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THE SYSTEM OF TRANSPORT COSTS AND PRICES

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There is a very close relationship between transport costs and transport prices (or pricing as the case may be). As we want to maximize the social welfare we must construct transport prices in accordance with marginal cost together with preservation of equality of price and marginal social cost.

Principles of pricing presented in this article are primarily focused on the public infrastructure. According to the principles of market economy, private companies will probably expense full infrastructural costs (the sum of fixed costs and variable costs) for the purpose of recoverability of invested costs instead of marginal (variable) infrastructural costs by constructing optimal prices. In case of the co-operation between public and private sector the interest will be focused on recovery of invested costs.

The costs and prices relationship exists throughout the transport system – from market prices via direct and indirect taxes right to toll. Please find below simplified overview of transport costs, prices and tax policy.

1. The model of transport costs and prices

In a simplified view of the transport costs system, we can assume that all modes of transport require considerable investment in the vehicles acquisition, vehicles maintenance and fuel purchasing. These costs are called source costs of transport and

are at user's expense as they are part of paid charges. They are generally cost results of market transactions.

There are also other costs we have to keep in mind – costs that are not borne by each individuals and costs borne by individuals just partially. These costs are called external costs. External costs cover the cost accruing from the air pollution, noise, security risks, infrastructure costs and congestions costs. Congestions are the special case. If we take into the consideration the transport sector as a complex system, we will come to the conclusion that it is the user who bears the congestion costs, therefore these are internal costs of the system. However from the final user's point of view, users who cause congestion costs are not necessary those users who bear the congestion costs, therefore the congestion costs are also partly external costs. Analogously, we can say that variable infrastructure cost are users external costs because those who caused these costs are not necessary those who bear the variable costs. This vision is in conformity with the supported vision relevant to optimal pricing based on principles of social marginal costs.

Resource cost together with external cost form social cost. Social cost covers all relevant costs borne by the society.

The role of government bodies which interfere this area by fee collection and tax collection is very important as well. Some of these items are of a fixed type (e.g. the annual road tax) while some of them depends on the volume of usage (e.g. the excise duty, mainly from the petrol and petroleum). There are other taxes and charges which depends on the volume of usage, such as the congestion charge in London. Tax and fee collection is the way how to partly internalize external costs. Better internalization can be achieved by configuration of taxes and charges. There are two ways how to do it:

- By configuration of taxes and charges in order to comply with external costs requirements,
- By configuration of taxes and charges in order to comply with the volume of usage.

Better internalisation of external costs will lead to lower external impacts by decreased transport demand or by decreased impacts of transport services which can be achieved by innovation introduction.

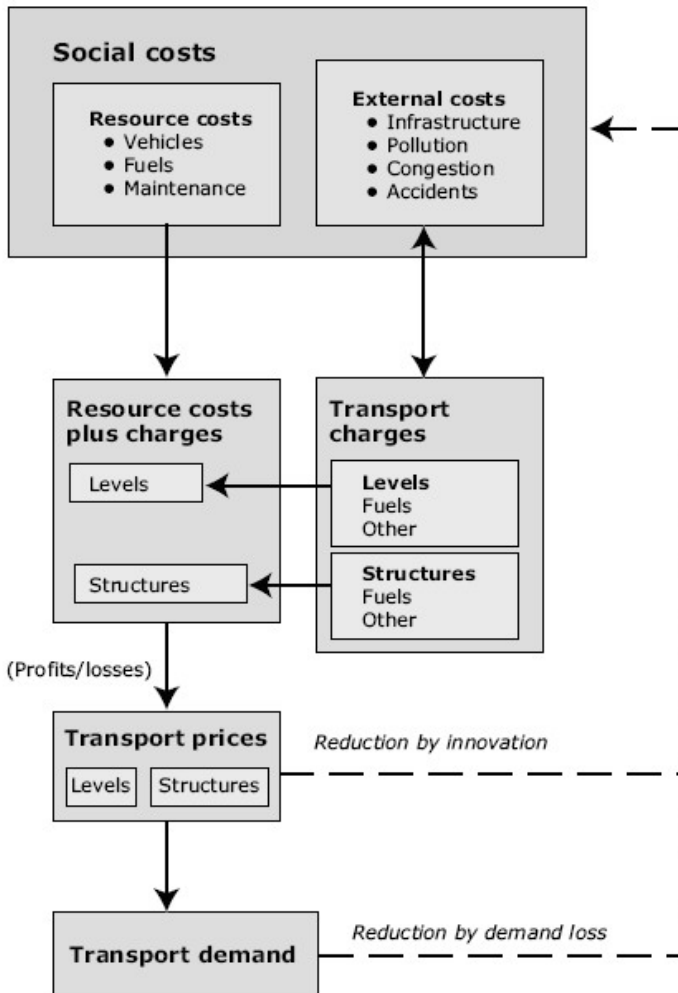


Fig. 1 Simplified scheme of transport costs and prices

The scheme shows that transport company (e.g. a road carrier or an air carrier) will transfer the resource costs, taxes and charges into the price paid by the final user of the transport service which will also influence the profit or the loss of the company.

This graphic model is typical for the area of transport service providers. The model, excluding the “profits and losses” area, is also relevant for each user of different means of transport other than the public passenger transport (passenger cars, etc.).

The right aim of pricing policy is the user of infrastructural services. The right way how to formulate real prices is the one which allows us to charge user with the marginal costs (those resulted from the infrastructure services which have not been paid yet). These costs include variable infrastructure costs (mainly depreciation). The marginal costs also include environmental costs, costs of accidents and congestion costs, which are usually introduced as external costs. From the individual users point of view the variable infrastructure costs are part of external costs.

Costs of transport can be categorized from many points of view. Please find one of them in the table below.

Tab. 1 Costs and cost contents

Costs	Cost contents
Resource costs	Total cost with the exception of state taxes and charges, which are reimbursed by user.
Fixed/ variable costs	Fixed costs are independent on extent of use; variable costs are dependent on extent of use; it is valid particularly in the case of infrastructure cost.
External costs	Transport costs not borne by the user –these costs usually include the infrastructure costs, congestion costs, ecological impacts and impacts of accidents.
Social costs	Total transport cost, which means source costs and external costs.
Transport charges and taxes	Charges used by the government bodies to internalize the external costs, such as the excise duty, road tax, VAT, direct and indirect taxes and other infrastructure charges.
State policy of infrastructure tax and charges collection	Method of payment used by the government bodies' to charge the use of transport infrastructure.

2. Price

Prices are one of the main factors in the market economy. The transport services demand is influenced by prices of different transport services and by the trend of prices in time and by further economic parameters such as the development of trends in the revenue area or general trend in prices. It follows that price, regardless the structure of pricing, is one of very important market signal. However the structure of the price or the way the taxes and charges collected by state reflect the external costs is important.

Changes of transport prices

Transport prices influence the transport demand and the modal choice by the force of price elasticity. It is known, that depreciation makes the travelling cheaper therefore the user can travel more with current budget. In the case that this development will influence only some forms of transport (for example air transport or road transport) it will increase

the attraction of these forms of transport and consequently (by force of price elasticity) it will influence the modal split. The transport demand and the modal split are determining factors of influence of transport sector on environment. This influence is indicated by the outward loop in the picture number 1 „decrease cause by loss of demand“.

Changes of transport charging policy

The transport charging policy is a very important part of price fixing in the transport system. The transport charging policy should clearly determine the amount of the fee (the level of the charge) and also the mode of payment (the charging structure). Last problem of the transport charging policy is to deal with charging by the force of indicators.

Possible aims of the transport charging policy

The transport charging is not self-purposeful; there are some reasons why to charge:

- For **fiscal** purposes: collected charges contribute to the state budget; in this case we do not talk about charges, but about taxes;
- For **commercial** purposes: to cover the costs (possibly to make a profit on the charging) in cases when the infrastructure is private;
- For **return on costs** purposes: to make the transport sector pay the infrastructure costs, environmental costs and safety costs, or to create the equal environment between sectors or states;
- For **efficiency** purposes (maximization of socio-economic wealth): by billing the extraordinary expenses to individual users, which are imposed by their transport decisions (infrastructure, environment, safety).

Majority of transport charge strategies represent broadly the combination of four purposes, although the accent is different in different cases and time shift plays very important role as well. At the beginning, the fiscal and commercial purposes were the most important reasons of transport pricing. Together with the growing complexity of the transport system and increasing tax burden of this sector the question of equality has started to play very important role (to guarantee the equality between forms of transport, to cover the infrastructural costs. Over the course of the last decade the transport charging acquired some dynamics as one of tool of growing of socio-economic wealth by the force of reduction of negative environmental impacts of transport, such as congestions, pollution, security risks or payments on variable infrastructural costs (simultaneously with respect of benefits resulting to users from transport). In the case of growing number of partnerships between the public and private sectors the recoverability of costs increases the importance.

One of aims of the transport pricing policy is to stick to a principle: to maximize the socio-economic wealth, which means to decrease negative impacts of transport

simultaneously with respecting social contributions of transport. Many documents focused on the transport policy published by EU are devoted to the role of pricing in transport sector. There are also other goals formulated in these documents partly the implicit and partly the explicit way (in the tax area, the commercial area and the equal treatment of each form of transport). These goals follow the marginal conditions as mentioned below.

Some of most significant documents published by EU:

- Green Paper – Towards Fair and Efficient Pricing in Transport Policy – Options for internalising the external cost of transport in the European Union (Commission of the European Communities, 1995) – the keynote was that the charging policy in the transport infrastructure area should be focused on full recoverability of costs which means the investment costs and the operating costs.
- White Paper - Fair payment for infrastructure use: A phased approach to a common transport infrastructure charging framework in the EU (Commission of the European Communities, 1998) – this paper launched pricing in accordance with marginal social costs as basic principal of the European transport pricing policy. Recoverability of infrastructural costs was not presented as the aim itself anymore, but as one of assumed consequences of this pricing strategy.
- White Paper: European transport policy for 2010: time to decide (Commission of the European Communities, 2001) - this paper did not explicitly mentioned the pricing in accordance with marginal social costs as basic rule but also did not explicitly changed the strategy from 1998.
- The EU guideline - The transport infrastructure billing (Commission of the European Communities, 2003) permitted to member states to base the pricing of ordinary levels of collected charges on full infrastructural costs (without construction costs which had been already paid) and external costs on accidents with emphasis based on differences between these levels on the basis of number of axle number, axle load weight, European motor coding into Euro categories, daily congestion level, conservancy, population density and accident risks. This guideline deals solely with transport secured by heavy lorry on prime transport routes which means the freight on all motorways which are part of the TEN and on other important communications. Rates of charges may differ in the level of charges counted on the basis of pricing in accordance with marginal social costs. Possibilities of differentiation allow the charging structure, which reflex the differences in categories of lorry and their impacts on environment.
- The European Parliament emphasize the most important principle of transport pricing policy proposed by European Commission but do not prefer the method based on marginal costs (with reference to infrastructural costs) and add several special marginal conditions as for example the respect of interests of abutting regions the

respect of people with decreased orientation in space or the respect of public passenger transport policy are.

- ECMT supports the maximization of social wealth or so called „internalization of external costs“ and come to the conclusion that the main effort is besides the economic efficiency also the support of tantamount conditions of economic competition between each means of transport and states of EU.

Maximization of socio-economic wealth means that transport should be carried only when the social contributions are bigger than social costs. It means that the traffic activity should be realized only then when contributions of users exceed gross internal costs including taxes and charges. That means that taxes and charges should, in ideal case, reflect marginal costs on utilization of transport infrastructure including external costs on congestions, accidents and ecological impacts. These components are demonstrated in the picture No. 1.

Economic tools such as transport charges and taxes are not the only tools for reduction of external impacts of transport on environment and increase of socio-economic wealth. Extensive direct control supported or no supported by financial incentives led for example to improvement of ecological parameter of passenger cars, camions, fuels, etc. Therefore it also led to reduction of external impacts and influenced the price levels and price pattern in transport. Economic tools have the advantage against prescript and regulation tools because the final decision is in hands of the market. This flexibility in principle leads to higher efficiency and consequently to bigger socio-economic wealth because:

- economic precautions are adapted to those with the least conformity costs whereas the prescript and regulation precautions it is necessary to accept these precautions,
- users who travel with maximum benefit will keep on travelling whereas the regulation and prescript precautions will influence everybody given mode.

3. Differentiation between transport charge levels and their structure

Not only level of transport pricing but also the structure of transport pricing play very important role. As far as the ecologically cleaner vehicles will be cheaper in operation than considerably contaminating vehicles, the market will ensure shift in direction to using the ecologically cleaner vehicles. The structure of pricing can cause innovations in transport towards cleaner, safer and calmer transport and towards reduction of external costs. Very important is to make differences between each level and price structures, taxes and charges in transport.

The charging levels report the extent of transport charging. It is relevant information because the transport charges may increase prices paid by user and simultaneously decrease the transport demand (in different modes of transport). It may in

future lead to differentiation in modal split or to loss of demand by the force of price elasticity. It may also lead to reduction of negative environmental impacts of transport.

The charging structure shows the way the charging is constructed. It means the composition of charges, the differentiation of charges and the process of transport charging. These structures show all incentives included in charges. By the force of differentiation and modulation of common transport taxes and charges the state agency may stimulate innovations and efficiency in transport without increased price intensity. When the relatively ecologically clear lorries of category Euro 4 will be charged less than for example more contaminating lorries of category Euro 3, carriers will be inspired to buy and carry the less contaminating vehicles. Next example is the fuel tax, which stimulates to buy those kinds of vehicles, which are relatively effective from the fuel consumption point of view. These innovations will also decrease the negative impacts of transport without decreasing of transport demand.

4. Conclusion

The principal objective of effective pricing policy in transport is the reduction of infrastructural external cost caused by user simultaneously with respecting of users benefits. From the economic point of view this process is also called maximization of transport efficiency or the social welfare maximization.

It is necessary to make changes of levels and structures of pricing, transport taxes and charges if the transportation charging system should follow such objective.

The key question is if it is possible to align the differences between transport taxes and charges which are imposed on each transport move and the marginal infrastructural and other external costs and how to do that because we do not know how it may influence the transport demand.

To get the economic optimum of users costs it is necessary to equalize user costs with social costs. Marginal costs play important role because we cope with addition of one more user to the system and the costs accruing there from. Social costs play important role because we are interested in costs of other users of transport system and society as whole (just as in case of private costs) including the impacts on environment and safety.

The development of prices in transport and the account policy in transport influence the changes in transport demand and the modal split and are also related to changes in environmental impacts.

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Resumé

SYSTÉM DOPRAVNÍCH NÁKLADŮ A CEN

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Nákladový přístup k tvorbě cen vychází z myšlenky, že cena by měla minimálně pokrýt náklady realizace a odbytu přepravní služby a současně umožnila dopravci realizovat přiměřený zisk. Vychází se zde tedy z principu jakési sociální spravedlnosti neboli maximalizace společenského nebo soukromého blahobytu.

Ekonomika blahobytu má na cenotvorbu širší pohled: cena je metodou rozdělování zdrojů, která spíše maximalizuje společenský blahobyt než jednoduše blahobyt dodavatele. V některých případech, je-li služba dodávaná veřejným dopravním podnikem může být společenský blahobyt roven minimalizaci blahobytu dopravce.

Určování cen za přepravní služby je jedním ze závažných plánových rozhodnutí, která ovlivňují zisk a prosperitu dopravního podniku nebo firmy. Jde o složitý a komplexní problém, protože stanovení ceny není pouze otázkou kalkulace vlastních nákladů a k ním stanovení přírážky, ale i zohlednění poptávky a cen konkurence.

Summary

THE SYSTEM OF TRANSPORT COSTS AND PRICES

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The cost access to pricing comes out from the idea that the price should cover the costs on realization and sales of transport service and consequently enable the carrier to get the adequate profit. It comes from the principle of social justice or maximization of private or social welfare.

The economic of the welfare looks at the pricing at a wider view: price is a method of distribution of resources which maximizes the social welfare rather than the carriers welfare. In some cases, when the service is provided by a public transport company, the social welfare may be equal to the minimization of the carriers welfare.

The pricing of transport service is one of very important planned decisions which influence the profit and the prosperity of transport company. It is complicated and complex problem because

the price fixation is not only the question of cost calculation (and relevant surcharge calculation) but also the question of demand and competitors price.

Zusammenfassung

DAS SYSTEM DER TRANSPORTKOSTEN UND DER PREISE

Jindřich JEŽEK

Der Kostenzugriff auf die Preisbildung geht von der Idee aus, dass der Preis mindestens die Kosten der Abwicklung und des Absatzes der Transportdienstleistung bedecken sollte. Gleichzeitig sollte der Preis dem Transporter einen entsprechenden Gewinn ermöglichen. Man geht hier also von dem Prinzip irgendeiner sozialen Gerechtigkeit oder der Maximierung des gesellschaftlichen oder privaten Wohlstandes aus.

Die Wohlstandökonomie hat ein breiterer Blick an der Preisschaffung: der Preis ist die Methode der Quellteilung, die vielmehr den gesellschaftlichen Wohlstand als einfach den Wohlstand des Lieferanten maximalisiert. In manchen Fällen, wenn die Dienstleistung dem öffentlichen Transportunternehmen geliefert wird, der gesellschaftliche Wohlstand kann zu dem Wohlstand des Transporters geglichen sein.

Die Preisbestimmung für Transportdienstleistungen ist ein von den triftigen Entscheiden, die den Gewinn und die Prosperität des Transportunternehmens oder der Firma beeinflussen. Es handelt sich um ein kompliziertes und komplexes Problem, weil die Preisbestimmung nicht nur die Frage der Kalkulation der Eigenkosten und der Zuschlagbestimmung zu ihnen ist. Es ist nötig auch die Nachfrage und die Preise der Konkurrenz berücksichtigen.