at work in the Swiss railway sector, the next step is to combine them into a qualitative model, so that we can understand their interactions. The key goal in developing such models is to create a picture that is “as simple as possible, but not simpler”. Whenever possible, we will combine actors into groups that we will assume to be homogenous. Likewise, as much as possible, we will leave out the less important incentives in order to focus only on those that really drive the performance of the railway sector. However, if we exaggerate this simplification, we will end up with a model of a generic railway sector that will not be very helpful in understanding the situation in Switzerland. On the other hand, if we do not simplify sufficiently, we will end up with a model that does not allow for clear recommendations.

In order to allow us to strike this balance as carefully as possible, we will model the incentives concerning each performance goal separately. That way, we can start each time by considering which actors drive performance in that particular area and which incentives are essential in order to understand the corresponding actors’ behaviour. By tailoring our model to each performance goal, we can avoid the need to add complexity in order to preserve the realism of the model.

First, however, there is the question of what we mean by incentives. Incentives in the economic sense are an automatic corollary of utility or profit-maximization: actors have an incentive to do whatever maximizes their utility or their profit. The logic is consequentialist: alternative actions are evaluated by their costs and benefits (e.g., “opportunity costs”). In

order to incentivise an actor to do something, the benefits of that choice have to be increased or the costs reduced.

Another way to look at this is to focus on contingent cash flows. Actors are incentivised to the extent that their cash in- or outflows are contingent on their actions. No incentive results from a cash flow that is contingent on something the actor cannot control, such as the winning lottery numbers. In other words, an incentive is always linked to an action the actor can or cannot take or a decision he can or cannot make.

Each incentive is characterised by its “importance” and its “direction”, both of which are connected to the underlying cash flow, or at least the contingent part of that cash flow. When a cash flow of one million euros is certain, except for a EUR 100,000 contingent component, it is of course only that last part that we are interested in. Moreover, when two cash flows are contingent on the same thing, they might partially or entirely cancel each other out, or they might reinforce each other instead.

The direction of the incentive refers to the action or decision that is incentivised. In this paper, we will generally look at performance incentives, and – as discussed above – at certain specific performance goals in particular. As a result, we end up with only ten possible directions; an incentive can aim at a higher or lower level of performance for each of the five goals. As explained above, however, this represents a significant simplification of reality.

The traditional method of incentivising performance in the railways along these lines is to create a *bonus/malus* system, whereby a bonus given or a penalty imposed depending on whether the actor exceeds or fails to achieve a target level of performance.²⁶⁰ However, as we will see below, there are a number of other ways to create incentives. In order to map them in a systematic way, we have to ask for every money flow into or inside the railway sector:

1. To what extent is this cash flow contingent?
 - Over which time horizon is it contingent?
2. Is it contingent on anything under the control of a railway actor?
3. What is the importance of the incentive?
4. In which direction does it “push” the actor?

Note that these questions concern all incentives, regardless of whether they were intended by policy makers or other railway actors, as long as they can be linked to a cash flow.

Once this is done, the next problem is to construct a map of the entire sector from the component pieces. As we will discuss in the next section, the Swiss railway system is financed through subsidies provided by national, cantonal and municipal authorities, through fares paid by passengers directly to the operators or indirectly via a regional *Verkehrsverbund* and through the prices charged to freight customers directly or through an intermediary. All these money flows, as well as the money flows within the system, create a variety of incentives; the effect of any one financing mechanism can only be analysed by looking how the incentives that it deliberately or inadvertently creates interact with the incentives that flow from all other sources.

²⁶⁰ Cf. for example art. 74 of the Management Contract for the period 2008-2012 between the Belgian state and the Belgian infrastructure company Infrabel, discussed in section 3.2, above.

To go from an understanding of individual incentives to a mapping of these incentives, we will ask the following questions:

5. For each two actors in the system, what is the net importance and direction of the incentives that flow from one to the other?
 - That is to say, for each of the five performance objectives discussed above, what is the incentive that results from the financial relationship between any two actors?
6. For every actor, what is the net importance and direction of the incentives received?
 - That is to say, for each of the five performance goals discussed above, is the net incentive for the actor to improve performance or to decrease it?
 - And how strong is this net incentive?

In the remainder of this report, the answer to these questions will often be represented visually with arrows in a map. These arrows are aimed to show who is influencing whom. Whether the incentive is to increase or decrease performance for the performance objective in question is shown through the colour of the arrow, with green representing an improvement in performance, red representing a decrease in performance, and blue representing a situation where an actor incentivises another actor to both increase and decrease performance at the same time.

In the end, inevitably some simplification needs to take place if clear conclusions are to be possible. When we are studying the access charges paid by operators to infrastructure companies, we will aggregate the Federal and Cantonal Governments into a single homogenous group called “the public sector”. Similarly, it was already noted that we will treat passenger TOCs and cargo TOCs as two homogenous groups.

Ultimately, of course, we would like to assess the effect of access charging on the overall performance of the sector. This requires taking together all incentives of all actors, or at least of a subset of all actors. To the extent that the effect of access charging is the same for all actors, the problem is simple. In practice, however, this will rarely if ever be the case. When the individual actors or groups of actors are influenced in contradicting ways, the next step is to focus on the most important actors, i.e., on those actors upon whose decisions and behaviour the performance of the sector particularly depends. If, among these actors, there are still contradicting incentives, the next step is to consider which incentives are the strongest, in the sense of being the result of the largest contingent cash flows:

7. For each of the five performance goals, which actors have the largest influence on the performance of the railway sector?
8. Do these actors have contradicting incentives with regard to this performance goal?
 - That is to say, do they all have an incentive to improve performance, or do some have an incentive to reduce it?
9. To the extent that these actors’ incentives contradict, what is the net effect that we would expect, given the relative importance of each actor for this performance goal, and given the relative strength of their incentives?

In the next section, we will consider the first six steps, which are to some extent preliminary to any mapping, given that they focus on the various railway actors individually. In section 5.3, we will aggregate the picture into an incentive mapping, using steps 7-9 to simplify the picture to the extent necessary.

5.2 The financial incentives in the Swiss railway sector

In this section, we will discuss the financial incentives in the Swiss railway sector in a disaggregated manner. Leaving the mapping of incentives, i.e., the systemic view, to the next section, we will first discuss questions 1-6 as discussed above, based on the discussion of financing mechanisms in chapter 2. In order to avoid too much duplication with that chapter, we will organise our analysis here around question 6: “*For every actor, what is the net size and direction of the incentives received?*” In answering this question, we will discuss each time the answers to question 1-5 as well, to the extent that these questions are not already dealt with in chapter 2.

5.2.1 Passenger TOCs

In the absence of competition for or on the market, most Swiss passenger TOCs compete only with other modes.²⁶¹ In their relationship with their customers, these TOCs enjoy “the best of all monopoly profits”²⁶²; incentives for price reduction are very weak. Each year, after the timetable is decided upon, each company knows with reasonable precision how much it will have to spend on rolling stock, labour costs, and access charges, and translates any cost increase into a roughly equivalent increase in fares. Even in the presence of competition with other modes, there is little evidence that passengers are very price-sensitive; for low levels of cost increase, there is no reason not to pass on (almost) the full amount to the passengers.

Even under the new access charging system, this does not change very much. The surcharge for trains operated during peak hours, for example, is known in advance, since each company knows how many trains it will operate during these hours, assuming there are no disturbances. Something similar goes for the noise bonus; a TOC can plan ahead which piece of rolling stock will be used where and when. The fact that the amount spent on access charges is known with a significant precision before the start of the timetable-year means that these costs can be included in the price charged to passengers. After all, neither the price supervisor nor any other public authority would deny the passenger TOCs the right to adjust their prices to account for cost increases, and for TOCs access charges are an expenditure just like any other. For this reason, any contingent element of the access charging system that can be estimated with near-certainty before the start of the year cannot be a source of incentives for passenger TOCs. Put differently: the access charging system does not create any long-term incentives for the passenger TOCs. It may only short-term incentives, where the difference between long-term and short-term incentives is defined based on the period until the next revision of the timetable and the price levels.

Given that short-term incentives can arise from the access charging system, the next question is which kinds of incentives. We can immediately eliminate the two input-based performance goals; it is difficult to see how the access charging system could incentivise lower prices or subsidies. Intensity of use, however, is a different story. Since access charges are, for the most part, calculated per train-km, while passenger TOCs receive their income on a passenger-km basis, the obvious result is an incentive to maximise the number of passengers per train, to avoid operating two trains and taking up two train paths when the passengers in question could just as well be transported using just a single train. Doing so also tends to improve punctuality and safety, especially if the network is used at or near full capacity. The

²⁶¹ Note that even there the general tariff eliminates one possible avenue of competition.

²⁶² Cf. Hicks (1935), p. 8: “The best of all monopoly profits is a quiet life.”

new access charging system for 2013 contains a few more elements that indirectly incentivise punctuality and safety, mostly by incentivising reduced wear and tear of the infrastructure, which in turn reduces the chance of rail failures.

While for access charging the long term begins at the start of the new timetable period, for the government subsidy to TOCs the short term consists of the period covered by the current financial framework. As explained in chapter 2, the *Leistungsvereinbarung* and financial framework between the Federal Government and SBB normally covers a four-year period. To the extent that a company is structurally unable to break even at the prevailing levels of prices and subsidy, it can negotiate for a higher subsidy at the end of four years. However, to the extent that a subsidised service proves structurally profitable, the budget-constrained Federal and Cantonal Authorities will find it difficult to justify maintaining the level of subsidy at the previous level. For this reason, we can summarise the situation by saying that at the end of every four year period the company's profit will be set at zero again. This is true regardless of how much it contributed to the various relevant performance goals. It follows that the amounts of money that can be expected to flow from the Federal and Cantonal Governments to the passenger TOCs are unrelated to these companies' performance today. Again, no long term incentives are created for subsidised companies.

Within a given four-year period, we find no attempts to create clear incentives through the use of *bonus/malus* systems. The only mechanism for disincentivising poor performance is the possibility of intervening under art. 22(4) KFEV.²⁶³ However, it appears that Swiss railway actors consider it highly unlikely that this competence will actually be used in a given contract period, so we will disregard it here. We conclude that the amount of subsidy is not contingent on performance in the short term, i.e., within a given contract period, meaning that no incentives result.

In conclusion, the net effect of all these financing mechanisms (i.e., customer behaviour, access charges and *Leistungsvereinbarung*) is that very few performance incentives remain for the passenger TOCs over and above the incentives created by the fact that the companies compete with other transport modes, and even these incentives get weaker as one extends the relevant time horizon. At most, access charges may incentivize TOCs to improve the intensity of use.

5.2.2 Freight TOCs

The freight transport market is fundamentally different from the passenger market. Unlike passenger companies, freight transport companies compete not only against other modes, but also against each other. This is particularly true for the most important transport link for freight: the connection between Basel and Milan. This connection is served by SBB using the Gotthard axis and by BLS using the Lötschberg axis. And unlike the passenger companies, who deal with millions of individual customers with little purchasing power, the freight TOCs deal with price-sensitive freighters and large individual customers, who have the purchasing power to negotiate individual discounts and service. This means that, in the freight transport sector, there is much less need for public intervention to keep prices down. In addition to price competition, there is also significant scope for competition based on quality; in the first decade of the 21st century BLS Cargo was able to raise its market share from about 10% to more than 40%, mostly at the expense of SBB, by offering superior

²⁶³ Cf. also art. 35 of the 2011-2012 *Leistungsvereinbarung* of SBB.

punctuality and flexibility. Only with respect to public subsidies does the freight transport market create socially undesirable incentives. After all, if a freight TOC can obtain a higher level of subsidy, it can gain market share by lowering prices. However, as discussed in chapter 2, the system of subsidies for the freight transport sector is highly standardised exactly in order to avoid this.

When it comes to access charges, freight TOCs are to a large extent in the same position as passenger TOCs. However, the more competitive environment for freight companies has its consequences. Given that only part of any surcharge can be passed on to customers, the net cash flow received by the company continues to be contingent upon performance; the access charging system is able to create both long-term and short-term performance incentives for freight TOCs. Specifically, the companies will always have an incentive to use the network as efficiently as possible, by transporting the cargo in as few trains as possible, using as few train paths as possible. This includes an incentive to avoid the peak hours, thus promoting punctuality and safety as well. Similarly, the freight TOCs' incentive to improve the punctuality and safety of the system persists regardless of the time horizon we apply; depending on the strength of the competition the company is exposed to, the freight TOC has a strong incentive to use high-quality electrically-powered rolling stock with modern low-noise recuperation breaks, which promotes punctuality and safety by reducing wear and tear of the infrastructure.

The Federal subsidies for the freight sector do not contain explicitly contingent elements. Instead, they are paid on a per-shipment and per-train basis. As such, they reinforce the pre-existing market incentives; the TOCs are incentivised to increase demand and lower costs. These incentives do not change depending on the time horizon.

In short, the freight TOCs are incentivized by all three factors, namely access charges, customer behaviour and the contractually agreed subsidies. They have significant incentives to keep price increases to a minimum, to use their resources as efficiently as possible, and to offer a high level of punctuality and safety. These incentives do not change depending on the time horizon used.

5.2.3 Infrastructure companies

The infrastructure companies receive their funding from two groups of actors: TOCs and public authorities. As before, we will consider each in turn.

Even more so than with the passenger TOCs, the idea that poor performance by the infrastructure companies will have negative future consequences for the subsidies paid by the public authorities is not credible. After all, infrastructure companies cannot – and do not – spend money they do not have. Simply put: when the investment funding runs out, they stop spending money on investments, and when the money for maintenance runs out, they stop carrying out maintenance projects. It is clear from the feedback we received from industry actors that infrastructure companies are run in a manner that is not that different from the procedure for government entities: they try to balance the budget each year. Investment and maintenance projects are scheduled based on the funding the company knows it will receive from the Federal and Cantonal Authorities, and the money it expects to receive from track access charges.

Since the authorities are aware of this, they understand that any reduction in the subsidy translates directly into a reduction in infrastructure investment or maintenance. Moreover, investments are carefully agreed upon between the authorities and the infrastructure companies. Ultimately, the administration and the infrastructure company try to predict what a given project is going to cost, on which basis the budget authorities then decide which projects they want to prioritise, and on which basis they provide the funds to match.²⁶⁴

So while we cannot exclude the possibility that there are some consequences to a failure to meet the performance objectives set in the *Leistungsvereinbarung*, we are confident that these consequences do not take the form of a reduced subsidy for the infrastructure company. Similarly, we again disregard the possibility of an intervention under art. 22(4) KFEV, since we judge such an intervention too unlikely to act as a source of incentives.

It follows that, in the long term, the level of subsidy is not determined by performance, but rather by the financing needs of the infrastructure company. These financing needs are determined by the investments that the company has agreed to undertake, by the maintenance that is necessary in order to maintain the network at a constant level of quality²⁶⁵, and by the income it receives from track access charges.

In the short term, that is to say within a single financial framework-period, the level of subsidy is fixed, i.e., not contingent on anything. As a result, the financial relationship between the public authorities and the infrastructure companies cannot create incentives over that time horizon.

As can be seen from the discussion of access charges in section 2.2, above, the Swiss access charging system is predominantly designed with the intention of incentivising the TOCs; most of the factors that determine the level of the charge are controlled by the TOCs rather than by the infrastructure companies. It is not the infrastructure company that determines which type of breaks is used for the rolling stock or how many trains are scheduled off-peak rather than on-peak. As a result, the primary effect that remains for the infrastructure company is the relationship between volume and revenue: since access charges are calculated on a per-train-km basis, the infrastructure manager is incentivised to maximise the number of trains that can use its network.

At its most basic, this means that infrastructure companies benefit directly from having a large network; construction of new rail costs money, but some of that expenditure is recouped through higher revenue from track access charges. The same goes, of course, for investments in technologies, such as ERTMS, that increase the capacity of the existing network. Over a somewhat shorter time horizon, infrastructure companies benefit from accommodating TOCs' requests for train paths whenever possible. This includes situations where an additional train might be accommodated, but only if additional staff is brought in. Finally, over the shortest possible time horizon, it means that infrastructure companies benefit if they solve a disturbance as quickly as possible. If a train cannot run because of an infrastructure failure, this costs the infrastructure company money. The quicker this problem is resolved, the higher the company's revenue from access charges.

²⁶⁴ Cf., for example, art. 29 of the 2011-2012 *Leistungsvereinbarung* of SBB, which establishes a budget for eight specific projects that are scheduled for that time period.

²⁶⁵ Cf. art. 51(2) EBG. In 2011, SBB published for the first time a *Netzzustandsbericht*, a report on the state of the network, which is intended to account for its activities in this regard. The authorities are encouraging other infrastructure managers to follow suit, to the extent that this is reasonable.

The problem is, however, that, as we have already said, at the beginning of each four-year period the infrastructure company's net cash flow is set back at zero. To the extent that it received a higher or lower amount in access charges than expected, the expectations for the next four-year period are adjusted accordingly. It follows that access charges cannot be a source of incentives to the extent that the payoff will occur only after the end of the current four-year period. This rules out a connection between access charging and long-term investments in infrastructure.

When it comes to decisions that pay off in the short term, on the other hand, access charging incentivises infrastructure companies to promote performance. Specifically, it incentivises them to promote the intensity of use of the system. The relationship between access charging and the levels of prices and subsidies is not a matter of incentives: the higher the average level of access charges, the higher the prices and the lower the subsidies for the infrastructure companies. The total cost of the railway sector does not change, however, except to the extent that access charging induces a higher intensity of use. Something similar goes for the other two aspects of performance we singled out in chapter 4: access charging incentivises the infrastructure company to promote punctuality and safety because the kinds of things that it might do to improve punctuality and safety, such as invest in preventing infrastructure failures, improve the intensity of use of the network, and as a result the company's revenue from access charges.

In conclusion, and combining these two sources of infrastructure financing suggests that, in the short run, the infrastructure companies are incentivised by the access charging system to improve the intensity of use of the system. The more trains there are on the network, the better off they are. The other four performance goals are affected only because of their link with the intensity of use. When it comes to decisions that last beyond the end of the current four-year financial framework to improve performance, however, there is no incentive. The net effect of the combination of subsidies and access charges is that performance improvements that take that long to materialise do not add to the infrastructure company's cash inflows, meaning that there is no financial incentive to improve performance over that time horizon.

5.2.4 The Funds

The introduction of FinöV in the 1990s was a highly significant development in the history of Swiss railway financing. By insulating the financing of large infrastructure projects from day-to-day politics, it gave various actors the confidence to fully commit to those projects as well. However, even though FinöV and its proposed successor BIF/FABI are undoubtedly an important part of the financing model for the Swiss railways, it is much less clear whether they should be a part of our modelling.

The first difficulty is that the funds are only politically distinct from the Federal Government. They do not have legal personality, do not have any kind of staff of their own, being managed by the BAV, and many important decisions about the funds are still taken by the Federal Council or even the Federal Parliament.²⁶⁶ This is the first reason why we might prefer to simply treat them together with the rest of the Federal Government, and in most cases even together with the Cantonal Authorities as well, as we have done in this chapter so far.

²⁶⁶ Cf. section 2.2.2 above.

The second problem is deciding whether the introduction of FinöV has actually affected any actor's performance incentives in a significant way. If not, then there is no reason to include them as a separate actor in our mapping. Examining the evidence we gathered, including the feedback we received from Swiss railway experts, we have concluded that these funds potentially influence the performance of the sector primarily in two ways: they reduce the amount of public funding that is necessary – both overall and in any given year – by creating an institutional framework that allows for the sector to borrow at low costs from private investors²⁶⁷ and of course these investments add to the size of the network thus allowing for a greater output in terms of passenger-km and tonne-km in the future.

However, this does not mean that the fund-based financing model incentivises these things. Instead, the funds are simply a means for the public authorities to procure a level of performance, which they may choose or not depending on which means of procurement they think will get them the best value for money. While FinöV reduced the degree to which infrastructure funding was contingent on things that happened within the political system, it did not affect the degree to which the level of funding was contingent on the level of performance of the railway sector or any actor within that sector. For this reason, we will not treat the funds separately in our mapping, although we will discuss the merits of some of the FABI-proposals in chapter 6.

5.2.5 Other actors

The other actors in the railway system, such as the railways' customers, the public authorities, Trasse Schweiz, public regulatory bodies like the SKE and the price controller, etc., are not discussed separately here. This is either because they are not part of the financing system for the railway sector, or because their effect on the performance of the sector is too indirect and thus too small.

Instead, we assume that the customers have exogenous transport needs, and that they choose between modes based on where they get the best value for money, with value for money being defined based on the performance goals discussed in chapter 4: customers want to pay the lowest possible price for a service that is carried out with the highest possible frequency, punctuality and safety.

Public authorities contribute to the performance of the system by subsidising it and by taxing other modes. However, the incentives they respond to are political in nature, and as such outside the scope of this study. Instead, public authorities are assumed to promote public transport, but within the constraint that their budget has to balance. This is why we concluded above that the public authorities cannot credibly promise to let subsidised undertakings make a profit indefinitely.

Trasse Schweiz and the SKE are assumed to do their jobs exactly as intended, without needing to be incentivised, which is why they do not normally show up in our mapping. The Price Supervisor, similarly, does not need to be incentivised, and is assumed to have the effect of constraining, but not eliminating, the ability of TOCs to increase their prices over and above the level of cost increases.

²⁶⁷ The most recent data for FinöV show that the fund has so far borrowed about CHF 7.7 billion.

The following figure summarizes our analysis so far; it shows that Cargo TOCs are most and infrastructure operators are least incentivized and that the access charging system is the most important and the contracts the least important incentivizer.

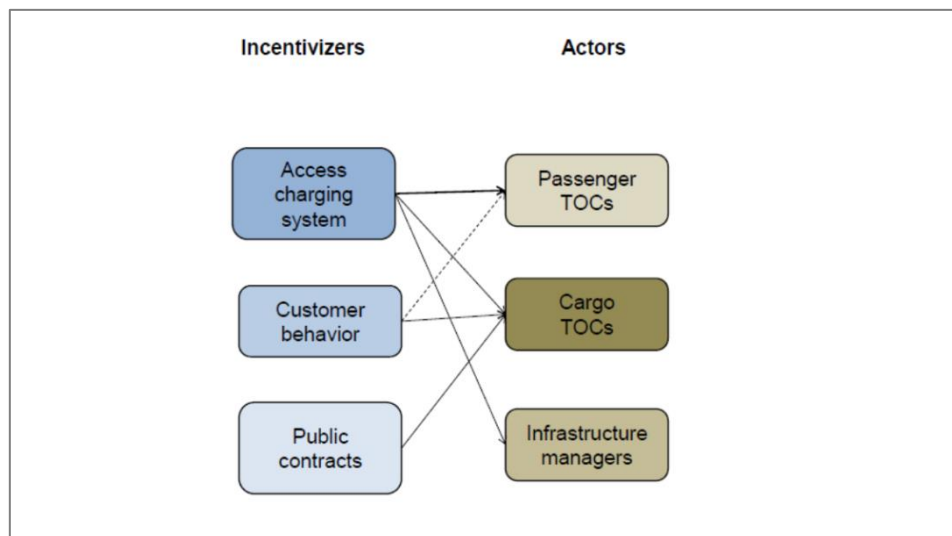


Figure 16 Relationship between incentivizing factors and actors

Having considered the incentives of each group of actors separately, the next step is to map out the incentives for the system as a whole. As discussed earlier, we will do this for each performance goal separately, so that we might pin down how the method of financing the railway system affects its performance.

5.3 Mapping

Given the information that we have gathered and discussed so far, the next question is how that information should be represented in order to make it as easy to understand as possible. The goal is to strike the optimal balance between “meaningfulness” and “manageability”. What we mean by this is that, on the one hand, the mapping has to do justice to the intricacies of the Swiss railway sector. Our goal is, after all, to discuss the Swiss railways, not some generic railway sector. The unique characteristics of the Swiss system have to find their place in the modelling. On the other hand, our goal is not simply to give a realistic description of the sector. Rather, we mean to make recommendations about the desirability of various possible reforms. For this reason, the complexity of the mapping should not be too great. A truly realistic model of the sector would have so many elements that it would be impossible to say conclusively what the effect of a given reform would be on all of them. It should be clear that the problem is to strike the right balance.

The answer to this problem depends greatly on the extent to which the various incentives contradict. In the extreme case where all incentives point in the same direction we can be confident about the outcome no matter how complex we make our mapping. In reality, however, this will rarely be the case. Instead, different actors will have contradicting incentives, resulting in an intermediary level of performance. In that situation, as discussed earlier in this chapter, the solution is to focus on those actors that have the greatest influence on a particular aspect of performance. It should be recalled that we formulated the following three final questions for this stage of the analysis:

1. For each of the five performance goals, which actors have the largest influence on the performance of the railway sector?
2. Do these actors have contradicting incentives with regard to this performance goal?
 - a. That is to say, do they all have an incentive to improve performance, or do some have an incentive to reduce it?
3. To the extent that these actors' incentives contradict, what is the net effect that we would expect, given the relative importance of each actor for this performance goal, and given the relative strength of their incentives?

We will now proceed to discuss these questions for each of the five performance goals discussed in chapter 4.

5.3.1 Price

It is clear from the discussion so far that the decision as to which price to charge a customer is made ultimately by the TOC. At one further remove, the development of prices is linked to the development of the costs of the TOCs, given that their freedom to raise prices by more than the increase in their costs is constrained by the Price Controller and by the public authorities. This means that the annual increase in prices is also influenced by those actors who control the level of costs of the TOCs. In our modelling, this is primarily the infrastructure managers through the access charges. Of course, labour and rolling stock are, in practice, even more important categories of costs for TOCs, but those cost categories are not influenced by actors that are part of our analysis; those variables are exogenous to our model. Instead, we observe that the average level of access charges is decided by the public authorities, particularly by the Federal Government in deciding the NZV.

A final factor that drives prices is competition. In passenger transport, that means competition between modes, and in freight transport, that means both competition between modes and competition between TOCs that operate between the same cities. In other words, the degree to which prices increase each year is influenced by exogenous factors that determine the attractiveness of competing modes, by the Federal Government's decisions with regards to taxes and subsidies for other modes, and by the extent to which there is sufficient capacity on the network to create competition between cargo TOCs. After all, such competition is only possible if each of the competing companies can accommodate additional volume should the opportunity present itself. At times and on lines where the network is already used at full capacity, competition between TOCs is impossible. The capacity of the network is determined to a significant extent, of course, by the infrastructure companies.

In other words, the key actors for the performance goal Price are the TOCs. In addition, the public authorities and the infrastructure companies also play a role.

As discussed in section 5.1, the incentive of the TOCs with respect to price is fairly straightforward. In terms of microeconomics each passenger TOC has a monopoly in the market for passenger transport on rail on its network, meaning that it faces a downward-sloping demand curve. The reasons for this downward slope were already explained before; the most important one for present purposes is that a price increase causes passengers to use different transport modes instead. Like any other monopolist, the passenger TOCs would like to charge a price that corresponds to the level of output where the marginal benefit of producing one more unit of output is equal to the marginal costs of doing so. The so-called Lerner condition states that at this point the company's mark-up over marginal costs is equal

to the inverse of the price elasticity of demand. In other words, when the customer is relative insensitive to price, the company will charge a relatively high price.

Something similar is true for the freight companies. While the most important lines in the freight market are not monopolies, they are still served by TOCs with significant market power. As such, these companies ideal pricing policy can be described in much the same way as for the passenger TOCs: they charge a high mark-up over marginal costs to consumers who are insensitive to price, for example because they have no ready alternative for using the rail, and are forced to deal with a particular TOC. Price-sensitive customers, on the other hand, get charged a lower price. A key difference between the freight and passenger sectors is, of course, that it is easier for freight TOCs to engage in price discrimination, i.e., to charge different prices to different customers. In the passenger sector, passengers can at best be divided into groups through the use of various discount cards and group discounts.

The attitude of the public authorities with respect to price is more ambivalent. On the one hand, we are assuming that they would like to promote the railways, meaning that they would act to encourage low prices, and to constrain the ability of the TOCs to increase prices. On the other hand, however, they have to make up any financial shortfall in the system, which can cause problems with their balanced budget constraints. An obvious way in which this constraint can lead to higher prices is through the question of which categories of costs should be included in the access charges. Without abandoning the principle that TOCs should pay only for the costs they cause for the infrastructure company, the formula for calculating access charges can nonetheless be written to include a wide array of cost categories. Doing so results in a higher average access charge, a higher price level, and a lower government subsidy for the infrastructure company. In any event, for a given access charging system, the public sector benefits from any improvement in the cost efficiency of the system, and seeks to incentivise the railway undertakings accordingly.

The infrastructure company, finally, is obviously a monopolist as well. However, unlike the TOCs it is not free to set its own prices. Instead, it can only reap the benefits of its market power by devoting less attention to keeping costs as low as possible as it otherwise might. Such lack of concern for efficiency drives up access charges to the extent that these charges are linked to actual costs, which in turn results in higher prices.

As was discussed above, however, these access charges also incentivise the infrastructure company to maximise the intensity of use of the network, and more generally the number of train paths that it sells. And the greater the capacity of the network, the more scope there is for competition, especially between the freight TOCs. And such competition keeps prices low.

Shortening the relevant time horizon would lead first of all to the public sector dropping out as a relevant influencer. Over a very short time horizon, i.e., less than one year, prices are only flexible in the freight sector, meaning that we could only sensibly draw a mapping of that sector, and the incentives generated by cargo customers and freight operators on the cargo TOCs, influencing them to set the lowest possible prices.

In short, lower prices are primarily the result of competition with other modes, and in the freight sector with other TOCs; customers incentivise low prices. Against this, the influence of the public sector and the infrastructure companies is mixed: the former is simultaneously trying to lower prices, lower subsidies and improve quality of service, while the latter is

incentivised to do manage the network in a manner that makes competition easier but also to acquire monopoly rents for itself.

5.3.2 The level of subsidy

Just like prices are set unilaterally by the TOCs, the level of subsidy is a decision that is reserved for the public sector. At the Federal level, this means ultimately the Federal Parliament, and in some cases the electorate. And at the cantonal level it is likewise the parliamentarians and the voters who have the final say. While the decision-making process within the public sector is replete with incentives, these are not primarily financial in nature. Given this fundamental difference between financial incentives and political incentives, we have chosen to focus on the former and to leave the latter out of our analysis. Instead, as discussed in section 5.1.4 above, we assume that the public authorities behave according to a few very simple principles.

Unfortunately, when it comes to the level of subsidy, two of these principles clash: on the one hand, concern for balancing the public budget means that the public authorities will want to keep their contribution to the railway sector as low as possible. On the other hand, promoting the railways means investing in infrastructure and maintenance, as well as keeping prices affordable, all of which will often times require public subsidies.

As we have seen, we have generally treated subsidies as covering whatever shortfall emerges between the money that railway customers pay into the system and the money that the railway actors spend on the railway system and its operation. This means that the level of subsidy is driven by two mechanisms, namely (1) the price-setting analysed in the previous section and (2) the decision-making about which investment projects to undertake.

Because the public authorities understand this, they make an agreement about what they are financing at the same time as their agreement about how much they are contributing. Particularly decisions about new infrastructure are largely removed from the world of financial incentives in this way; rather than being taken by private actors who optimise the net present value of their incentives, the decision about which infrastructure project to undertake is taken by actors who only care about the financial merits of the project as one factor among many, and whose concern for balancing the overall budget means that they might need to prioritise lower taxes or a new hospital over a new railway line that is otherwise clearly beneficial to the country. That is to say, the decision-making about which investment projects to undertake is so mixed up in factors that are external to the railway sector that we cannot reasonably make it part of our analysis.

For a given level of investment, the relationship between the incentives for price reduction and the incentives for lower subsidies is fairly simple:

- In areas where actors have an incentive to increase prices by being inefficient, i.e., by taking their monopoly rents in the form of less than perfect costs efficiency, a similar incentive exists for subsidies.
- In all other areas, money paid by customers and money paid by public authorities are substitutes, meaning that the incentives mirror; an incentive to lower prices implies an incentive to look for higher subsidies. However, because prices and subsidies are decided in different places in the system, the practical effect might not always be very significant. For example, there is no question that freight customers would like the public authorities

to increase subsidies. However, there is no way for them to incentivise that result within the railway system – the only way for them to promote higher subsidies is to lobby, which is outside our mapping.

The influence of tax payers is clear: in their capacity as tax payers – ignoring for the sake of simplicity that many tax payers are also railway passengers – they incentivise the government to keep its subsidies as low as possible.²⁶⁸ It is similarly obvious that railway passengers are, by threatening to switch to other modes, incentivising the TOCs to keep prices low and quality high, implying a need for subsidies to cover shortfalls. Because the passenger TOCs are in a better position to assess which level of prices the market can bare – as opposed to the level of prices that best suits the TOCs – they are able to pass on this incentive to the public authorities.

At the same time, the passenger TOCs, as a result of the access pricing system, incentivise the infrastructure companies to invest in the network, both its quality and its size. As such investments costs money, this creates upward pressure on subsidies. To this we can add the incentive of the infrastructure company to extract monopoly rents from the public sector through less than perfect cost efficiency.

The freight sector, finally, cannot incentivise the public sector to increase subsidies in the way that the passenger TOCs can. Instead, they only receive subsidies that are fixed in advance for all companies and benchmarked to ensure cost efficiency. However, they do still incentivise the infrastructure companies to invest, thus causing the level of subsidy to be higher than it otherwise would be. While the influence of both passenger and cargo TOCs, as well as freight operators, on the level of investment in the network is normally thought of as being an example of lobbying, the existence of an access charging system allows them to add financial incentives to lobbying, at least as far as the infrastructure companies are concerned: the larger and better the network is, the more revenue the infrastructure companies receive through access charges.

Taking the present section and the previous one together, we conclude that the incentives for shifting the burden from tax payers to railway customers or vice versa are reasonably balanced. We would expect no major changes in the percentage of the costs of the system that is covered by subsidies from year to year, unless some external shock, such as a budget crisis, forces the government's hand. Consequently, price levels and subsidies have to be seen together as one single block called “costs of the Swiss railway system”.

The overall cost of the system, the sum of revenue from customers and subsidies, is driven mostly by factors that are not affected by the way the sector is financed. Clearly, the most important question by far is the decision by Federal and Cantonal Governments regarding which infrastructure investments to approve. As we have discussed above, this decision can be driven by the economic merits of the proposal, for example because of the existence of a bottleneck or a need for more competition between infrastructure companies, but it can just as easily be influenced by the state of the public treasury or the need to appease voters in a particular part of the country. In any event, the government cannot be incentivised into making “optimal” investment decisions.

²⁶⁸ Note that this result can also be reached by viewing tax payers as representing all the alternative uses to which public funds could be put.

Another important question that drives the level of costs is the extent to which parties with market power can extract monopoly rents from their customers or from the government through their superior knowledge of market conditions and the true minimum cost of their activities.²⁶⁹ This depends not only on the – exogenous – ability of the government to acquire sufficient knowledge of the sector, but also on the extent to which the financing mechanisms in question are designed to prevent actors from taking advantage of their superior knowledge.

It is instructive to compare the means by which the Swiss passenger and freight sectors are subsidised. In the freight sector, the financing mechanisms incentivise the truthful revelation of costs, while at the same time forcing companies to bear themselves the financial consequences of poor cost efficiency. In the regional passenger transport market, on the other hand, the financing mechanism is much more vulnerable to being gamed. Of course, there are many reasons why the subsidies for these sectors should be structured differently, but it might be possible to reduce the size of such perverse incentives, for example by extending the length of the performance contracts. This is a question that will be addressed in the next chapter.

We thus can summarize the factors that influence the way the actors affect the cost of the Swiss railway system as follows:

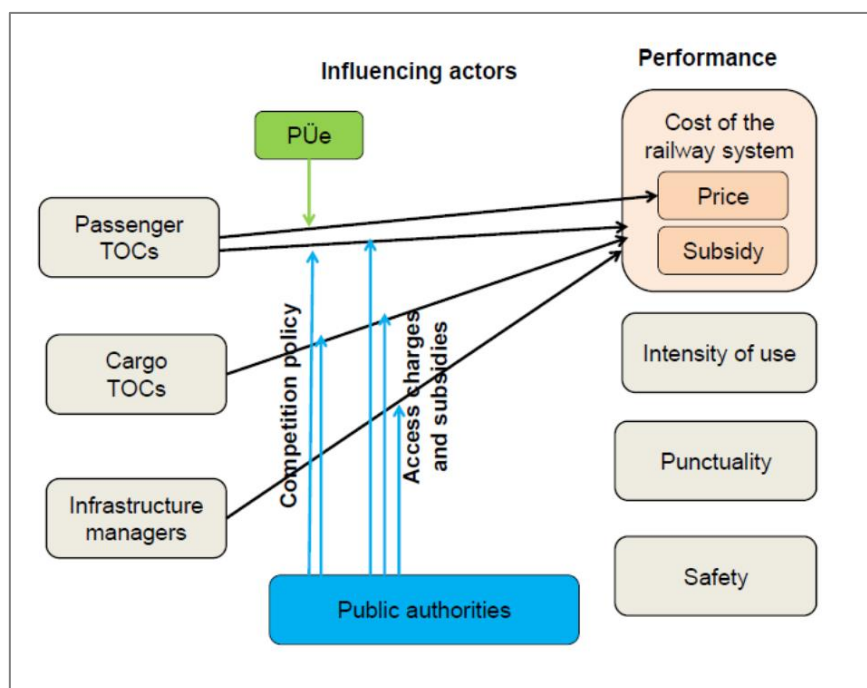


Figure 17 Influencing factors on the cost of the Swiss railway system

It appears that the effect of the public authorities (Federal and Cantonal Governments combined) on the overall cost of the Swiss railway system is limited, given that price reductions (which may result from competition and contracts) will have to be compensated by increased subsidies. At most, the price supervisor may have a (limited) impact on the prices passenger TOCs can charge to their customers.

²⁶⁹ In formal terms, bureaucratic organisations are sometimes described as maximising “slack”, defined as the difference between their budget and the true minimum cost at which their tasks could be carried out. Cf. Wyckoff (1990), p. 35.

5.3.3 The Intensity of Use

As explained in section 4.5, above, the intensity of use of the network is usually defined in terms of the number of passenger-km and tonne-km “produced” by the system. As such, it can be calculated as the number of train-km produced multiplied by the average number of passengers or tonnes of cargo per train.

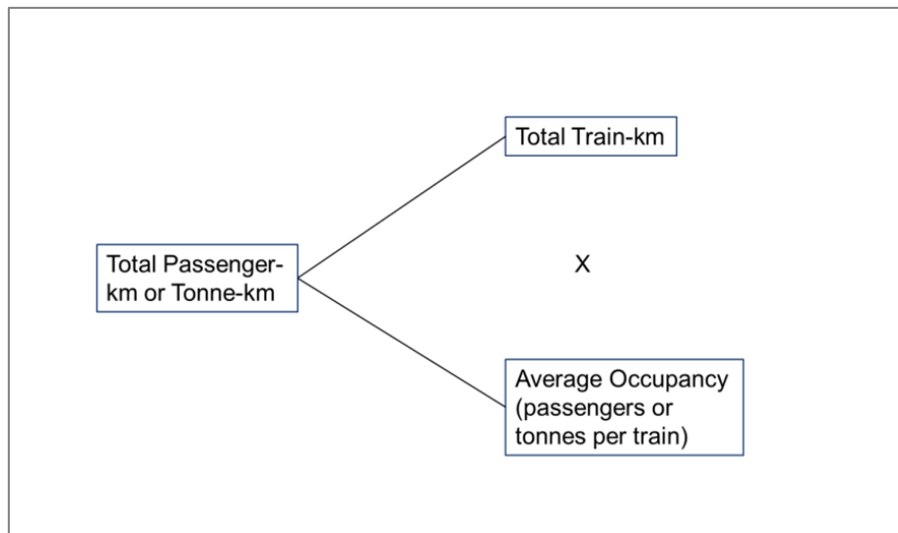


Figure 18 Intensity of use (simple version)

The first, the system’s output in terms of train-km produced, results primarily from the choices made by the users of the network, the TOCs, and the suppliers of train paths, i.e., the infrastructure managers. The incentives of the infrastructure managers with regard to intensity of use were discussed at some length in section 5.1.3, above. Simply put, since access charges are calculated for the most part on a per-train basis, infrastructure companies are incentivised to create as many train paths as possible, at least to the extent that this can be done without marginal costs that exceed the marginal revenue of an additional train path. This incentive is only weakened by the fact that every four years structural surpluses lead to a reduction in government subsidies while structural deficits are made good by the public authorities.

For the TOCs, on the other hand, the access charges represent an expenditure, meaning that they are incentivised to keep the number of train paths they buy as low as possible. For passenger TOCs, however, this incentive is quite weak, because the timetable is constructed during the same period as when the price increase for the new year is decided, meaning that the likely expenditure on access charges can be taken into account. Nevertheless and overall, the timetable is negatively affecting the intensity of use.

The net result is that the total number of train-km produced in a given year is often determined more by supply-factors than by incentives on the demand-side. In other words, we might speculate that the number of lines that is being used at maximum capacity could be lower if the passenger TOCs faced a stronger incentive to be frugal in their ordering of train paths.

Of course the reason why they do not do so is because this would mean increasing the number of passengers per train. Since there seems to be little scope for making trains longer,

for example because the platforms at train stations are only so long, this means operating trains at higher capacity, which passengers tend to disfavour.

The solution for this problem is to give passengers (and cargo operators) an incentive to contribute to greater intensity of use. This is generally done by offering discounts to passengers who travel during off-peak hours or by increasing the prices for travelling during rush hours (e.g., peak-load pricing). At present, however, such schemes are not widely used in the Swiss long-distance and regional passenger railway market, mainly because of some political impediments. This is why we will discuss them only in the next chapter. Additionally, one may consider similar peak-load pricing in respect to access charges.

The following graph summarizes the above considerations:

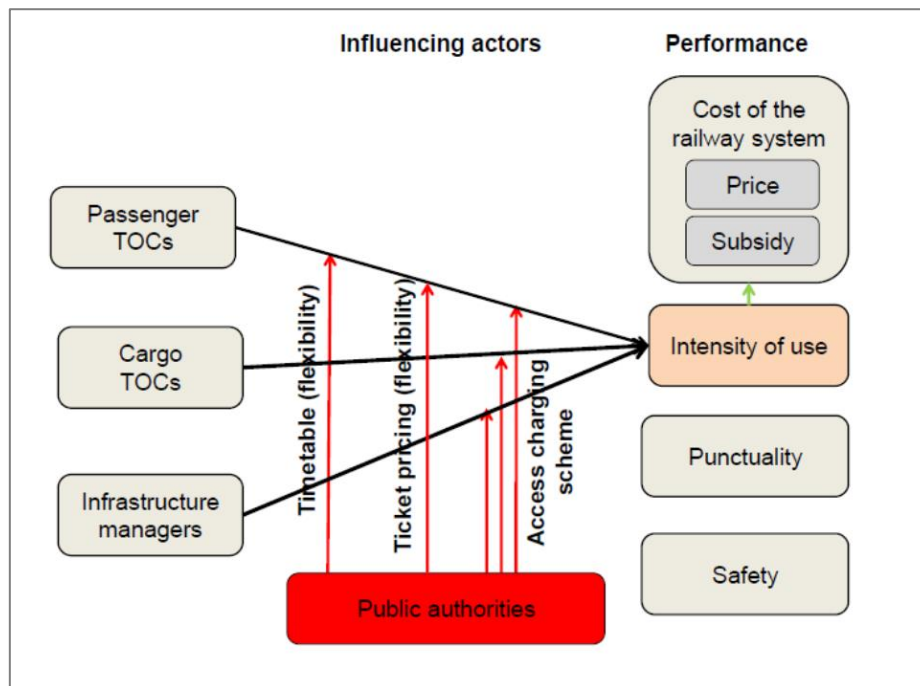


Figure 19 Dis-incentives to increase the intensity of use

It is clear from this figure that, generally, all actors have an incentive to promote intensity of use at least to some extent. However, where the network is operated at full – or nearly full – capacity, the incentive of the passenger sector to contribute towards greater operational efficiency is weaker than those of the freight sector and of the infrastructure managers, given the current ticket pricing and timetable policies. Incentives for a more intensive use could also be created by changes in access charging schemes.

5.3.4 Punctuality

First and foremost, punctuality is under the control of the TOCs who operate the trains. However, it is important not to disregard the influence of the infrastructure managers; where delays are caused by problems with the infrastructure, it is the response of the infrastructure manager that determines overall punctuality.

Moreover, as we have seen earlier in this chapter, punctuality has a clear link to intensity of use: the less intensely a network is used, the easier it is for the TOCs to keep to the timetable. It follows that, for networks that are operated at or near full capacity, any incentive to reduce the number of trains on the network is also an incentive to improve punctuality.²⁷⁰

Regardless of the intensity of use of the network, however, improving punctuality is something that is costly for all railway undertakings involved. For infrastructure companies, improving punctuality means taking precautions to deal with disruptions as swiftly as possible, for example by having personnel on standby throughout the country to solve any rail failures as they occur, by having advanced computer systems that are able to assist in adjusting the timetable as quickly as possible with the smallest possible effect on the regularly scheduled service²⁷¹, etc.

Likewise, TOCs contribute to punctuality by building margins for error into the timetable, which reduces the intensity of use of the rolling stock in the sense of the average number of train path-km travelled by an average train each year, by having surplus rolling stock and personnel available to replace the scheduled train in case of a breakdown or to pick up the service again in case of a cancellation. Moreover, TOCs, like infrastructure companies, need highly skilled personnel to coordinate the manner in which the schedule is to be adjusted in case of a disruption.

TOCs are incentivised to spend money on punctuality because it is an important aspect of intermodal competition; poor punctuality causes passengers and freight customers to switch to road transport, if not to other modes still. It is less clear, however, to what extent the infrastructure companies are similarly incentivised. As discussed in section 5.1.3, above, there are no explicit punctuality incentives incorporated in the access charging system. Instead, the access charges create punctuality incentives only by incentivising intensity of use. The performance contracts between the infrastructure companies and the public authorities do tend to contain more direct punctuality incentives, for example by referencing the number of infrastructure failures in a given year, or the number of delay-minutes attributable to infrastructure. However, as we have seen, the governments' implicit threat to impose a financial penalty for poor performance is not credible; the level of subsidy will always be set at a level where no systemic shortfalls or surpluses are to be expected. At most, the public authorities will not entrust the company with the management of any new lines that are being built.

Graphically, the situation can be represented as follows:

²⁷⁰ To some extent, the same goes for an incentive to reduce the number of passenger trains that run at or near full capacity; large numbers of passengers per train tend to cause delays at the station. However, this is a factor that we need not consider at this point.

²⁷¹ In Switzerland, it is still SBB Infrastruktur that is responsible for taking the lead in making such adjustments, even for disruptions on parts of the network that are managed by other companies.

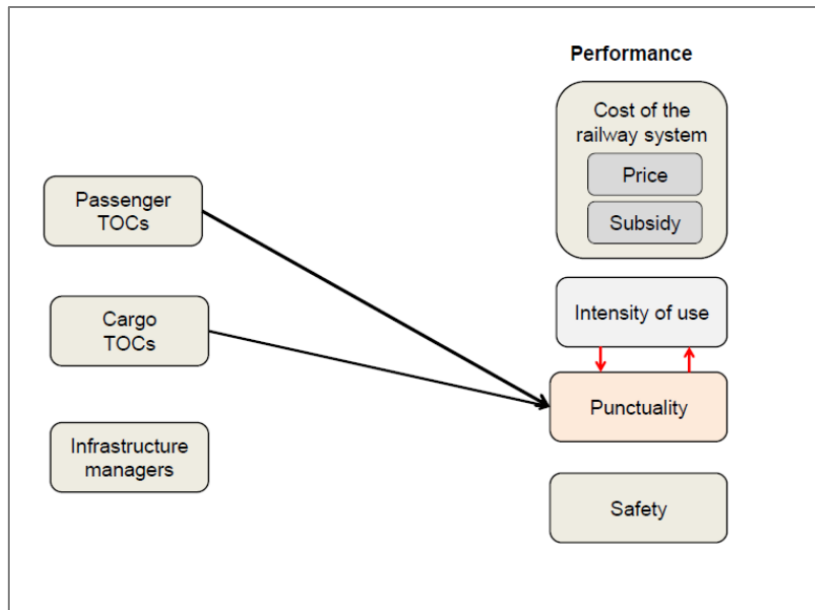


Figure 20 Incentives to improve punctuality

It is clear from the figure that there are two areas where incentives could be introduced to improve punctuality: the public sector subsidies to various railway undertakings could be made contingent on punctuality, and the access charges could be as well. As we have seen in chapter 3, above, the latter is not uncommon in other European countries, where it usually takes the form of a full or partial rebate in case of a delay that can be ascribed to the infrastructure manager.

In Switzerland, the actors we have interviewed have generally been less than enthusiastic about such a system. This is true not only for individuals who work for infrastructure companies, but also for others. The majority view appears to be that the transaction costs involved in establishing for each delay which actor should be liable are likely to exceed the benefits of such a system. This is a question we will return to in the next chapter, when we evaluate various reform proposals.

5.3.5 Safety

The safety record of the railway sector is the result of the actions of the infrastructure managers and the TOCs, as well as, of course, the individuals and companies they contract to help with the operations, maintenance and construction of the system. Since the latter are outside the scope of our analysis, we will focus on the TOCs and the infrastructure managers.

In many ways, what was said about incentives to promote punctuality is equally true of incentives to promote safety, as it would be for most other aspects of service quality: the TOCs are incentivised by intermodal – and occasionally intramodal – competition to offer the best possible service quality, whereas the incentives of the infrastructure managers are much weaker. Obviously the infrastructure manager benefits from any increase in popularity of the railways because it has an effect on the demand for train paths. Moreover, the things the infrastructure manager is incentivised to do in order to resolve disruptions quickly – or better yet to prevent them – promote safety just like it promotes punctuality and intensity of use. However, all things considered it is clear that the incentives of the infrastructure manager are much weaker than they could be.

That said, safety is different from punctuality in two important respects, which is why we discuss them separately here. Firstly, there is the question of how much incentives matter when we are talking about safety. While notions of innate motivation are outside the scope of our analysis, they are particularly pertinent here. In our interviews with Swiss railway actors all interviewees strongly denied making safety-related decisions on the basis of costs and benefits. For this reason the fact that freight customers arguably care less about the possibility of an accident during transport than railway passengers should not lightly lead us to conclude that therefore passenger TOCs will be more concerned about safety than cargo TOCs.

Secondly, unlike punctuality safety is promoted by the Federal Government through a variety of non-financial means. Every aspect of the sector is governed by licensing requirements under the *Eisenbahngesetz*, the *Personenbeförderungsgesetz*, the *Gütertransportgesetz* and a variety of other enactments, and these requirements are enforced through criminal and administrative penalties. There is little doubt that these requirements play a much more important role in promoting the safety of the railways than the financial incentives that are the subject of our study, especially given the limited ability of passengers, cargo customers and third-party stakeholders to accurately assess the safety risks of railway actor behaviour. Unlike punctuality, safety requires enforcement by specialised government actors.

With these caveats in mind, we can construct the following map of the safety incentives in the Swiss railway sector:

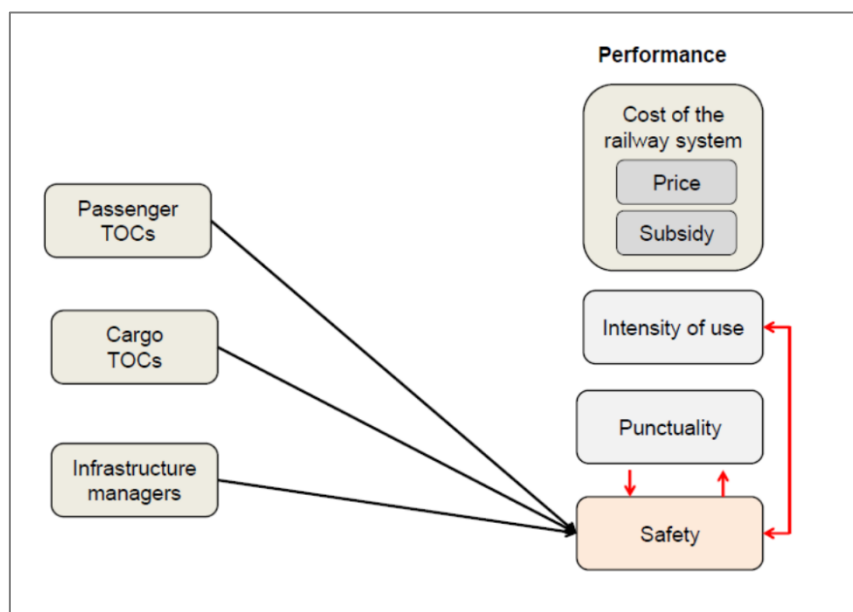


Figure 21 Incentives to improve safety

That is to say, when we simplify the incentives in question in the manner described at the beginning of this chapter, we end up with exactly the same mapping as for punctuality. The public sector promotes safety, of course. In fact, it does so not only through the licensing requirements mentioned above, but also by requiring the subsidised railway undertakings to report their performance in a variety of safety-related areas. The performance contract for SBB, for example, requires reporting on the number of collisions and derailments, on the number of level crossings that have not yet been adjusted to conform with the most recent safety requirements, on the number of accidents involving people in the station and on the platform, as well as information on a number of different kinds of infrastructure failure. The

problem is, however, that while poor performance in any of these areas might lead to an unpleasant meeting between SBB officials and the civil service or Parliament²⁷², there is no obvious way in which poor performance carries a financial penalty for the company. For this reason, the public sector is shown in our mapping as not creating any financial incentives to improve safety.

As with punctuality, an exception should be made for the very long term. Over a sufficiently long time horizon, which is to say a time horizon significantly longer than the four-year time horizon we applied earlier in this chapter, a consistently poor performance will almost certainly result in government action that has clear financial consequences for the railway undertakings. After all, consistently poor performance will make it difficult for the undertakings to argue that the current governance structure of the railway sector should be maintained. Instead, they are likely to end up either with more government interference or, more likely, with more competition. However, this relationship between performance and the money flows in the sector is too uncertain, too political and contingent over a time horizon that is too long for it to be included in our mapping at this point.

5.4 Conclusion

Bringing together our analysis of the financial incentives in the Swiss railway sector with respect to price, level of subsidy, intensity of use, punctuality and safety, it is clear that many important drivers of performance do not appear in our mapping. The reason for this is clear: our purpose in this study is to examine the relationship between the financing of the Swiss railway sector and its performance; other factors that promote or undermine performance are outside the scope of our analysis. It is intended that our report should contribute to the discussion about the reform of the way the Swiss railway sector is financed by improving our understanding of the effect that such a reform is likely to have on the performance of the railways. Which things, in general, should be done to encourage performance is a different question, and not one that we can nor aim to answer here.

With that proviso in mind, we can consider to what extent all actors in the Swiss railway system are financially incentivised to be responsive to the needs of customers and public authorities, with the latter acting on behalf of a tax-paying public just as eagerly to get value for money as the railways' customers. The answer is that in a number of performance categories, they are not.

When it comes to performance in the sense of providing the service for the lowest possible amount of money, i.e. keeping prices and subsidies low, we find decidedly ambivalent incentives. Many railway undertakings know that they can pass their costs on to their customers or to the public authorities, meaning that they have little incentive to pursue cost efficiency. In the absence of competition in the passenger sector, and with great variation between the different passenger TOCs and between the infrastructure managers, neither competition nor benchmarking acts as a sufficient check on costs. Where cost increases cannot be passed on to passengers, they will sooner or later be paid for by the tax payer. The instruction in the Strategic Goals of SBB to pursue cost efficiencies in various areas is not relevant to our analysis, given that the Federal Government, as owner of SBB, will always cover any structural shortfalls, and given that in any event the Strategic Goals do not contain any sanctions for failure to meet the stated goals. Only in the area of freight transport are

²⁷² Cf. art. 8(2) SBB Act.

SBB and BLS, both in their cargo subsidiaries and in their network management activities, incentivised to keep costs and prices low. In that sub-market, competition is effective and the costs of each company can be benchmarked against the other, as is indeed done by the Federal Government in its financing mechanism for trans-Alpine freight transport.

The output of the Swiss railway system, measured in terms of the total number of passenger-kilometres and tonne-kilometres produced (e.g., intensity of use), is the performance category that is incentivised in the most effective manner, with an indirect effect on prices and subsidies. When it comes to that performance area, all incentives are aligned. This is particularly the case when it comes to increases in output that also translate to increases in the demand for train paths on non-congested lines. When it comes to increases in output that are realised only by increasing the number of passengers or the amount of cargo on the average train, the infrastructure company shares little in the increased revenue, with its only additional income coming from the gross tonne-km element of the access charges. Where the increase in demand pertains to lines that are already operated at maximum capacity, there is of course no alternative but to try to meet this demand by increasing the number of passengers or the amount of cargo per train.

Quality of service (e.g., punctuality), finally, is an area where the TOCs are properly incentivised, but where there is a shortcoming in the extent to which that incentive is passed on to the infrastructure managers. At best, the incentive of the latter is indirect, and therefore much weaker than optimal. Instead of being incentivised directly to promote punctuality, the infrastructure company is incentivised to promote punctuality because that ultimately has an effect on demand, and because the access charging system incentivises it to do a number of things to promote the intensity of use of the system that also have a beneficial effect on punctuality. As discussed in the previous section, the situation for safety is in most respects the same.

We can thus summarize the results of chapter 5 as follows:

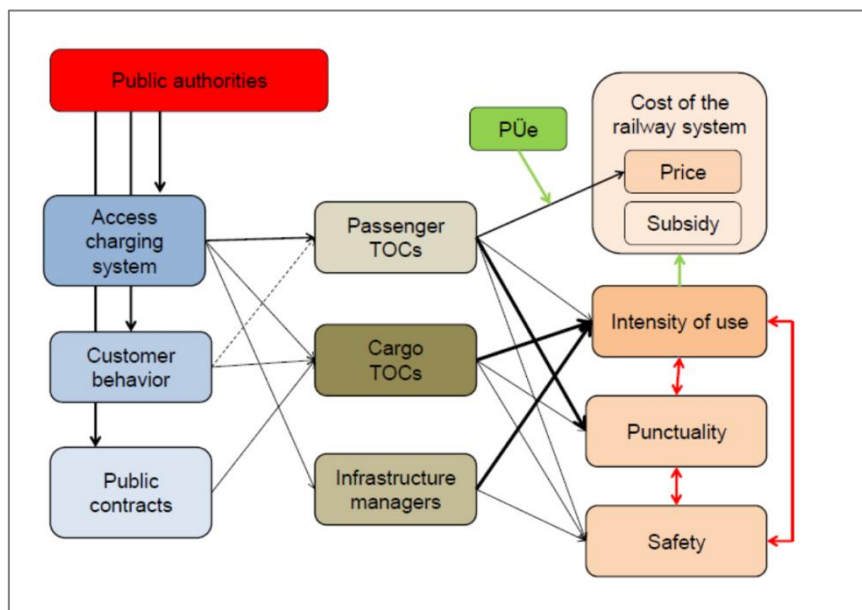


Figure 22 Summary of incentives

6. An Evaluation of Policy Alternatives

In the previous chapter, we have outlined a general model of how the ways in which the Swiss railway sector is financed drives its performance. While we discussed the sector in a way that abstracted from many noteworthy details, we were still able to outline the basic drivers of performance, to the extent that these were related to financing mechanisms. What we will do in this chapter is take these results and vary the assumptions about financing. What would happen if the sector were financed differently than it currently is, keeping the total amount of funding the same? A number of proposals have been made in recent years that would change one element or another, including a number that are brought together in the government's FABI proposal from January 2012. We will look at those, and at some other outstanding issues regarding Swiss railway financing.

In order to structure our evaluation, we will organise the possible reforms into four categories:

1. A reform can affect the financial incentive structure of the sector by creating a source of funding that did not previously exist;
2. A reform can affect the financial incentive structure of the sector by removing a source of funding;
3. A reform can affect the financial incentive structure of the sector by making a source of funding more contingent on performance;
4. A reform can affect the financial incentive structure of the sector by making a source of funding less contingent on performance.

With regards to categories 1 and 2, it should be born in mind that our analysis takes all the funding sources that flow between the same two actors together. This means that a new source of funding only shows up in category 1 if it connects two actors who were not previously connected. The same goes for category 2: only reforms that completely sever the relationship between two actors fall into that category. Smaller changes are likely to involve a change in the level or manner of contingency, meaning that they will fall in categories 3 and 4.

With this in mind, it is clear that most proposed reforms will not be so drastic as to fall in categories 1 and 2. Nevertheless, some important proposals do, and we will discuss them in the following sections. Afterwards, we will consider some proposals that fall in categories 3 and 4.

6.1 Introducing a new source of funding

Introducing a new source of funding has the result that the recipient is made accountable to the actor who pays the money. Given that performance is defined based on the needs of railway customers and tax payers, making actors more accountable to one another will often improve the link between them and the ultimate stakeholders. However, in the Swiss railway sector there are no obvious lacunae in this regard; where there were gaps in figures we constructed in the previous chapter, this was generally not because no money was being paid, but because the sums paid were not contingent on performance, or at least not contingent on performance in the right way. For this reason, we will limit ourselves in this section to discussing the merits of introducing access charging, which was done in Switzerland as part of phase 1 of railway reform.

Access charging has been a part of railway financing whenever some degree of unbundling, even if it is only a separation of accounts, has been instituted. When the degree of unbundling is modest, it may be nothing more than a transfer price for accounting purposes, a sum of money that is only notionally paid by one part of the organisation to another, which serves to allow a profit to be calculated for each separate set of accounts. As we have seen in chapter 2, in Switzerland the larger railway undertakings have organised their transport and infrastructure activities into separate legal entities, meaning that the access charge becomes legally meaningful, even if the amount that is paid still does not affect the profit of the group as a whole, other than through its effect on performance.

While we will consider the most recent reform of the Swiss access charging system separately below in section 6.3, at this point it is useful to consider the changes that resulted from the original introduction of access charging in 1999. Before that reform, there were no financial incentives for the infrastructure companies nor for the passenger and cargo TOCs to operate more efficiently. Yet, our graphic model shows that access charging clearly incentivized more efficient practices of the Swiss railway system.

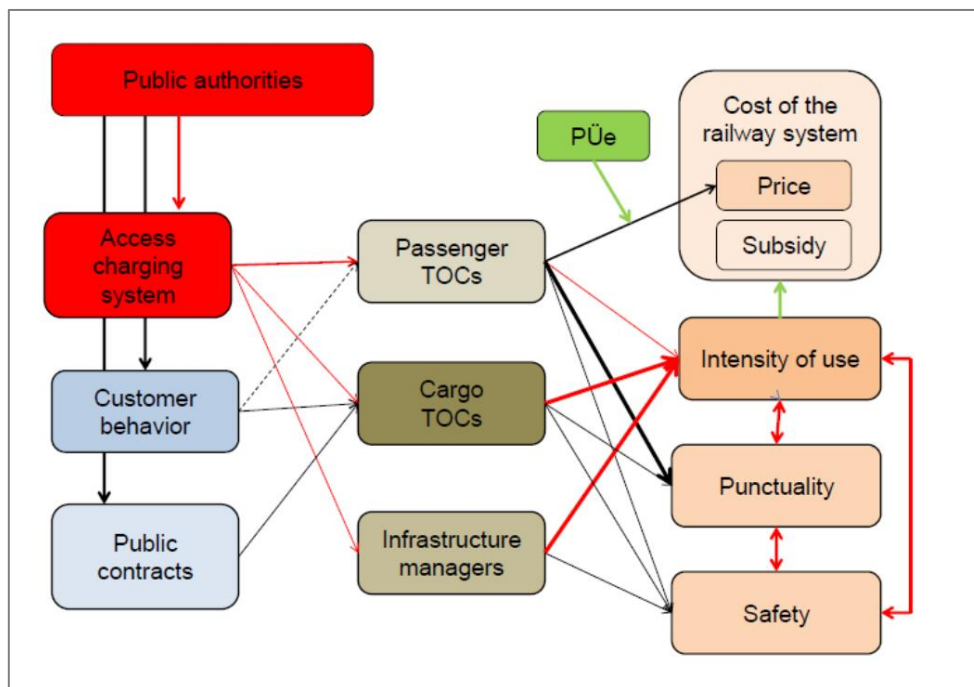


Figure 23 Incentives created by the introduction of access charging

As discussed in the previous chapter, this alignment of incentives is particularly important for the swift resolution of rail infrastructure failures. While, anecdotally, there is little evidence that infrastructure companies would fail to repair infrastructure breakdowns absent some explicit financial incentive to do so, a financial incentive through the access charging system is likely to improve the performance of the railways particularly for those parts of the infrastructure that are heavily used by TOCs. For example, when on the 9th of June 2011 a BLS train caught fire in the Simplon tunnel, which is managed by SBB Infrastruktur, the access charging system created a clear incentive for SBB to manage the traffic through the other tunnel in a non-discriminatory manner²⁷³, and for it to take into account the entirety of

²⁷³ It can often be useful to have financial incentives that duplicate legal requirements, especially when those legal requirements are otherwise difficult to enforce.

Swiss-Italian rail transport in deciding how much money to spend on repairs, and when to carry them out. Given the importance of the Simplon tunnel for trans-Alpine transport, even a marginal improvement in performance has significant benefits for railway customers and other stakeholders.

Remains the question of the optimal level of accessing charging as a percentage of the revenues of the infrastructure manager on the one hand and as an expenditure of the TOCs on the other. However, we cannot conclusively answer this question within our current conceptual framework, other than by saying the access charge needs to represent a significant amount of the revenue of the infrastructure manager and a significant portion of the expenditure of the TOC in order to create a behavioural incentive. The question of the access charging regime will be treated in section 6.3.

Finally, one might think of new sources of financing the Swiss railway system other than the ones currently existing. One might mention two possibilities in this respect, namely (1) by way of new profitable activities or (2) by way of new and additional subsidies. Already today SBB uses CHF 150 million of its profits from its real estate activities to subsidize its infrastructure, as mandated by law. One could imagine to offer SBB greater commercial freedom and allow it to cross-subsidize more of its infrastructure and even some of its train operating activities in such a way. We would have to examine the implications of doing so on the performance of the Swiss railway system more in detail. Similarly, one could imagine to have the cities subsidize (or even pay for) railway stations, thus introducing a new source of financing. Again, one would have to assess the implications of doing so on the overall performance of the Swiss railway system.

6.2 Abolishing a Source of Funding

Abolishing a source of funding can lead to improved performance when the source of funding in question, either by careless design or in practice, correlates negatively with performance. In section 6.4 we will discuss proposals to make the prices paid by passengers and the subsidies paid by public authorities less contingent, so as to prevent them from undermining the incentives that are created elsewhere in the system. In this section, though, we will discuss a clear example of a proposal to abolish a source of funding altogether, which is included in the [FABI proposals](#).

As we explained earlier in section 5.1.4, the use of funds is generally not something that affects our analysis. While funds may change the level of funding, they do not as such change the degree of contingency of that funding on performance. Without such contingency, there is no influence on incentives. This is true for the new BIF fund for the operations, maintenance and extension of the railway infrastructure, just like it is true for the current FinöV fund.

However, there is one part of the FABI-proposal that is potentially significant for our analysis. Indeed, the government has proposed to abolish the system of joint financing for rail infrastructure.²⁷⁴ Rather than having the Federal Government and the cantons jointly order non-SBB rail infrastructure activities in the same way that they do it for rail transport, the government is proposing that the Federal Government should, from now on, fund

²⁷⁴ Par. 6.2.2 of the *Botschaft zur Volksinitiative «Für den öffentlichen Verkehr» und zum direkten Gegenentwurf*, p. 1610.

infrastructure operations, maintenance and extension alone, with the exception of train stations, which will be funded by the canton in which they are located.

In order to understand what the likely effect of this reform will be, we define a new performance goal, i.e., customer satisfaction with stations. Previously, we have not relied on customer satisfaction as a measure of performance, because it is better understood as a measure of customers' subjective evaluation of the overall performance of the sector with respect to all other performance goals. Yet with such separate financing it is convenient to focus on customers' satisfaction with the station facilities.

The effect of this reform is twofold: On the one hand, it allows the cantons to drive an improvement in performance by making it easier for them to order a level of quality that reflects the desired quality in the specific canton, and the ability to pay of the canton, rather than having the infrastructure ordering reflect something of an average across the country. On the other hand, it allows cantons to credibly commit to penalise poor performance in a way that was not possible before.

The extent to which the first factor matters depends on how heterogeneous the Swiss cantons are with respect to their needs with regard to station facilities and with regard to their willingness to pay for improved quality. There is likely to be significant heterogeneity, with, for example, important differences between areas where commuters depart from in the morning, the cities they travel to, and the parts of the country that are much less affected by commuter traffic, such as the Alpine cantons. As for willingness to pay, we note that the Gross Domestic Product per inhabitant ranges from about 200% of Swiss average in Basel-City and about 175% of Swiss average in Zug to about 65%-67% in Uri, in Appenzell-Innerrhoden and -Ausserrhoden and in Freiburg.²⁷⁵ Such income differences inevitably result in differences in the willingness of the people to pay for a higher level of quality and therefore in the willingness of the cantonal authorities to do so.

As for the ability of the cantons to credibly commit to penalise poor performance, there is still a measure of uncertainty, and there will probably continue to be uncertainty at this point until after the proposal is fully implemented. As a matter of law, the current FABI-proposal seems to envisage that the cantons will contract with the infrastructure companies completely outside the framework of the rest of the railway ordering process.²⁷⁶ This suggests that the overall budget balance of the infrastructure companies does not have to concern the cantons. However, it is unclear whether the Federal Government would still take that view if the cantons ended up spending significantly less than the CHF 470 million per year estimated in the proposal. It might be difficult, either politically or practically, to distinguish between a canton seeking to reduce its expenditure by placing the bill with the infrastructure company or the Federal Government and a canton seeking to penalise poor performance, unless a clear performance contract has been agreed in advance. And given how difficult it is to measure the company's performance with respect to train stations – customer satisfaction surveys are quite costly and not very reliable – that may not be feasible. A further problem is that cantons often own the railway companies that operate in their territory. Where this is the case, the threat to reduce funding in response to poor performance is not really credible.

²⁷⁵ Source: *Bundesamt für Statistik* data for 2010.

²⁷⁶ Cf. *Botschaft zur Volksinitiative «Für den öffentlichen Verkehr» und zum direkten Gegenentwurf*, p. 1614.

A final source of uncertainty is the contribution of the Federal Government itself. Even if the Federal Government continues to allow the cantons to contract independently, the question remains whether the overall level of funding the Federal Government provides for the infrastructure would not in some way come to depend upon the total amount of spending by the cantons, as well as upon the total amount of expenditure projected for the infrastructure. If the Federal and Cantonal contributions come to act as communicating vessels in the same way that the public subsidies and the access charging revenue do now, the incentive power of having the cantons fund the stations would be greatly undermined. With these provisos in mind, though, we can conclude that this reform is likely to be beneficial to customer satisfaction with the railway stations, and, indirectly, to the cost portion of railway performance overall.

6.3 Increased Contingency

A less far-reaching approach to reforming the financing of the Swiss railway system is to make the existing financing mechanisms more or less contingent on performance. In this section, we will look at an example of increased contingency, i.e., the introduction of the new access charging system in 2013.

Earlier, in section 6.1.1, we looked at the benefits of introducing a system of access charging, as was done in Switzerland in 1999. A different question is the question of how these access charges should be calculated. To what extent should the sum payable be made dependent upon variables other than the number of train-km demanded? Since the introduction of access charging in Switzerland, the system has become significantly more complex, especially with the entry into force of the 2013 system. The question is whether, problems of interaction with other sources of funding aside, the incentive elements that were introduced are likely to be beneficial for performance.

The answer is that, in general, linking payments to performance is always beneficial for performance. The question is how this should be done. In a perfect world, the TOCs would negotiate with the infrastructure managers about the level of access charges and the extent they should be contingent upon performance, while the government enacts legislation and agrees performance contracts that safeguard the interests of 3rd parties. In such a system, the signals the TOCs receive from their customers about their needs and the willingness to pay for higher or lower quality of service would be translated into an access pricing system that creates the right incentives for infrastructure managers. However, it is inherent in the nature of the railways as a network industry that such a degree of liberalisation is not realistically possible. After all, it is difficult to see how TOCs, even in a fully liberalised transport market, could negotiate with an infrastructure manager whose railways are indispensable for their service. Access to a railway infrastructure, as well as the way such access charges are calculated, will thus always be regulated.

In Switzerland, the authorities have chosen to solve this problem by having the Federal Council enact a Regulation that governs the level of access charges and the manner in which it is calculated. The question is how much the end result resembles the theoretical first-best. Unfortunately, this is a question that cannot be answered in the abstract, given that it requires an understanding of the needs of railway customers. Moreover, it is a question that cannot be answered without also considering the government's other efforts at promoting performance through the performance contracts and through the Strategic Goals for SBB. Looking at the combined effect of the various financing mechanisms in this way, as we did in chapter 5, we

find that most of the performance goals that one would expect are reflected in at least one of these instruments.

What we can say, however, is that the access charge should contain only a few key incentive elements. Having too many incentives results in a system where the financial payoff of any one element is too small for railway undertakings to take it into account in their decision making. Experience with the one major incentive-element that has already existed for a number of years, the noise bonus, is consistent with this analysis. TOCs have indeed replaced their old breaking systems to the extent that the Federal Government has directly subsidised this. However, the effect of the noise bonus has been disappointing, so that the government is now considering an outright ban on certain breaking systems.²⁷⁷ Nevertheless, the noise bonus has been maintained in the 2013 access charging system.

Another aspect of the new charging system that is even more curious is that it also contains an element that is not even intended as an incentive element, but rather to defray the additional costs caused by various kinds of transport. Specifically, the new system has a surcharge for every stop on tracks with mixed transport, that is to say passenger transport of different speeds, and there is a surcharge for the transport of dangerous goods. In both cases, there is no evidence that the authorities intended for the activity in question to be discouraged. Nevertheless, making them more expensive will result in either a financial loss for the TOC or a higher price for the customer, and to the extent that the customer is asked to pay a higher price for, for example, dangerous goods transports, they will in some cases prefer to use a different mode. When the public authorities want to compensate the infrastructure company for the incremental costs associated with a specific activity that they do not want to disincentivise, a separate item should be included in the performance contract, and the infrastructure company should be compensated with public money.

One final area where increased contingency is likely to be beneficial is the area of prices charged to passengers. As we will argue below, in general passenger fares should be regulated more strictly, but at the same time they should be made more contingent.

As we have seen in section 2.2, above, the new access charging system contains several elements that seek to incentivise TOCs to avoid the peak hours. As we argued in chapter 5, however, these incentives are likely to be ineffectual in the passenger transport sector, because passenger TOCs will normally pass the additional expenditure on to their customers.²⁷⁸ Where off-peak discounts are quite common in other countries, they are not widely used in Switzerland, and the new access charging system will not change this.

It is unclear why this should be the case. Even a TOC with significant market power would benefit from introducing a measure of price discrimination. Moreover, even a TOC with significant market power would benefit from reducing the number of passengers per train during peak hours, as this would probably mean that passenger satisfaction would increase.

Perhaps the legal mandate that there should be a uniform pricing system has been interpreted to forbid off-peak discounts.²⁷⁹ Perhaps the way the uniform pricing system is implemented

²⁷⁷ Cf. *Botschaft zur Änderung des Bundesgesetzes über die Lärmsanierung der Eisenbahnen*, decided by the Federal Council on 30 November 2012.

²⁷⁸ Cf. section 6.4.2, below, for a discussion of the effects of the market power of passenger TOCs on their pricing behaviour.

²⁷⁹ Cf. art. 15 *Personenbeförderungsgesetz*, SR 745.1, particularly the non-discrimination rule of art. 15(2).

results in a strong institutional barrier against such a discount, for example because it would require a discount that would include the other modes as well. In any event, by enacting the current access charging system, the Federal Government has indicated a strong commitment to incentivising all railway actors to avoid the peak hours whenever possible, and therefore the government should do what it can to make sure that passengers are incentivised to plan their journeys during off-peak hours when possible. For this reason, we propose that the government should consider clarifying the law to make clear that such discounts are not forbidden. It should also take another look at the merits of the uniform pricing system to consider whether it prevents the introduction of an off-peak discount either because it implies a degree of collusion with regard to prices or for some other reason. And finally, all public authorities should use their position as owners of passenger TOCs to instruct companies to introduce such a tariff system.

In short, an access charging system that is too complex (as the new one is) or that does not simultaneously allow passenger TOCs to flexibilize its ticketing, nor its timetable, will most likely remain ineffectual (see 6.4.2 below).

6.4 Reduced Contingency

Perhaps counter-intuitively, the best way that the performance of the Swiss railway system could be improved is to make certain cash flows less contingent on performance. The reason why this is so is one of definitions: we have deliberately used the word “contingent” throughout this report to indicate any kind of connection between performance and funding, even if the correlation is a negative one. And it turns out that there are two clear instances where different sources of funding act as communicating vessels, where a reduction in one leads to an increase in the other. This means that if one of these is positively connected to performance, the other is necessarily negatively correlated. It is this negative correlation that needs to be removed as much as possible.

In the remainder of this section we will first discuss the performance contracts between the railway undertakings and the public authorities. Next, we will consider a variety of proposals that affect the way prices are set in the passenger segment.

6.4.1 Performance Contracts

As was explained in the previous chapter, it is a political reality that the state will never be willing to subsidise a company that has a structural budget surplus. This means that, sooner or later, the amount of the subsidy will have to be adjusted downwards if the company’s excellent performance has resulted in a structural profit. Likewise, as long as the public authorities still own the railway companies, a structural shortfall will sooner or later have to result in an increase in the subsidy, and even in a privatised system a structurally loss-making railway undertaking is not sustainable. It follows that, sooner or later, the level of public subsidy has to be adjusted to the level where the subsidised company will, on average, break even. And, since this creates the corresponding vessels problem we have discussed in the previous question, the key question is how often this adjustment has to take place, i.e. how long a performance contract should run.

In Switzerland, the contracts have generally been for four years, the 2011-2012 SBB *Leistungsvereinbarung* being an exception due to a change in the government’s financial planning cycle. Compared to other countries, this is relatively short. Art. 30(2) of the new EU

Recast Directive establishing a single European railway area²⁸⁰ requires that such contracts shall cover a period of no less than five years, and this is consistent with existing European practice. As we have seen in chapter 3, the Netherlands uses contracts with a duration of 10 years, in Austria the contract length is 6 years and in Germany and Belgium it is 5 years.

Considering a lengthening of the performance contracts means weighing the benefits of having stronger performance incentives against the potential costs for the treasury of potentially subsidising a profitable enterprise. Obviously this turns on the government's assessment of how necessary it is to strengthen incentives and of the extent to which the government can afford to spend the money in this way. It is certainly no coincidence that, of the countries listed above, the Netherlands is the only one that has a payment from the railway undertaking to the state, instead of the other way around. In the abstract, this should make no difference, but politically it is clear that it is easier to have a high contract length if the contract is with a profitable company.

Another factor is the turnaround time of the actions the government is asking the railway undertakings to take. After all, some performance improvements can be carried out fairly quickly, while others take a long time to pay off. As we have discussed in chapter 5, the subsidised railway undertakings will not be incentivised to spend money on performance enhancements that will only start paying off shortly before the end of a four-year period. On average, this means that if the government has performance improvements in mind that take a year or two of preparation, the current contract length might result in it being disappointed by the outcomes of the incentives that it has created.

Given that the Swiss government has, in recent years, sought to introduce more incentive elements in the access charging system (see section 2.2 and 6.3), we might conclude that they are concerned with strengthening the existing incentives. On that basis, we recommend that the Swiss performance contracts should run longer than four years.

6.4.2 Pricing

Another thing that is unusual about the Swiss railway sector is the relative lack of constraint on the freedom of the passenger TOCs to charge whatever level of prices they like. Neither the market, nor the performance contracts, nor the regulatory system seems to create an effective constraint. In the passenger transport market, the railways enjoy a sufficient practical advantage over other modes that most passengers will not readily be tempted to stop using the railways. The performance contracts and Strategic Goals tend to say in general terms that the railway undertakings must pursue a strategy aimed at maintaining the current modal split or improving it, but do not contain any kind of explicit formula that proscribes the maximum annual price increase, the way the Dutch performance contracts do. In the regulatory system, finally, there is the Price Supervisor.

The Price Supervisor can best be viewed as a somewhat unusual competition authority. His authority extends throughout the economy, but only to those sectors where there is a significant degree of market power. Where there is market power, the Price Supervisor is tasked with ensuring that this market power is not abused by setting prices that are discriminatory or abusively high.²⁸¹ Recently, the Swiss Parliament has debated the

²⁸⁰ Directive 2012/34 establishing a single European railway area (recast), OJ dd 14.12.2012, L 343, p. 32.

²⁸¹ For a longer discussion, cf. section 2.1.1, above.

possibility of removing the authority of the Price Supervisor over the railway sector. In 2012, no majority emerged for this proposal, but it might still be adopted in the future. For this reason, it is useful to see what our analysis suggests about the value of this official.

In light of what was said at the beginning of this section, it should be obvious that our conclusion can be summed up best by saying that the Price Supervisor is too weak, rather than too strong. It has been claimed that the Price Supervisor does not sufficiently take into account the impact of his decisions on the level of subsidy that is needed in order to keep the various railway undertakings financially healthy²⁸², when in fact the level of subsidy should ideally be set in the context of a system of strictly regulated prices. If the Price Supervisor – or some other regulatory body – were put in charge of administering a rule-based regime for approving or vetoing price increases, the level of subsidy could be set accordingly without either the passenger TOCs or the Federal Government being tempted to impose a – real²⁸³ – price increase that is not based on a verifiable improvement in performance.

Of course, incorporating a price increase formula in the performance contract or concession for each TOC dispenses with the need for such a regulatory regime altogether. This avoids the need for having a relative outsider to the sector, a regulator with little expertise in railway matters, judge whether a company has “earned” a price increase. Instead, to the extent that a price increase over and above the level of inflation is warranted, this could be decided as part of the periodic review of the concession or performance contract, which is done by primarily the BAV. For this reason, we would recommend abolishing the power of the Price Supervisor over the railway sector, and adopting a formula for the maximum permissible price increase as part of the performance contract instead. In this way the performance of the railway industry is promoted by making the prices charged less contingent.

6.5 Conclusion

At this point, we may conclude that the current incentive system is difficult to improve substantially without a major overhaul. A much more radical approach would be needed and we will discuss it in section 7.3.

From the above follows, that the overall performance of the Swiss railway system could nevertheless be improved by an enhanced, yet simplified access charging system (see also section 7.2.1). Indeed, the current access charging I thought from the perspective of the costs that are generated by the use of the infrastructure, thus seeking to incentivize the TOCs to somehow reduce these costs. Yet, such an access charging system can only deploy its full effects, if some current negative influences are removed. The most important such negative influence to be removed is the function of the Price Supervisor (see 7.2.4). Simultaneously, the passenger TOCs should be given the possibility set prices according to demand (e.g., peak-load and off-peak pricing) (see 7.2.2). Finally, the performance of the overall system would be furthermore enhanced if the duration of the performance contract (*Leistungsvereinbarung*) would be lengthened (see 7.2.3).

²⁸² Cf. Neue Züricher Zeitung, December 7, 2011, ‘Preisüberwacher soll nicht ausgehebelt werden: Der Nationalrat wendet sich bei der Bahnreform 2 gegen einen Beschluss des Ständerats’

²⁸³ In a system of regulated prices the service provider is generally allowed to increase their prices in line with inflation. What concerns us here are price increases that exceed the level of inflation.

The revised overall incentive system would look as follows:

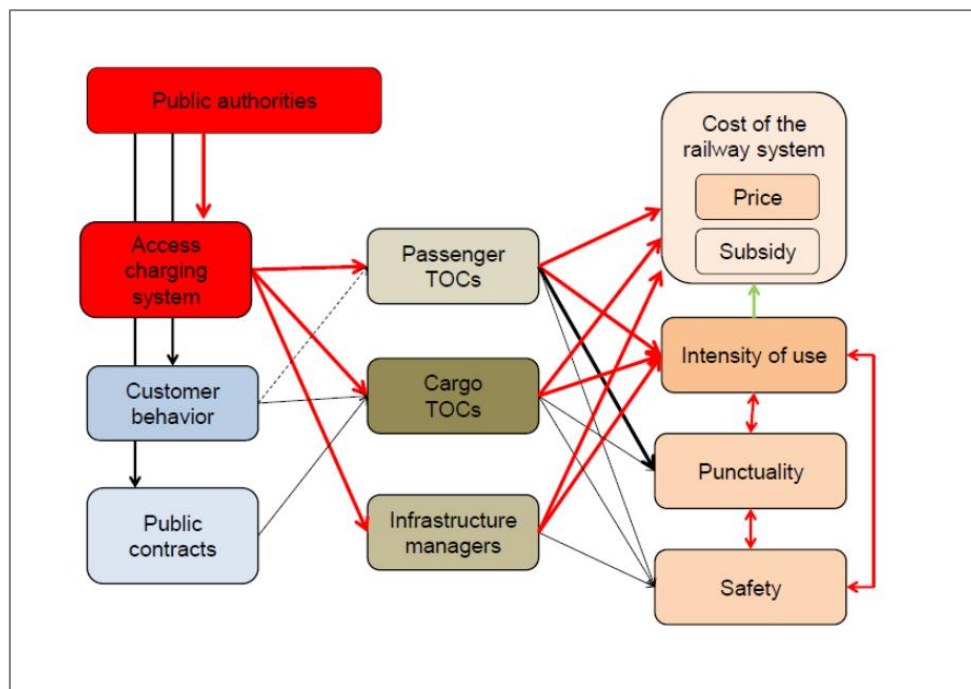


Figure 24 Revised incentive system for the Swiss railway sector

7. Conclusion and Recommendations

In this report, we have examined the relationship between the design of the financing mechanisms used to fund the Swiss railway sector and the performance of that sector. On the whole, we have found that in important respects this relationship creates performance incentives that are weaker than what would be optimal. In this chapter, we will first summarize the results of our research, then make concrete recommendations for better incentivizing the performance of the Swiss railway sector and finally make recommendations for future research.

7.1 Summary

Throughout this report, we have based our analysis on a step-by-step abstraction from reality, where the actual Swiss law and practice was reduced to a mapping of only a few types of actors for only a few categories of performance. After all, had we not done so, we would have only been able to make statements with many qualifiers, statements that would have failed to usefully contribute to the debate about the future of the Swiss railway sector.

The first step in this process was to examine the actual law and practice of the Swiss railways. This we endeavoured to do in chapter 2. While of course the financing of the Swiss railway sector is a topic that could have been treated at much greater length still, we discussed the main sources of funding for both the TOCs and the infrastructure companies. While in conclusion of that chapter we presented a categorisation in order to aid in our understanding of the various mechanisms, there is no question that the Swiss system of railway funding is indeed highly complex.

The complexity of the Swiss system was further highlighted by its comparison with the systems used in comparable European countries in chapter 3. While each of these countries shares one or more key characteristics with the Swiss, such as its topography, the intensity of use of its system or its constitutional structure, none of them have funding mechanisms that are even remotely as complex as the funding of the Swiss system. The biggest difference is that each of these countries has one level of government that has the primary responsibility for financing each kind of railways. In other words, while long-distance rail and regional rail are not necessarily controlled and funded by the same level of government, only Switzerland has a system of shared responsibility for regional rail. A number of the other countries we examined had dedicated public transport subsidies that were paid by the central government to the regional governments in order to help them pay for regional public transport.

In chapter 4, we considered the question of how the performance of the railway sector should be evaluated. Many past studies have applied an excessive focus on costs, and this is something we wanted to avoid. On the other hand, railway customers have many different criteria for evaluating the quality of service²⁸⁴, and the public authorities tend to have any number of additional concerns. For this reason, we elected to narrow down our analysis to five performance criteria that are representative for the overall performance of the sector: the level of prices, the level of subsidies, the intensity of use of the system, the degree of punctuality and the level of safety of the service. The first two criteria add up to the overall financial cost of the system, which – all else equal – should be as low as possible. The intensity of use of the system refers to the simply output produced, defined in terms of the

²⁸⁴ Cf. Eurobarometer (2011).

number of passenger-km and tonne-km, while the last two categories concern the quality of the service.

Taking these initial results, we developed our main model in chapter 5, where we successively simplified the incentive structure of the Swiss railway sector, to the extent that it is linked to cash flows. For each of the most important cash flows in the system, we studied the nature of its contingency: Is it contingent? Is it related positively to some form of performance? Or is it connected negatively to performance, allowing the actor to reduce the effect of other incentives? The next step was to consider the combined effect of incentives, working out the net effect of all the financing mechanisms that exist between any two actors, and finally all the financing mechanisms that fund the same actor. Once we had gathered together all the incentives at that level, we were able to map the incentives as they result from the funding streams between actors in such a manner that we were able to draw conclusions about the performance of the railway sector as it results from the joint efforts of all railway actors.

What we found is that in some respects the incentives of the actors are not properly aligned. To be sure, sometimes that is unavoidable. It will always be the case that railway undertakings would like for the public subsidies to be higher, while the tax payers would like for them to be lower. However, a properly designed system for funding a network industry will ensure that all actors have an incentive to promote performance whenever possible. This is done by making sure that the actors that initially receive the incentive from the outside stakeholder, for example the passenger TOCs in the case of the punctuality of passenger transport, are able to create new incentives to make sure that other railway actors whose efforts are important in promoting that area of performance are incentivised to do so. However, as we have seen the Swiss infrastructure managers are only indirectly incentivised to promote punctuality, meaning that punctuality is likely to be lower than it otherwise would be.

Whether such “gaps” in the incentive mapping should be closed is a question that cannot be answered from our analysis alone. It has been pointed out on several occasions that interviewees were reluctant to support certain kinds of incentive schemes, because they were concerned about the transaction costs involved. How high such transaction costs are likely to be in a given case is something that would have to be studied further when a new scheme is contemplated. Our analysis simply shows where in the system additional incentives might be needed.

In chapter 6, finally, we applied our understanding of the incentives of the Swiss railway sector as it is currently financed in order to study the likely effect of various proposed reforms. The most important of these is, of course, FABI. Such evaluations of policy alternatives do not always lead to the results one might expect. The reason for this is that the first step in our evaluation is always to separate the financial from the political. An important part of the FABI-proposal, for example, is to extend the current FinöV fund to all infrastructure renewals and extensions. Such a reform is highly significant, but mostly because it is a device that allows the public authorities to commit more credibly to spend a stable amount on railway infrastructure in the future, thus reducing the political uncertainty involved in infrastructure projects. While important, this aspect of FABI in no way changes the level of funding for the railways, nor does it establish a connection between funding and performance that did not exist before. In this way, our evaluation of policy proposals often highlighted elements of the proposal that would not otherwise be thought of as being

essential, elements that did affect the manner in which the financing of the sector is related to its performance.

7.2 Recommendations

As observed above, it is actually not that easy to improve performance of the Swiss railway sector substantially within the current institutional framework characterized by multiple sources of funding, contradictory performance objectives, as well as weak or even contradictory incentives that often cancel each other out. In section 7.3 we will discuss the possibility of rethinking the incentive system altogether. In this section, we will simply recommend four relatively easy to implement changes within the current institutional structure.

7.2.1 Access Charges

In any railway system that relies on some measure of open access, access charges are an essential element of the funding of the infrastructure. Without them, the TOCs would be unable to pass on the incentives they receive from their customers to the infrastructure managers, meaning that it would be impossible to align the incentives of all railway undertakings towards optimising customer value for money. However, the most recent Swiss reform of the access charging system has introduced a number of elements whose value is highly doubtful. For example, cargo TOCs are made to pay a surcharge for transporting dangerous goods even though no incentive is intended to result from this, the intention being to allow the infrastructure managers in question to recover the additional costs involved from the ultimate customer, or at least from the TOC. Clearly this surcharge results either in a reduced profit for the TOC or in an incentive for the ultimate customer to consider other modes of transport. Other elements in the new scheme are at best incentive-neutral, meaning that they do not affect performance but only add to the transaction costs of the system. Instead, the access charging system should be focused on incentivising performance by rewarding efforts that customers clearly value, and by rewarding them in proportion to the customers' willingness to pay for such additional performance. Also, as we have seen, incentive-based access charging schemes can only deploy their effects if some other flexibility is granted (e.g., removal of the Price Supervisor; see below 7.2.4).

Overall, the access charging system should be thought from the perspective of the performance it wants to achieve, not from the perspective of the costs triggered by the use of the infrastructure. Also, the relative importance of the access charges – as a proportion of the revenues of the infrastructure manager and as a proportion of the costs of both the passenger and the cargo TOCs – should be rethought (see section 7.3).

7.2.2 Price setting

In the absence of a truly competitive market, the costs of the overall Swiss railway system should be controlled better and especially in a more simple fashion. The Price Supervisor is not the right actor to do so (see below 7.2.4). However, such control will be different for the infrastructure manager, non-subsidized passenger transport, subsidized regional passenger transport and cargo transport (see also 7.3). Overall, it should not be possible to simply pass on the (increased) access charges to the customers. This means, for example, that the passenger TOCs will be incentivised to think more carefully about how many trains – and

train paths – they will need to meet demand, thus reducing the burden on the bottlenecks in the system and allowing for a greater intensity of use overall.

On the other hand, the passenger TOCs should be allowed and should be incentivized to much more flexibility in pricing. While the new access charging system already differentiates the price between on-peak and off-peak hours, passenger TOCs have not yet followed suit. To the extent that the law or the system of uniform pricing creates obstacles to them doing so, these obstacles should be removed. Together with the above-mentioned control over the overall cost of the railway system, this will give the passenger TOCs both the incentive and the means to contribute to a more efficient use of scarce railway infrastructure capacity.

7.2.3 Performance Contracts

The performance contracts for all railway undertakings, both TOCs and the infrastructure companies, should be longer than the four years that are currently customary. That way, the companies receive a higher reward from increases in cost efficiency or demand, as it will take longer before such gains are translated into a lower subsidy.

7.2.4 The Price Supervisor

As noted above, and in the absence of widespread competition, the overall costs of the Swiss railway system must be controlled. However, this should not be done by having an outside regulator supervise them. Having a regulator with a very narrow view (i.e., *sost* for final consumers, but not for taxpayers) and relatively little sectorial expertise introduces high uncertainties and inefficiencies into the overall system. Rather, the maximum price increase that is allowed should be as predictable as possible, which is why we recommended earlier that a formula should be included in the broad contracts. The authority of the Price Supervisor to control the development of prices in the railway sector should be abolished.

7.3 Recommendations for future research

The above are the main four recommendations that can be made on the basis of our approach and without changing the broad institutional framework. Yet, this is a quite poor outcome such an ambitious research project. However, the main outcome of our, admittedly, ambitious research projects takes the form of two recommendations for further research and development.

The first such recommendation for further research is not very spectacular, as it pertains to deepening the analysis within our current approach. Indeed, especially the role of the cantons in incentivizing the performance of the overall Swiss railway system is still not well understood. While our intuition is that cantons are not very effective when it comes to incentivizing the overall performance of the Swiss railway system, as the multiplicity and the complexity of the various cantonal incentives are probably cancelling each other out. Nevertheless, the corresponding mechanism should be better studied. As said above, FABI creates the possibility for cantons to act directly upon railway stations, provided of course that the cantons will be able to credibly penalise poor or reward good performance. Looking beyond FABI, the practice of having the Federal Government and the cantons share the responsibility for regional rail is unique to Switzerland, and our analysis suggests that it is not automatically beneficial for the system's overall performance. Performance could probably be affected by having the cantons negotiate independently with the railway companies. But

again, one would have to understand what the overall effects of such incentive mechanisms would be. This, however, raises the question of the relevant unit: are cantons, indeed, the right unit or should there be regional transport units (*Tarifverbünde*) or is ultimately the whole country the single best unit? Similarly, the role of other actors in incentivizing the Swiss railway system could also be studied

A second, much more radical recommendation pertains to a change in approach. Rather than to further analyse the incentives created by the current system and to make incremental recommendations, we would recommend to rethink the current incentive system altogether. Indeed, as already noted above, the current system is not thought from the perspective of incentives, as it is not thought from the perspective of its performance. Instead, it is an input-based-system where money flows create outputs (e.g., passenger or ton kilometres), which, in the absence of other indicators, are generally equated with performance. Also, the financing system has grown so complex and so convoluted over time (multiple actors with multiple objectives), that no clear incentives can possibly come out of it, much less significantly improved performance. We would therefore recommend, as a next step, to develop a simplified and clear incentive system which is thought from the perspective of its performance, rather than from the perspective of the money that is fed into the system. Graphically, and in its most simplified version, such system could be represented as follows:

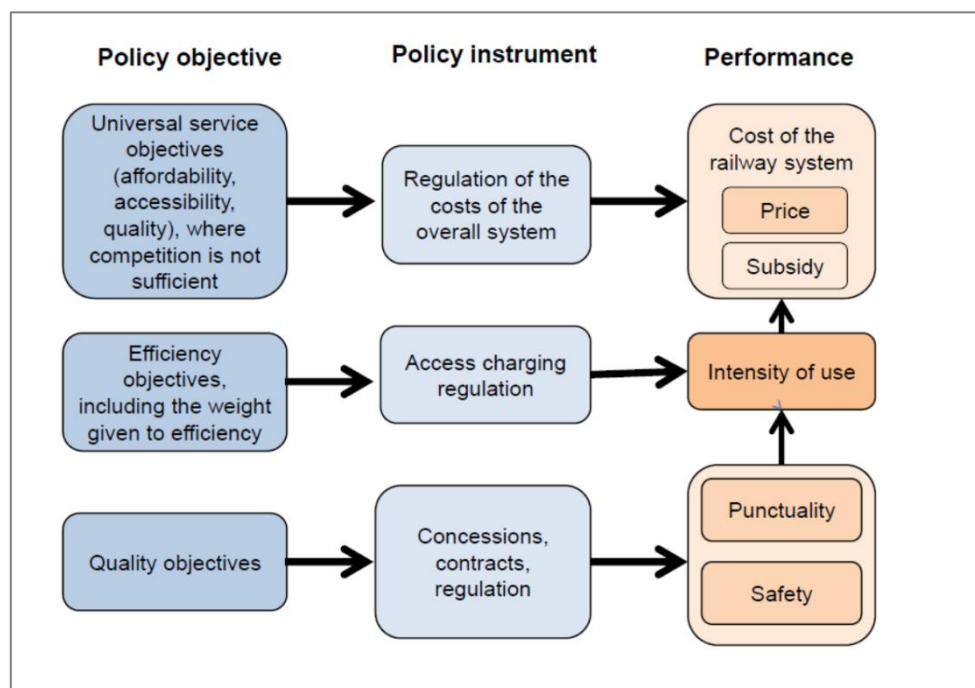


Figure 25 A new incentive system for the Swiss railway sector

This new system can be characterized by a few simple principles:

- A clear political hierarchy must be established between the performance objectives, such as, for example safety and punctuality come before intensity of use, which is to be a key driver for the costs of the overall system.
- Unambiguous public policy objectives shall be attached to each of the three types of performance objectives, such as, for example, Universal service objectives to the overall

costs of the Swiss railway system, efficiency objectives to the intensity of use, and quality objectives to the rest.

- Each of these public policy objectives makes use of a different policy instrument (and not by a combination of policy instruments). For example, safety and punctuality shall not be incentivized by access charging schemes, whereas intensity of use shall not be incentivized by means of contracts or concessions.
- Policy instruments shall be regulatory instruments (e.g., tenders, contracts, concessions supervised by a regulator) and not traditional administrative instruments (command-and-control), nor ownership-based instruments (e.g., strategic goals), including instruments pertaining to organizational structures (e.g., holding, unbundling).

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