

Practice and Experience with Implementing Transport Pricing Reform in heavy goods transport in Switzerland

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1. Introduction

The focus of the IMPRINT-EUROPE thematic network is on developing recommendations for how to implement transport pricing reform based on the principle of marginal cost pricing. The Swiss contribution to Imprint therefore focuses on the recently implemented Swiss Heavy Vehicles Fee (HVF), which complies – though not entirely – with the objectives of this project. For a better understanding of its role in the Swiss transport policy, a brief description of Switzerland's overall approach to charging for use of transport infrastructure of the main transport means road and rail shall be given in the following chapter.

2. Approach to charging for use of transport infrastructure

Road

According to the Swiss Constitution, the use of the road network is free of charge. As a consequence, construction, maintenance and operation of this network is – mainly – financed by sources different from user charges. The revenue required comes primarily from fuel excise duties, vehicle licenses and - especially on the local level – public contributions.

The strict principle of the Constitution was weakened in 1984, when people agreed in a public referendum to the introduction of a motorway user permit and of a flat fee for heavy vehicles:

- **Motorway user permit:** The motorway user permit is a flat fee for private cars. It has to be paid for the use of the motorway network and costs at present about 25 Euros a year.
- **Flat fee for heavy vehicles:** This fee was in many ways similar to the Eurovignette. It was a flat fee, the rate depending on the weight class of the vehicle ranged till 1999 between 450 and 2'600 Euros (In 2000, before the introduction of the performance related fee, this figures were doubled for just one year).

In another referendum in 1998, people agreed to replace the flat fee for heavy vehicles by a distance related, or - to be more precise - a performance related fee. It is a charge with specifications according to its design, to the way it came about, to the use of the revenue etc. which will be explained in this paper.

Rail

In Switzerland, many projects for rail infrastructure are in realization or planned. From 2000 to 2020, about 20 billion Euros are or will be invested in such projects. The most important ones are Alp Transit, i.e. two new railway tunnels across the Alps with new access lines, and Rail 2000, both aiming at the modernization of the rail network. For the financing of these major projects a special fund was created, which is financed by different sources:

- part of the revenue of the Heavy vehicles fee(HVF)
- part of fuel excise duties
- 0.1 % value added tax (VAT)
- loans

Rail projects not included in this special fund are financed by contributions of the central government and the cantons.

The regulation dealing with the use of the rail network was reformed in recent years, this reform is still going on. Main points of the Railways reforms – with its implementation Switzerland also satisfied the relevant EU directives - are the introduction of free access, the separation of the infrastructure and transport sectors, the introduction of the commissioning principle and the liberalization of goods transport.

- Free access: Railways may use other companies' networks. In return they have to pay a fee, the train path price
- Separation of infrastructure and transport sector: This separation concerns the accounting and organization and brings increased transparency in the performance of services: performance-inhibiting cross subsidies disappear.
- Commissioning principle: The railway shall provide only those services that cover their costs. If that is not the case, the state may commission services which are considered essential for the country as a whole or for particular regions. The commissioning principle is now in force for regional transport, combined traffic and for railway infrastructure.
- Liberalization of goods transport: goods transport is now exposed to the forces of the free market and is expected to survive without state compensation. The state has, however the possibility of securing a basic service by commissioning goods transport services, depending on how the framework conditions develop.

3. How the HVF came about

It has taken 20 years from the very first approaches to the introduction of the Heavy Vehicle Fee (HVF). At the beginning, the main argument in favor of this fee was provided by the high uncovered costs of goods transport by road. Interesting enough, it was planned already at this early stage to introduce a performance related fee, differentiated according to weight and distance traveled. But it became apparent that it was – mainly due to technical reasons – too early for such a solution. Parliament therefore decided to introduce, as a first step, a flat fee (see above).

After this had been approved by a referendum, the Confederation was legitimated to collect the charge from 1985 onwards. One year later, a second proposal for a distance related fee failed. The population clearly rejected a corresponding popular initiative by ecological organizations.

Nevertheless, the discussion did not end there. The fixed fee had been conceived from the outset as a transitional solution to a distance related fee and was therefore limited in time. In the 1990s, the time seemed ripe for the change to a performance related fee. Exhaustive studies proved the substantial external costs of heavy goods traffic on the road and the technology for the electronic collection of the fee was now available. But decisive for the final break-through of the HVF was the key role it played and still plays in transit transport policy on one hand and the importance of transit traffic on the overall political level on the other.

Role of Transit Traffic

Since the middle age, transit across the Alps played an important role in Swiss history. It was not only important for the exchange of goods, but also for strategic reasons. Of special importance in this context was (and is) the Gotthard pass, the shortest and most direct connection between the regions north and south of Switzerland. Events along the Gotthard Pass are therefore of special political interest. This is especially true for the development in transit traffic since the opening of the Gotthard road tunnel in 1980. Up to this opening, goods transport across the Swiss Alps happened almost exclusively on the rail. Meanwhile more and more lorries profited from the short and cheap relation across the Alps. From a few hundred at the beginning their number increased steadily to about 4'000 a day in the year 2000. In comparison with the streams of heavy vehicles in industrialized areas this number may still seem to be low. But the special and difficult topographical and ecological situation in the Alps, the important role of the Gotthard pass in Swiss history and the strong interest of the neighboring countries, especially Germany and Italy, in reliable transport routes across the Alps led to a dominating role of transit traffic within the general debate on transport.

Key role of the HVF

The Situation in Transit traffic had led to a political deadlock. On one hand, Switzerland wanted to reduce the number of lorries by shifting goods transport from road to rail. In a referendum in 1994 a corresponding mandate was given to its government. At the same time, the Swiss economy was very interested in bilateral agreements with the EU. On the other hand, the EU requested not only “free access” for the lorries of its member countries to the Swiss Transit routes, but also the increase of the Swiss weight limit from 28 to 40 tons. Though it was clear that such an increase of the weight limit would have an additional strong growth in the number of lorries on the Swiss road, Switzerland could, because of its interest in the bilateral treaties, not simply deny this demand. The HVF provided a way out of this deadlock. If its rate would be fixed on a level high enough, the HVF would be a sustainable instrument against the avalanche of lorries people along the transit routes were afraid of. This constellation allowed the HVF to clear its final political hurdle in September 1998 with a surprisingly large mandate: After an energetic campaign 57 percent of Swiss citizens voted in favor of the new fee. This was the successful completion of a 20-year marathon. A little bit more than two years later, the HVF was successfully introduced.

Chronology of the Swiss Heavy Vehicles Fee (HVF)

- 1978: Parliament requires legal bases for a HVF
- 1980: Government suggests a distance related HVF
- 1984: Introduction of a flat fee for HV
- 1986: Initiative for distance related HVF refused
- 1994: Constitutional bases for distance related HVF accepted (Art. 85 Cst.)
- 1998: Law for distance related HVF accepted
- 2001: Law put into force

4. Charge level

The EU and Switzerland negotiated for a long time over the rate of a transit fee. They finally agreed on a compromise which is also well anchored in Swiss domestic policy, where it had been developed step by step, as the following explications show.

First step: Summarizing the uncovered costs of heavy traffic

To get a solid scientific basis for the setting of the charge level, in a first step the uncovered costs of heavy traffic were calculated. This included on one hand the uncovered road costs, on the other the external costs caused by heavy vehicles. As the road costs were covered almost entirely by the users (mainly by fuel excise duties), in this domain there remained a gap of uncovered costs of only about 10 million Euros. In order to calculate the external costs, the Swiss Transport Department commissioned wide ranging studies. These concentrated primarily on three areas of a significant size and that can easily be given a monetary value: health costs and damage to buildings caused by air pollution, the external costs of noise and the external costs of accidents. Not considered were among others the damages caused by congestion or the greenhouse effect.

▪ Air pollution:

To summarize the external health costs, the value of years of life lost due to air pollution caused by heavy vehicles was estimated. According to this specific study, the corresponding sum amounted to 260 million Euros. The costs of damages to buildings, summarizing to 220 million Euros, correspond to the costs for the cleaning of the buildings due to the emissions of heavy vehicles.

▪ Noise:

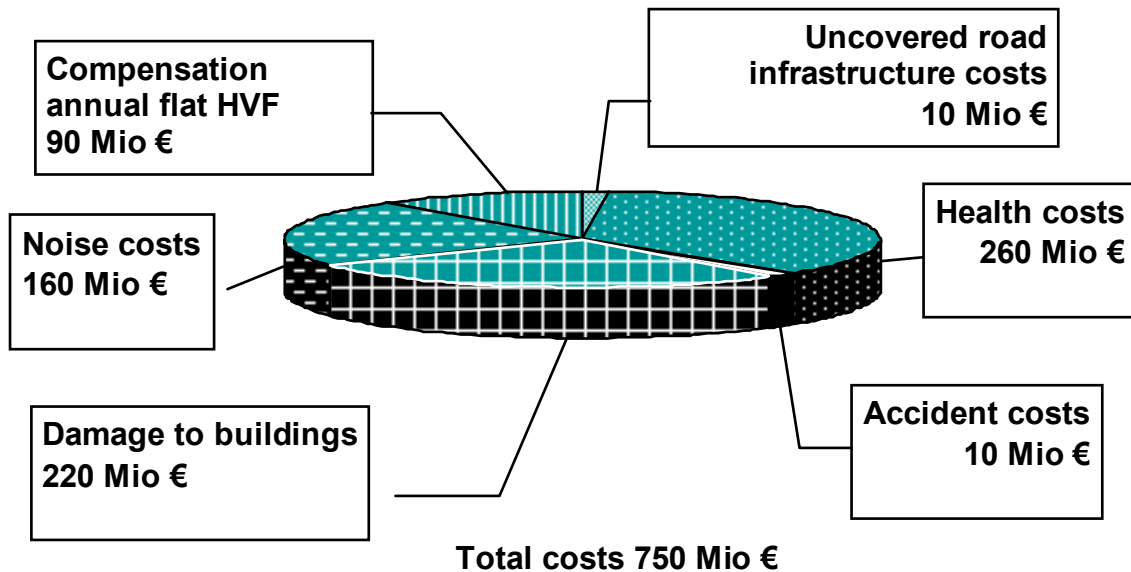
The costs of noise were calculated by comparing the value of houses situated close to a noisy street with the value of similar houses in quiet areas. The part of these costs attributed to heavy vehicles comes to 160 million Euros.

▪ Accidents:

As the costs of accidents are mainly covered by insurances, there remained a gap of “only” about 10 million Euros.

Altogether, the amount of the external costs is 650 million Euros. To this total, there had to be added the uncovered road costs and the amount to replace the flat fee, which was dropped in parallel to the introduction of the performance related fee. The total of the uncovered costs caused by heavy vehicles summarized therefore to 750 million Euros. The calculations use 1993 as baseline year; the data are currently being updated.

Costs to be covered by heavy vehicles 1993



Second step: Calculation of the total transport performance

In a second step, the total transport performance, measured in ton-kilometers (tkm) had to be calculated. First, the corresponding performance for each weight category was calculated. These figures were then multiplied by the average admissible weight in each category. For all classes combined, this gave the figure of 47 billion ton-kilometers.

Third step: Fixing the rate

Dividing the uncovered costs of 750 million Euros (as figured out in the first step) by the total transport performance in tkm (figured out in the second step) gives the value of 1.6 Cents per tkm.

Stepwise introduction

As mentioned above, the rate of the fee was also discussed with the EU while negotiating the bilateral treaties. The two partners finally agreed to introduce the new fee in several steps and in parallel with the increase of the weight limit:

- 01.01.01 Introduction of the HVF at a rate of 1.0 ct/tkm. Simultaneously increase of the weight limit from 28 to 34 tons.
- 01.01.05 Increase of the rate from 1.0 to 1.6 ct/tkm and of the weight limit from 34 to 40 tons.

For the transitional period between 2001 and 2005, Switzerland accepts a quota of 40-tons heavy goods vehicles (2003: 400'000). The fee for these vehicles consists of two components: a performance related fee on the bases of 34 tons and an additional flat fee of 40€. Switzerland also grants lower flat rates (at present 50€) for an annual total of 220'000 empty and light transports (up to 28 tons).

Compliance with marginal cost pricing principles

As economists among the readers will certainly – may be regrettably - have noticed, the approach chosen for setting the charge level does not correspond with a number of requirements of marginal cost pricing principles. It should be considered, that some simplification of marginal costs into categories is always going to be necessary to derive a charging system in practice. Stephan Suter and Felix Walter from the Ecoplan office (an Economic Research and Policy Consultancy which was in charge of the economical design of the HVF) argued as follows in favor of the Swiss solution:

...we analyzed the HVF along a narrow pricing or internalization approach. The strong and pure foundation on neoclassical welfare economics of pricing in transport is not uncontested. Some authors claim, that there should be the possibility left to put an internalization strategy into a broader context of policy goals and strategies than is presented by the narrow fairness/efficiency philosophy behind neoclassic (Rothengatter in Christensen et al., 1998). Policy goals of internalization can then be

- *optimal use of existing capacity*
- *abolition of subsidies that are not justified by public good characteristics of the transport system*
- *allocation of the costs to the agent who is responsible for their production (polluter pays principle)*
- *achievement of defined long term environmental/safety quality standards*
- *better balance of regional development*
- *better balance of social development*
- *development of new markets and new technology with lower consumption of natural resources*

Without going into detail it is obvious that the HVF is very suitable to contribute to some of these objectives and shows advantages compared to a fuel taxation. It is in this light that, according to our view, the HVF should be judged.”

5. Implementation

The implementation of the fee has two dimensions, the political and the technical one. From the beginning, the responsibilities for either side were strictly separated, the Department (or Ministry) of Finance being in charge of the technical, the Department of the Environment, Transport, Energy and Communication being in charge of the political side.

Technical implementation

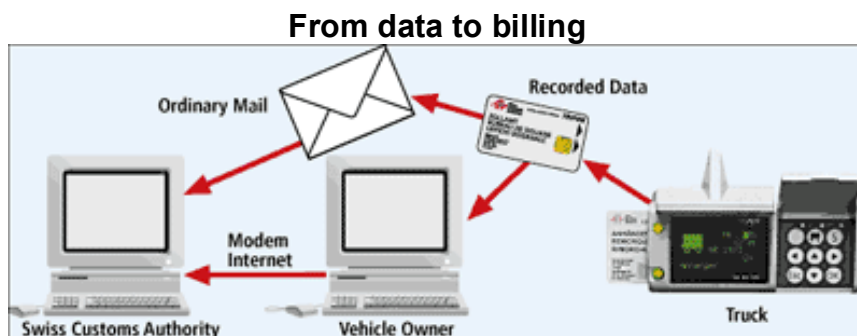
Taxable are heavy goods vehicles with a total admissible weight of more than 3.5 tons. For these vehicles, the fee varies according to the following three factors:

- The kilometers driven on Swiss territory
- The admissible weight of vehicle and trailer and
- The emissions of the vehicle (there are three categories)

In order to gather the relevant data, two systems had to be developed, one for domestic and one for foreign vehicles.

System for domestic vehicles

Each domestic vehicle has to be equipped with an on board unit (OBU). The OBU is given for free, but the owner has to pay the installation costs. This on board unit is fixed at the windscreen and connected with the tachygraph. As soon as the engine is started, the on board unit starts as well and counts the electronic impulses it gets from the tachygraph. In this way, it registers the kilometers driven. Different lamps at the back of the on board unit (visible from the outside) indicate information on the status of the vehicle. The admissible weight and the emission category are stored in the OBU as well as in the background system. At the beginning of each calendar month, the data stored in the OBU have to be transmitted, physically by chip card or electronically to the Swiss Customs Authority (SCA), which is, within the Department of Finances, responsible for the administration and the collection of the HVF. The checked and, if necessary, corrected data then form the basis for the calculation of the fee and the billing.



System for foreign vehicles

For foreign vehicles, the installation of an OBU is not mandatory, though owners of foreign vehicles can acquire them for free as well, if they demand it. If the vehicle is not equipped, the fee is registered by using an identification card at the special terminals for HVF clearance. This identification card is provided upon entering Switzerland for the first time and contains the relevant data, especially the admissible weight and the emission class. To get the distance relevant for calculating the fee, the driver has to insert on a form the actual mileage on the tachygraph when entering and when leaving the country. To avoid fraud, the distance driven is checked occasionally by comparing the mileage declared with the tachygraph and by papers the driver has concerning the destination of his goods. The fee has to be paid when leaving the country, either by cash or, preferably, by fuel credit cards or through an account with the Customs Authority.

The technical solution worked fine from the very first day the fee was introduced in 2001. The successful implementation was, however, not the most natural thing in the world. Two points had been especially critical (and controversial): the good functioning of the OBU and the question of possible delays at the border, due to the new system. The following factors were, according to the view of the author, decisive for the successful implementation:

- the long experience and the know-how of the Swiss Customs Authority on how to implement operational and data processing projects nationwide
- The use of a technology, that has been used successfully for road user charging before (DSRC)
- A good project organization, engaging up to 70 people during a period of four years.

Political implementation

In chapter three (how the HVF came about) the major steps on the way to the final implementation of the HVF are described. Looking back the following three reasons have been decisive for the finally successful implementation on the political level.

1. Political situation: It is interesting to know that before the final implementation project was started in 1996, a first draft for a corresponding law was criticized in consultation so heavily, that it seemed likely to give up the idea. It was the political deal, to offer the higher weight limit to the EU, getting the bilateral treaties instead and introducing the HVF to outbalance the negative effects of the higher weight limit which led the project on safe political grounds again.
2. Use of Revenue: As it can be learned from the EU Project called PRIMA (Pricing measures acceptance) the way the revenue of a road pricing project is used can be vital for the project. As the project showed, acceptance is especially good when the revenue is reinvested in transport infrastructure. According to the outcome of the project, the focus of this reinvestment had not necessarily to be the road. In fact, reinvestment in public transport showed an even slightly higher

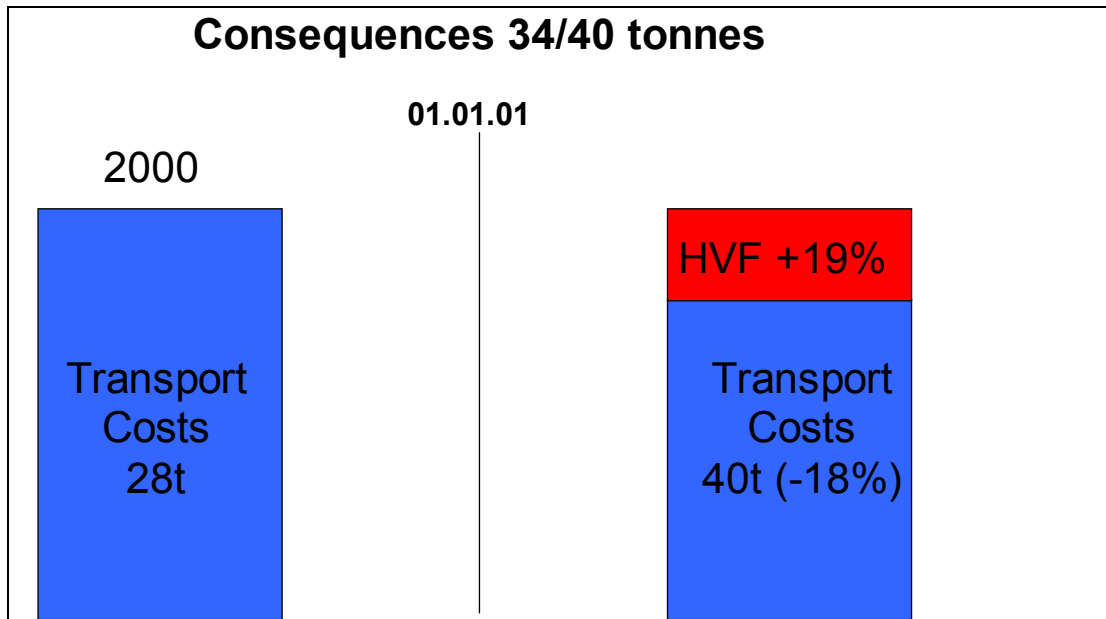
acceptance (about 85%) than reinvestment in the road (about 80%). Although it has to be considered that the Focus of PRIMA lay on Road Pricing in towns, the findings mentioned above can be confirmed by the experience made with the HVF: People explicitly (and with a large majority) agreed, that up to 2/3 of the revenue of the HVF are to be used for projects in public transport. This decision fits perfectly into the strategy of shifting goods from road to rail and helps to solve the problem of financing the new railway lines. The remaining third goes to the cantons where it is used mainly for road purposes (including measures to balance damages caused by road traffic). To increase acceptance of the HVF in peripheral regions, cantons with such regions get a bigger share from the revenue than the others.

3. Polluter pays principle: As the analyses of the Referendum showed, one of the strongest arguments in favor of the fee was its link to the polluter pays principle.

6. Impacts so far

For a correct assessment of the impacts of the HVF, the following facts have to be considered:

1. Though the HVF was introduced in context with the situation in transit traffic, it is applied on the whole road network and deploys its effects therefore on the whole territory of Switzerland.
2. The introduction of the HVF did not only mean a change according to the structure, but also to the (average) level of the fee. On an average, the fee rate per truck is now five times higher than it used to be until 1999 (from 2005, it will be about 8 times higher).
3. The fee was not introduced isolated, but simultaneously with a change of the weight limit: The consequences of raising the weight limit are ambiguous. On one hand it raises the productivity of road transport which in short term leads to less heavy vehicle traffic on the roads, on the other hand, it more or less balances out the advantage of higher competitiveness conferred on railways by the HVF (average gain in productivity for road transport of 18% due to the higher weight limit). The effects explained immediately below have to be seen as a result of the interaction between the HVF and the higher weight limit.



The figure shows that in terms of competition road/rail the overall gain in productivity of 18% in road transport due to the higher weight limit more or less balances out the cost increasing effect of 19% of the HVF.

Impacts on Road transport

Within the road transport sector remarkable changes could be noticed in terms of fleet composition, structure in the road haulage industry and on road performance.

Fleet composition:

In the year prior to the introduction of the HVF, sales of heavy goods vehicles increased by 45%. By renovating their fleets, truck owners saved money in two ways: new vehicles belong to the lowest and therefore cheapest emission class and the size (or admissible weight) of the trucks in the fleet could be better matched to the actual needs of the market (with the flat fee truck owners used mainly over-sized vehicles for the loads generally hauled).

Structure in the road transport industry

The new system led to a concentration in the hauler industry, either through mergers or through the closure of smaller companies. Larger companies are able to manage their lorries more efficiently and particularly avoid empty runs.

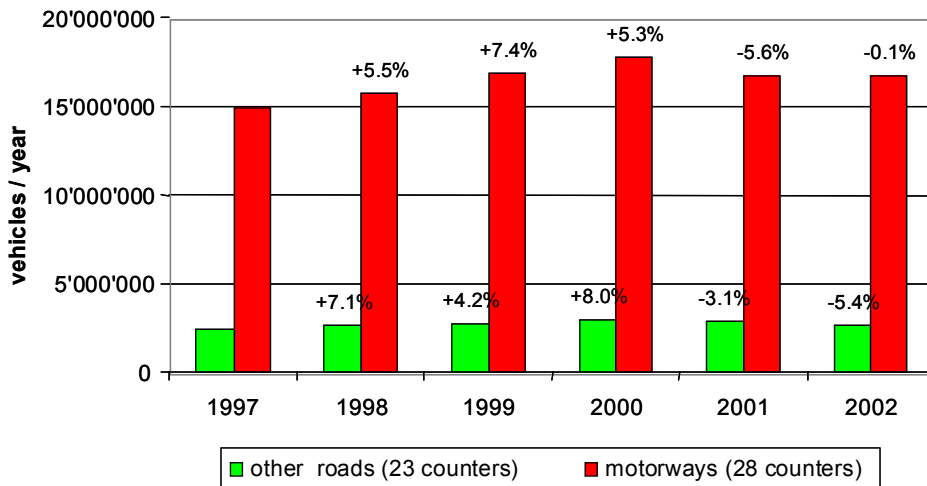
Road performance

As for the development of road performance, two levels have to be considered separately.

On the national level, the new traffic regime led to a significant break of the former growth-trend: annual increases of about 7% in the years before the introduction of the fee were replaced by a drop of around 5% in 2001. This decrease cannot be attributed to the slow down of economy, because it was also recorded in the first half of 2001, when economic growth was still about the same as in previous years. Interesting enough, the doubling of the flat fee in the year 2000 had shown no effect on growth in transport performance. The break in trend only happened after the change from a flat to a performance related fee.

Changes in the number of vehicles 1997 - 2002

Number of vehicles > 12,5 m



Changes are given in per cent from the previous year. The data are based on figures from electronic traffic counters for vehicle categories of over 12.5m. As the sample of counters is not exactly the same as the one used for the graph in "Fair and efficient", the figures are also slightly different. But the trend remains the same.

In transit traffic across the Alps, the higher weight limit led (in combination with the quotas for 40-tonners) to a tremendous increase of articulated lorries. As this increase was almost outbalanced by a significant decrease in the ratio of lighter lorries, the total number of lorries crossing the Swiss Alps in 2001 was practically stable. After the steady annual increase of about 7% before, this meant a break in trend. In 2002, the number of lorries across the Swiss Alps was even reduced by 9%. As this reduction might be mainly due to the restrictive traffic regulation system introduced after the tragic accident in the Gotthard tunnel on the 24th October 2001, this decrease cannot be considered as representative. At present, the number of lorries crossing the Swiss Alps is about equal to the level in the corresponding periods in 2000, the last year under the old regime.

Impacts on the rail

No significant influence could be measured so far on the performance of rail transport. According to what was said above, this is not astonishing: The better competitiveness of rail due to the HVF was outbalanced by increased productivity in road transport due to the higher weight limit. To reach a higher market share, railways have to improve their productivity as well. With the construction of new railway infrastructure and the railway reform program (see chapter 3), the necessary framework is established. There remains the interesting question, what might have happened in the rail sector if the effects of the HVF had not been balanced by the effects of the higher weight limit. In this context it is most interesting to know that since the introduction of the HVF, rail has a much bigger share in the transport of mineral oil from some Rhine ports to the oil storage sites in central Switzerland. Though mineral oil is a heavy good it is, at least in the short term, for various reasons (e.g. safety regulations and the capacity of road tankers) not possible to profit from the higher weight limit in this transport sector. This example shows clearly the importance of pricing where there is real competition between different modes of transport.

The importance of pricing is not the only lesson that can be learnt in the road-rail context from the mineral oil example. Another interesting fact is, that this example took place in the short-haul sector, where rail is said to be not competitive with the road. Other factors than distance seem to be more decisive for the choice of the mode. This seems especially true for the factor of reliability, as the following example shows: A retail firm, which originally transported all their goods on the road, has now shifted their transports to the Ticino (distance of about 200km) on the rail. One of the major arguments for doing so was the better reliability of rail, due to the difficult situation along the Gotthard road connection. The HVF was important insofar, as it compensated the gain in productivity of the road due to the higher weight limit. In conclusion, pricing measures can deploy their effects only if other conditions for the shift like reliability and simple procedures (what is often not the case in international rail transport) are fulfilled.

7. Revenues and Costs

Prior to the introduction of the HVF, the annual net proceeds had been estimated to the amount of 750 Million CHF (appr. 500 Mio €) for the period from 2001 to 2004 and to 1'500 Mio. CHF (appr. 1'000 Mio€) after 2005. As the following presentation of the numbers for 2002 shows, this estimation was quite precise. It has to be admitted, that this precision was not due to an overall precise estimation, but to the fact, that different divergences were outbalancing one another.

Revenues 2002:

In 2002 the gross revenue of the HVF amounted to 679 Mio. CHF (77%) derived from domestic, 203 Mio. CHF (23%) owed by foreign vehicles. Almost 2/3 of the fee owed by foreign vehicles was paid by fuel cards, the rest by account at the Customs Authority or by Cash.

882 Mio. CHF.

To figure out the net income, the following sums had to be deducted from the total of 882 Mio. CHF:

- | | |
|---|---------------------|
| ▪ Revenue from quotas (additional flat fee for 40-tonners, flat fee for empty and light transport. | 49 Mio. CHF. |
| ▪ Reimbursements (mainly due to specific regulations for combined transport and transport of woods) | 20 Mio. CHF. |
| ▪ Share Liechtenstein (the fee is due on the territory of Liechtenstein as well) | 5 Mio. CHF. |
| ▪ Reimbursement to SCA for Investments and Operation | <u>35 Mio. CHF.</u> |

Net income according to federal account 773 Mio. CHF.

This net income was distributed as follows:

- | | |
|---|---------------|
| ▪ Reimbursement to Cantons for their operational costs | 8 Mio. CHF. |
| ▪ Reimbursement for additional Enforcement | 13 Mio. CHF. |
| ▪ Share Cantons (1/3) | 251 Mio. CHF. |
| ▪ Share Federation (481 Mio for railway projects, 20 Mio for management of HGV traffic) | 501 Mio. CHF. |

Costs

According to the Swiss Customs Authority, the implementation Costs for the HVF amount to about 65 Mio CHF per year. In this amount are included the costs for research, investment, constructions, replacement, operation and personal. In the short term, these 65 Mio correspond to about 8% of the gross revenue. In the long term, the cost-performance ratio will even improve. While the costs remain stable, the revenues will raise considerably, due to the raise of the rate. The costs should be so in the range of 5-6% of the revenue.

This very good ratio is due to different factors:

- simple and efficient system
- low number of users
- comparatively high rate of the fee

8. Relation to objectives

According to what has been said so far, the main objectives of the HVF are:

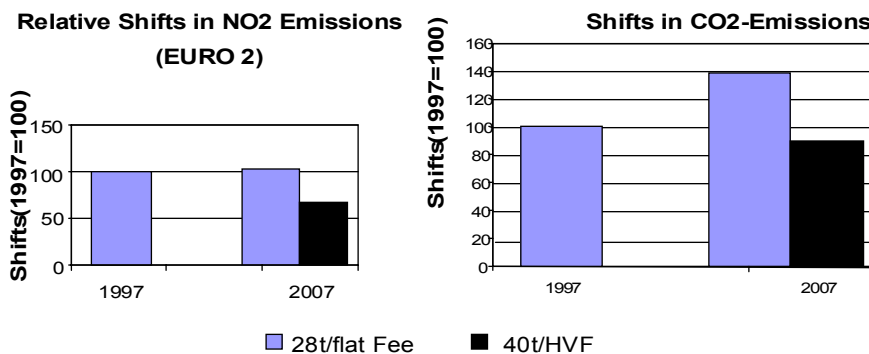
- Implementation of the Polluter Pays Principle
- Promoting the shift to rail
- Catalyst for Bilateral Treaties

Implementation of Polluter Pays Principle

The change from a flat to a performance related fee, depending on factors that give an incentive to drive less, to use lorries not heavier than necessary and with modern emission standards complies entirely with the Polluter Pays Principle. The fee deployed their effects even prior to its introduction, causing a considerable renovation of the fleet composition.

It is difficult to quantify the benefits the introduction of the HVF brought (or will bring) to the environment. The following Graphs, calculated by the Swiss Agency for Environment before the introduction of the fee, shows, that in 2007 the emissions of CO2 and NO2 caused by heavy goods vehicles will be about 30% lower with the new regime than it might have been if the old regime (flat fee, no higher weight limit) had been maintained.

Effects on environment



Promoting Shift to Rail

As explained in chapter 6, no considerable shift to rail could be noticed so far. The following facts need to be considered:

- The Share of Rail in goods Transport in Switzerland is already one of the highest in the world. Nationwide, it's about one third, in Transit Traffic across the Alps it's even about two thirds of the total (measured in tkm). On such a high level, it's difficult (but, as the example with the transport of mineral oil shows, not impossible), to get a higher share.
- Concerning the competition Road/Rail, the advantage for rail due to the introduction of the HVF was outbalanced by the higher weight limit. According to the report 2/99 of the Bureau for Transport Studies, a considerable shift to rail is not expected before 2005 (as a result of the higher tax rate and, especially, the phasing-out of the transitional period with quotas).

The real win in terms of goods transport is, so far, not the shift to rail, but the higher efficiency of road transport. This was not an objective explicitly postulated, however the positive effect remains the same. The shift to rail is not an objective in itself, but an objective to make goods transport more sustainable. To make road transport more efficient leads in the same direction.

Catalyst for Bilateral Treaties

The HVF played a key role on the way to find out of the deadlock in the negotiations between Switzerland and the EU about the bilateral treaties (see chapter three). It proved to be a solid ground: Two years after the HVF had been accepted, a large majority of the Swiss population said also yes to the bilateral treaties, which were on other hand also accepted by the EU.

9. Lessons learnt

The Swiss pricing reform in heavy goods transport is generally considered as a success. One of the key elements for its successful implementation was the strict separation of the political from the technical part. Lessons to be learnt should therefore also be treated separately on the levels of techniques on one hand and on politics on the other. But there is a third level, which is, according to the targets of the Imprint project, of specific interest: the level of science.

Level of Science: Solid bases

Chapter four has explained how a solid scientific approach had been developed to define the level of the fee. Of specific interest is the integration of external costs, leading to a considerably high rate of the fee. The fact that the approach chosen bases on full cost recovery and not on marginal cost pricing should not be overestimated. As shown in the project "Reforming taxes and charges of the ECMT subgroup on Fiscal and Financial Aspects of Transport" (see bibliography and sources), the approach of marginal cost pricing could lead in countries with traffic situations similar to Switzerland to a considerably higher charging level for Heavy Goods Vehicles (compared to today). Also the specific rate might be different the direction is probably be the same. As mentioned in chapter four already, some simplification of marginal costs into categories is always going to be necessary to derive a charging system in practice.

Decisive in the Swiss case was not the approach chosen, but the fact, that politicians finally accepted the internalization of external costs. This would not have been possible without the solid scientific work.

Level of politics: Clear targets

For the acceptance of the fee, the setting of clear and understandable targets proved to be decisive.

- **Polluter pays principle:** The polluter pays principle seems to be well accepted, at least as a principle. It has to be mentioned that things look different, when the principle would be applied not only to the comparatively small heavy goods transport sector, but to all road users. As the PRIMA project showed, in Switzerland the acceptance of road pricing for all users is not better than in any other country (or even worse).
- **Shift from Road to Rail:** The approach, to solve the transport problem not by hindering transport, but by presenting a better, more sustainable solution, was certainly helpful for the acceptance of the pricing reform. As it has been explained in chapter six, the corresponding results are, so far, ambiguous. Pricing is one element, which is decisive, as the example with the transport of mineral oil shows. But other conditions for the shift like reliability and simple procedures have to be fulfilled too. If this is not the case, as it happens especially in international transport only to often, a remarkable shift is not possible.
- **Use of revenue:** It is important to embed the use of the revenue in the policy (in the Swiss case the shift from road to rail). And there seems to be no problem to use the revenue of one transport mean to improve another. This finding complies with the experience of the London charge recently introduced as well as with findings of the PRIMA project.

Level of technique: Keep it simple

The following factors can be considered as decisive for the successful implementation on the technical level

- **Simple system:** The system is comparatively simple. Switzerland is considered like one single road pricing area. Two of the three factors determining the fee remain more or less stable (weight, emissions). A well experienced and basically simple technology (DSRC) is used for the correct registration of the third factor (distance). It was important to allow as few exceptions as possible and, where they could not be avoided, to keep their regulation simple as well. The simplicity of the system was one of the key factors for a comparatively good cost benefit ratio.
- **High competence of the authority in charge:** It proved to be wise elaborating the system for the technical implementation within the administration. In this way, the large competence in taxation matters of the authority in charge, the Swiss customs authority, could be utilized directly. The knowledge of external experts was essential of course, but these people were integrated in a project organization, which had been installed in January 1997 with the clear objective to introduce the fee on January 1st of 2001.

- **Cooperation with transport lobby:** It was natural that the road transport lobby had been fighting heavily against the introduction of the fee. But once the fee had taken its last political hurdle, the cooperation between the authority in charge and the transport lobby was (and is) good. This development was on one hand due to the cooperative proceeding of the Customs Authority. On the other hand, it proved to be an advantage to have a mandate not only of government or parliament, but of the people, which gives a higher political legitimacy to the decision taken.

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