

EC DG TREN, ALP-NET

# **NATIONAL PRICING STRATEGIES**

## **NEEDS AND POSSIBLE STRATEGIES FOR HARMONISATION**

Input paper for the ALP-NET Workshop 4 'Pricing and Financing of Alpine Transport Infrastructure'

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## 1. INTRODUCTION

Transalpine traffic has always been a special issue on the political agenda of transport policy. Both fast growing traffic volumes and its consequences in terms of environmental problems have prepared the floor for

- › An in-depth analysis of new infrastructure capacity,
- › New measures that will lead to a potential modal shift towards rail and combined transport as these means become more attractive to cover long distances.
- › A policy discussion for instruments that equilibrate the three important aims of the Alpine transport policy: i.e., Steering, financing and fair distribution of transit nuisances.

From an economical point of view it becomes obvious that pricing policies are an important factor for a comprehensive and hence an effective strategy. First, pricing instruments may directly raise people's attention that, in turn, will lead them to an alternative (and more sustainable) behaviour. Second, increased incomes may then be used to cover new investments and may even compensate for damages which are imposed on potential victims.

At preset, we find that alpine countries have chosen different approaches to tackle the issues above. Arguably, the different approaches are an outcome that may be explained by different backgrounds such as the individual history of the infrastructure development, the political relations and the differences in the perception of the environment as well as the economical importance of the rail sectors. Yet, until now neighbouring countries have ignored the cooperation aiming the application of a nationwide strategy. As a consequence we see unwanted effects such as traffic deviations, interoperability problems and still unused synergies between potential partners.

Since Switzerland has changed its regime from a command and control oriented to a pricing policy (2001, based on the bilateral treaty between Switzerland and the European Union), the common denominator on the strategic level is a road pricing policy. Yet, the policies of Switzerland and the EU countries differ rather widely in terms of their aims, the basic principles, their structure and price levels (as well as the level of invested subsidies). Compared to the situation before 2001 (i.e., 28 tonnes weight limit within Switzerland) we see, however, already some significant efforts towards harmonisation.

In the present paper we analyse the potential effects of a comprehensive pricing strategy both from an economical and political scientific point of view. We answer the question whether a harmonised policy is indeed necessary and - if so- what are the necessary con-

tributions (from the individual political stakeholders) that will improve the current situation. To answer these questions we have chosen the following approach:

- › a comparison between current strategies employed by the core countries (i.e., France, Italy, Switzerland, and Austria) and its history behind it,
- › a brief evaluation of the current state by investigating wanted and unwanted effects,
- › an analysis of the needs and criteria for an improved harmonisation,
- › an evaluation of potential policy designs and policy windows that improve the current situation.

In the section policy conclusions we synthesise our answers and recommend the necessary actions to be taken on the level of a comprehensive policy (including the EU, MS, and Switzerland).

## 2. TRANSPORT POLICY IN ALPINE REGIONS, A COMPARISON

### 2.1. HISTORICAL DEVELOPMENT

#### **The most important driving factors**

The historical development of Alpine transport pricing policy varies rather widely between different countries and is, therefore, beyond the scope of this study. From the literature (e.g. Maibach et.al. 1999, Kux et.al. 2000, Walter et.al. 2000), we may summarise the following core elements:

- › The policy development was bottom up based on national policy strategies; a real coordination between the countries became only visible at the levels of communication and transport statistics.
- › Politicians became aware that existing Alpine transport policies lead to negative effects because two major events took place: on the one hand, freight traffic volumes have increased dramatically as a result of improved road capacities that went for instance with the opening of the Mt. Blanc and the Gotthard tunnels. On the other hand, as a consequence of the increased traffic through the Alps environmental problems became more and more prevalent. Even more so when the EU has decided to set the overall HGV maximum weight limit at 40 tonnes, a decision that evoked a huge discrepancy between the neighbouring countries Switzerland (with an 28 tonnes weight limit), Austria (with a 38 tonnes weight limit), and France (with a 40 tonnes weight limit).

- › The national pricing policies rely on the necessary income to sustain the expensive infrastructure in the Alpine region. Here, we may distinguish between a corridor based scheme with its own institutional bodies (as in France, Austria, and Italy) and a more general financing scheme (realised in Switzerland and Germany).
- › The EU took its first initiative in the mid 80ies, and has subsequently prepared the basis for a more comprehensive implementation of national policies in the early 90ies. Though the EU has build some solid ground for such a policy a straight forward approach failed because the three core countries in question had different relations with the EU at that time. More specifically France was a member of MS, Austria was just about to join the EU and Switzerland still remains a non-member. Therefore, each of the three alpine countries negotiated individually and only on the bilateral level with European Commission.
- › Accordingly, the bilateral treatment of the European Commission led to a weak coordination (e.g. a weak common strategy) of the Alpine countries.
- › Because each of the three core counties fears that local policies will be weakened by accepting unwanted compromises, the efforts to collaborate more extensively remain little. It is also argued that alpine regions might get under political pressure from outside to weaken their strong positions at the national policy level. In this context it is quite remarkable that none of the countries has shown any intention to increase its revenues by allowing larger traffic volumes to pass through.
- › The need for an improvement of the situation for the railways (interoperability, combined transport terminals) increased the incentives to collaborate at least in several programmes to increase the share of rail transport.

In summary, the list above shows the current situation and the countries' positions that have to be considered for a comprehensive and successful policy. We conclude that, most importantly, a comprehensive policy needs to exclude all potential risks of an increase in traffic volumes as the partner countries will show little interest to cooperate otherwise. Furthermore, the political situation between the three core countries is rather different and therefore a clear strategy is not in sight at present. So far, the only effective driving factor that proved suitable for a closer collaboration was the effort to improve the interoperability in the railway sector as well as the technical adaptation between different charging systems.

### Switzerland as a special case

In the last years Switzerland has significantly changed its freight policy., It used to apply a command and control oriented approach that has now become a price oriented approach that aims both the explicit reduction of the volume of traffic and to split that volume into different channels (road or rail). Switzerland's response has been proven to be an important step forward towards a workable pricing policy that may also serve as a paradigm for all alpine countries, at least in the freight sector. Therefore, it is worth to remember the "milestones" listed below which illuminate why Switzerland took the initiative to change its policy (see Maibach et.al. 1999):

- › At the beginning Swiss officials strongly believed that the efficiency of the split-up strategy and of the reduction of traffic volume may be directly achieved by defining constraining boundary conditions. These measures encompass a low weight limit (i.e., at 28 tonnes) and a driving ban at night for Lorries.
- › Both measures were, however, in clear contradiction to the existing European policy that would not discriminate single modes of transport. Hence new solutions had to be sought and were eventually found in giving in to abandon the weight restrictions for heavy Lorries on the one side while charging higher road taxes on the other. These taxes are used to support new railway infrastructures and should simultaneously motivate entrepreneurs and private persons to use the railway as an alternative way of transport. (The new railway infrastructure consists of the two alpine base tunnels along the axes of Gotthard and Lötschberg.)
- › The idea of cross-financing railway infrastructure through new road charges became generally accepted and gave way for a pricing policy that was eventually also conformable with EU policies.
- › The functions of the pricing instruments are summarised below:
  - › Value capturing of the advantages of the (stepwise) introduction of the 40 tonnes limit,
  - › Internalisation of (mean) external costs (environmental costs and costs through accidents),
  - › Steering road freight transport across the Alps by KM- and weight-dependant charges (i.e., heavier vehicles are charged significantly higher).
  - › Financial support of the new railway infrastructures and direct contributions to cantonal budgets (for road maintenance).

## 2.2. AIMS AND STRATEGIES

Table 1 compares the different strategies employed by the Alpine countries with the focus on the role of the pricing instruments. Regarding the efficiency and the aims of protection the three countries are comparable. Nevertheless, the following differences between the countries are rather interesting:

- › Though all countries are concerned with how to improve their capacity of the railway infrastructures Switzerland is the only country so far that has guaranteed financing and outlined projects (under construction) that are realising the proposed aims.
- › In contrast to other countries Switzerland shows a high acceptance of railways as a mean of transport and is therefore more inclined to invest into railway improvements.
- › Based on legal commitments protection aims (indicators of traffic volume) are more developed in Switzerland than in any other countries. This is, however, only true concerning freight transport.
- › Thus Swiss pricing instruments (for the transport of freight) are primarily a control agent (to reduce the volume of traffic) whereas in other countries these instruments are rather seen as financial income.
- › Notwithstanding, Switzerland reveals a high discrepancy in that passenger transport has been merely neglected so far. Transalpine road passenger transport is restricted only weakly compared to road freight transport.

<b>AIMS AND STRATEGIES FOR A TRANSALPINE TRANSPORT POLICY</b>			
	<b>France</b>	<b>Switzerland</b>	<b>Austria</b>
<b>General aims</b>			
Transport aims	Transport efficiency	Use of railways, transport efficiency	Transport efficiency
Railways	Low use, improvement envisaged	Highly important	Low use, improvement envisaged.
Protection	General protection of the alps	Specific aims for freight traffic volumes	Specific aims for freight traffic emissions
<b>Freight transport</b>			
Specific aims	Financing of infrastructure	Reduction of traffic volumes on the road, improved modal split	Financing of railways and reduction of emissions from road freight
Role of pricing policy	Financing	Internalisation of external costs, value capturing of increased efficiency.	Financing and improvement of vehicle performance
<b>Passenger transport</b>			
Specific aims	Financing of infrastructure	No specific aims in Alpine regions	Financing of infrastructure
Role of pricing policy	Financing	-	Financing

Table 1

## 2.3. INSTRUMENTS

### General situation

Switzerland has been gradually increasing its weight limit from 28 tonnes over 34 tonnes to 40 tonnes (in 2005). The change in weight limits is followed by the introduction of a weight and distance-dependent HGV-fee. Since Switzerland has introduced the HGV-fee in 2001 all other Alpine countries have a similar pricing system in order to allocate road freight transport. The pricing principles, however, differ in the levels and in varying institutional setups. Except for France Switzerland and Austria use additional instruments which have also an important impact on traffic flows and the modal split:

› I.e., the ecopoint system for HGV transit traffic in Austria controls the level of NO<sub>x</sub> emissions (expected reduction by 40%). The allocation system is rather complicated and unique. In order to prevent from a significant increase of Lorries, an additional controlling instrument has been introduced and should restrict the maximum annual growth rate of flows at 8%.<sup>1</sup>

<sup>1</sup> The ecopoint system is under pressure from the EU. A phase out was planned until 2003. Latest developments show a new date of 2006. In addition the controlling element of the traffic amount has been brought to court.

› The night ban for Lorries in Switzerland is an important measure to favour railway services and may protect the population from noise nuisances.

Table 2 summarises the most important instruments that are implemented today.

<b>MAIN INSTRUMENTS FOR TRANSALPINE TRANSPORT POLICY (2002)</b>			
	<b>France</b>	<b>Switzerland</b>	<b>Austria</b>
<b>Pricing instruments road</b>			
Road pricing freight	Highway charging system and specific tunnel charges	Weight and km-dependent HGV-fee	Passage charges (along Alpine corridors)
Road passenger pricing	Highway charging system and specific tunnel charges	General flat fee on highways	General flat fee on highways and Alpine passage charges
Other (general) pricing instruments	Motor vehicle taxes and mineral oil tax	Motor vehicle taxes and mineral oil tax	Motor vehicle taxes and mineral oil tax.
<b>Non road-pricing instruments</b>			
Weight limits	40 tonnes, 44 tonnes for combined transport	34 tonnes until 2005, 40 tonnes after 2005	40 tonnes for HGV
Other restrictions	Weekend ban for lorries	Night and weekend ban for lorries	Weekend ban for lorries
Additional instruments	-	Increased traffic control instruments?	Ecopoint system
<b>Pricing Instruments rail</b>			
General rail subsidies	State aids for rail infrastructure and services	State aids for rail infrastructure and services	State aids for rail infrastructure and services
Subsidies for combined transport (C.T.)	State aids for specific investments (terminals)	Railtrack subsidies, subsidies for investments, no HGV charge for pre and end haulage?, subsidies for C.T. services (acc. and unacc. C.T.)	State aids for specific investments, subsidies for rolling motorway.
<b>Other instruments rail (only most important ones)</b>			
Infrastructure investments	Bilateral decision to construct a base tunnel between Lyon and Torino (TGV transalpine)q	Construction of two base tunnels (Gotthard and Lötschberg)	Plans to construct a base tunnel along the Brenner axis (Innsbruck-Verona)

**Table 2** Data are taken from, Maibach et.al. 1999b and additional investigation

There are much less instruments used for **transalpine passenger transport**. Whereas Switzerland is not applying for specific instruments for transalpine transport at all, France and Austria applies for specific road charges (tunnel charges, passage charges).

Regarding railway policy all countries are subsidising **combined transport systems**. Yet detailed instruments differ in the intensity. All Alpine countries support infrastructure

provision (i.e. terminals, specific feeder lines) through state aids. Switzerland is the only country which also subsidises combined transport services in using competitive benchmarking schemes.

### Exceptional situations after tunnel accidents

During the last two years three severe road accidents have happened in Austria (Semmering), France (Mont Blanc) and Switzerland (Gotthard). These accidents point to the importance of the issue of safety and led to additional measures that have recently been taken:

- › In France (after a long debate) the Mont Blanc tunnel has been reopened for Lorries. At present only Lorries with a maximum weight of up to 19 tonnes are allowed to pass through.
- › In Switzerland a capacity regulating system is used for the Gotthard axis. The capacity for Lorries is now significantly reduced.

Though these specific safety measures have been regarded as temporarily instruments, they might still remain of importance in the future.

## 2.4. PERFORMANCE OF PRICING INSTRUMENTS

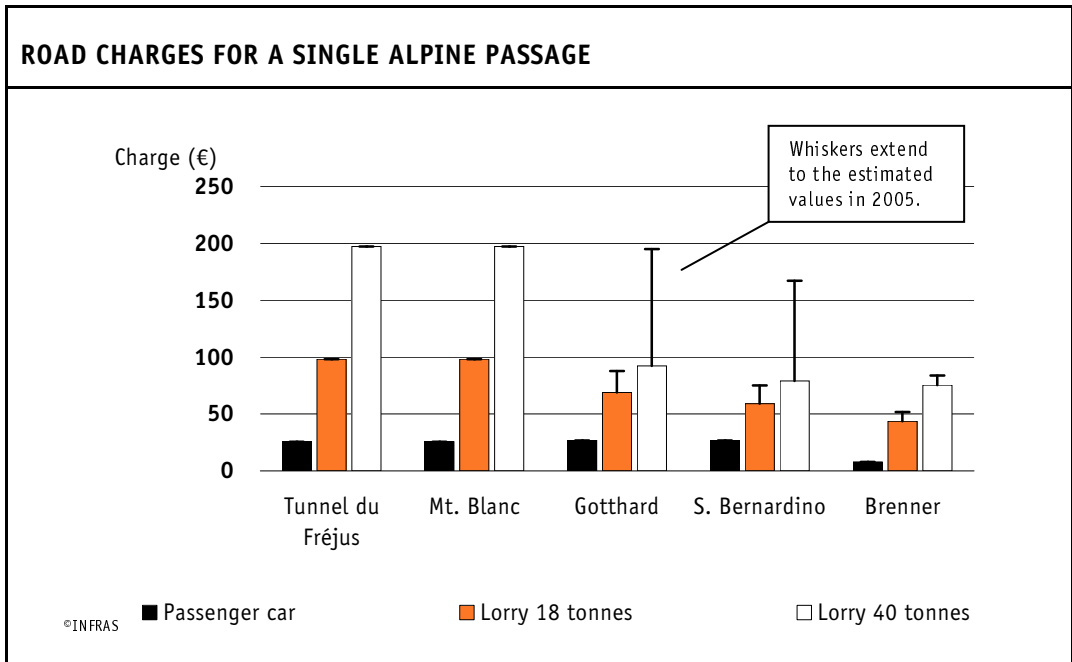
As emphasised above we ought not to compare pricing systems on their own since they are part of a policy mix. For reasons of simplification in this chapter we compare, however, the current principles and levels applied with the future situation in order to find a common denominator that ease a harmonised policy. Table 3 summarises the most important features; Figures 1 to 4 compare the price situation on different basis.

<b>PRICING INSTRUMENTS IN TRANSALPINE ROAD TRANSPORT</b>		
	<b>Freight Transport</b>	<b>Passenger transport</b>
<b>France</b>		
Pricing Principle applied	Ramsey pricing/Average cost pricing for highways and passages General average cost pricing for other roads	Ramsey pricing/Average cost pricing General average cost pricing for other roads
Price structure	Highway charging system acc. to distance and vehicle categories (weight, axles) and user characteristics (e.g. frequency rebates) Tunnel charging system acc. to vehicle categories (weight, axles)	Highway charging system acc. to distance and vehicle categories Tunnel charging system acc. to vehicle categories and user characteristics (e.g. frequency rebates)
Technical system	Manual, Smart cards, DSRC 1)	Manual Smart cards, DSRC 1)
Future developments	No specific changes envisaged, increase of tariff level	Non specific changes envisaged, increase of tariff levels

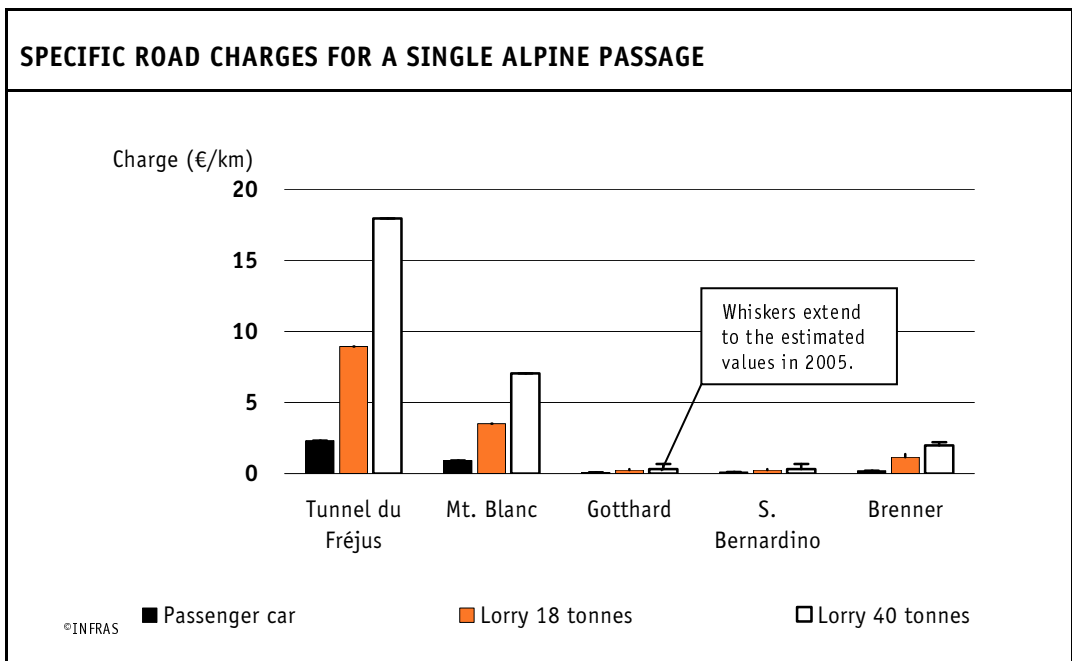
<b>PRICING INSTRUMENTS IN TRANSALPINE ROAD TRANSPORT</b>		
	<b>Freight Transport</b>	<b>Passenger transport</b>
<b>Switzerland</b>		
Applied Pricing Principle	External charging (with the new HGV fee) of all roads, average cost charging all roads with diesel and motor vehicle tax	Average cost charges of all roads
Price structure	Weight, distance, EURO classes	Not specific for Alpine regions
Technical System	Tachograph, GPS	-
Future developments	Increase of charges (with parallel increase of weight limit) by 56% 2005	No change envisaged
<b>Austria</b>		
Applied pricing principle	Ramsey pricing at Alpine passages, general average cost pricing for all roads	Ramsey pricing at Alpine passages, general average cost pricing for all roads
Price structure	Passage charges acc. to vehicle categories and user characteristics (e.g. frequency rebates) Night/Day	Passage charges acc. to vehicle categories and user characteristics (e.g. frequency rebates)
Technical System	Manual, DSRC (as well in future)	Manual, Smart Card, DSRC
Future developments	General highway road pricing 0.22 Eurocents per km, differentiation as well as acc. to EURO-classes	General highway road pricing in the long term envisaged.
<b>Germany</b>		
Applied pricing principle	Average cost charging through Euro vignette	Average cost charging for all roads
Price structure	Vehicle categories and EURO-norms	Not specified
Technical System	Manual, In future GMS	-
Future developments	KM-and vehicle (EURO)-dependent charge, average 0.15 EURO cents/km	No change envisaged
<b>Italy</b>		
Applied pricing principle	Ramsey Pricing on Highways	Ramsey Pricing on Highways
Price structure	Acc. to vehicle categories	Acc. to vehicle categories
Future developments	No specific changes envisaged, increase of tariff level	No specific changes envisaged, increase of tariff level

1) Dedicated Short Range Communication

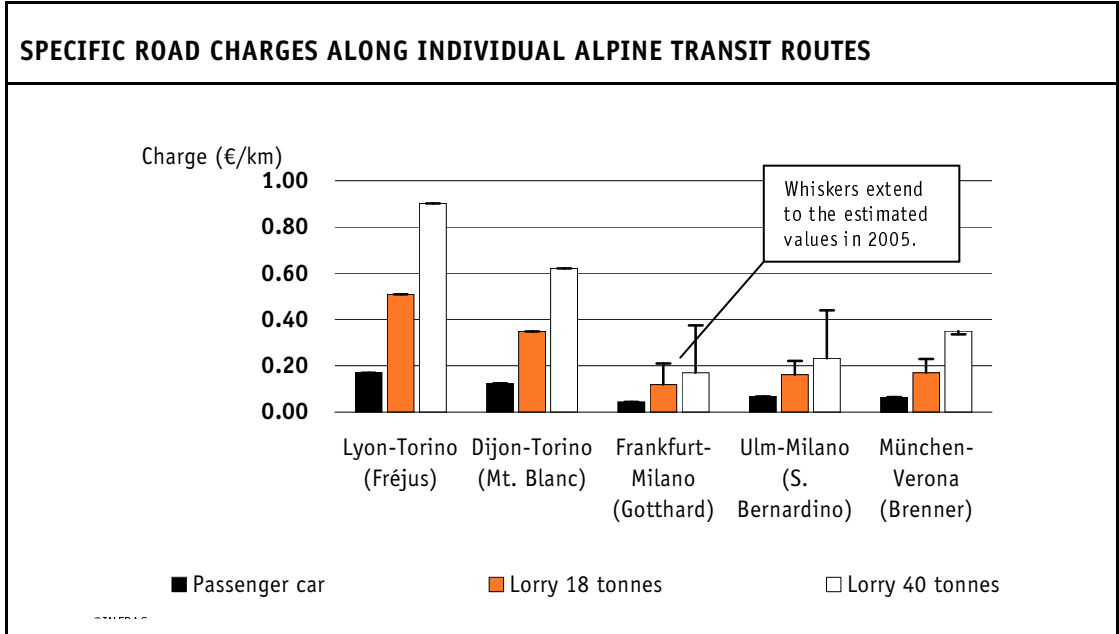
Table 3



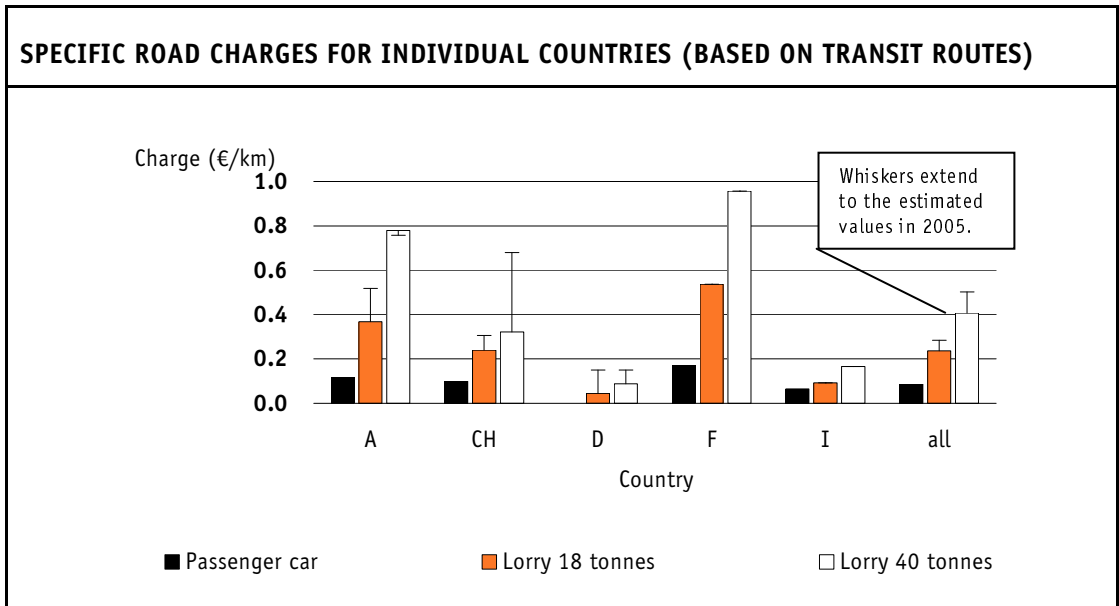
**Figure 1** The graph shows the current and future absolute road charges imposed for different alpine passages. Values represent the cheapest fare for one single passage. Please note that for all countries except for Switzerland prices will decrease for multiple passages due to allowed discounts. In contrast, within Switzerland road charges will linearly increase with the distance travelled.



**Figure 2** The graph shows the current and future relative road charges per km imposed for different alpine passages. Values represent the cheapest fare for one single passage. Please note that for all countries except for Switzerland prices will decrease for multiple passages due to allowed discounts. In contrast, within Switzerland road charges will linearly increase with the distance travelled.



**Figure 3** The graph shows the current and future relative road charges per km imposed for the complete individual alpine transit routes. Values represent the cheapest fare for one single passage. Please note that for all countries except for Switzerland prices will decrease for multiple passages due to allowed discounts. In contrast, within Switzerland road charges will linearly increase with the distance travelled.



**Figure 4** The graph shows the current and future specific road charges per km imposed within individual countries. Values are computed on the basis of the imposed road charges along the routes given in Figure 3. Values represent the cheapest fare for one single passage. Please note that for all countries except for Switzerland prices will decrease for multiple passages due to allowed discounts. In contrast, within Switzerland road charges will linearly increase with the distance travelled.

## 2.5. CONCLUSIONS

In conclusion we may distinguish between the following commons and divergences in terms of pricing policies. It is important to distinguish between freight and passenger transport.

### **Commons in freight transport**

- › If Germany and Austria are introducing a KM-charge for lorries all Alpine countries will apply the same type of pricing instrument,
- › The expected adaptations within the charging systems (Switzerland, Austria, Germany) will lead to coherent price levels,
- › There is a tendency in common price differentiation regarding environmental criterions (e.g. EURO-norms); apart from France and Italy that use criterions,
- › Though the amount of subsidies of combined transport are not equal they are a common denominator of rail provisions

### **Divergences in freight transport**

- › While France, Italy and Austria (today at its passages) use a demand oriented pricing system (for the number of passages) Switzerland, Germany and Austria on the other hand use a cost oriented system. The second system will not be beneficial for multiple passages.
- › The levels of charging are still different. A neutral comparison, however, is difficult because other costs and taxes are also relevant.
- › The price structure is very individual, although some criteria (e.g. vehicle categories) are similar.
- › The technical systems to collect the charge differ quite widely. The transparency is weak.
- › Switzerland is the only country which applies a charging system for all roads. All other charging systems are concentrated on highways,
- › The level of subsidies for combined transport is much higher in Switzerland than in other countries.

### **Commons in passenger transport**

- › Pricing is less dominant compared to freight transport.

### **Divergences in passenger transport**

- › There are two groups to distinguish. France and Italy (partly Austria) collecting charges with an own institutional body, and Germany and Switzerland with no specific pricing instruments.

### 3. COHERENT POLICY: AIMS AND CRITERIA

Harmonised pricing schemes have to be embedded in a coherent policy approach considering the main aims of sustainable transport solutions in Alpine regions. Many scientific and political studies have elaborated such criteria. Looking at the different sources (Alpine convention, UVEK 2001, EST 2000) available, we can state the following propositions:

- › **Efficient transport:** All modes should use the most efficient way of transportation, that means the shortest route, optimal use of infrastructure with low congestion, high load factors with little share of empty vehicles, best available technology,
- › **Optimal modal split:** Rail and road should use their comparative advantages: Long distance transport should favour rail wagon load or combined transport solutions, if feasible transport services can be presented.
- › **Interoperability and Non-Discrimination:** Transport should be based on market based approaches, enabling access to infrastructure with low transaction costs. Pricing instruments should use similar technology with a high degree of interoperability.
- › **Effective protection of the Alps:** The environmental targets within environmentally sensitive areas should be considered, mainly air pollution and noise levels in valleys, nature and landscape. For this purposes, effective additional cost-effective measures might be added.
- › **Fair distribution of transit nuisances:** The nuisances for one alpine region should not exceed a certain level compared to others and the costs and benefits of transalpine transport should be balanced in a fair manner.

These five main aims are not free of conflicts and trade off's. Most obvious is the trade-off between efficient and non-discriminatory transport solutions and effective and fair protection of the Alpine regions. There is no strong scientific approach to solve these conflicts. Some approaches however are interesting and helpful towards optimisation.

- › Railways might not be that efficient than road solutions. But their environmental and social performance is definitely superior. Thus the improvement of modal split is one important path towards sustainable solutions in Alpine regions, which is as well visible in national transport policies. Cross-financing solutions based on pricing options, as it is applied in Switzerland, are therefore important strategies towards more coherence. This approach is as well recommended within the recent EU White Book for the future Common Transport Policy.

- › Within sustainability criteria sets, participation has a very important role. It guarantees access of the regional population to shape sustainable solutions including a more concrete definition of their protection and development aims. This approach has to be understood in its political context. The Alpine Convention (and the respective transport protocols) are important elements.

#### 4. EVALUATION OF TODAY'S STATE

Applying the criteria developed above and the description of today's (and next future) policy designs, we are able to evaluate the systems briefly and to clarify the needs for more coherent solutions. The evaluation is very much based on pricing instruments.

<b>EVALUATION OF COHERENCE IN TRANSALPINE PRICING POLICIES</b>		
	<b>Today's state</b>	<b>Future development</b>
<b>Efficiency</b>		
Road Freight	There are minor detouring effects still visible, especially detouring Switzerland. After the change of the Swiss regime towards an HGV tax, 200'000 trucks changed their route towards Switzerland. The detouring effect of the Swiss night ban is unclear. In general the introduction of the Swiss HGV-tax increased loading factors significantly and reduced the amount of empty trucks. There might be as well other detouring traffic, if ecopoints are getting scarce in Austria (dirty vehicles towards Switzerland). The incentives to use high load factors are bigger in Switzerland than elsewhere. The incentives to use low emission vehicles are highest in Austria, whereas there is no real incentive in France.	The future plans (Switzerland, Germany, Austria) will lead to less detouring traffic. Is unclear how non highway routes (e.g. Munich-Garmisch-Innsbruck) might be used instead of normal highway routes. Other differences occur in the upper Rhine valley (San Bernardino corridor).
Road Passenger	Detouring effects are minor (special holiday traffic), although price differences are huge. There are no incentives to use environmentally friendly cars.	No real change in future visible.
Rail Freight	The relatively high subsidy level for combined transport in Switzerland might lead to 'cannibalisation' of rail traffic (from other passages to Switzerland).	The attractive rail axis with two base tunnels in Switzerland might lead to longer distances.
<b>Modal split</b>		
Freight transport	Today's pricing levels do not lead to significant changes of modal split. Modal split relations remain stable.	The higher road transport pricing regimes and the new base tunnels in Switzerland will improve modal split.

<b>EVALUATION OF COHERENCE IN TRANSALPINE PRICING POLICIES</b>		
	<b>Today's state</b>	<b>Future development</b>
Passenger Transport	Pricing instruments are not used for modal split changes	No change
<b>Interoperability and non Discrimination</b>		
Freight Transport	The interoperability of the charging systems is low. Truck drivers need different appliances. Track pricing systems for the railways face minor interoperability problem in comparison to technical and organisational interoperability. The night ban in Switzerland is forbidding trucks. If scarce ecopoint cannot be bought, the same is true in Austria.	There is even a higher difference within the operability of charging systems, since Austria and Germany are supposed to introduce different technologies.
Passenger Transport	The charging systems in Austria, Italy and France lead to waiting times at the charging places.	More technical progress might reduce waiting times.
<b>Effective protection of the Alps</b>		
Noise and Air pollution	The level of protection is rather different in the three Alpine countries. There are specific schemes only in road freight transport. Austria is very NOx-effective (Ecopoint system), Switzerland is noise effective (night ban) and emission effective (EURO-differentiation).	The envisaged differentiation of the charging system in Austria and Germany might improve the situation for road freight transport.
Nature and Landscape	No direct effects.	The cross-financing approach in Switzerland is enabling the construction of new rail capacities. Tunnels will help to protect nature and landscape.
<b>Fair distribution of transport nuisances</b>		
	The distribution of transport flows is not according to equity criteria. Modal split in Switzerland is significantly better than in other Alpine countries.	The differences might diminish, if Switzerland is opening base tunnels. Investment costs on the other hand are rather high (no subsidies from other countries)

Table 4

The table indicates clearly, that today's situation is not optimal in regard to the criteria of sustainable transport solutions. With respect to pricing policies, we can summarize the following strengths and weaknesses:

### **Strengths**

- › There is a common basis of road pricing solutions in road freight transport, where financing (and cross-financing) aims are considered. Although the levels and the differentiation are not harmonised, detouring traffic is not caused due to pricing system, but due to not yet harmonised flanking measures like ecopoints, night bans etc.

- › Road-Rail solutions are most important and lead at least in the direction of more coherence and sustainable transport.

#### **Weaknesses**

- › The charging systems are not interoperable and lead to additional transaction costs (information, waiting times),
- › The different levels and differentiation do not provide enough incentives to use environmentally friendly vehicles. This is especially true for private cars and light trucks.
- › The pricing strategies are not able to provide enough financial means to change modal split significantly especially outside of Switzerland.

This brief analysis can be used as the basis for more cohesion in pricing strategies. Within the next chapter, we compare different strategies and seek for a common path of development.

## **5. POSSIBLE STRATEGIES**

### **5.1. SOCIAL MARGINAL COST PRICING**

If all transalpine modes would be charged according to an efficient pricing principle, the prices for rail would increase and the prices for road might even decrease. The latter can be expected since external costs in Alpine corridors are usually rather low (low level of congestion, little population, difficult measurement of environmental nuisances in sensitive areas). On the other hand the high the level of fixed costs (tunnels, bridges, shorter life expectancy etc.) is above average. It must be expected that prices according to social marginal costs are not able to cover ongoing expenses (and foreseen investments).

A puristic approach of social marginal cost pricing therefore would only fulfil short term efficiency criteria, but might lead to deficits in regard to modal split and environmental protection. On the other hand, social marginal cost pricing is able to define different pricing levels for different type of vehicles, being an important basis for price differentiation (e.g. according to weight and environmental criteria). This can be expanded, if specific capacity problems (i.e. congestion at Alpine tunnels) or specific safety issues are relevant.

## 5.2. FULL COST PRICING ROAD, MARGINAL COST PRICING RAIL

This approach is more or less used in Switzerland (in average), since Swiss trucks pay (with their HGV-charges and taxes) more than just infrastructure costs, whereas the railways are paying more or less marginal infrastructure costs. This solution is the basis for cross-financing, since the surpluses of the road sector might be used to finance rail infrastructure. This approach is definitely less efficient than social marginal cost pricing, but more effective in regard to modal split and protection aims.

There is a parallel to this approach in urban areas, where road is producing costs above average (mainly due to congestion), whereas urban public transport is not able to pay the costs by its own. There is the (rough) assumption, that the difficult sensitive elements in Alpine regions can be expressed as extra charges of road in comparison to rail.

## 5.3. NEW INSTITUTIONALISM AND RAMSEY PRICING

This third approach does not applying a common pricing approach, but wants to harmonise institutional elements, as the situation in France, Italy and Austria points out. Possible extensions of this approach might be as follows:

### **Corridor Road Company**

Similar to the situation in France, Italy and Austria, a company should manage the infrastructure in an efficient way and should pay the relevant protection measures. In these cases, the company is responsible for the financing of new investments (capacity increases and environmental protection measures such as compensation for nature and landscape and noise walls or windows). Especially Germany and Switzerland would charge not only freight, but as well passenger transport. The price levels for freight might increase especially in Germany, since the company should be able to finance its own investments by road charges (applying some sort of Ramsey pricing strategy). There would be only a weak incentive to differentiate charges according to environmental criteria.

### **Corridor Company**

One could imagine as well further developed institutional models, where a corridor company is managing road and rail solutions at the same time, being free to choose between different improvement paths. The path will be depending on efficiency criteria (willingness to pay and potential to pay of different modes and environmental restrictions (noise/emission targets)).

Such strategies are definitely very different to implement in a harmonised way. They are however interesting on a more scientific (virtual) level since the strategy of the actors might differ. There is especially a competitive aspect, where an infrastructure operator even might be interested in acquiring transport in order to increase income.

#### 5.4. HARMONISED POLICY MIX

Finally one could imagine a comprehensive situation, where pricing policies are mixed with other instruments, in order to protect Alpine regions effectively from transport nuisances. Important elements are

- › General night bans, being very effective for noise and favouring modal split if railway noise emissions are not contradictory.
- › Emission bubbles or general environmental targets for all means of transport, embedded in efficient instruments such as emission trading schemes.
- › Harmonised traffic controls, especially in order to increase safety (e.g. driving hours) and social security (legal status of lorry drivers),
- › Capacity restrictions for certain transport flows and capacity shift to more environmentally friendly means of transport (including eco-efficient truck and car systems).

The shape of an efficient policy mix should be based on the understanding, that pricing is the core instrument supplemented by policy components which cannot be priced in detail or where the benefit of reaching clear (environmental) targets is very relevant.

#### 5.5. COMPARISON: ELEMENTS OF MORE COHERENCE

It is obvious that today's national pricing policies and additional flanking measures are all using part of the elements shown above. It is as well obvious that institutional changes (such as the founding of new corridor societies) are much more difficult to implement than the adjustment of an existing pricing strategy. Thus the core elements towards more harmonisation of pricing policies are:

- › A differentiated pricing scheme considering external costs, based on a km-dependent scheme. The differentiation should include environmental criteria and incentives to maximise loading factors,
- › A technical collecting scheme which is compatible through all countries, mainly based on a GPS-system in the longer run,
- › A cross-financing scheme road -> environmental protection measures and road -> rail, being able to define and justify price levels above social marginal costs,

- › An institutional body being able to allocate financial means between road and rail in an efficient way. An important precondition is the availability of transparent evaluation and appraisal instruments (socio-economic cost benefit analysis).
- › Additional flanking elements (not pricing) which allow to guarantee protection aims in sensitive Alpine regions.
- › A path from road freight transport towards road passenger transport going along similar pricing principles and clearing techniques.

## 6. POLICY CONCLUSIONS

This paper points out clearly that Alpine transport policy is an important key factor for the development of more sophisticated and coherent pricing instruments, since the problem squeeze is more severe than elsewhere. It is also made visible that the Alpine core countries have similar aims and strategies with respect to pricing. This led to significant cohesion processes in the last couple of years. Especially in road freight transport, road pricing systems are a common denominator, although the pricing principles, the institutional framework and the price levels differ quite significantly.

A harmonised pricing policy should firstly provide a framework for common pricing techniques. It is not very useful and efficient, if countries like Germany and Austria introduce new schemes at the same time and will apply different techniques. At the same time Switzerland applies an own scheme with own On Board Units. A harmonisation step has been prepared with several actions on a European level. An interoperability directive for this purpose however is still missing.

Secondly a common pricing principle has to be developed. It is useful to define a social marginal cost approach as a baseline for price differentiation (e.g. according to weight criteria and EURO-norms). Due to the fact however, that the definition of marginal costs in Alpine regions is very difficult and usually arbitrary, additional elements have to be considered. Most obvious is the link to total infrastructure costs and steering aims and environmental targets. In this sense, price levels according to total infrastructure costs are justified. If – like in Switzerland – additional investments in the railway's sector are foreseen, the price level could be even beyond total road infrastructure costs. In this context, road freight and road passenger transport should be considered. Cross-financing might not be a general transport policy approach for several economic reasons. Within Alpine transport

however, the approach is very useful, since railways are the only alternative to guarantee non-discriminatory transalpine traffic access.

Thirdly it has to be accepted, that pricing regimes alone are not able to guarantee an essential protection aims in Alpine regions. Coherent pricing regimes should be accompanied by additional measures. Punctual traffic bans (like a night ban) are definitely a possible additional measure and very cost-effective. A weaker variant is a differentiation according to day times, as Austria is applying it, and a ban for not environmentally friendly vehicles.

Finally, pricing regimes should support as well quality and interoperability issues of the railways sector, especially for combined transport. Track pricing along the Alpine corridors, one stop shops and better quality are corner stones of sustainable rail solutions. Track prices should consider environmental and quality criteria at the same time, in order to provide incentives for improved rail solutions.

Transalpine transport policy is very politically discussed in all Alpine regions. Thus it is not easy to provide scientifically based recommendations for an implementation path towards more cohesion. The introduction of Km-dependent schemes for road freight transport in Germany and Austria is definitely one of this very first (and hopefully realistic) step. A next step might be visible, when Austria and the European Commission have to discuss further solutions for the abolishment (or change) of the Eco-point system. A possible next step might be the discussion of general road pricing solutions as well for passenger cars, maybe also in the context of the realisation of other railway corridors in Austria and France. In any case, there are several policy windows visible in the future. Thus a leadership from the European Commission towards more coherence is useful. A first step has been done with the approaches described in the White Book for Common Transport Policy.

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