Switzerland: Financing Constraints and Charging System

Dr. Arnold Berndt, Federal Office of Transport, Section Freight Traffic
Workshop on Rail Infrastructure Charges – Rome, 9 July 2004
Outline

1. The Swiss Rail 'Landscape'
2. The Legal Framework
3. Track Access and Infrastructure Services: The Basic Price Structure
4. Financing Constraints and Cost Recovery
5. Reflection and Perspectives
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1. The Swiss Rail 'Landscape'
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Data:
69 railways active as infrastructure manager

Networks:
SBB Swiss Federal Railways 3003 km
BLS Lötschbergbahn 242 km
Rhätische Bahn (narrow gauge) 384 km
...

5041 km

... but there is only one system of track access charges
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2. The Legal Framework

- Railways Reform I
- **Fund for Financing Infrastructure Projects in Public Transport** (FinöV / FPT), mainly: NRLA – New Rail Link through the Alps / NEAT (Lötschberg Base Tunnel, Gotthard Base Tunnel)
- **Traffic Transfer Act:**
  supporting measures to shift the cross-alpine heavy road transport to the rail
2. The Legal Framework

Railways Reform I of 1999

Four measures for all railways:
- Separation of infrastructure and transport sectors in terms of accounting and organisation
- Access to the railway network
- Commissioning principle for public regional transport
- Liberalisation of the freight transport market
2. The Legal Framework

- Railways Reform I of 1999:
  Access to the railway network
  Directive 91/440 is valid in CH (active and passive)

International groups in freight traffic: access for transit

Combined transport
2. The Legal Framework

Railways Reform I of 1999:
Access to the railway network

Open Access for Swiss Railway Undertakings

Passenger traffic: concession for the conveyance of passengers is required
2. The Legal Framework

- Railways Reform I of 1999:
  Access to the railway network

Access to the Swiss railway on the basis of reciprocity (only freight traffic)
2. The Legal Framework

- Railways Reform I: Access charges

Art. 9b para. 3 Eisenbahngesetz (Railway Act)

- Basic right of the infrastructure manager to charge the access

- The details of the access conditions and the charges are arranged in an agreement between infrastructure manager and railway undertaking. If there is no agreement found the ‘Schiedskommission’ (arbitration committee) decides.
2. The Legal Framework

- Railways Reform I: Access charges

  Art. 9b para. 3 Eisenbahngesetz (Railway Act)

- The charge
  - is non-discriminatory
  - is not lower than the (normed) marginal costs (defined by the Federal Office of Transport for different line categories).
  - can take into account: different infrastructure costs (topography), environmental impact of vehicles, characteristics of demand.
2. The Legal Framework

Railways Reform I: Access charges

Art. 9b para. 3 Eisenbahngesetz (Railway Act)

For regular and concessioned passenger traffic the charge consists of the normed marginal costs and a part of the revenues of traffic services (contribution margin), which is defined by the concession authority.

The Swiss Federal Council determines the basic principles of charging and defines the rules of publication. These details are subject of the ‘Netzzugangsverordnung‘ (Swiss Order of Network Access).
2. The Legal Framework

- Railways Reform I:
  Access modalities: Priority rules

  Art. 9a para. 2 Eisenbahngesetz (Railway Act)

- Passenger trains running at regular intervals have priority over other trains.
- Connections within a co-ordinated transport chain must not be broken.
- Exceptions are possible and defined by the Swiss Federal Council.
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3. The Basic Price Structure

- **Basic services**
  - Train path, train operation service, traction energy

- **Supplementary Services**
  - Shunting in shunting yards, stabling, provision with water etc.

- **Other Services**
  - Coupling and uncoupling, brake trial etc.

**Prices**

- **Minimum price**
- **Contribution margin**
- **Prices for supplementary services**
- **Prices for other services**

**Train path price**
### 3. The Basic Price Structure

<table>
<thead>
<tr>
<th>Minimum price</th>
<th>Contribution margin</th>
</tr>
</thead>
</table>

3. The Basic Price Structure

**Minimum price**

- Contribution margin

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>CHF 0.0025 per gr/t/km</td>
</tr>
<tr>
<td></td>
<td>lightweighted roadbed and track: CHF 0.0020 per gr/t/km</td>
</tr>
<tr>
<td>Train operation service</td>
<td>CHF 0.4000 per train/km</td>
</tr>
<tr>
<td>Purchase of energy</td>
<td>CHF 0.0029 – 0.0062 per gr/t/km</td>
</tr>
<tr>
<td>Supplement for nodes</td>
<td>Big nodes: CHF 5.00</td>
</tr>
<tr>
<td></td>
<td>Small nodes: CHF 3.00</td>
</tr>
</tbody>
</table>
3. The Basic Price Structure

Contribution margin

- Long-distance passenger traffic: 4% share of revenue
- Regional passenger traffic: 14% share of revenue
- Goods traffic (fixed by infrastructure manager):
  - SBB: CHF 0.0052 per net/t/km
  - BLS: CHF 0.0035 per gr/t/km
3. The Basic Price Structure

<table>
<thead>
<tr>
<th>Minimum price</th>
<th>Contribution margin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Further parts of the basic fee:**

<table>
<thead>
<tr>
<th>Transportation of dangerous goods</th>
<th>0.3 CHF per axle/km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise bonus</td>
<td>- 0.01 CHF per axle/km</td>
</tr>
<tr>
<td>Train path cancellations</td>
<td>50 - 100 CHF</td>
</tr>
</tbody>
</table>
3. The Basic Price Structure

<table>
<thead>
<tr>
<th>Minimum price</th>
<th>Contribution margin</th>
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</table>

Due to subsidies (with the political aim of modal shift) the charges for freight traffic are temporarily reduced:
Due to subsidies (with the political aim of modal shift) the charges for freight traffic are temporarily reduced:

**Conventional freight traffic**

<table>
<thead>
<tr>
<th>Year</th>
<th>Minimum price</th>
<th>Contribution margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td></td>
<td>fully subsidised</td>
</tr>
<tr>
<td>2005</td>
<td></td>
<td>2/3 subsidised</td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td>1/3 subsidised</td>
</tr>
</tbody>
</table>
Due to subsidies (with the political aim of modal shift) the charges for freight traffic are temporarily reduced:

**Combined traffic**

<table>
<thead>
<tr>
<th>Contribution margin</th>
<th>fully subsidised</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>Reduced to CHF 0.0010 per gr/t/km</td>
</tr>
</tbody>
</table>

until 2010
3. The Basic Price Structure

Example: Typical international freight train
3. The Basic Price Structure

- Example: Typical international freight train: Basel – Chiasso via Gotthard
3. The Basic Price Structure

Example: Typical international freight train: Basel – Chiasso via Gotthard: 321.6 km
1000 gr/t / 700 net/t conventional freight train

<table>
<thead>
<tr>
<th></th>
<th>Formula</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>$321.6 \times 1000 \times 0.0025 = \text{CHF} \ 804.00$</td>
<td></td>
</tr>
<tr>
<td>Train operation service</td>
<td>$321.6 \times 0.4 = \text{CHF} \ 128.64$</td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td>Day: $321.6 \times 1000 \times 0.0029 = \text{CHF} \ 932.64$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Night: $321.6 \times 1000 \times 0.0019 = \text{CHF} \ 611.04$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$6 \times 5 = \text{CHF} \ 30.00$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$4 \times 3 = \text{CHF} \ 12.00$</td>
<td></td>
</tr>
<tr>
<td>Nodes</td>
<td>$321.6 \times 700 \times 0.0052 = \text{CHF} \ 1170.62$</td>
<td></td>
</tr>
<tr>
<td>SUM</td>
<td>$\text{CHF} \ 3077.86 (9.57 \text{ per km})$</td>
<td></td>
</tr>
</tbody>
</table>
3. The Basic Price Structure

Example: Typical international freight train: Basel – Chiasso via Gotthard: 321.6 km
1000 gr/t / 700 net/t conventional freight train

<table>
<thead>
<tr>
<th></th>
<th>Maintenance</th>
<th>Train operation service</th>
<th>Energy</th>
<th>Nodes</th>
<th>Contribution m.</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>321.6 x 1000 x 0.0025 = CHF 804.00</td>
<td>321.6 x 0.4 = CHF 128.64</td>
<td></td>
<td>6 big nodes: 6 x 5 = CHF 30.00</td>
<td>Subsidised at the moment</td>
<td>CHF 1907.24 (5.93 per km)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 small nodes: 4 x 3 = CHF 12.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>321.6 x 1000 x 0.0029 = CHF 932.64</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Night</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>321.6 x 1000 x 0.0019 = CHF 611.04</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 3. The Basic Price Structure

- **Example:** Typical international freight train: Basel – Chiasso via Gotthard: 321.6 km
  - 1000 gr/t / 700 net/t combined traffic

<table>
<thead>
<tr>
<th></th>
<th>Calculation</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maintenance</strong></td>
<td>321.6 x 1000 x 0.0010 = CHF 321.60</td>
<td></td>
</tr>
<tr>
<td><strong>Train operation service</strong></td>
<td>321.6 x 0.4 = CHF 128.64</td>
<td></td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td>Day: 321.6 x 1000 x 0.0029 = CHF 932.64</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Night: 321.6 x 1000 x 0.0019 = CHF 611.04</td>
<td></td>
</tr>
<tr>
<td><strong>Nodes</strong></td>
<td>6 big nodes: 6 x 5 = CHF 30.00</td>
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</tr>
<tr>
<td></td>
<td>4 small nodes: 4 x 3 = CHF 12.00</td>
<td></td>
</tr>
<tr>
<td><strong>Contribution m.</strong></td>
<td>Subsidised at the moment</td>
<td></td>
</tr>
<tr>
<td><strong>SUM</strong></td>
<td>CHF 1424.84 (4.43 per km)</td>
<td></td>
</tr>
</tbody>
</table>
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4. Cost Recovery

The Swiss System of Financing Infrastructure

- Railway undertakings
  - National passenger traffic
  - Regional passenger traffic
  - Freight traffic

- Infrastructure
  - Network expansion
  - Development of the existing network
  - Conservation of Substance
  - Network Operation

- Swiss Confederation
  - FPT Fund
  - Ordinary budget

- Access Charges
4. Cost Recovery

- Infrastructure costs vs. Revenues (Example: SBB)
  Total Costs SBB Infrastruktur: CHF 3065 mill.
4. Cost Recovery

Infrastructure costs vs. Revenues (Example: SBB)

- Energy
- Operation service
- Maintenance
- Suppl. for nodes
- Contribution margin
- Suppl. services

Other services, rental revenues, services on own account, etc.

Subsidies to cut access charges (freight traffic)
- ‘Performance agreement’ CH and SBB

= 25.4 %
= 28.8 %
= 45.7 %
4. Cost Recovery

- Government expense for rail infrastructure vs. Revenues from track access
- Expenditures for infrastructure: CHF 3930 mill.

```
<table>
<thead>
<tr>
<th>'Performance agreement' between CH and SBB</th>
<th>Subsidies private railways</th>
<th>New Rail Link through the Alps</th>
<th>Rail 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1311</td>
<td>439</td>
<td>95</td>
<td>1320</td>
</tr>
<tr>
<td>603</td>
<td>193</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

Ordinary budget

FTP Fund (network expansion)

Revenues from track access charges
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- Reflection on marginal costs

- not the actual level of marginal costs is relevant for charging but the calculated / normed level of marginal costs (calculated average; ‘Normgrenzkosten’) studies show: this level tends to be too low
- equivalence to marginal costs is quite rudimental. There is no reflection of the specific costs of:
  - axle load
  - quality of rolling stock (‘track friendliness’)  
  - speed
  etc.
5. Reflection and Perspectives

Reflection on opportunity costs

- no scarcity charges for congested lines
- no peak load charges
- the quality of the train path is not taken into account
- no direct orientation on the willingness to pay

→ only small incentives for a more efficient use of existing infrastructure
5. Reflection and Perspectives

- Compatibility with competition

- level playing field for all competitors:
  - no quantity discounts or other non-linear tariffs
  - no advantages for big or loyal clients
- high compatibility with active competition:
  5 railway undertakings in the market of cross-alpine freight traffic (SBB Cargo, BLS Cargo [in alliance with Railion], Crossrail/RM Regionalverkehr Mittelland, TX Logistik, Rail4Chem)
  ➔ Productivity gains of active competition are important in the field of the Swiss policy of modal shift.
5. Reflection and Perspectives

Perspectives:
Planned changes / additional measures

- Design of an auction procedure in case of offers of traffic with equal priority (corresponding to the priority rule)
- Higher charges on the high performance rail network (e.g. the base tunnels): same price on the shorter new line and on the longer old line
- Introduction of a bonus/malus system to minimise delays (imposed by infrastructure managers or operators)
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