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CONCLUSIONS AND RECOMMENDATIONS

This report sets out a theoretical framework for establishing an efficient system of taxes and charges for transport and goes on to develop an accounting framework for making international comparisons of tax systems as they apply to road freight transport. This enables meaningful comparisons of the structure and level of taxation to be made. The work provides a framework for addressing the questions "what is the right level for transport taxes" and "what kinds of charges should be used".

Nine neighbouring countries were examined in detail. Austria, Belgium, the Czech Republic, France, Germany, the Netherlands, Spain, Switzerland and the United Kingdom. The analysis is applied to road haulage but the framework can also be extended to cover rail freight and both road and rail passenger services. The data tables used in the analysis can be downloaded from the ECMT web site http://www/oecd.org/cem/ in spreadsheet format.

According to classical economic theory, in order to maximise social welfare, transport charges should be based on social marginal costs.[1] That is the costs of providing an incremental unit of transport service including related external costs (mainly health, environment, accidents and congestion) to the extent that these can be defined. In order to achieve this the instruments used to levy taxes must be differentiated to reflect marginal costs as closely as is cost effective.

A shift towards differentiated territorial based charges (away from more purely fiscal, national charges) is required both for efficiency and to avoid problems of international competitiveness. This implies moving partially away from vehicle excise duties, fuel taxes and the Eurovignette towards electronic km-charges and road tolls that can be varied in function of time and place as far as politically feasible.

Resolution 2000/3 included at the end of this report adopts these broad principles together with principles for avoiding discrimination in charges levied on international road haulage, in a coherent framework.

The analysis below highlights the following policy issues:

– what needs to be done to avoid differences in charges distorting competition;

– what forms of international tax harmonisation are desirable and where different levels of charges are to be expected and accepted;

– the choice to be made between efficiency in the use of infrastructure and infrastructure cost coverage.

COMPETITIVENESS

In order to assess the impact of taxes on the competitiveness of national haulage industries, the taxation of labour and capital has to be taken account of in addition to transport taxes and charges. Although the analysis described in this report confirms that there are large differences between countries in transport charges, it found that differences in labour and capital taxation cancel out most of the variation. The highest net effective rates[2] of transport charges were three times those of the country with the lowest charges. Factoring in labour and capital taxes reduces the difference in marginal taxation to 36%.

Applying the analysis to a situation in which hauliers from each of the countries examined compete to undertake the same international haul (e.g. from Manchester to Zaragoza) revealed that differences in the impact of taxation on competitiveness are minimal. Thus differences in competitiveness that do currently exist in such transcontinental haulage markets arise from comparative advantage, differences in pre-tax prices of inputs and possibly other factors but not from differences in taxation.

Such multinational competition, however, represents only a small part of the haulage market. When the analysis was applied to particular pairs and groups of countries, differences in the structure of taxation were found to have a potentially substantial impact on the competitiveness of hauliers in some cases. Large differences were found between several pairs of national hauliers competing in each others markets. Even larger differences were found between some pairs of national hauliers potentially competing for hauls in third countries. The differences recorded in this part of the analysis are much larger than with the long distance international hauls because on the longer hauls, the more territorial charges (tolls, Eurovignette, fuel tax) that all pay on a more or less equal basis dilute the differences in the national charges (vehicle taxes).

The key factor within transport charges in determining the impact of taxation on the competitiveness of hauliers is the relative weight of more purely fiscal, national based taxes compared with more territorial charges, in the sum of taxes levied. Potential impacts on competitiveness can be avoided by limiting the weight of national charges (such as vehicle excise duty) in the country's basket of transport taxes.

For vehicle taxes there are significant differences in levels of charges. Their impact on competitiveness was not fully determined but the analysis demonstrated that distortion of competition can be avoided by partially replacing vehicle charges with territorial charges.

Turning to fuel taxes, the data examined suggest that the market works well in preventing major differences in fuel taxation between most countries. Only the United Kingdom diverges from the general pattern among the countries studied. It is able to do this due to its geographical isolation which limits fuel-tank tourism.

EFFICIENCY

Efficiency and competitiveness are separate issues. Efficiency, that is maximising social welfare, is the more important issue. Three broad categories of taxes can be identified in relation to efficiency:

– efficiency and welfare enhancing taxes – charges on external costs;

– welfare neutral taxes – e.g. taxation of economic rents on the production of natural resources;

– efficiency and welfare reducing taxes – most other forms of taxation.

Thus because of the nature of the impact of taxes on economic activity, the efficiency of transport taxation depends largely on its relation to external costs. All governments require revenues over and above those that can be raised by taxing externalities. The aim should be to select the least welfare-reducing tax package to raise the necessary additional revenues.

In the absence of externalities, taxes on intermediate products such as road haulage distort markets. They alter the allocation of resources in production sectors and thereby reduce the net output of the economy. They are therefore strongly welfare-reducing. Ideally taxes on intermediate products should be avoided. It is less *in*efficient to tax inputs (labour and capital) and outputs (VAT and profit taxes) as they do not effect the efficiency of the production sector.

This implies that the taxation of intermediate goods (such as commercial transport) should be set at the level of marginal social costs and no higher.[3] This provides for different tax treatment between freight and passenger transport. For example VAT should generally be levied on passenger transport (as it is generally considered final consumption) but not on freight transport. This is indeed generally the case, although not always.

In order to avoid distorting the allocation of production factors, rates of taxes on labour and capital should be identical for every sector of the economy. Thus there should be no special regimes for labour or capital taxes for haulage or for any other sector of the economy. It is always better to address income distribution concerns via taxes on final consumption and on income rather than taxes on specific production sectors. Therefore distributional issues should also play no role in determining the taxation of freight transport.

TAX INSTRUMENTS

Transport taxes and charges are under review in many ECMT Member countries in response to political pressure to ensure charges are fair and as part of the wider reform of taxation to underpin the improvement of environmental protection in the economy as a whole. The analysis in the main report discusses in some detail how existing transport tax structures can be made more efficient by shifting from national charges (such as annual vehicle excise duties) towards more purely territorial charges (such as electronic km charges or tolls). This means restructuring and reducing some taxes and introducing or increasing others. For example, replacing the existing Eurovignette with an electronic km-charge would increase efficiency.

Fuel taxation has been a key element in strategies to relate transport taxes to external environmental costs and a shift from national taxes to fuel tax (which is weakly territorial) can in many cases be recommended. However, except for CO_2 emissions, fuel tax is a relatively blunt instrument for tackling many elements of the social costs of transport. Technological progress is now making the introduction of more accurate and better targeted charges cost effective. Electronic km-charges for trucks are the leading example. The introduction of such marginal cost based charges is recommended and could allow for a reduction in the level of fuel tax.

INTERNATIONAL COHERENCE IN TAXATION

As marginal social costs vary by location, one should not expect efficient transport charges to be uniform. Territorial charges should vary with costs. General harmonisation of the *level* of such charges is therefore inappropriate. Harmonisation of the *basis* for such taxation, e.g. in the methodologies use for determining marginal social costs, is more appropriate.

As noted, market forces tend to limit the divergence of tax structures and levels between neighbouring countries in an open economy. Differences between countries co-operating in the European Union's single market are therefore likely to be small. However, if Governments wish to maintain substantial national charges (such as vehicle excise duty) an agreed minimum rate is required, or else the floor rate of taxation may come under pressure from third countries. The same applies in the case of fuel tax, hence the existing EU minimum rates.

Although market forces imply no need for maximum rates of tax, transit countries are in a position to set monopolistic rent seeking prices. Ensuring charges are non-discriminatory will limit the tendency for this to happen. However, a country with large transit traffic could maximise national revenues by increasing charges beyond marginal social costs. A maximum limit may be needed for territorial charges (although no maximum is needed for vehicle or fuel taxes, as discussed in the previous paragraph).

Thus there should be freedom to set territorial charges nationally or locally according to marginal costs but exploitation of the potential for monopoly pricing of transit traffic may need to be curtailed.

It should be acknowledged that due to their geographical location some countries, such as the United Kingdom, Russia and Turkey, enjoy a certain degree of freedom to diverge from the structure and level of taxes imposed by competition in neighbouring markets, although the same principles for efficient taxation apply to all countries and the remarks on limiting monopoly pricing also apply to all.

Russia and some neighbouring countries may be forced to diverge from the recommended structure of taxes while they continue to experience severe difficulties in collecting many categories of tax. However, this will be a transient phase, it is to be hoped. In the long term welfare will be maximised by adopting the recommended structure and level of taxation.

INFRASTRUCTURE COST COVERAGE

An important conclusion that results from the principles for efficient taxation is that 100% coverage of infrastructure expenditures is not an appropriate basis for ensuring efficiency. Increasing returns to scale, such as exhibited by railways, mean that marginal social cost based pricing will not cover total costs. This is because marginal costs are below average costs in these industries. Transfers (subsidies) will be required to cover the difference and ensure an efficient outcome.[4] Work to date suggests that efficient pricing will require transfers amounting to around at least 40% of total infrastructure costs for railway systems.

Road networks do not exhibit quite the same degree of increasing returns to scale. At the same time, road use often occasions a high incidence of external costs. Taxing on the basis of

marginal social costs as recommended will result in revenues that exceed infrastructure expenditure for the road network as a whole. Current research covering a number of Member countries suggests that revenues from efficient taxation could exceed 150% of infrastructure costs at the national level. This surplus of revenues will be pronounced in urban areas. But in the case of rural roads and some trunk inter-city roads, revenues are likely to fall below infrastructure costs in an efficient taxation system. The urban/rural differences are accounted for by congestion, air pollution and noise which are all highly site specific. Efficient taxation thus implies that revenues will differ from expenditures both within and across the various modes of transport.

NOTES

1. Practical considerations can, however, result in divergence from this theoretical norm. Budgetary pressures may mean sufficient public funds are simply not available to subsitute for charges above marginal social costs in order to more fully cover total infrastructure costs. Some governments also pursue as a principle the recovery of infrastructure costs.

2. The net effective rate of transport charges is simply the overall weight of charges obtained by summing all the various charges and taxes levied (vehicle taxes, fuel taxes, tolls etc.), substracting any reimbursements, discounts etc. and expressing the overall figure in terms of a carge per tonne km (or per km or per litre of fuel used or some other common denominator).

3. See also the section on infrastructure cost coverage and footnote 1.

4. See footnote 1.

GLOSSARY

Ad valorem net effective taxation: Net charges paid for some specific haul related to the pre-tax price of fuel.

Book transfer: Positive or negative difference between chargeable expenditure and chargeable income.

Book transfer rate: Book transfer over chargeable expenditure/costs (in percent).

Capital account: Balance between capital infrastructure costs and revenues from freight transport.

Capital infrastructure cost: Estimated using an empirical 1.3 ratio for the relationship between current and capital infrastructure expenditures.

Charge: Generic term including all kinds of taxes, duties, charges, fees… levied on the freight transport by road.

Composite: Embodying all territorial categories.

Decomposed: Differentiating all territorial categories.

Distortion: Difference relative to some defined optimum.

Duty: Charge levied on fuel (on diesel). Also called fuel excise duty.

Earmarked: Revenues attributed to some special tasks or fund.

Economic criterion: Principle used to define fiscal structures, ranging charges from the most fiscal to the most price-like.

Eurovignette: European flat rate road use charge.

Exemption: Full release from the payment of a tax, charge or fee.

Expenditure account: Balance between chargeable infrastructure expenditure and chargeable income from freight transport.

Fiscal charge: Charge based on vehicle ownership (vehicle tax); a fiscal charge is a national charge according to the territoriality of application.

Fiscal structure: Revenue share structure based on the economic criterion.

Flag: Nationality of the truck.

Flat rate: Set price.

Full cost coverage transfer: Difference between full social costs and chargeable income.

HVF:	Future Swiss distance/weight related user charge.
Infrastructure account:	Balance between chargeable infrastructure expenditure or capital costs and chargeable income, as opposed to operating account in freight transport by rail.
Marginal cost:	Cost of the last unit produced.
Marginal effective tax rate (METR):	Combines all inputs (labour, capital and fuel), their respective shares and individual tax rates into a single cost function.
METR:	See marginal effective tax rate.
National tax:	Charge on a vehicle depending upon ownership nationality (flag) and truck characteristics.
Net taxation:	Amount of charges paid on a haul, less rebates, refunds (VAT) and exemptions.
Operating account:	Balance between costs related to freight services (as opposed to infrastructure costs) and commercial revenues.
Paired flags:	Scenarios by flag over 200 km that allow crossed hauls relative to two different countries.
Rebate:	Reduction of the amount of a tax, charge or fee.
Refund:	Repayment of part or of all the amount of a tax, charge or fee paid.
RTPL:	Current Swiss flat rate road use charge.
Scenarios by country:	Standard haulage scenarios, involving 40-t semi-trailers over 500 km within the country of registration.
Scenarios by flag:	International haulage scenarios involving 40-t semi-trailers of different nationalities over two itineraries: Manchester-Milan and Manchester-Zaragoza.
Scenarios:	Different "scenarios" were built up and used in this study, with various parameters (km travelled, itinerary, country or countries crossed …). See scenarios by country, scenarios by flag and paired flags.
Social costs:	Full costs, external costs included. It is assumed in this study that social costs might empirically correspond to 1.5 times chargeable road infrastructure capital costs as an average figure for Europe.
StraBA:	Austrian flat-rate road use charge.
Subsidy:	Transfer defined as a difference between chargeable income and the full social costs of freight transport.
Territorial charges:	Charges defined according to a geographical application criterion.
Territorial criterion:	Geographical principle used to define territorial structures, ranging charges from the most national to the most territorial ones.
Territorial structure:	Share structure for charges paid based on the territorial criterion.
T-km:	Tonne-kilometre.
Toll:	Km based use charge.
Transfer:	Difference between chargeable infrastructure expenditure/costs and chargeable income (see also book transfer and full cost coverage transfer).

Use charges: Charges paid in relation to usage. Some are paid on a flat rate basis (vignettes), others are strictly determined by km travelled and/or tonnes transported (tolls, distance/weight related charges).

Vignettes In this report the term vignettes is used as short-hand for the following moderately territorial charges levied in the form of an entry ticket to use a road network:
– the Eurovignette (although in Belgium the way scheme is administered corresponds more to an annual vehicle charge);
– the StraBA in Austria;
– and the RTPL currently applied in Switzerland.
Note that in contrast the term vignette is also employed in some countries to designate annual vehicle charges.

FRENCH / ENGLISH TERMS

AD VALOREM (SUR LE PRIX HT DU GASOIL)	AD VALOREM (BASED ON PRE-TAXED FUEL PRICE)
ACCISES SUR LE GASOIL (OU SUR LE DIESEL)	FUEL EXCISE DUTIES
COMPTES ROUTIERS / FERROVIAIRES	ROAD / RAIL ACCOUNTS
DÉGRÈVEMENTS	TAX EXPENDITURES
DIESEL, GASOIL, GASOLE	DIESEL
EXEMPTION	EXEMPTION
PÉAGES, VIGNETTES AUTOROUTIÈRES	TOLLS, MOTORWAY ACCESS CHARGE
PRIX / TARIFICATION DE L'USAGE	ROAD PRICING
REDEVANCES / DROITS D'USAGE	ROAD USER CHARGES
RÉFACTIONS, EXEMPTIONS	RATE RELIEFS, EXEMPTIONS
REVENUS MANQUANTS (MÉTHODE DES)	REVENUE FORGONE METHOD
SUBSIDES, SUBVENTIONS	SUBSIDIES
TAUX DE TAXATION	TAX RATE
TAUX MARGINAL EFFECTIF DE PRÉLÈVEMENT (TMEP)	MARGINAL EFFECTIVE TAX RATE (METR)
TAXE SUR LE VÉHICULE	VEHICLE TAX
TARIFICATION AU COÛT MARGINAL SOCIAL	MARGINAL SOCIAL COST BASED PRICING
TERRITORIALITÉ (CRITÈRE DE) *Nationalité* : ex. Taxes sur le véhicule *Territorialité faible* : ex. Accises sur le gasoil *Territorialité forte* : ex. Redevances d'usage, péages	TERRITORIALITY CRITERION *National*: e.g. vehicle taxes *Weak territoriality*: e.g. fuel excise duties *Strong territoriality*: e.g. user charges, tolls
T-km	TONNE-KILOMETRE
TRANSFERT Transferts "Comptables"	TRANSFER, SUBSIDY "Book" Transfers

INTRODUCTION

How do taxes and charges for transport in, for example, France compare with those in, say, Germany? Do hauliers in one country pay more than in the other, and what impact does this have on the profitability of haulage in each country? Is the impact of an increase in tax on diesel the same in each country or are differences in the taxation of labour more significant? Do these differences distort the international haulage market. Answering these international transport policy questions requires a framework that can relate all the various taxes and charges levied on transport activities to marginal costs. This paper attempts to lay the basis for such an internationally acceptable framework of comparison.

Table 1 summarises and compares the structure of taxation on heavy goods transport in 10 countries. It follows a coherent methodology for classifying the different categories of transport charges and taxes. The Table is taken from a report prepared for the Federal Swiss Transport Studies Service[1] in 1997 which provides an essential basis for making comparisons between countries with widely differing systems of taxation. Some of the resulting categories of charge are applied in all countries, for example diesel excise duty. Others exist only in some of the countries studied. The significance of different types of charge, by share of total revenues generated, for 8 countries and the European Union as a whole is summarised in Figure 1.

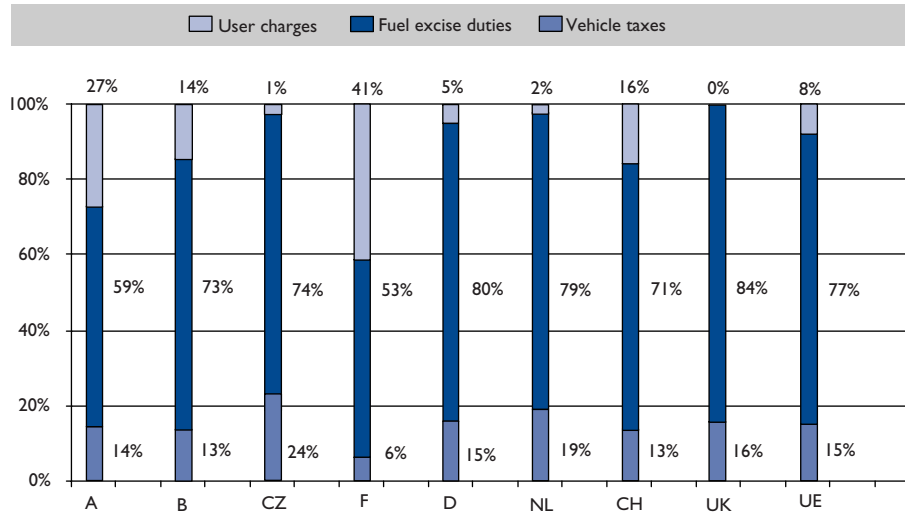
One simple conclusion that can be drawn from the comparison is that fuel excise duty has a different weight in the total burden of taxes and charges in each country, and therefore an increase or decrease in fuel duty will have different impacts in different countries. It is also clear that in any comparison between the revenues generated by taxes and expenditure on road infrastructure, all of the tax and charge elements must be considered. It should clearly not be concluded that because one country does not apply a certain category of charge there is likely to be under-coverage of infrastructure costs when compared to other countries, or that it might be advisable to introduce the missing category of charge in the country where it is absent.

The importance of examining the whole picture of taxation when trying to make international comparisons indeed goes beyond the charges examined in table 1. Road transport is subject to taxes on labour and capital as well as "transport" charges. In order to compare systems of taxation between countries, or to evaluate the impact on road transport of changes in taxes and charges, all three categories of taxation - transport, labour and capital - must be taken into consideration. Their combined impact on haulier's operating costs must be quantified to gauge the likely effect of changes in taxation on economic activity. More precisely the impact of taxes and charges on the marginal cost of transport must be established.

It is not only taxes that influence marginal costs. Public expenditure on infrastructure also has very large effects through its influence on quality of service, congestion etc.. It is therefore also necessary to find some way to factor the level of expenditure into the analysis. The efficient

way to charge infrastructure use is to price according to marginal social costs. Budgetary transfers must therefore be used to meet any uncovered costs that result from increasing returns to scale in the provision of infrastructure. These transfers (subsidies) should not, however, be allowed to spill over into covering marginal costs.

♦ Figure 1. ***Structure of revenues (proportional shares) from road freight transport***



Sources: Ecosys final report on European taxation of heavy goods transportation by road, SG DETEC (Swiss Federal Department for Transport, Communications, Energy and Environment), Bern, December 1998, adapted.
Czech Republic: Ministry of Transport and Communications / Transport Research Centre, 1999.

The analysis developed in this report reveals the key questions for assessing the efficiency of taxation in the transport sector to be:

– the way transport charges (fuel taxes, vehicle registration taxes, vignettes, etc.) relate to marginal costs (road wear, pollution, congestion, accident costs);

– whether transport operators pay the same level of taxes on labour and capital as other sectors of the national economy;

– whether domestic and foreign operators pay the same level of transport charges for operating within any one given country. (The best guarantee of this is that the same charges apply to both. Where different systems of charges are applied, an attempt to assess their overall impact has to be made).

– whether transport charges are applied to different transport modes on the same basis;

– whether subsidies to parts of the transport system that exhibit increasing returns to scale (e.g. road and railway infrastructure) either fail to cover fixed costs or alternatively cover not just fixed costs but spill over to cover part of marginal costs.

Table 1. **Comparison of the structure of taxes and charges on road freight transport**

	Registration charge*	Vehicle tax	Diesel excise duties	User charges		VAT			
				Vignette	Tolls + user charges on a distance weight basis	Vehicle	Diesel	User charges	Tunnel / bridges tolls
Austria	Administration fee	Vehicle tax	Diesel (non earmarked)	Vignette, StraBA	Tolls on some motorway and tunnels	20%	20%	20%	20%
Belgium	Registration fee	Taxe de circulation	Fuel excise duties (non earmarked)	Eurovignette**	–	21%	21%	–	–
Czech Republic	n.a.	"Road tax"	Excise duty	Motorway vignette	–	22%	22%	–	–
France	Charge incl. engine displacement	Vignette or axle tax	TIPP and other taxes on fuel (earmarked to several funds)	–	Tolls on motorways and some tunnels	20.6%	20.6%	5.5-8.0%	France-Italy link exempt
Germany	Administration fee	Vehicle tax differentiated by environmental classes (emissions and noise)	Diesel tax (non earmarked)	Eurovignette	–	16%	16%	–	–
Italy	IET and APIET	Vehicle tax; surcharge on diesel vehicle	Excise duty (non earmarked)	–	Tolls on motorways and some tunnels; central garantee fund	19%	19%	19%	Italy-France link exempt
Netherlands	Administration fee	Vehicle tax	Excise duty; environmental fuel tax (partially earmarked)	Eurovignette	–	17.5%	17.5%	–	–
Spain	Exemption for HGVs	Vehicle tax and business tax	Fuel tax (non earmarked)	–	Tolls on motorways and some tunnels	16%	16%	16%	16%
Switzerland	Registration fee	Vehicle tax (cantons)	Fuel tax (earmarked to several funds)	Current heavy goods vehicle tax (RTPL) is going to be replaced by a per t-km heavy vehicle fee (HVF); tolls on some tunnels		6.5% (currently 7.5%)	6.5% (currently 7.5%)	–	–
United Kingdom	Registration fee	Vehicle tax	Excise duty (non earmarked)	–	Tolls on some bridges and tunnels	17.5%	17.5%	–	–

* Registration charges will not be included in further calculations.

** Obligatory yearly vignette for vehicles registered in Belgium.

NOTE

1. Redevances sur le Trafic Routier Lourd en Europe: Comparabilité et Possibilités d'Harmonisation, Ecosys for SET, Federal Department for Transport, Communications, Energy and Environment, published 1998.

Chapter 1

PRINCIPLES FOR EFFICIENT TAXATION

The purpose of this report is to provide a methodological framework for making international comparisons of the way the structure of transport taxes and charges affects the transport sector and the wider economy. To do this, all the various taxes and charges levied have to be identified and classified according to the way they affect the behaviour of economic agents. The report concentrates on road haulage. Preliminary analysis of other transport modes and services was undertaken and will be completed if resources permit.

Comparisons of taxes and charges may be required to inform a range of different policy questions. Different questions require different indicators in order to come to meaningful conclusions. The analysis presented in this report is organised as a series of steps to develop increasingly synthetic indicators, each of which is appropriate to answering a specific set of questions. Applying the wrong indicator to the wrong question yields misleading results and care must be taken in the way the indicators are used to avoid abuse. A table at the end of chapter 2 summarises the kind of policy questions for which each indicator developed is appropriate.

1.1 EFFICIENT TAXATION

Taxes on externalities actually increase social welfare, by orienting the behaviour of producers and consumers to increase efficiency and reduce external costs. Most other taxes are welfare reducing to a greater or lesser degree and are usually designed to minimise changes in behaviour in order to preserve their revenue raising capacity. Taxes on externalities do raise revenues although this is not their primary purpose.

Three broad categories of taxes can be identified:

– efficiency and welfare enhancing taxes – charges on external costs;

– efficiency and welfare neutral taxes – e.g. taxation of economic rents on the production of natural resources;

– efficiency and welfare reducing taxes – most other forms of taxation.

All governments require revenues over and above those that can be raised by taxing externalities. They should aim to select the least welfare-reducing tax package to raise the necessary revenues. In the absence of externalities, taxes on intermediate products such as road haulage distort markets. They alter the allocation of resources in production sectors and thereby reduce the net output of the economy. They are therefore strongly welfare-reducing. Ideally taxes on intermediate products should be avoided. It is less inefficient to tax inputs (labour and capital) and outputs (VAT and profit taxes) as they do not effect the efficiency of the production sector.

In general, only relatively immobile production factors can be taxed efficiently, including labour and fixed capital (e.g. land as opposed to financial capital). The optimal weighting of taxes on labour *versus* capital depends on the relative mobility of production inputs together with supply and demand for each input and the redistributive preferences of government. For example, when labour is in excess supply (unemployment) it will be efficient to reduce labour taxes, lowering the cost of employment which will tend to bring supply and demand into balance, other things being equal.

Extreme difficulty in the collection of many kinds of taxes, as is currently the case for example in Russia, can justify departure from these basic principles in determining the most efficient structure of taxation.

Redistribution of income is frequently an important government objective. In an optimal tax system it is always better to address income distribution concerns via taxes on final consumption and on income rather than taxes on production. Therefore distributional issues should play no role in determining the taxation of freight transport.

1.1.1 Efficient tax packages for idealised economies

Closed economy with no externalities and no increasing returns to scale

In a closed economy, in the absence of externalities (pollution, noise, accidents, congestion, road damage) the following principles for optimally efficient taxation hold[1] :

- Intermediate products (e.g. freight transport) should not be taxed (raising revenue through such taxation would decrease the overall productivity of the economy);
- Revenue should be raised using a combination of indirect consumption taxes (e.g. VAT) and taxes on inputs to production (labour and capital) and on profits;
- Rates of taxes on labour and capital should be identical for every sector of the economy (so as to avoid distorting the allocation of production factors).

Closed economy with externalities

Perfectly efficient taxation in a closed economy with externalities would be achieved by taxes on the externalities themselves – emissions, congestion, road damage, etc. – at a rate equal to marginal damage costs, with additional taxes on inputs (labour and capital) or outputs (consumption) to meet total revenue needs. Of course this assumes that one can charge freight haulage according to marginal external costs.

Open economy with no externalities

As with domestic transport services, freight haulage by foreign operators should not in theory be taxed as it is an intermediate product. This also provides a basis for efficient trade between countries.

Entry or transit taxes on hauliers that seek to protect a national haulage industry against foreign competitors are not efficient for the country that imposes them. Taxes on exports of transport services, employed sometimes to secure better terms for trade (technically known as tax exporting) may be efficient nationally but are not efficient for the group of countries involved as a whole. In a trading union, such as the European Union, both practices must be avoided.

Taxes on factors of production (labour and capital) should be identical across sectors within each country, but can differ between countries if preferences for the level of public expenditure differ by country.

Open economy with externalities

Sources of externality should be taxed as close as possible to the point of origin (fuel combustion, road use, etc.) and at the place where the externalities arise (according to territoriality). Taxes on externalities are the most efficient form of taxation, with taxes on inputs and outputs the next best alternative for raising revenues over and above the revenues raised from taxes on externalities if required. Apart from the taxes on externalities, freight transport, as an intermediate product, should not in theory be taxed.

Increasing returns to scale

In the absence of increasing returns to scale one can essentially rely on a competitive market to use resources efficiently and only two market failures require correction: redistribution of income (via taxes on labour and capital) and internalisation of external costs (via taxes closely correlated to the generation of externalities).

In the supply of road and rail infrastructure, however, increasing returns to scale prevail and costs are minimised when provision of infrastructure is concentrated in the hands of a single agent. This means that competition can not be relied on to ensure efficiency.

Three types of problem can be expected:

– First, in the absence of competition the agent will attempt to charge monopoly rents (which could result in the over-recovery of costs).

– Second, efficient, marginal cost based pricing will not cover total costs as marginal costs are lower than average costs with increasing returns to scale. Transfers will be required to cover the difference.

– Third, once part of the costs are covered by subsidies it becomes difficult to discipline the agent to produce at the lowest cost and behave efficiently.

Businesses exhibiting increasing returns to scale may thus require a complex system of subsidies to operate efficiently and the degree of cost coverage is not a good guide to detecting inefficiency in pricing (see section 1.2 on distortions below for further discussion).

1.1.2 Taxes on fuels and materials

Natural resources, and especially oil, are frequently taxed in the form of royalties to ensure that a large part of economic rent is captured by government. This can be an efficient form of profit tax. Oil products are also frequently taxed because of strategic import dependency or terms of trade considerations. This can be justified in oil importing countries in terms of reducing dependency and vulnerability to potential cartel pricing. Of interest here, however, is whether increased excise duties on fuel for the road haulage sector can be justified.

Except with respect to externalities, it is not efficient to charge different levels of tax on the same fuel product employed for use in different sectors of the economy or different modes of transport. This is, however, frequent practice. Domestic heating oil, gas oil for gas turbines, and diesel are all essentially the same product but in most countries much higher taxes are charged on the latter. Moreover, diesel used for road vehicles and rail locomotives is taxed at different rates in some countries. For small-engined vehicles, petrol and diesel are essentially interchangeable products and it is therefore inefficient to tax them at different rates, except in relation to the marginal external costs of using each fuel.

Even to correct externalities the efficiency of fuel excise in the transport sector is limited. Fuel use is only indirectly linked to most external costs (fuel charges are the same on congested and uncongested roads, they are the same whether or not vehicles are fitted with catalytic or other emissions control devices). External costs vary by location but it is difficult to vary fuel taxes accordingly. A truck can fill its tank in one country and cross one or more neighbouring countries before needing to re-fuel, particularly when supplementary fuel tanks are installed. Thus the possibility of varying fuel taxes is largely determined by geography. For example, the United Kingdom is largely insulated from tank tourism by the cost of crossing the English Channel and a large fuel tax differential with other countries can be maintained. In the Netherlands, a small country with good road connections to all its neighbours and a large international haulage fleet, the amount fuel taxes can be maintained above the level in neighbouring countries is severely limited. Tank tourism gives rise to tax competition between countries. It can be in the interests of a small country to level excise taxes below marginal external costs in order to attract higher excise revenues through tank tourism. Tank tourism makes it difficult both to vary fuel excise duty by country and to levy sufficiently high charges for internalisation.

1.1.3 Implications for tax harmonisation

The above principles from welfare theory hold true to the extent that all countries behave in an optimal way and to the extent that instruments can be designed to make transport pay its marginal external costs. These are major assumptions and do not hold in present European circumstances.

One also has to assume that all countries act co-operatively. Specifically we need to assume that each country refrains from:

– trying to export taxes or charge foreign operated transport above its marginal external costs through transit charges;

– trying to maximise revenue through tax competition, e.g. setting taxes on fuels at levels below marginal external costs, in order to undercut fuel prices in neighbouring countries and attract tank tourism.

The first choice for taxation is to levy charges on the production of externalities at a rate determined by marginal external costs. As transport is associated with significant marginal external costs one can expect transport services to be taxed, even though they are an intermediate product. As marginal external costs vary greatly with place, it is also to be expected that levels of transport charges (fuel taxes, tolls, vignettes, etc.) are not uniform across countries.

As noted, national preferences as to the level of public expenditure and the need for income redistribution will be reflected in national differences in the level of taxes on labour and capital. What is important is that within a country labour and capital employed in providing transport services are taxed at exactly the same rates as in other sectors of the economy. Differences are therefore to be expected in the level of labour and capital taxes paid by transport operators in different countries and do not necessarily imply inefficiency.

The key questions for assessing the efficiency of taxation in the transport sector are, therefore:

– the way transport charges (fuel taxes, vehicle registration taxes, vignettes, etc.) relate to marginal external costs (road wear, pollution, congestion, accident costs);

– whether transport operators pay the same level of taxes on labour and capital as other sectors of the national economy;

– whether domestic and foreign operators pay the same level of transport charges for operating within any one given country. (The best guarantee of this is that the same charges apply to both. Where different systems of charges are applied, an attempt to assess their overall impact has to be made).

– whether transport charges are applied to different transport modes on the same basis;

– whether subsidies to parts of the transport system that exhibit increasing returns to scale (e.g. road and railway infrastructure) either fail to cover fixed costs or alternatively cover not just fixed costs but spill over to cover part of marginal costs.

Earlier work by the ECMT examined the first of these questions[2] and found substantial undercharging in all modes of transport in relation to marginal external costs. It also found an urgent need to improve the linkage of taxation to marginal external cost through improvements to the instruments used to levy transport charges and taxes. The need to increase transport charges to internalise external costs implies there is an opportunity to reduce taxes on labour and/or capital in compensation (by the same amount in all sectors of the economy).

The analysis that follows in this report is designed to help address the remaining issues as well as questions that go beyond the transport sector in isolation. For example, sub-optimal charges related to external costs will be compensated by above optimal charges on labour and/or capital. This will affect the competitiveness of industry. For example, in many OECD countries primary metals production is more highly transport intensive and less labour intensive than recycling. Sub-optimal transport charges will therefore penalise recycling.[3]

1.2 INTER-MODAL DISTORTIONS

1.2.1 Subsidies, distortions and a definition of the optimum

Whatever its origin, a distortion can be defined and measured only in relation to a definition of an undistorted state. Fortunately, economics provides such a unique reference point: the "perfectly competitive" equilibrium where the prices and quantities at which goods are supplied ensure that the marginal social benefit gained from the last unit consumed equals the marginal social cost of the last unit produced. This is the point at which, under given consumer tastes and technological possibilities, the allocation of resources is at its most efficient and the welfare of *society as a whole* is thus maximised.

Relative to this theoretical optimum, all real world markets will, to some degree, fail – if only because the attainment of this optimum in any one market requires that it be attained simultaneously in *all* markets. In this sense, market failure is pervasive. The question at issue is the manner and degree of it.

In the classic counter-example to perfect competition – that is, pure monopoly – the imposition of profit-maximising monopoly pricing results in a reduction in the consumers' surplus which is greater than the increase in the producer's surplus – the creation of a "deadweight" loss – and thus a reduction in the welfare of society as a whole.

Government intervention can impose welfare losses in a similar manner. If a special excise tax is imposed on a more or less competitive market, it can result in a reduction in the sum of the consumers' and producers' surpluses which is greater than the increase in tax revenues – the creation of a deadweight loss – and thus a reduction in the welfare of society as a whole.

The consensus view amongst policy-makers is that, at least in the developed market economies of the countries of the OECD, most markets sufficiently approximate perfectly competitive markets so as not to warrant direct and detailed government intervention. It is only in those cases where markets fail in a manner which is systematic and predictable and to a degree which is measurable and large that governments are best advised to intervene directly. For the rest, competition policy and the institutional apparatus to enforce it are what are relied upon to address insufficient competition at any given time.

1.2.2 Market failure in transport

In the field of transport, markets do fail in a manner which is systematic and predictable and to a degree which is measurable and large. This is so for two main reasons (two types of market failure).

On the one hand, the provision of transport infrastructure, in each mode and to varying degrees, is characterised by increasing returns to scale and this implies:

– significant elements of natural monopoly, whereby one firm can supply the entire output required more efficiently than many;

– a high ratio of fixed costs to marginal costs;

– substantial sunk costs — that is costs which cannot be recovered by putting assets to alternative uses, even by discontinuing production.

On the other hand, the use of transport infrastructure, in each mode and to varying degrees, entails external costs (uncompensated costs imposed by one party on others). These include air and noise pollution, accidents, and the marginal external costs of congestion imposed by new users on all existing users whenever the infrastructure is operating at or above optimal capacity.

Thus, the technical characteristics of infrastructure provision mean that its marginal social cost can lie far below its average cost. On the other hand, the external costs arising from the use of infrastructure mean that the marginal social cost of transport can also rise far above its average cost. These two effects need not and clearly do not coincide to off-set each other. Comparatively, the first effect is most acute in rail and least acute in urban roads. Conversely, the second effect is least acute in rail and most acute in urban roads.

In the absence of government intervention, the private producer will continue to supply the market only if the revenues derived from users enable him fully to recover all producer costs, including fixed costs, as well as to provide for normal profit. At the same time, he will be indifferent to the recovery of external costs which he himself does not have to bear. Hence, in the absence of government action to correct both types of market failure, the immediate result would be the inefficient use of existing infrastructure – in particular, the over-pricing and under-use of rail, and the under-pricing and over-use of urban roads.

In order to prevent the emergence of serious welfare losses, government intervention in transport pricing is indeed essential. And if governments must intervene in the name of social welfare to impose an artificial price, they are best advised to opt for the welfare-maximising price at or close to the marginal social cost price.

1.2.3 Cost recovery

Since marginal social cost lies below average cost in some cases and above it in others, pricing at marginal social cost will yield under-recovery of total costs in some cases and over-recovery in others. The first case will require government to provide *transfers* to enable the infrastructure provider to break even.[4] The second case will require government to impose *taxes* in order to raise price up to the level of marginal social cost.

1.2.4 Fiscal and financial distortions in the light of market failure

In the light of the above, it should be clear that fiscal and financial distortions in transport markets cannot simply be defined in relation to a non-distortionary norm applicable to competitive markets. In the case of competitive markets, it might be reasonable to define non-distortionary tax treatment as the application of a common rate of taxation and the absence of subsidies – and, derivatively, to define any special taxes and transfers as a distortion. But such an approach could be highly misleading in the case of transport markets.

On the one hand, the non-taxation of negative externalities is, in effect, a subsidy. It reduces social welfare by encouraging consumption even where marginal social costs exceed marginal social benefits. It also distorts inter-modal choice by introducing a bias in favour of those modes which are most favoured by this subsidy – in particular, urban roads.

On the other hand, the non-provision of transfers to enable and compel naturally monopolistic infrastructures to price at or close to marginal social cost entails, in effect, the imposition of a *special excise tax* on the users of those infrastructures.[5] And this effect applies irrespective of whether governments collect and retain the excise tax inherent in monopoly pricing *via* the pricing policies of public enterprises or whether they grant private parties the extraordinary right to collect and retain it – as obtains in the case of privatised monopolies.

In any case, the non-provision of the transfers required to price at or close to marginal social cost reduces social welfare by disallowing consumption even where marginal social benefits exceed marginal social costs. It will distort inter-modal choice by introducing a bias against those modes which are characterised by the highest ratio of fixed costs to marginal costs – and *a fortiori* so when these modes are also the least afflicted by negative externalities. The example *par excellence* is rail.

It is important to note that neither the welfare loss nor the distortion of inter-modal choice can be corrected by government intervention which imposes on each mode of transport, taken separately, the obligation to price at full recovery, and no more than full recovery, of total social costs. As is demonstrated in Roy (1998),[6] such a policy would, *at the margin*, deliver too large a "subsidy" to urban roads users and impose too large an "excise tax" on rail users.

Available evidence for EU Member States suggests that the marginal social cost of road use in urban areas is now significantly above average cost. In a recent analysis of alternative pricing policies for Belgium, the price changes required to arrive at efficient pricing of urban road use are shown to be over 200% for gasoline cars and over 250% for diesel cars in the peak period.[7] At these orders of magnitude, the likelihood is that an efficient pricing regime would deliver significant over-recovery for the road network *as a whole* in many countries. Recent work in the United Kingdom for example suggests that cost recovery under efficient pricing could be in the order of 150% of total costs.[8] And the current UIC/CER/European Commission research programme on revenues from marginal social cost pricing has confirmed cost recovery results of the same order of magnitude.[9]

Pricing road use at the level of full cost recovery would thus lock in a welfare-reducing price for urban areas well below the level of the efficient price. Equally it would lock in a welfare-reducing price for lightly used rural roads above the level of the efficient price.[10]

Extensive econometric studies[11] have demonstrated that the marginal social cost of vertically integrated rail lies in the range of 60-70% of average cost. Where rail services are separated from infrastructure, the marginal social cost of rail infrastructure alone will be well below 60-70% of its average cost. Price discrimination might succeed in raising cost recovery to around 60% of total cost without driving demand off the market. If so, full cost recovery would still require a further price mark-up of two thirds above the efficient price.

Pricing at full cost recovery would thus fail the test by a large margin. Even if it raised the price of road use above what would obtain in the absence of any pricing of externalities, the result would still be an under-pricing and over-use of ro Table 8-I: ads. And even if it restrained rail prices

below what would be obtained in unregulated monopoly pricing, the result would still be an over-pricing and under-use of rail. And since these modes are also substitutes, the result would also include a welfare-reducing modal shift from rail to roads.

The basis for non-distortionary taxes and subsidies for transport is, therefore, the alignment of prices to marginal social costs. The question of how best to raise the revenues required to provide the necessary subsidies is separate and addressed in the section E*fficient taxation in an ideal economy* above. Essentially revenues should be raised through charges and taxes with the lowest welfare-reducing impact, starting with taxes on externalities.

1.2.5 Public service obligations

In general, subsidies to cover the shortfall in total cost coverage should only cover fixed costs and not spill over to cover the marginal costs of operations. This requires that payments in compensation for operations under public service obligations should be clearly and transparently separated from general infrastructure subsidies.

1.2.6 External benefits

The only significant technological external benefit (that does not get processed eventually by the market without intervention) so far identified by economists is the Mohring effect[12] : when the frequency of scheduled public transport services is increased in response to an increase in demand, waiting times fall for existing users. The new users create a benefit external to themselves but internal to the system. This is a mirror image of the effect of congestion – which is also internal to the system. The effect should be taken into account in determining the levels of fares and public subsidy.

1.2.7 Summary of grounds for efficient subsidies

To summarise the above discussion, in principle there are three, and only three, grounds on which welfare-enhancing transfers can be provided for transport infrastructure or operations. These are:

– transfers to meet full infrastructure costs in the face of increasing returns to scale;

– compensation payments for public service obligations;

– subsidies in respect of external benefits.

It is true that so long as prices for road use have not been fully corrected by means of taxes on externalities, subsidies to allow for below marginal cost pricing in alternative modes (e.g. public transport) can be justified by "second-best" reasoning. But once prices have been corrected, there is no longer any justification for such second best pricing and the larger than optimal subsidies associated with it. In principle, therefore, efficient pricing allows for subsidies only on the three grounds listed above. All other subsidies reduce economic efficiency and overall social welfare.

NOTES

1. Diamond and Mirlees, American Economic Review, 1971; Mayeres and Proost, Scandinavian Journal of Economics, 1997.
2. Efficient Transport for Europe: Policies for Internalisation of External Costs, ECMT, Paris 1998.
3. See for example *Impacts of Economic Support Measures on the Environment*, OECD Environment Directorate, 1997.
4. Carefully targeted price discrimination – by applying price mark-ups above marginal social cost to those consumers with low price-sensitivity – can raise cost recovery without driving demand off the market. This can reduce the size of transfer required from government, but only in rare cases can it eliminate the need for subsidy.
5. The point was noted by Hotelling sixty years ago. See his early papers in Econometrica: "The General Welfare in Relation to Problems of Taxation and Utility Rates, Econometrica, Vol. 6, 1938, and "The Relation of prices to Marginal Costs in an Optimum System, Econometrica, vol. 7, 1939.
6. Rana Roy, *Infrastructure Cost Recovery under Allocatively Efficient Pricing*, UIC/CER Economic Expert Study Mrch 1998, UIC, Paris, 1998 – hereafter reffered to as Roy (1998).
7. See B. De Borger, D. Swysen, S. Ochelen and S. Proost, "Alternative Transport Pricing and Regulation Policies: A Welfare Analysis for Belgium in 2005", *Transportation Research*, Part D, Vol. 2, No. 3, 1997, and the summary table presented in Roy (1998), p. 45.
8. See Douglas McWilliams, "Treating Roads as a Public Utility", in CEBR, *The Economic Report*, March 1997, and the summary provided in Roy (1998), p. 46.
9. Roy (ed.), Revenues from marginal social cost pricing: Evidence from selected EU Member States, UIC/CER/EC study, forthcoming.
10. It should be noted that covering infrastructure costs and internalising external environmental and accident costs are separate issues and earmarking revenues raised from taxes on external environmental and accident costs to covering infrastructures costs is not warranted on theoretical grounds.
11. Quoted in Roy (1998), p. 21.
12. Herbert Mohring, *Optimisation and Scale Economies in Urban Bus Transportation*, American Economic Review, 1972.

Chapter 2

SUMMARY OF THE CALCULATIONS AND MAIN RESULTS

As noted, this study aims at comparing in quantitative terms road freight transport fiscal regimes in European countries. The countries studied in detail so far are: Austria (A), Belgium (B), Switzerland (CH), the Czech Republic (CZ), Spain (E), France (F), Germany (G), the Netherlands (NL) and the United Kingdom (UK). Results for Italy (I) are included where available. The quantitative part of the report is organised as a series of analytical steps evolving towards increasingly synthetic indicators of taxation.

i) First, the absolute levels of specific charges on road freight transport are inventoried and the resulting *fiscal structures* set out.

ii) Second, net amounts of charges paid according to standard national and international freight hauls are calculated and resulting *territorial structures* are established. Results are expressed on a t-km basis.

iii) The next analytical step addresses the calculation and comparison of effective tax rates on the marginal cost of production of road freight transport on the basis of country specific input share structures (labour, capital, and fuel) and respective taxation rates. Marginal effective tax rates (METRs) are estimated.

iv) The territorial structures of taxation established in step 2 are used to examine the impact of taxes on the competitiveness of hauliers from different countries on the international freight hauls. The impact of taxes on the competitiveness is also examined between pairs of countries, France-UK, France-Spain, Germany-Netherlands and so on.

v) In the final stage of analysis, net taxes in t-km are examined with respect to capital infrastructure costs (calculating book transfers) and full social costs.

This chapter summarises the analysis, with a more detailed account provided in chapter 3 and the annexes.

2.1 ABSOLUTE LEVELS OF CHARGES

The framework for such an analysis consists in an inventory and a comparison in quantitative terms of all charges that various countries levy on freight transport by road. The inventory is compiled according to variables such as rate of taxation, basis of imposition, amount paid, type of payment, revenue yielded, refunds, rebates and exemptions.

Collation is organised according to an economic standard, ranging charges in categories from the most purely fiscal to the most commercial (i.e. closest to a price for infrastructure use), see Table 2-Ia. Revenue share structures can be worked out on the basis of these categories according to the yearly revenue yielded in each country for each category of charge.

Four categories of taxes were also created according to the territorial characteristics of their application – i.e. the degree to which charges are linked to the use of particular sections or regions of the infrastructure network (Table 2-Ib; also cf. section 2.2 ff.).

In practice the two systems of classification tend to go hand in hand, and territoriality is retained as the criteria of most interest in the rest of the report as this principle is applied through some existing road freight transport charges.

Table 2-Ia. **Economic categorisation of charges levied on road freight transport**

Charges	Vehicle taxes	Fuel excise duties	User charges	
			Vignettes°	Tolls + user charges on a distance/weight basis
Description	Trucks are imposed on the basis of ownership in the country of registration	Weak link with usage*	User charges due on a flat rate basis	The amount to be paid is strictly determined by usage (number of km done and/or tonnes transported)
Economic criterion	Fiscal charges	Earmarked charges	Fixed prices	Prices
Result	Purely fiscal structure according to share of revenue generated by each category of charge**			

° Eurovignette, Austrian StraBA, Czech Vignette, Swiss RTPL.
* Hauliers may choose to fill tanks in one country while using roads in a neighbouring country.
** See Figure 2.1.

Table 2-Ib. **Territorial categorisation of charges levied on road freight**

Charges	Vehicle taxes	Fuel excise duties	User charges	
			Vignettes°	Tolls + user charges on a distance/weight basis
Description	"National" charges relative to the territorial criterion	Hauliers may choose to not fulfil the territorial link (tanking in country A while using roads in country B)	Charges bounded to a specific territory though not linked to the quantity used (fixed price)	Charges strictly bounded to a specific territory and to the quantity used (price)
Territorial criterion	National charges	Least territorial charges	Middle territorial charges	Most territorial charges
Result	Territorial structure of taxation according to share of fees paid on specific hauls*			

° Eurovignette, Austrian StraBA, Czech Vignette, Swiss RTPL.
* Calculated according to standard haulage scenarios (40 t, 500 km in each country); see below.

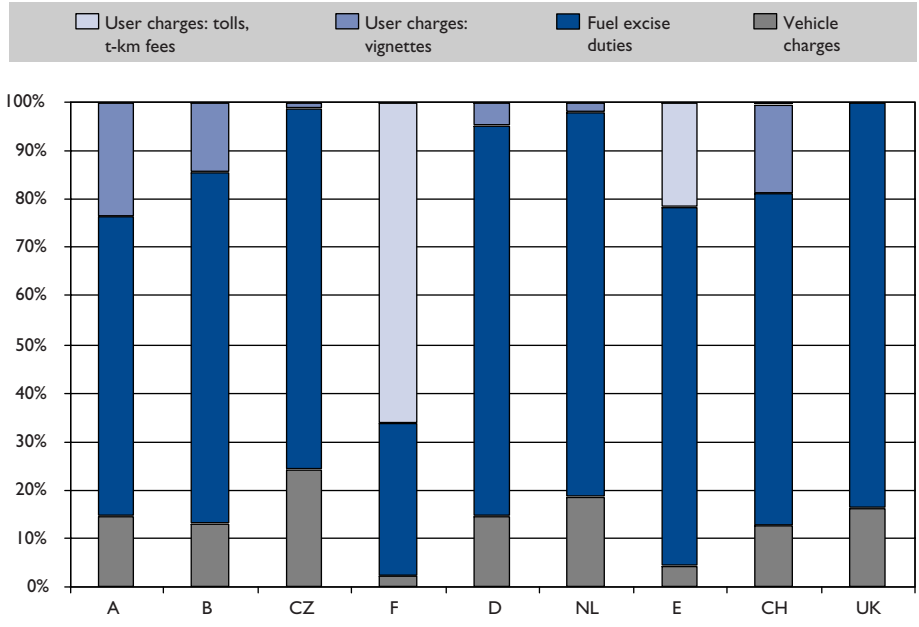
An inventory of charges levied is shown in Table 2-II. As the countries in the study do not all levy the same types of charges, superficial com-parisons are meaningless. Thus comparing levels of a specific tax (for example Swiss and French fuel duties) in isolation gives no indication of the impact of differences between the levels of that tax on hauliers. Similarly the impact in different countries of an increase or reduction in any particular type of tax can not be assessed without reference to the other charges and taxes levied in each country.

Table 2-II. **Inventory table**

Countries	Vehicle taxes	Fuel excise duties	User charges		VAT	
			Vignettes	Tolls + user charges on a distance/weight basis	on fuel	on tolls
Austria	✔	✔	✔ StraBA		✔	
Belgium	✔	✔	✔ Eurovignette°°		✔	
Czech Republic	✔	✔	✔		✔	
France	✔	✔		✔	✔	✔°
Germany	✔	✔	✔ Eurovignette		✔	
Italy	✔	✔		✔	✔	✔
The Netherlands	✔	✔ + ecotaxe	✔ Eurovignette		✔	
Spain	✔	✔		✔	✔	✔
Switzerland	✔	✔	✔ RTPL (till 2001)	new HVF (since 2001)	✔	
United Kingdom	✔	✔			✔	

° Non deductible.
°° Obligatory yearly vignette for vehicles registered in Belgium.
Sources: Ecosys final report on European taxation of heavy goods transportation by road, SG DETEC (Swiss Federal Department for Transport, Communications, Energy and Environment), Berne, December 1998, adapted. Czech Republic: Ministry of Transport and Communications / Transport Research Centre, 1999.

✦ Figure 2.1. ***Fiscal structures (based on revenues collected)***



The fiscal structure is not available for Italy.
Source: ECMT, 2000.

Figure 2.1 shows revenue share structures by category of revenue raised from charging road freight transport in the different countries under review. The relationship between share and absolute level of each tax varies by country and a broader picture must be drawn in order to formulate meaningful comparisons.

2.2 NET TAXATION

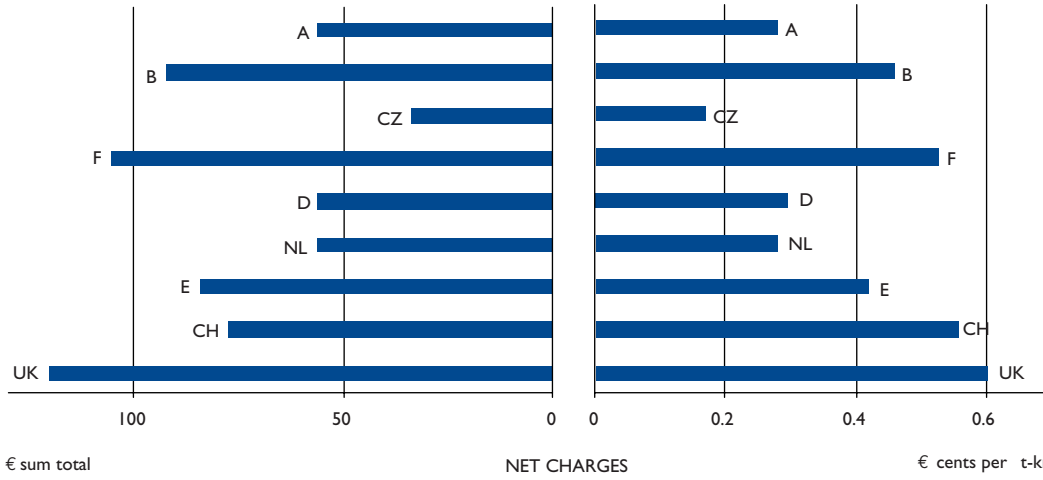
The next methodological step addresses net taxation of road haulage in selected countries. The aim is to compare different road freight tax regimes by computing the net amount of charges that a 40 t truck has to pay on a 500 km haul within its country of registration. Standard road haulage scenarios were constructed on a spreadsheet to do this, details are given in Annex II. The methodology involves the following stages.

First, all charges are calculated with possible refunds (VAT), rebates, and exemptions deducted. Second, standard scenarios by country are performed, running 40 t trucks on an imaginary 500 km road haul. The net amount of charges (net taxation) paid along each run is computed. Last, the share of each territorial category of charge paid is identified.

Figure 2.2 (left hand side) shows amounts paid (sum total in Euros) for a 40 t, 500 km haul within the country of registration. For example, 105.6 Euros are charged for a French truck in France, while 56.21 Euros are charged for an Austrian truck undertaking a comparable haul in Austria. Net taxation per t-km is also calculated (Figure 2.2, right hand side). Net taxation per t-km is a useful complementary measurement, particularly in the case of Switzerland where there is currently a maximum loaded-weight restriction of 28 tonnes.

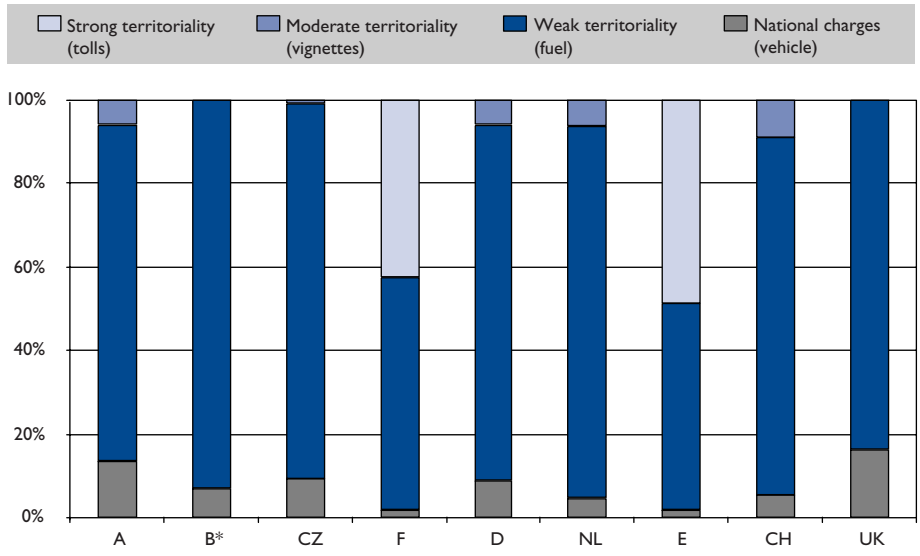
Figure 2.3 shows the territorial share structure of charges on the basis of the standard 500 km, 40 t freight haul in each country. Differences in the structures recorded in figure 2.1 and 2.3 arise because the scenarios constructed to represent typical hauls do not correspond to the "average"

♦ Figure 2.2. ***Rates of net taxation (sum total) and net taxation per t-km (€), 1998***



Source: ECMT, 2000.

♦ Figure 2.3. ***Country specific territorial structures for national hauls (based on fees paid on scenario routings)***



Standard national hauls were not calculated for Italy.
* For Belgium, national charges consist of vehicle tax plus Eurovignette.
Source: ECMT, 2000.

of all the hauls undertaken each year in the countries examined. Specifically transport on feeder roads was not included in the scenarios. The impact of this omission is particularly apparent in the results for countries that levy tolls on motorways (France and Spain) where the scenarios were built on an assumption of 250km driven on tolled motorways, 250km driven on untolled roads.

H*aulage scenarios by flag* were also developed, in which trucks of different nationalities carry out an identical international haul. Two different international hauls were constructed:

– Manchester – Reims – Stuttgart – Basle – Milano

– Manchester – Rotterdam – München – Zurich – Zaragoza.

For the same trip, all trucks fuel the same way: same amount at the same places (where fuel prices are the lowest on the route).

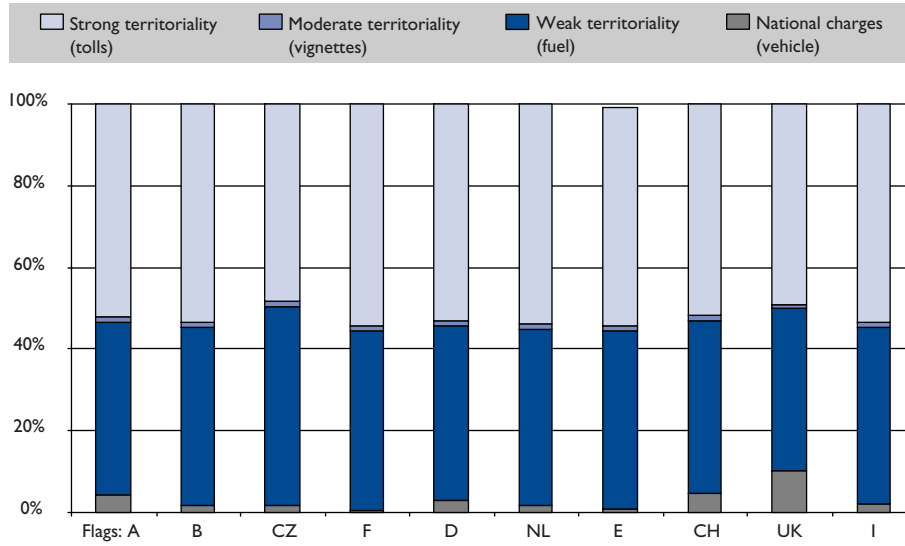
Figure 2.4 repeats the previous figure on the basis of the standard international hauls (flag specific scenarios). Results are for haul #1 Manchester – Milan (results for haul #2 Manchester – Zaragoza are quite similar). By freezing territorial parameters (roads to be used, places for filling tanks), national parameters (vehicle taxes, etc.) which differ from flag to flag, are isolated. These haulage scenarios highlight the degree of fiscal nationality associated with hauliers of each flag.

French tolls and the Swiss HVF account for the large majority of the strongly territorial charges recorded (note that in Figure 2.3, the Swiss RTPL "vignette" is used as it is the charge currently in force, while in Figure 2.4 it is replaced by the new Swiss HVF km tax used in the calculations for trucks crossing Switzerland, avoiding complications arising from the current Swiss weight restriction).

The "national" category of charges is responsible for differences in competitiveness between the "flags" performing identical international freight services (though labour and capital charges have to be factored in before an overall measure of the impact of taxation on competitiveness is derived - see below).

Flag specific scenarios cannot be compared directly with country specific scenarios as by definition fiscal and territorial patterns differ.

♦ Figure 2.4. ***Flag specific territorial structures for international hauls***



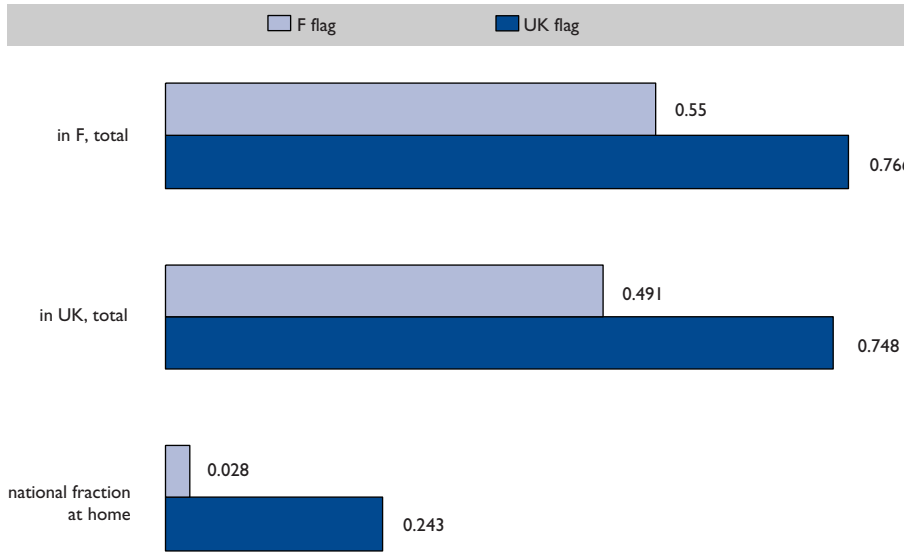
Source: ECMT, 2000.

Examining pairs of flags

In order to examine the impact of taxes on competitiveness between "flags", scenarios were constructed showing crossed results for pairs of countries. The task was to compare the charges paid by UK and French trucks crossing their own and each others territory and so on for each pair. To do this, 200 km scenarios were created for each country (the new scenarios were necessary so that the total 400 km trip could be made in one day, to simplify calculations). The analysis reveals the impact of territoriality on hauliers subjected to different home fiscal regimes. Figure 2.5 shows the results for UK and French trucks hauling at home and abroad.

Figure 2.5 shows that the national fraction of charges paid per t-km is higher for UK flags (0.24 cents per t-km) than for French flags (0.03 cents per t-km). This fraction is independent of the country where hauls are performed. Whether in France or in the United Kingdom, a French truck pays lower transport charges per t-km than a UK truck. The impact of taxes on the competitiveness is analysed at the end of section 2.4 on the basis of marginal effective tax rates (METRs).

♦ Figure 2.5. ***Flag specific crossed hauls between countries (French and UK flags case-study) net transport charges***
(€ cents / t-km)



The French national fraction (axle tax) is reimbursed when hauling away.
Source: ECMT, 2000.

2.3 EFFECTIVE TAX RATES ON THE MARGINAL COST OF PRODUCING FREIGHT TRANSPORT BY ROAD (METRS)

The next stage of methodology aims at considering the taxation of all of the main inputs that are involved in producing freight services — including capital and labour.

Transport taxes are levied on various bases (vehicle ownership, fuel and use) and it is convenient to combine all these charges into a single indicator related to a single denominator in order to obtain road related taxation rates that can be interfaced with capital and labour taxation rates. This was done by converting all charges levied on freight transport (with respect to the previous standard 40-t, 500-km haulage scenarios by country) to a common cost element — the pre-tax price of fuel. In this way, "*ad valorem* net effective taxes rates" were computed. This is a useful comparative tool because it allows direct comparisons to be made between very different fiscal and territorial regimes.

Table 2-III. **Country specific composite ad valorem net effective tax rates (standard haulage scenarios by country)**

Ad valorem	A	B	CZ	F	D	NL	E	CH	UK
Composite ad valorem tax rates	151 %	289 %	151 %	420 %	205 %	150 %	270 %	210 %	457 %

Country specific ad valorem net effective tax rates are shown in Table 2-III. Pre-tax fuel costs account for a share of only 8 to 10% in the road haulage input cost share-structure. Transport charges, amalgamated as a hypothetical ad valorem rate, add up to as much as 450% of the pre-tax price of fuel. Tax rates on labour and capital are more modest, but these two categories of input account for a much larger share of costs on a pre-tax basis. Income tax rates plus employees and employers social security contributions add up to 30 to 50% of pre-tax labour costs. Capital depreciation rates are situated between 12% and 25% of the value of road vehicles.

All inputs (labour, capital and fuel), their respective shares and individual tax rates are combined into a single equation for computing marginal effective tax rates (METRs). METRs represent overall tax rates paid for one additional unit of freight service. The aim is to determine to what extent METRs differ and how sensitive they are to different taxation scenarios. The calculations are made using a Cobb-Douglas cost function, in which the inputs are labour (L), capital (K), fuel and user charges (G).[1] Two parameters are taken into account: the proportional share of the relevant input and its taxation rate.

Scenarios by country allow the computation of country specific METRs. Scenarios by flag (Manchester-Milano and Manchester-Zaragoza) allow the computing of flag specific METRs. Freezing territorial parameters through the international haulage scenarios isolates national parameters (vehicle tax, labour and capital taxation) which differ from flag to flag. This analysis provides for a comparison of the impact of taxes on international competitiveness by flag when producing one additional unit of service. Table 2-IV shows country specific METRs. From this new standpoint, international differences soften as compared to differences in transport charges alone. Differences in road related taxes tend to be cancelled out by differences in charges levied on other inputs (labour and capital).

Table 2-IV. **Country specific composite marginal effective tax rates (METRs)**

METRs	A	B	CZ	F	D	NL	E	CH	UK
Composite marginal effective tax rates	36 %	47 %	49 %	46 %	42 %	34 %	38 %	30 %	47 %

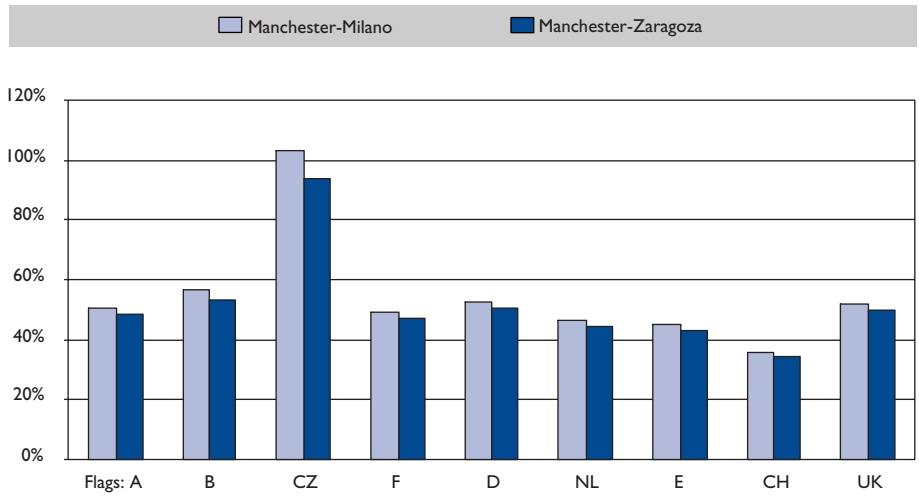
It should be noted that there is no suggestion that harmonisation of METRs should be a policy objective — see chapter 1 for a discussion of the theory of efficient taxation.

2.4 THE IMPACT OF TAXATION ON COMPETITIVENESS

Scenarios by flag

Figure 2.6 shows flag specific composite METRs for both haulage scenarios by flag. METRs vary between haulage scenarios because territorial charges are different from one scenario to the other. Both are different from country specific METRs due to the change in the pattern of territorial charges that apply.

♦ Figure 2.6. ***Flag specific composite marginal effective tax rates***



Source: ECMT, 2000.

In general, given the relatively small shares of fuel in the production of freight transport by road, high composite *ad valorem* net effective tax rates in a country only moderately affect METRs. Payments on labour and capital have much more influence on the relative competitiveness of country specific road haulage services.

The major exception to this pattern is the Czech Republic. As in other transition economies, the input share structure differs to that typical in western Europe. Diesel accounts for 28% of pre-tax marginal costs in the Czech Republic — in the other countries the figure is 5 to 8%. Diesel taxes are little different in the Czech Republic to the other countries examined, thus the impact transport charges on the total marginal cost of Czech hauliers is large. Moreover, as it is outside the European Union and there are no bilateral arrangements, Czech hauliers cannot obtain reimbursements on VAT paid on diesel purchased abroad unlike hauliers in the European Union.

The Czech example serves also to underline the point that METR is not a direct indicator of competitiveness. Absolute levels of pre-tax marginal costs have also to be taken into account. And for labour and capital these are substantially lower in the Czech Republic than in the other countries.

The impact of taxes on the competitiveness between hauliers from different countries

The small differences between METRs revealed in Figure 2.6 suggest that in competing for international hauls differences in taxation do not confer a significant competitive advantage to any of the countries examined, with the possible exception of Switzerland (see previous section for notes on the results for the Czech Republic). However, the relative positions of hauliers competing with trucks from neighbouring countries in each others markets are probably a more important aspect of the impact of taxation on competitiveness than the international hauls examined in the last section.

The 200 km scenarios described above to compute net transport charges were used again to examine METRs for pairs of national haulage industries (flags). The results, presented in

Table 2-V show the biggest difference between neighbouring pairs to be for British and Dutch hauliers in Holland where METRs are 22% higher for British hauliers. French and Spanish hauliers are also subject to significant differences in taxation. In both markets French hauliers face METRs 12% higher than their Spanish counterparts. These difference in METR appear likely to have an impact on competitiveness although a specific market analysis would be required to confirm the importance of these differences in taxation compared to other influences on competitiveness.

It must be remembered that other factors — including pre-tax prices of labour and capital, quality of service provided and exchange rates — are primarily responsible for the competitive advantages that do exist in practice.

Table 2-V. **Differences in METRs between flag pairs**

Flags	METRs	Differences in METRs (%)	
UK flag in UK	51.54%	11%	in the United Kingdom
F flag in UK	46.47%		
UK flag in UK	51.54%	17%	in the United Kingdom
NL flag in UK	43.96%		
F flag in F	47%	9%	UK/F in France
UK flag in F	51%	21%	UK/E in France
E flag in F	42.06%	11%	F/E in France
E flag in E	39.46%	12%	in Spain
F flag in E	44.25%		
NL flag in NL	36.19%	9%	in the Netherlands
D flag in NL	39.53%		
NL flag in NL	36.19%	22%	in the Netherlands
UK flag in NL	44.01%		
D flag in D	41.74%	10%	in Germany
NK flag in D	38.11%		

Differences are established relative to the lowest METR.

The next largest difference is for UK and French hauliers in the UK (11%). If the UK was part of the European monetary system this would probably be significant. In current circumstances, however, the value of the Pound against the Euro has a much greater impact. The relative strength of the Pound and weakness of the Euro in 1999 has had a significant effect in increasing imports from France and depressing exports to France. Hauliers continue overwhelmingly to be hired in the country of origin of goods for export, despite the freedom conferred by full application of the Single Market to the haulage industry since July 1998. Thus in present conditions French trucks normally carry French exports to the UK. They then offer rates for return trips that UK hauliers can not match — not because of costs in the haulage industry but because of the imbalance in trade and thus in the depression of the international haulage market for UK based companies.

The large difference revealed in the table (21%) between the impact of taxes on the competitiveness of UK versus Spanish hauliers in the French market is difficult to assess. The opportunities for such potential competition are probably limited and would need to be investigated on the

basis of specific markets — for example haulage from French ports where UK and Spanish trawlers both unload fish. This is beyond the scope of the present report.

Table 2-VI takes up this point and a number of further multiple comparisons. Again it is difficult to draw firm conclusions as to the impact of the differences on haulage markets without figures for specific markets that cover all aspects of competitiveness. For example, it would be interesting to examine markets for transport out of the port of Rotterdam to test whether Spanish hauliers enjoy an advantage over other non-Dutch hauliers given that METR for the Spanish flag is even lower than for the local haulage industry in the Netherlands. It would also be interesting to investigate whether the very large difference in METR between Swiss and other flags is reflected in competition in the haulage market in southern Germany. The large differences in METR revealed do suggest that such research could be useful.

Table 2-VI. **Differences in METRs between groups of flags**

Flags	METRs	Differences in METRs (%)	
UK flag in UK	51.54%		
F flag in UK	46.47%	17%	in the United Kingdom
NL flag in UK	43.96%		
NL in F	43.59%		
F flag in F	47%	21%	in France
UK flag in F	51.00%		
E flag in F	42.06%		
NL flag in E	40.80%		
E flag in E	39.46%	12%	in Spain
F flag in E	44.25%		
NL flag in NL	36.19%		
D flag in NL	39.53%		
UK flag in NL	44.01%	25%	in the Netherlands
F flag in NL	40.97%		
E flag in NL	35.16%		
D flag in D	41.74%		
F flag in D	42.23%	38%	in Germany
CH flag in D	30.33%		
NL flag in D	38.11%		

Differences are established relative to the lowest METR.

2.5 TRANSFERS WITH RESPECT TO CAPITAL INFRASTRUCTURE COSTS (BOOK TRANSFERS) AND TO FULL SOCIAL COSTS

The final stage of the analysis is to examine subsidies/transfers. Transfers with respect to capital infrastructure costs can be calculated from road accounts (and after constructing an infrastructure account for rail). Empirical research[2] suggests that the capital costs of road infrastructure are on

average in western Europe approximately 1.3 times current expenditure. Book transfer rates could be computed for each country on this basis, defined as the difference between chargeable income from freight transport taxation (as calculated above) and the capital infrastructure costs (the 1.3 ratio incorporated) that can be attributed to freight transport. It was decided, however, to restrict the analysis to the level of an average figure for Europe due the large variation that can be expected in the rates of book transfers that would be revealed by undertaking the analysis country by country with national data. Such an analysis would determine to what extent road expenditures are subsidised by other revenues (positive book transfers) or to what extent road freight revenues subsidise expenditure in other sectors (negative book transfers). For the current analysis, the estimate of a positive transfer of 23% to subsidise capital road infrastructure costs was retained from the empirical 1:1.3 ratio.

In a further stage of analysis, transfers were redefined as the difference between chargeable income from freight transport taxation and a benchmark value for revenues that would obtain under efficient taxation. On the basis of the analysis set out in section 1.2.4 (Fiscal and financial distortions in the light of market failure) and the research results quoted in that section, we assume that marginal social cost pricing — including pricing most externalities — would yield revenues in the order of 150% of capital infrastructure costs. The exact relationship will vary from one country to another and differences could be substantial. Thus our comparison with this benchmark value is again only applied to Europe as a whole (the average for the nine countries examined).

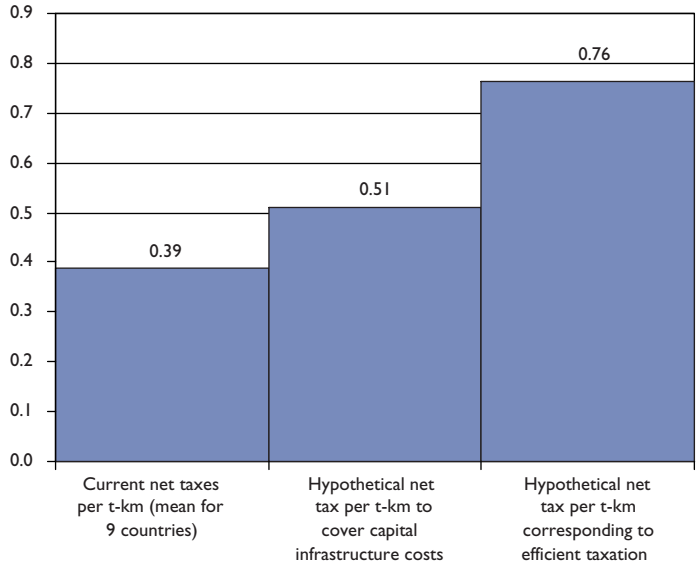
The analysis could be applied at national level, given adequate national data on external costs by vehicle and infrastructure type. This would permit assessment of the distortions (excess of fiscal charges versus uncovered costs) that different fiscal regimes for road freight transport embody. This level of analysis is feasible with the methodology developed and should be possible on the basis of data available in many of the countries examined.

Table 2-VII and Figure 2.7 compare current rates of transport charges in Euro cents per t-km with hypothetical rates corresponding to a) a benchmark value for full coverage of capital infrastructure, and b) a supplementary benchmark value for efficient taxation (full marginal social costs pricing). The results illustrate that current net rates would have to be increased by one third to arrive at the first benchmark and doubled to reach the second benchmark.

Table 2-VII. **Net taxes in t-km in relation to benchmarks for full coverage of capital infrastructure costs and in relation to efficient taxation taking into account external costs**

	Actually paid net taxes in € cents per t-km	Net taxes in € cents per t-km that, empirically, would raise revenues equal to capital infrastructure costs	Net taxes in € cents per t-km that, in a context of optimum pricing, would raise revenues equal to full cost coverage
Basis of calculation	Chargeable expenditure	130% of chargeable expenditure	150% of capital infrastructure costs
Mean for Austria, Belgium, Czech Republic, France, Germany, Netherlands, Spain, Switzerland and United Kingdom	0.39	0.51	0.76

♦ Figure 2.7. ***Net taxes in relation to efficient levels of taxation (€ cents/t-km)***



Source: ECMT, 2000.

As noted, more detailed, country specific analysis would be necessary to assess how current taxation compares with optimal taxation in individual countries. It should also be noted that raising revenues equal to costs does not amount to internalisation. Structuring charges so that they operate on economic actors in ways that reduce external costs is also necessary, and probably more important than the precise level of charges.

2.6 USE OF THE INDICATORS DEVELOPED

By describing fiscal structures, outlining financial accounts (expenditures and receipts) and integrating operating factors (input structure), we highlight differences in the taxation of road freight transport between counîtries. These are differences, not distortions, until they are related to optimal pricing on the basis of social marginal costs.

The differences that this study seeks to identify relate to:

– Net taxation (t-km basis);

– Fiscal and territorial tax structures;

– Factors of production (L, K and their respective taxation);

– Marginal taxes (all inputs and taxes together);

– Book transfers and their relation to current marginal taxes;

– Revenue under efficient taxation and its relation to current marginal taxes.

Table 2-VIII below identifies which indicators are of use in examining which policy issues. Questions of the efficient level of taxation can only be resolved with reference to marginal social costs.

Table 2-VIII. **Summary of policy issue where each indicator is of relevance**

Policy issue	Appropriate indicator of transport taxes and charges			
	Degree of nationality/ territoriality	Net taxation	METR	Transfers
The impact of taxtes on the international *competitiveness* of hauliers	✔		✔	
Efficient *structure* of charges and taxes	✔			
Efficient *level* of charges and taxes		✔*		✔*
Inter-modal equity				✔*
Impact of taxes on the relative competitiveness of transport-intensive industries		✔	✔	
Environmental impact of taxation	✔	✔	✔	✔*

* Only when used for comparison with marginal social costs.

NOTES

1. METRs are given by the following equation: $T = (1 + t_L)^{\alpha L} \times (1 + t_K)^{\alpha K} \times (1 + t_G)^{\alpha G} - 1$, in which t is rate of tax and α the share of the relevant input.

2. INFRAS/IWW 1995, External Effects of Transport, published by UIC, 1995, Paris.

Chapter 3

ABSOLUTE LEVELS OF SPECIFIC CHARGES AND CORRESPONDING FISCAL PATTERNS

This chapter addresses levels of specific charges as a first step for comparing taxes and other charges levied on road freight transport in various European countries. Although absolute levels of charges on road haulage in one country cannot, in isolation, be compared meaningfully with those in other countries, the fiscal structures that emerge are important.

3.1 METHODOLOGICAL STAGES

The aim of chapter 3 is to compile for a number of European countries an inventory of all taxes and other charges (upon vehicle, fuel, roads, and so on) levied on freight transport by road (3.1.1). Charges can then be classified according to economic criteria (purely fiscal versus more commercial) (3.1.2) and an overall fiscal structure can be defined (3.1.3).

3.1.1 Inventory

Building an inventory is the first methodological step for examining the structure and level of charges. The inventory must include all charges levied on road freight transport; that is, taxes on vehicles, fuel duties, user charges like vignettes and tolls, VAT, and so on. Data were collected for all countries under review (Switzerland, France, Germany, Austria, the United Kingdom, Spain, the Netherlands and to some extent Belgium and Italy). All sources used were official. For each charge, the following data were compiled:

- basis of imposition (vehicle, fuel or usage);
- amount paid (per year, per km, per litre, …);
- destination of revenues raised (state budget, other budgets, infrastructures, etc.);
- type of payment (time period, road segment, bridge, …);
- VAT on diesel and tolls.
- VAT refunds, rebates and other exemptions obtained;
- revenue from each tax or charge.

Data draws on the Ecosys final report on European taxation of heavy goods transportation (1998).[1]

3.1.2 Classification

In order to allow comparisons, all charges inventoried are organised according to economic criteria classifying charges into four categories ranging from the most purely fiscal to the most commercial:

- Purely *fiscal taxes* such as taxes upon motor vehicles. These taxes are purely fiscal because they are levied on the possession of a vehicle, regardless of where and how much the vehicle is used. As they are payable in the country of registration of that vehicle, vehicle taxes are "flag" related charges.

- F*uel taxes*. Although they relate closely to usage, their territorial linkage is weak. In other words, trucks may fuel-up in country A while using the roads of the neighbouring country B.

- F*ixed prices* – infrastructure use charges that apply on a flat rate basis (per day, per year, and so on) like the Eurovignette and the Swiss RTPL.

- P*rices* – infrastructure use charges applied on a more direct usage basis (per km, per t-km, per segment, etc.) such as tolls for passage across a bridge or along a section of a motorway and the forthcoming Swiss distance-weight related heavy vehicle fee (HVF). Tolls and other distance-weight related charges come very close to prices.

3.1.3 Fiscal share structures by country

This system of classification can be used to make international comparisons of the fiscal structures applied to road haulage. Fiscal structures were produced on the basis of the yearly revenues yielded in each country for each category of charge. Each category — considered as a single source of income — was plotted as a share (%) of the sum total of revenues from road freight transport country by country. A fiscal share structure is defined as:

Revenue of the single category considered / total revenues of all charges × 100

3.2 RESULTS

3.2.1 I*nventory*

Table 3-I shows the types and levels of various charges in different European countries.

- All countries apply taxes that are of fiscal (national) character (vehicle taxes). Possessors of trucks pay these taxes in the country of registration. Exception: Swiss trucks do have to pay a portion of the French vehicle tax (axle tax) per day spent in France.

- All countries charge duties on fuel.

- All countries apply use charges, though of quite different types. France, Italy and Spain apply tolls on highways, bridges, tunnels and passes; Germany, the Netherlands and Belgium (plus Denmark, Sweden and Luxembourg) apply the Eurovignette; there are tollgates

in the United Kingdom for a few bridges and tunnels; Switzerland applies tolls on passes and the RTPL vignette — which will soon be replaced by the HVF; Austria applies a user charge called StraBA, a highway vignette as well as tolls for some tunnels and passes.

– No charge in any country explicitly internalises environmental or other social costs.

– There are numerous possible refunds, rebates and exemptions ranging from VAT re-funds to 100% of a charge due.

Table 3-I. **Taxes and other charges on road haulage in some European countries (in Euros), 1998**

Charges	Type	Country								
		A	B	CZ	F	D	NL	E	CH	UK
Vehicle tax, €/yr	Tax	2738	1132	1166	793 Axle tax	1890 Euro 1	955	592	1555	7011
Fuel duties, €/l (diesel)	Excise duty	0.28	0.29	0.19	0.37	0.32	0.31	0.26	0.47	0.63
Eurovignette, €/yr B, NL, D, L, DK, S	Flat rate basis	—	1256*	—	—	1256	1256	—	—	—
Other vignettes, €/yr	Flat rate basis	1214 StraBA°	—	106	598**	—	—	—	2488 RTPL***	—
Tolls (highways), €/km (mean)	Distance pricing	—	—	—	0.17	—	—	0.16	—	—
Tunnels, bridges, € (examples)	Distance pricing	109 Brenner	—	—	143 Mt Blanc	—	—	20 Cadi	112 Gd St Bernard	3.36 Dartford Bridge
Other user charges, €/100 t-km	Distance + weight pricing	—	—	—	—	—	—	—	1.42 HVF°°	—
VAT on fuel (%)	Tax	20	21	22	20.6	16	17.5	16	6.5	17.5
VAT on tolls (%)	Tax	—	—	—	6	—	—	16	—	—
VAT refunds	Refund	✓	✓	✓°°°	✓ not on tolls	✓	✓	✓	✓	✓
Rebates	Discount	—	—	✓	✓ axle tax	—	—	—	✓ RTPL	—

Source: Ecosys final report on European taxation of heavy goods transportation by road, SG DETEC (Swiss Federal Department for Transport, Communications, Energy and Environment), Berne, December 1998, adapted.

* Obligatory yearly vignette for vehicles registered in Belgium

** Only in the case the axle tax does not apply

*** Will be replaced by a distance-weight related charge (HVF, see below)

° When over 12 t: vignette (872 ¤/yr)

°° Initial phase (2001-2004), period during which the maximum authorised weight in Switzerland will be 34 t and for class 3 heavy goods vehicles (least polluting vehicles) only.

°°° No refund for CZ trucks when hauling abroad.

3.2.2 Similarities and differences between fiscal structures in different European countries

Figure 3.1 compares fiscal structures on the basis of the revenue shares obtained from the different categories of charges levied on road freight transport. A possible benchmark against which to assess differences might be the proposals in the EC Green Paper COM(95)691 concerning a move in fiscal regimes away from purely fiscal charges on heavy goods transportation by road towards more commercial charges, in particular road pricing.

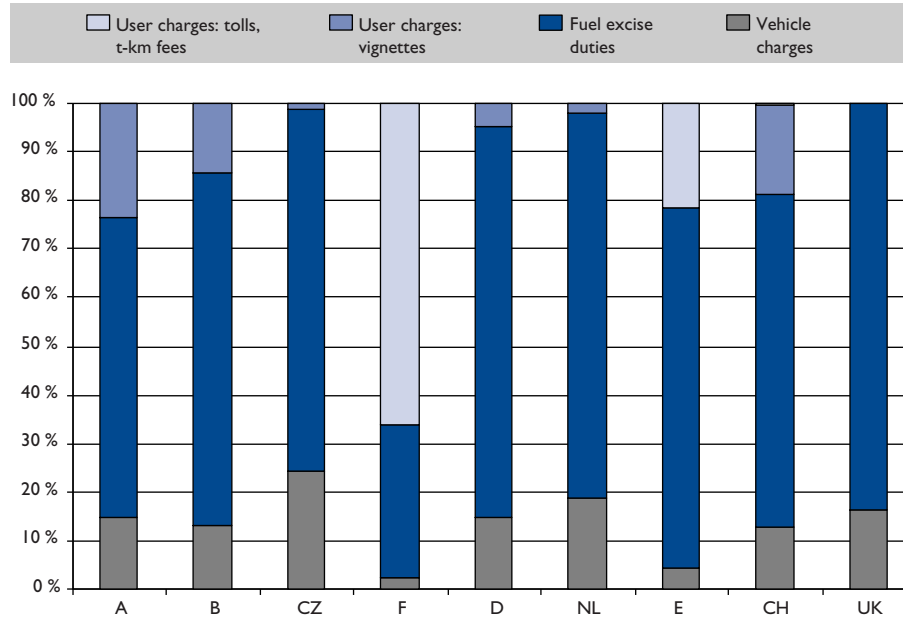
– The prevailing situation in every country except France shows a very large revenue share from fuel duties.

– In France, highway tolls ("price" category) dominate revenue shares.

– There are large differences between countries concerning the shares of vignette revenues ("fixed price" category) – present in Switzerland, Germany, Austria, the Netherlands and Belgium – and of revenues from vehicle taxes (all countries).

– The United Kingdom stands apart, it applies high vehicle taxes and fuel duty and does not employ the "fixed price" or "price" categories of charges to any significant degree.

♦ Figure 3.1. ***Fiscal share structures by category of revenues raised from charging freight transport by road***
(All revenues except those from tolls on bridges and passes)



Source: ECMT, 2000.

3.3 CONCLUSIONS

The inventory of taxes and other charges levied on road haulage in different European countries shows similarities and differences in the fiscal patterns associated to the revenues raised from these taxes. At this point in the analysis these differences can not be called distortions as no optimal pattern is yet defined.

An inventory of this type is not suited to comparing the types or levels of charge in one country with those of another country. At this methodological stage, comparing for instance the Swiss RTPL (flat rate basis) with French highway tolls (road pricing) is meaningless.

Additional methodological steps are needed to identify meaningful similarities and differences in the taxation of freight transport by road.

NOTE

1. Redevances sur le trafic routier lourd en Europe: Comparabilité et Possibilité d'Harmonisation, Ecosys for SET, Federal Department for Transport, Communications, Energy and Environment, published 1998.

Chapter 4

NET TAXATION OF ROAD HAULAGE AND CORRESPONDING COUNTRY- AND FLAG-RELATED TERRITORIAL PATTERNS

This chapter addresses the net taxation of road haulage (net amount paid in total and per t-km) in different countries as a second step for comparing charges levied on road freight transport. All refunds, rebates, and other exemptions related to VAT, vehicle characteristics, transit, etc. are taken into account. The net taxation calculation is obtained from the run of standardised haulage scenarios within each country (standard scenarios by country). The "territorial" structures revealed by these scenarios are then used for examining similarities and differences between net taxation patterns.

This examination is then extended to international hauls in which trucks of different nationalities perform the same international road haul (scenarios by flag). The "territorial" structures revealed by these scenarios allow identification of the degree of nationality that is associated with different flags.

4.1 METHODOLOGICAL STAGES

Net taxation is worked out by calculating the net amount of charges that a 40 t truck would have to pay for a 500 km haul within the borders of its country of registration (standard scenarios by country; detailed descriptions of the scenarios are given in Annex II). A territorial share structure for each country is defined on the basis of the geographic criteria presented in chapter 2, the charge categories are:

- national charges such as vehicle taxes;
- weak territorial charges such as fuel duties;
- moderately territorial charges such as user charges on a flat rate basis (e.g., euro-vignette);
- strongly territorial charges such as user charges on a distance and/or weight basis — such as tolls.

The territorial structure reflects the shares (%) of each category of charge paid on the standardised haul. The basis for the calculation is the amount paid for one category of charge in proportion of the total amount paid for the standard haul.

Scenarios by *flag* were also developed. They incorporate two different international hauls. Haul #1 is from Manchester to Milan via Reims, Stuttgart, and Basle; haul #2 from Manchester to Zaragoza via Rotterdam, Munich, and Zurich. They are labelled "scenarios by flag" as the only difference between trucks is their nationality (their flag). Flag specific haulage scenarios are defined in paragraph 4.1.2; calculations and other details appear in the annex.

Calculations based on *standard scenarios by country* enable a quantitative scan of the territoriality of different European fiscal regimes. Calculations based on *international scenarios by flag* allow identification of the degree of nationality that is associated with different flags performing the same international road haul.

4.1.1 Haulage scenarios by country

The standard scenarios by country were elaborated in order to calculate the net amount of charges paid for a standard haul in each country, in contrast to the calculations in Chapter 3 which were based on annual tax revenue yields. This standard haul is 500 km for a 40 t[1] semi trailer driven in its country of registration, without any specific itinerary defined. Charges for crossing specific bridges, tunnels and passes are ignored. In countries with tolls (France and Spain), toll roads account for half the haul (250 km).

The calculations produce:

– standardised net taxation (sum total) for 40 t, 500 km country-related hauls;

– standardised net taxation per t-km for 40 t, 500 km country-related hauls;

– country-related territorial charge share structures; that is, the territoriality of different European fiscal regimes.

National charges (annual vehicle charges) were computed on an average daily basis rather than an average km basis. Thus, for example, the rate of UK vehicle excise duty applied to a standard haul was one 360th part of the annual VED payment. (Calculating the standard haul on the basis of the annual VED payment divided by the annual average number of km driven multiplied by 500 would yield a different, more accurate result. However, calculation on a daily basis was preferred to facilitate calculations in later stages, as France offers refunds against its national axle charge on the basis of days of haulage worked abroad.)

Annex II gives more details of the way these haulage scenarios were constructed and how the calculations were made.

4.1.2 Haulage scenarios by flag

There are two international haulage scenarios by flag:

– Scenarios # 1: from Manchester to Milan (with stages in Reims, Stuttgart and Basle),

– Scenarios # 2: from Manchester to Zaragoza (with stages in Rotterdam, Munich and Zurich).

The roads to be taken are specified, number of kilometres is calculated, travel time is worked out (with types of roads, speed and distance parameters). The trucks (semi-trailers) have a maximum authorised weight of 40 t,[2] but they make exactly the same haul, at the same speed, and fill fuel tanks at the same places (all fuel up first in the United Kingdom and none are equipped with extra tanks). Taxes, duties, user charges, rebates, refunds and exemptions are calculated on this basis for each flag, for both international haulage scenarios.

The calculations produce:

– standardised net taxation (sum total) per international haul and "flag";

– standardised net taxation per t-km per international haul and "flag";

– *flag*-related territorial charge share structures; that is, the *degree of nationality* that is associated with different flags performing the same international road haul (in as far as other, territorial components of these structures, are by definition frozen).

Annex II gives more details of the way these haulage scenarios were constructed and how the calculations were made.

4.1.3 Further analysis: per t-km net taxation rate

Net taxation per t-km is another way to scan similarities or differences between countries. Specifically, a net t-km taxation rate allows the comparison of hauls according to different maximum authorised weights. This enables Swiss trucks limited to a maximum of 28 t to be compared with the standard 40 t, 500 km hauls in the other countries (calculations on the basis of the Swiss RTPL "vignette"). In our international haul scenarios, 40-t trucks from all countries cross Switzerland (the calculations therefore anticipate full application of the new Swiss distance/weight HVF user charge which will be introduced progressively from 2001 with the full tariff applied from 2005).

4.2 RESULTS BASED ON STANDARD SCENARIOS BY COUNTRY

4.2.1 Net taxation (sum total) and per t-km net taxation rate (Table 4-I)

The calculations for net taxation (sum total) and net taxation per t-km summarised in Table 4.I reveal a number of differences in fiscal regimes for freight transport:

– The United Kingdom and France clearly stand out. High net taxation is a result in the United Kingdom of a high vehicle tax coupled with a fairly high duty on fuel. In France a fairly high duty on fuel is coupled with highway tolls.

– Switzerland — the 4th most expensive country according to absolute net taxation — is the 2nd most expensive (after the United Kingdom) once the 28 tonne maximum truck weight limit is accounted for in a net taxation rate per t-km.

Table 4-I. **Net taxation (sum total) and per t-km net taxation rate in some European countries, 1998**

Countries	Country specific scenarios	
	Net taxation, sum total (500-km, 40-t haul) [Euros]	Net taxation per t-km [€ cents]
A	56.21	0.2811
B	92.61	0.4601
CZ	34.20	0.1710
F (tolls on 250 km)	105.60	0.5280
D	59.46	0.2973
NL	56.19	0.2810
E (tolls on 250 km)	84.19	0.4210
CH (28 t, RTPL)	77.85	0.5561
UK	120.41	0.6021

4.2.2 Similarities and differences between territorial share structures in different European countries

Figure 4.1 illustrates the territorial share structures arrived at on the basis of standard haulage scenarios by country.

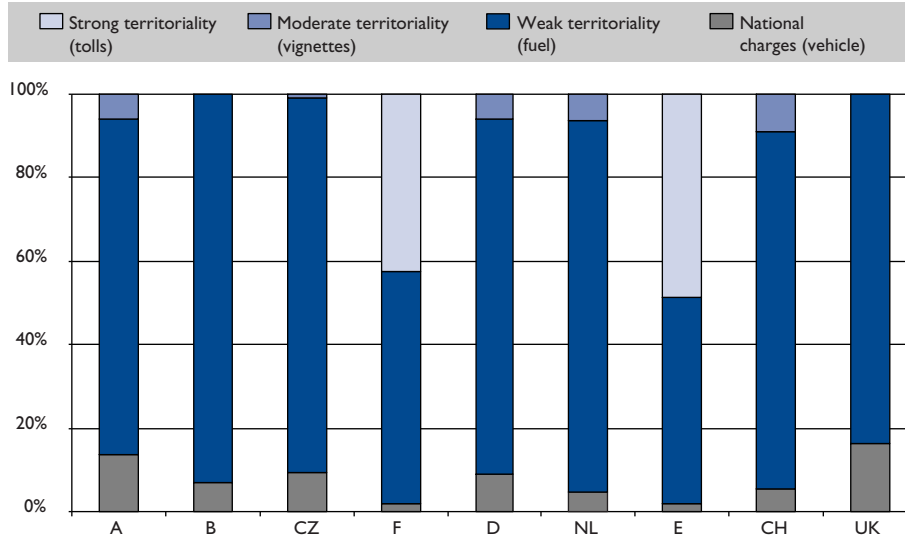
– For all countries, the largest part of the charges paid relate to the weakly territorial category of charges (fuel excise duties).

– In France and Spain, however, the most territorial category of charges (tolls) are as important as fuel duty.

– National charges (vehicle taxes) are of little importance in proportion to the sum total in most countries except for the UK and Austria and, to a lesser extent, Germany.

– The United Kingdom is the only country, of those examined, without user charges (absence of strong or moderate territorial categories of charges).

♦ Figure 4.1. ***Territorial share structures for net taxation according to standard haulage scenarios by country***



Source: ECMT, 2000.

4.3 RESULTS BASED ON INTERNATIONAL SCENARIOS BY FLAG

Running the two haulage scenarios by flag calculates flag specific composite net taxation (4.3.1) and flag specific territorial rates (4.3.2).

4.3.1 Flag specific net taxation

The flag specific haulage scenarios differ from country specific haulage scenarios in some respects:

– Flag specific scenarios cover two different itineraries. Calculations were made for both (haul # 1: Manchester-Milan and haul # 2: Manchester-Zaragoza).

– 40-t trucks are allowed to travel through Switzerland. There are two options regarding Switzerland: either applying the current RTPL vignette or anticipating the coming HVF. Results for the RTPL vignette option can be found in the annexes only while results for the HVF option are reproduced in the main text below as well as in the annexes.

– The switch from RTPL in the national scenarios to HVF in the flag scenarios is responsible for the large shift in the overall rate of charges recorded for all flags when compared to national scenarios. The current RTPL is levied on a daily basis at 4.32 euros per day. In the national scenario a theoretical 500 km haul through Switzerland therefore is charged 4.32 euros, and the Swiss part of the international haul in the flag scenarios also attracts a charge of 4.32 euros in RTPL. The HVF rate is CHF 0.0247 / t-km. The HVF charge for an imaginary 40 t, 500 km haul in Switzerland would be 307.25 euros and under the flag scenarios is over 100 euros.

– Flag specific scenarios have nothing in common with country specific scenarios as by definition fiscal/territorial patterns differ and the two flag specific scenarios differ as the respective itineraries involve crossing different fiscal/territorial regimes.

– The HVF option gives a higher composite net tax rate for all flags (for haul #1, a Spanish truck will pay 620.37% fees on pre-tax fuel price in the HVF option and only 409.19% in the RTPL vignette option—see the annexes).

As all trucks make the same haul and fuel at the same places, the only things that make net taxation rates vary are :

– flag related charges a truck must pay in its country of origin (vehicle taxes),

– national charges a truck might have to pay in a foreign country if no bilateral agreements exist for exemption (e.g., Swiss trucks pay a portion of the French axle tax when hauling in France).

In both flag scenarios, the highest rates are revealed for British trucks (high home vehicle tax) and to a smaller extent for Swiss, Austrian and German trucks. The lowest rates are revealed for Dutch, Spanish and French trucks (French trucks get refunds on their domestic axle tax when hauling across foreign countries).

Table 4-II shows net effective taxation according to flags. Abbreviations in the first column therefore do not correspond to countries along the itinerary, but to the nationality of the trucks (their flag).

Table 4-II. **Per t-km net taxation rate by flag (international haulage scenarios by flag)**

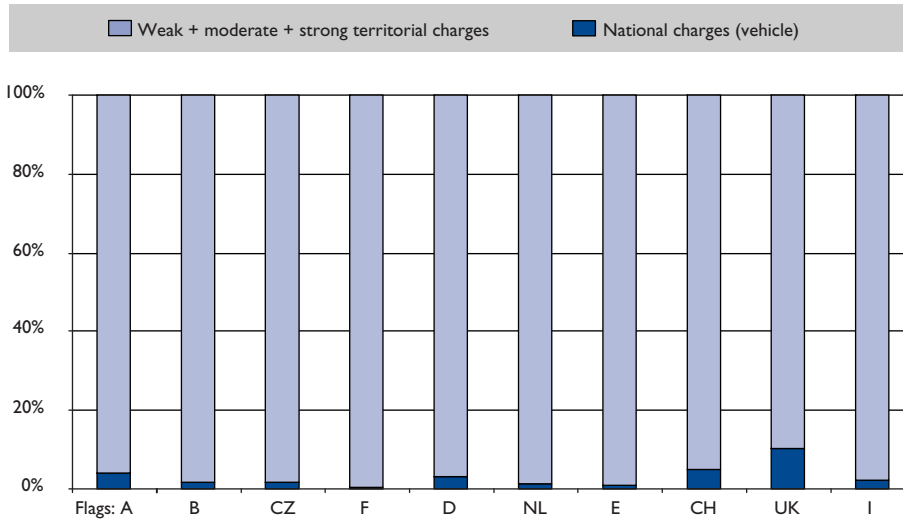
Flags	Flag specific international scenarios	
	Net taxation per t-km* [€ cents]	
	Haulage # 1 Manchester-Milan	Haulage # 2 Manchester-Zaragoza
A flag	0.7794	0.6657
B flag	0.7601	0.6445
CZ Flag	0.8404	0.7155
F flag	0.7509	0.6322
D flag	0.7692	0.6545
NL flag	0.7580	0.6422
E flag	0.7536	0.6374
CH flag	0.7839	0.6707
UK flag	0.8306	0.7222
I flag	0.7626	0.6473

*International haulage scenarios special hypothesis : HVF in Switzerland

4.3.2 Flag specific degrees of nationality

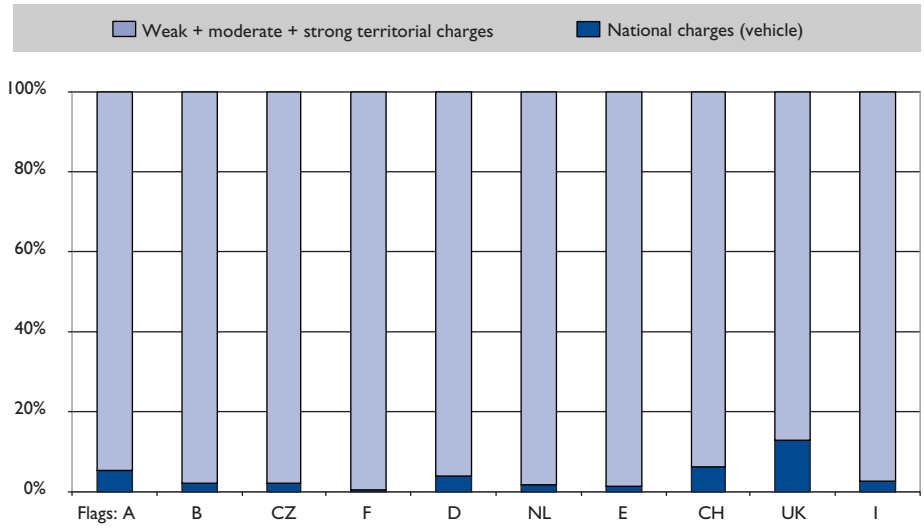
For both scenarios, the highest rates of charges are in the "middle and most territorial" categories, followed by the "least territorial" category (fuel). For all flags, the "strongly territorial" taxation rates (tolls, HVF) are much higher than "moderately territorial" rates (Eurovignette). "National" rates are much lower. However, as the haul is the same for all flags, only the "national" category of charges varies from flag to flag – the territorial parameters are frozen and thus the national element is isolated. Differences among national net taxation rates are illustrated in Figures 4.2 and 4.3.

♦ Figure 4.2. ***Flag specific degree of nationality in haul #1 Manchester - Milan***



Source: ECMT, 2000.

♦ Figure 4.3. ***Flag specific degree of nationality in haul #2 Manchester - Zaragoza***



Source: ECMT, 2000.

4.4 CONCLUSIONS

The net taxation calculation results in a ranking of countries according to charges paid under a standard road haulage scenario (40 t semi-trailer, 500 km within the country). This ranking changes when t-km net taxation rates are computed (28 t truck in Switzer-land). The ranking changes again when international itineraries are considered and will change again when further parameters are taken into account (see chapters 5 and 6).

Country specific haulage scenarios reveal the weight of charges paid per t-km by categories of charges levied (Table 4-I).

– The UK stands out because of the relatively large part nationality based charges account for in net taxation.

– The UK shows the highest rate of taxes per t-km. France lies in second place, with tolls accounting for the bulk of charges.

– The highest rates for strongly territorial charges are found in France and Spain (tolls).

The flag specific scenarios reveal essentially that rates of overall taxation differ with respect to the nationality based taxes only. This provides for a sensitivity analysis, calculating the degree of taxation on the basis of nationality relative to the same haul performed under different flags. The share of nationality based charges is low relative to the more territorial charges for all countries. This analysis sheds light on how home fiscal regimes effect the competitiveness of international freight transport by road. Differences in "national" taxation rates translate into "distortions" between flags relative to the same haul.

Additional methodological steps are required in order to be able to compute and compare overall the impact of taxes on the competitiveness between countries.

NOTES

1. 28 t for Switzerland.

2. 40 t ftrucks are allowed to cross Switzerland by replacing the current RTPC and 28 t limit with the new HVF and 40 t limit (to be fully applied in reality from 2005).

Chapter 5

EXAMINING NET TAXATION FOR PAIRS OF FLAGS

This section further examines differences between "flags" in net transport charges paid. In a first step, scenarios were built to show results for French and UK trucks hauling in each others countries and at home. Scenarios were also constructed for other pairs of flags from neighbouring countries and for groups of flags hauling in specific countries.

5.1. COMPARISON BETWEEN UK AND FRENCH FLAGS

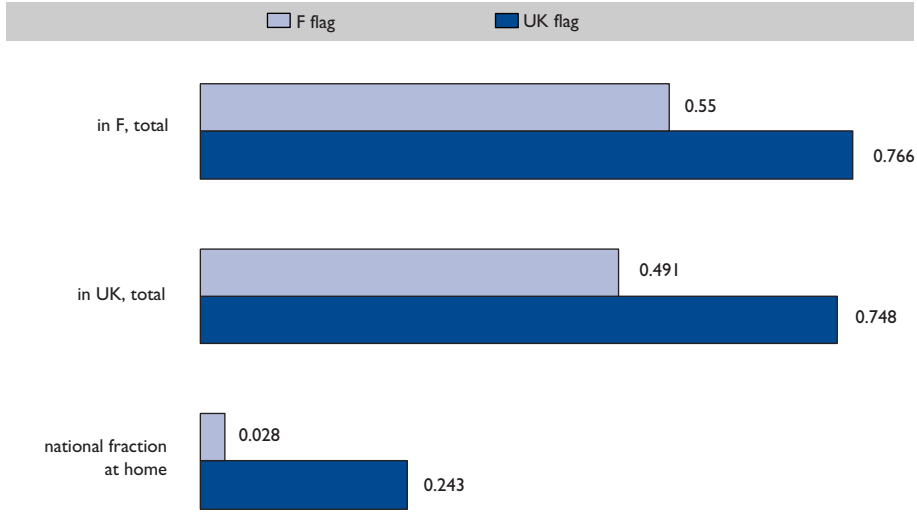
An arbitrary haul of 200 km was constructed in each country. French and British trucks were "run" over the haul each crossing 200 km in France and 200 km in the United Kingdom. See annex for details of the calculations. The new hauls were constructed so that the combined 400km runs could be made in one day, simplifying calculations.

Figure 5.1 shows the results for UK and French trucks hauling at home and abroad. Territorial charges paid vary with the specific fiscal regime of the country crossed while the "national" fraction of charges (calculated as an average paid per haul) remains constant.

For both flags (French and UK), it is cheaper to haul in the United Kingdom:

– French trucks pay 0.49 cents per t-km in the United Kingdom and 0.55 cents per t-km at home.

♦ Figure 5.1. ***Flag specific crossed hauls between France and the United Kingdom***
(Net taxes in € cents per t-km)



The French national fraction (axle tax) is reimbursed when hauling away.

Source: ECMT, 2000.

– UK trucks pay 0.75 cents per t-km at home and 0.77 cents per t-km in France.

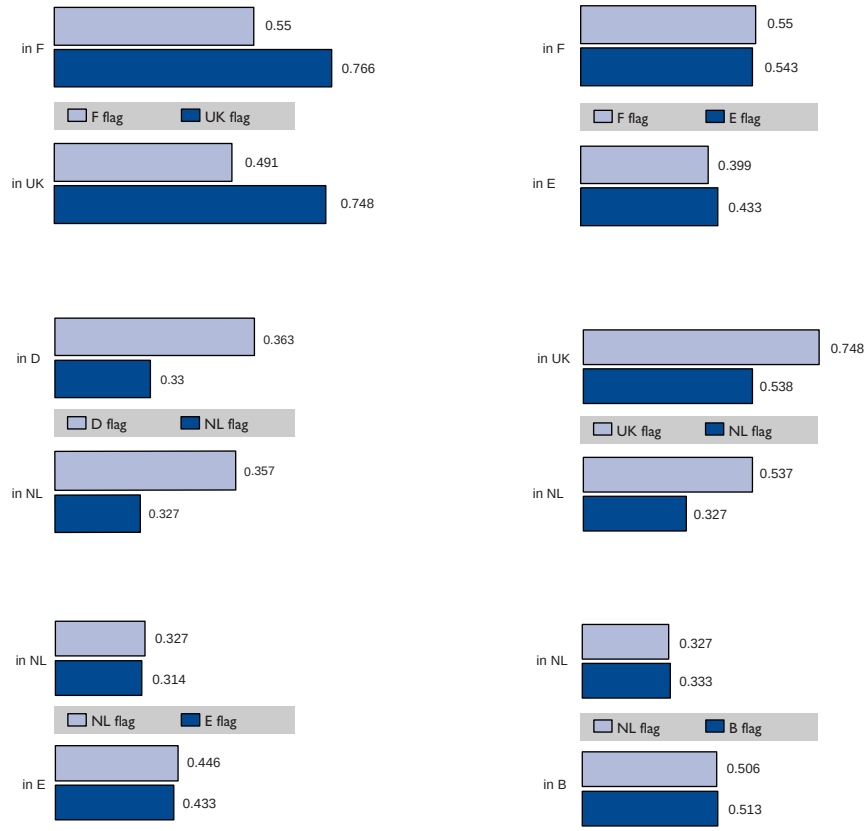
UK hauliers pay higher net charges then French hauliers in whichever of the two countries they haul.

National charges are much higher for UK flags (0.24 cents per t-km) than for French flags (0.03 cents per t-km). For almost all countries this fraction is independent of the country where hauls are performed. In the case of France a refund is available against the annual axle tax for each day spent hauling abroad.

5.2 OVERALL RESULTS

Figure 5.2 shows results for the six pairs of flags in a crossed manner following the same calculations as in the F-UK case study. Results are expressed as net taxes in cents per t-km. Overall the results show that, independently of the country of haulage, one flag is in most cases cheaper in a pair (F-flags are cheaper than UK-flags, NL-flags are cheaper than D-flags). The exception is for the E-F pair: E-flags stay cheaper than F-flags in France and F-flags are cheaper than E-flags in Spain. These results can not be used directly to gauge the impact of taxation on competitiveness as taxes on labour and capital also have to be taken into account. This is done in Chapter 7 below.

♦ Figure 5.2. ***Results for six pairs of flags*** *(net taxes in € cents per t-km)*



Source: ECMT, 2000.

Chapter 6

EFFECTIVE TAX RATES ON THE MARGINAL COST OF PRODUCTION OF ROAD FREIGHT TRANSPORT (METR)

This chapter examines how taxes on various inputs – fuel (ad valorem composite rate for vehicle, fuel and user charges), labour and capital – together affect the marginal cost of road freight transport. All these inputs and respective tax rates are combined by share into a single equation for computing marginal effective tax rates (METRs). METR estimates — at the margin — the effects of all payments on the three main inputs to freight transport. It gives the rate of a single composite tax that could be levied, hypothetically, on the marginal production cost of road freight transport in place of all the various existing charges.

6.1. METHODOLOGICAL STAGES

In essence, the METR approach consists of estimating the total pecuniary effect of taxes and charges as a percentage of the marginal cost (exclusive of taxes) of production of road freight services (actual market prices for this service for simplicity).[1] Using a Cobb-Douglas cost function, a simple formula is derived that expresses the overall effective tax rate on the marginal cost of production in terms of two basic parameters: the *relative shares of the analysed inputs* (fuel, labour and capital), and the marginal *effective rates of taxation on these inputs* (rates actually paid). The result is the effective net rate of tax that would be paid on the production of one additional unit of freight transport by road as a result of the fiscal pattern of the country of production.

Differences revealed in METRs are not viewed as distortions, indeed differences are to be expected when taxes are set at efficient levels in each country. Further analysis that compares taxes against appropriate benchmarks is required to make judgements as to whether there are distortions and this is addressed in Chapter 8.

6.1.1 Estimation of an ad valorem composite rate for vehicle, fuel and infrastructure use charges

The first step in deriving METRs is to combine fuel, vehicle and other road user charges into a composite indicator that can subsequently be combined with rates of taxation on labour and capital in the Cobb-Douglas cost function. The net road taxation rates calculated in chapter 4 are converted to an *ad valorem* rate by comparing them with the national pre-tax price of fuel. This produces a net effective *ad valorem* rate for road taxes.

The rate is "net" because all refunds and rebates were deducted; it is "effective" because such tax rates result from observable and measurable rates according to different haulage scenarios; it is "*ad valorem*" because it is in proportion to pre-tax fuel prices. This is a "composite" approach that relates charges paid along the road to a common cost element, the pre-tax price of fuel (although this price varies slightly from one country to another).

Composite ad valorem net effective tax rates were calculated according to the haulage scenarios introduced in section 4 (standard scenarios by country; calculation and other details appear in the annex). The national scenarios are for 40-t trucks over 500-km hauls.

The composite "ad valorem net effective tax rate" is defined as:

Net charges (Euros) / amount of fuel (litres) / pre-tax price of fuel (Euros/litre) × 100

Table 6-I shows the composite ad valorem tax rates for the countries under review.

– The United Kingdom and France (and, to a smaller extent, Spain) stand out with high rates. As seen before (section 3.2), the United Kingdom is a fuel duty and vehicle tax oriented country; the United Kingdom also has a quite low pre-tax price of fuel. France is a fuel duty and tolls oriented country with a low pre-tax fuel price. Spain is a tolls oriented country and also has a quite low pre-tax price of fuel.

– The Netherlands and Austria in contrast have fairly low composite ad valorem net effective tax rates.

Table 6-I. **Composite ad valorem net effective tax rates in some European countries**
(standard haulage scenarios by country)

Countries	Country specific composite ad valorem net effective tax rates
A	151%
B	289%
CZ	151%
F	420%
D	205%
NL	150%
E	270%
CH (28 t)	210%
UK	457%

Decomposing *ad valorem* tax rates into territorial *ad valorem* tax rates may help in understanding which category of charges is especially high or low relatively to the pre-tax price of fuel. Table 6-II shows territorial *ad valorem* net effective tax rates for the countries under review.

– The "weakly territorial" *ad valorem* net tax rate (the part attributable to fuel taxes) is the highest rate for all countries by far.

– Switzerland and the Netherlands show a slightly higher "moderate and strongly territorial" (road use charges) *ad valorem* tax rates than their "national" (vehicle charges) *ad valorem* rates. The pattern is reversed in Germany, Austria and the United Kingdom.

– The United Kingdom's relatively high rates of fuel and vehicle taxes are reflected in high *ad valorem* tax rates in the categories "weak territoriality" and "national".

– France has the highest *ad valorem* tax rate in the "strongly territorial" category and is second in the row for the "weak territoriality". Spain is second in the "moderate and strongly territorial" category.

– The Netherlands and Austria are globally fairly low in all categories (but not always the lowest).

– The lowest score in the "nationality" category is for Spain: vehicle tax is low relative to the pre-tax price of diesel.

– The United Kingdom shows a 0% rate in the "moderate and strongly territorial" category as standard scenarios by countries do not include crossing tolled bridges.

Table 6-II. **Territorial ad valorem net effective tax rates in some European countries**
(standard haulage scenarios by country)

Countries	Country specific territorial ad valorem net effective tax rates		
	National charges (vehicles)	National charges Least territorial charges (fuel)	Moderate and strongly territorial charges (usage)
A	20%	121%	9%
B	10%	269%	11%
CZ	14%	136%	1%
F	9%	234%	178%
D	18%	175%	12%
NL	7%	133%	9%
E	5%	133%	131%
CH (28 t)	12%	180%	19%
UK	74%	383%	0%

6.1.2 Estimation of marginal effective tax rates (METRs)

The application of the METR methodology to road haulage services in this study is aimed at estimating the net effect of taxes on fuel, labour and capital, on the marginal cost of freight transport. In order to determine to what degree taxes influence marginal costs, several steps must be taken.

(*a*) *The taxes and charges actually paid on the various inputs must be calculated*:

– Fuel taxes: composite *ad valorem* net effective tax rates (vehicle taxes, fuels duties and user charges computed as composite *ad valorem* net tax rates on pre-tax fuel prices) – calculated above;

– Labour taxes: % of labour costs calculated for a single individual at the income level of the average production worker, including employees' and employers' social security premiums (1996) – source OECD Observer N° 214, 1998 (see section 6.1.4).

– Capital depreciation and amortisation: taking fiscal depreciation rules [capital cost allowances (CCA)] into consideration – various national sources (see section 6.1.4).

(*b*) *Taxes paid by national road freight services must be estimated as a proportion of the total marginal costs of these services, for which it is necessary to*:

– Standardise the haulage (running haulage scenarios by country and by flag; this study).

– Estimate the relative input shares of the various inputs (inventory by country; see annexes).

6.1.3 Marginal effective tax rates

Assuming a Cobb-Douglas cost function, with inputs of fuel and other consumables (G), labour (L) and capital (K), McKenzie, Mintz and Scharf (1992) derived the following expression for the effective tax rate on marginal costs (T):

$$T = (1 + t_L)^{\alpha_L} \times (1 + t_K)^{\alpha_K} \times (1 + t_G)^{\alpha_G} - 1$$

in which t is the "marginal" effective tax rate on the relevant input[2] and α_L, α_K, α_G are the shares of the various inputs — labour (L), capital (K) and fuel and user charges (G) — in the total costs. This equation makes it possible to estimate the effective marginal tax rate using only two parameters : the rate of tax on each input (t_L, t_K and t_G) and the share of each input in the marginal costs (α).

6.1.4 Tax Rates on Income and Capital

The rates of taxation on labour and capital used in the calculations and sources from which the data was taken are summarised in Table 6-III. Capital depreciation rate allowance is taken as the most suitable indicator of rates of capital taxation. The high rate of taxation on capital in the UK stands together with the high rates of labour charges in Germany, Italy and France.

Table 6-III. **Tax rates on income and capital in selected European countries**

Countries	Income tax rate and social security [25]	Capital depreciation / amortisation (%)					
		Road : vehicles				Rail: Rolling stock	
		HGV		Coach			
		Rate %	Period	Rate %	Period	Rate %	Period
Switzerland	30%	16.16 [3]		40 [4]		7-8 [4]	
France	50%	12.0 [6] 20.0 [7]		25 [7]		11.8 [8]	
Spain	39%	16.0 [10]	14 [10]	16 [10]	14 [10]	3 [10]	68 [10]
Austria	42%	17.0 [12]	6 [12]	20 [12]	5 [12]	4 [13]	50 [13]
Germany	51%	17.0 [15]	6 [15]	20 [15]	5 [15]	7 [15] 8.44 [16]	20 [15]
Netherlands	44%	14.6 [17]				2-4 [18]	
United Kingdom	33%	25.0 [20]		25 [20]		6 [20]	20-30 [24]
Italy	51%	20.0 [22]		20 [22]		3-5 [23]	
Czech Republic	43%	12.5					

NOTES
(1), (2), (5), (13) cancelled.
(3): Compte national routier,1996.
(4): *Guides to European taxation, volume* II, *The taxation of companies in Europe*, Switzerland-56, no 2.3.4., Deloitte Haskins & Sells, London, 1997.
(6): Compte national routier,1996.
(7): *Guides to European taxation*, op cit, France-68, no 2.3.4., 1995.
(8): SNCF.
(9), (11), (14), (19), (21): *Etude fiscale de* L'OCDE, *Base d'imposition du revenu des personnes physiques, Etude comparée*, OECD, Paris 1990, p. 80.
(10): taux et durées maxima. *Guides to European taxation*, op cit, Espagne-43, no 2.3.4., 1997.
(12): le taux allemand ainsi que la durée allemande de l'amortissement du capital sont appliqués par analogie compte tenu des « movable fixed assets », *Guides to European taxation*, op cit, Autriche-45, no 2.3.4, 1994.
(15): Afa Tabelle.
(16): DBahn.
(17): Dutch NEA.
(18): *Guides to European taxation*, op cit, Pays-Bas-51, no 2.3.4, 1994.
(20): *Guides to European taxation*, op cit, Royaume-Uni-55, no 2.3.4, 1997.
(22): *La fiscalité des sociétés dans la* E.E.E., Jean-Marc Tirard, 3ème édition 1991/1992, p. 187.
(23): *Guides to European taxation*, op cit, Italie-54-56, no 2.8, 1997.
(24): British Railways Group, 1995/1996.
(25): % of labour costs, single individual at the income level of the average production worker, incl. employees and employers social security, 1996, reported in OCDE taxes revisited, The OECD Observer N° 214, 31, OECD, Paris, 1998;

RP/GP-Ecosys® Geneva 1998-99.

6.1.5 Computation of METRs

Table 6-IV summarises the calculation of METR by country. Input shares for labour, capital and fuel were taken from studies by major transport industry associations (IRU and members) or by governments.

Table 6-IV. **Input structures, tax rates on inputs and net effective rates of taxation on the marginal cost of road freight transport in selected European countries**

	A	B	CZ	F	D	NL	E	CH[28t]	UK
Input shares:									
Labour	41%	40%	27%	51%	48%	39%	43%	54%	47%
Capital	49%	50%	46%	43%	44%	52%	49%	40%	44%
Fuel etc.	10%	14%	27%	6%	8%	9%	8%	6%	9%
Tax rates:									
Labour*	42%	56%	43%	50%	51%	44%	39%	30%	33%
Capital**	17%	14%	12.5%	20%	17%	14.6%	16%	16.2%	25%
Fuel etc.***	151%	289%	151 %	420%	205%	150%	270%	210%	457%
Country specific METR	36%	47%	49%	46%	42%	34%	38%	30%	47%

* % of labour costs; single individual at the income level of the average production worker; incl. employees and employers social security; 1996, The OECD Observer N° 214, 31 (OCDE taxes revisited, by Steven Clark and Flip de Kam)

** Depreciation rates; Guides to European Taxation (The Taxation of Companies in Europe), various volumes

*** Composite ad valorem net effective tax rates calculated on the national pre-tax price of fuel (standard national hauls)

6.2. RESULTS: COUNTRY SPECIFIC METRS (STANDARD HAULAGE SCENARIOS BY COUNTRY)

The results shown in this chapter are country specific composite METRs (6.2.1) and country specific territorial METRs (6.2.2). Section 6.3 gives the results for flag specific scenarios.

6.2.1 Country specific METRs

Table 6-V shows METRs for all countries.

– France, Germany and Austria lie somewhat closer together than in the t-km and *ad valorem* rate comparisons, while Switzerland's position is much more clear cut than in the figure comparing absolute charges.

– The Czech Republic, United Kingdom and France have the highest METRs. Reasons: apart from the Czech Republic the United Kingdom has the highest *ad valorem* and capital taxation rates; France has a high capital taxation rate; the Czech Republic has very different structure of input costs to the other countries — although pre-tax diesel prices are little different they account for a much higher share of input costs. With a fuel tax rate similar to other countries this yields a very high METR for the Czech Republic.

– Switzerland and Spain show the lowest METRs. Reasons: Switzerland has very low rate of capital and labour taxes; Spain has a very low *ad valorem* taxation rate and quite low capital and labour rates.

Table 6-V. **Country specific "composite" marginal effective tax rates for some European countries**
(standard haulage scenarios)

Countries	Country specific composite METRs
A	36 %
B	47 %
CZ	49 %
F	46 %
D	42 %
NL	34 %
E	38 %
CH	30 %
UK	47 %

Seen in this light, road-related taxes are in a way "counter balanced" by taxes on the other country specific inputs (labour and capital). This gives a different picture than that obtained by comparing road related taxation rates only. No judgement can be made as to the impact on efficiency of the differences in taxation from one country to the other without reference to the benchmarks developed in chapter 8.

6.2.2 Country specific territorial METRs

METRs can be decomposed into the categories of tax identified in chapter 3 on the basis of territoriality:

– national (vehicle taxes),

– weakly territorial (fuel tax),

– moderately and strongly territorial (infrastructure use charges).

"Territorial METRs" are calculated on the basis of territorial *ad valorem* rates. There is no change regarding L and K.

Table 6-VI shows "territorial METRs" for each country. The highest METRs are, for all countries, those related to the "weak territoriality" category (fuel). For some countries the impact of use charges (Eurovignette, tolls etc. – "moderate and strongly territorial METR" category) is higher than the impact of national, fiscal charges (annual vehicle taxes etc.) – CH, F, E and NL. The reverse is true in D, A and UK.

Table 6-VI. **Country specific "territorial" marginal effective tax rates for some European countries**

Country	Country specific territorial METRs		
	National charges (vehicle)	Least and moderately territorial charges (fuel)	Strong territorial charges (usage)
A	27 %	35 %	26 %
B	30 %	46 %	27 %
CZ	21 %	47 %	17 %
F	34 %	43 %	41 %
D	32 %	41 %	32 %
NL	24 %	33 %	25 %
E	24 %	33 %	33 %
CH	23 %	29 %	24 %
UK	33 %	45 %	26 %

6.3. RESULTS: FLAG SPECIFIC METRS (HAULAGE SCENARIOS BY FLAG)

Results presented in this section are flag specific (composite) METRs (6.3.1) and flag specific territorial METRs (6.3.2).

6.3.1 Flag specific METRs

Table 6-VII shows the METRs for all flags and for both itineraries (Manchester – Milano and Manchester – Zaragoza). These flag based METRs contribute a first step in examining the impact of taxation on the relative competitiveness of national trucks in Europe. The following observations can be made.

Table 6-VII. **Flag specific "composite" marginal effective tax rates for some European countries**

Flags	Flag specific composite METRs (HVF in Switzerland)	
	Haulage # 1	Haulage # 2
A flag	51 %	48 %
B flag	56 %	54 %
CZ flag	103 %	94 %
F flag	49 %	47 %
D flag	52 %	50 %
NL flag	47 %	44 %
E flag	45 %	43 %
CH flag	36 %	35 %
UK flag	52 %	50 %

Independently of the itinerary, the flags with highest METR are Czech, German, British, Austrian and French trucks. Reasons: Germany has the highest labour tax rate; the United Kingdom has the highest capital tax and *ad valorem* tax rates; Austria and France have quite high labour tax rates. The very high Czech figure is explained by the unusual structure of inputs

to production with a high share of pre-tax fuel costs in total marginal costs whilst the rate of tax on diesel is little different from other countries.

It can also be noted that the flags with the lowest METR are Swiss trucks (by far), then Spanish and Dutch trucks. Reasons: Switzerland has the lowest labour tax rate and a low capital tax rate; Spain has a quite low labour tax rate, the second lowest capital tax rate and the second lowest *ad valorem* tax rate; the Netherlands has the lowest capital tax rate.

If the RTPL vignette option is taken for Switzerland, METRs are, for all flags, a bit lower (e.g. haulage # 1 - CH: 34%, F: 46%, etc.). Differences between haulage scenario # 1 and scenario # 2 are of little significance.

6.3.2 Flag specific territorial METRs

Tables 6-VIII and IX show the territorial METRs for haulage scenarios 1 and 2. For all flags "moderate and highly territorial charges" have the biggest impact (Eurovignette, tolls, etc.), closely followed by fuel charges.

Table 6-VIII. **Flag specific "territorial" marginal effective tax rates for some European countries**
(international haulage scenario # 1)

Flags	Flag specific territorial METRs (HVF in Switzerland)		
	National fiscal charges (vehicles)	Weak and moderately territorial (fuel)	Strongly territorial charges (usage)
A flag	28 %	41 %	45 %
B	29 %	46 %	49 %
CZ	20 %	73 %	74 %
F flag	33 %	43 %	45 %
D flag	36 %	45 %	47 %
NL flag	25 %	39 %	41 %
E flag	24 %	38 %	40 %
CH flag	24 %	31 %	32 %
UK flag	33 %	42 %	44 %

Table 6-IX. **Flag specific "territorial" marginal effective tax rates for some European countries**
(international haulage scenario # 2)

Flags	Flag specific territorial METRs (HVF in Switzerland)		
	National fiscal charges (vehicles)	Weak and moderately territorial (fuel)	Strongly territorial charges (usage)
A flag	28%	40%	41%
B	29%	45%	45%
CZ	20%	68%	64%
F flag	33%	43%	43%
D flag	36%	44%	44%
NL flag	25%	37%	38%
E flag	24%	37%	37%
CH flag	24%	30%	31%
UK flag	33%	41%	41%

6.4. CONCLUSIONS

METR calculations shed fresh light on the comparison of the charges levied on road freight transport. Taking into account other inputs than fuel, vehicles and infrastructure use, i.e. labour and capital, leads to a wholly different image of road freight transport taxation.

Country specific METR calculations give a new picture of the fiscal regimes that prevail in Europe. The image is different because of differences between countries in the weights of taxation on labour and capital. To take the case of Switzerland, it was the "most expensive" country with respect to the net taxation by t-km. According to calculations that take into account all inputs, Switzerland shows the lowest METR of all the countries examined (under the current RTPL road use charging system).

In general, given the relatively small shares of fuel in the production of freight transport by road, high *ad valorem* net effective tax rates only moderately taxation as expressed by METRs. Payments on labour and capital have much more influence on the relative competitiveness of road haulage services.

The major exception to this pattern is the Czech Republic. As in other transition economies, the input share structure differs to that typical in western Europe. Diesel accounts for 28% of pre-tax marginal costs in the Czech Republic — in the other countries the figure is 5 to 8%. Diesel taxes are little different in the Czech Republic to the other countries examined, thus the impact transport charges on the total marginal cost of Czech hauliers is large. Moreover, as it is outside the European Union and there are no bilateral arrangements, Czech hauliers cannot obtain reimbursements on VAT paid on diesel purchased abroad unlike hauliers in the European Union.

The Czech example serves also to underline the point that METR is not a direct indicator of competitiveness. Absolute levels of pre-tax marginal costs have also to be taken into account. And for labour and capital these are substantially lower in the Czech Republic than in the other countries.

Setting to one side the results for the Czech Republic, national haulage scenarios record the highest METRs for the United Kingdom and France in the selection of European countries examined. Switzerland records the lowest METR with the second lowest score in the Netherlands.

Flag specific international haulage runs reveal a different pattern again. From this perspective Germany taxes haulage hardest, very closely followed by the United Kingdom and Austria. Switzerland and the Netherlands again come out lowest. In the international market METRs are sensitive to the "national" elements of home fiscal regimes when decomposed on the basis of territoriality of application, i.e. vehicle taxes, labour taxes and capital depreciation, and insensitive to more territorial charges — fuel taxes, use charges and tolls.

NOTES

1. The methodology draws on the analysis developed by McKenzie, Mintz and Scharf, 1992 for quantifying differential taxation of Canadian and U.S. passenger transportation, as well as the OECD case-study of effective tax rates on the marginal cost of production for different modes of freight transport, Pillet, 1998.

2. It should be noted that, in reality, a tax on an input will be split between producers and consumers according to the relative price elasticities of demand and supply for that input. For simplicity reasons and lack of data, it is assumed that the tax is fully paid by the user of the input.

Chapter 7

MARGINAL EFFECTIVE TAXATION RATES AND COMPETITIVENESS

The relative positions of hauliers competing with trucks from neighbouring countries in each others markets is the next step in examining the impact of differences of taxation on competitiveness. The 200 km scenarios described in Chapter 5 to compute net transport charges were used again to examine METRs for pairs of national haulage industries (flags). The results are presented in table 7-I.

The biggest difference between neighbouring pairs was found to be for British and Dutch hauliers in Holland, where METRs are 22% higher for British hauliers. French and Spanish hauliers are also subject to significant differences in taxation. In both markets French hauliers face METRs 12% higher than their Spanish counterparts.

These differences in METR appear likely to have an impact on competitiveness although a specific market analysis would be required to confirm the importance of these differences in taxation compared to other influences on competitiveness. It must be remembered that other factors — including pre-tax prices of labour and capital, quality of service provided and exchange rates — are primarily responsible for the competitive advantages that do exist in practise.

Table 7-I. **Différences in METRs between flag pairs**

Flags	METRs	Differences in METRs (%) between highest and lowest METRs in one country, relative to the lowest METR	
UK flag in UK	52 %	11 %	In UK
F flag in UK	46 %		
F flag in F	47 %	UK/F : 9 %	
UK flag in F	51 %	UK/E : 21 %	In F
E flag in F	42 %	F/E : 12 %	
E flag in E	36 %	12 %	In E
F flag in E	40 %		
D flag in D	42 %	9 %	In D
NL flag in D	38 %		

The next largest difference is for UK and French hauliers in the UK (11%). If the UK was part of the European monetary system this would probably be significant. In current circumstances, however, the value of the Pound against the Euro has a much greater impact. The strength of the Pound in 1999 has had a significant effect in increasing imports from France and depressing exports to France. Hauliers continue overwhelmingly to be hired in the country of origin of goods for export, despite the freedom conferred by full application of the Single Market to the haulage

industry since July 1998. Thus in present conditions French trucks normally carry French exports to the UK. They then offer rates for return trips that UK hauliers can not match – not because of costs in the haulage industry but because of the imbalance in trade and thus in the depression of the haulage market for UK based companies.

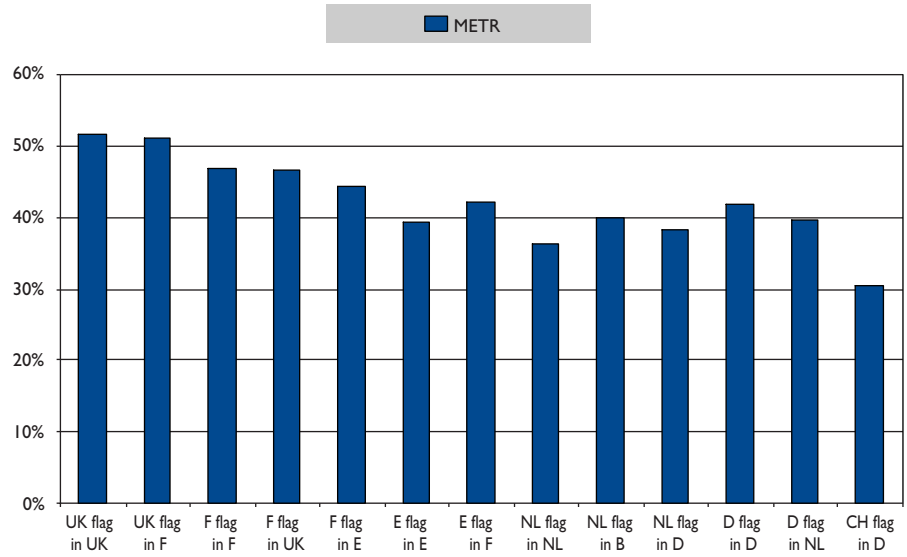
The large difference revealed in Table 7-1 (21%) between the impact of taxes on the competitiveness of UK versus Spanish hauliers in the French market is difficult to assess. The opportunities for such potential competition are probably limited and would need to be investigated on the basis of specific markets – for example haulage from French ports where UK and Spanish trawlers unload fish. This is beyond the scope of the present report.

Table 7-II takes up this point and a number of further multiple comparisons. Again it is difficult to draw firm conclusions as to the impact of the differences on haulage markets without figures for specific markets. For example, it would be interesting to examine markets for transport out of the port of Rotterdam to test whether Spanish hauliers enjoy an advantage over other non-Dutch hauliers given that METR for the Spanish flag is even lower than for the local haulage industry in the Netherlands. It would also be interesting to investigate whether the very large difference in METR between Swiss and other flags is reflected in competition in the haulage market in southern Germany. The large differences in METR revealed do suggest that such research could be useful.

Table 7-II. **Differences in METRs for flags in neighbouring countries**

Flags	METRs	Differences in METRs (%)	
UK flag in UK	51.54 %		
F flag in UK	46.47 %	17 %	In the United Kingdom
NL flag in UK	43.96 %		
NL flag in F	43.59 %		
F flag in F	47.00 %	21 %	In France
UK flag in F	51.00 %		
E flag in F	42.06 %		
NL flag in E	40.80 %		
E flag in E	39.46 %	12 %	In Spain
F flag in E	44.25 %		
NL flag in NL	36.19 %		
D flag in NL	39.53 %		
UK flag in NL	44.01 %	25 %	In the Netherlands
F flag in NL	40.97 %		
E flag in NL	35.26 %		
D flag in D	41.74 %		
F flag in D	42.23 %	38 %	In Germany
CH flag in D	30.33 %		
NL flag in D	38.11 %		

♦ Figure 7.1. ***Results in METRs for all pairs of flags***



Source: ECMT, 2000.

Chapter 8

TRANSFERS WITH RESPECT TO GOVERNMENT INFRASTRUCTURE ACCOUNTS (BOOK TRANSFERS) AND FULL SOCIAL COSTS

This chapter examines transfers and their relation to net taxes in t-km. Transfers are here generically defined as the difference, for any country, between chargeable infrastructure expenditure and chargeable income from freight transport taxation.

The opportunity costs of roads are higher than annual expenditures on roads in most, if not all, countries. Empirical research suggests an average ratio of 1 to 1.3[1] for western Europe. A benchmark of 130% of average annual expenditure is thus used in this report as the best approximation available for road opportunity costs (although the figure is based on limited research it is a better approximation than a 1:1 ratio that would be implied if no correction were to be made). Corresponding transfers are called "book transfers" because they draw from national road accounts (freight transport fraction).

Transfers might also be defined as the difference between chargeable incomes from freight transport taxation and the revenues that would obtain under efficient taxation (full marginal social cost pricing). On the basis of the argument set out in section 1.2.4 (Fiscal and financial distortions in the light of market failure) and the research results quoted in that section,[2] full marginal social cost pricing — including pricing of externalities — is assumed to yield revenues of the order of 150% of capital road infrastructure costs at a European-wide level. Accordingly, a second benchmark of 150% of capital infrastructure costs is also applied.

8.1. METHODOLOGICAL STAGES

The aim of this section is to re-examine net taxes in t-km, first with respect to the freight transport fraction of national road accounts and, second, according to the supplementary efficient taxation benchmark value.

Data draw on existing or reassembled national road accounts. B*ook transfers* are then defined relative to capital infrastructure costs. Further analysis examines the *efficient taxation benchmark value* (taking into account social costs due to freight transport by road).

8.1.1 National road accounts (freight transport fraction)

National road accounts "superpose" a) chargeable income from freight transport taxation onto b) chargeable government infrastructure expenditures.[3] No specific subsidies were identified in these accounts but in each country virtual subsidies can be found as a result of "book transfers", contingent on the degree to which expenditures are covered. These transfers can be positive or negative.

A "transfer" is defined as:

Chargeable expenditure – chargeable income

A "transfer rate" is defined (in %) as:

Transfer / chargeable expenditure × 100

8.1.2 "Book transfers" based on capital infrastructure costs

"Book transfers" were calculated on the basis of capital infrastructure costs estimated to be 1.3 times annual average expenditure. Using this relationship between current and capital accounting for infrastructure expenditure is consistent with the previous ECMT report E*fficient Transport for Europe*. Thus, "book transfers" are defined in the current study as:

Capital infrastructure costs [=130% chargeable expenditure] – chargeable income

Book transfer rates could be computed for each country on this basis. It was decided, however, to restrict the analysis to the level of an average figure for Europe due the large variation that can be expected in the rates of book transfers that would be revealed by undertaking the analysis country by country with national data. Such an analysis would determine to what extent road expenditures are subsidised by other revenues (positive book transfers) or to what extent road freight revenues subsidise expenditure in other sectors (negative book transfers). For the current analysis, the estimate of a positive transfer of 23% to subsidise capital road infrastructure costs was retained from the empirical 1:1.3 ratio.

8.1.3 Revenues in relation to efficient taxation

As stated above, transfers can also be defined as the difference between chargeable income from current transport taxation and the hypothetical revenues generated by efficient taxation (full marginal social cost pricing). Full marginal social cost pricing — including pricing of externalities — is expected to yield revenues of the order of 150% of capital road infrastructure costs at a European-wide level.[4] This ratio is applied to capital infrastructure costs to estimate the level of charges that would result from efficient taxation.

Summing up, we have:

[1] Chargeable expenditure ×	1,3 ratio for the empirical relationship between current and capital accounting for infrastructure expenditure	**[2] Capital infrastructure costs** ×	1,5 ratio for the empirique relationship between capital infrastructure costs and full social costs	**[3] Full social costs**

8.2. RESULTS: COMPARISON WITH EFFICIENT TAXATION BENCHMARK VALUE

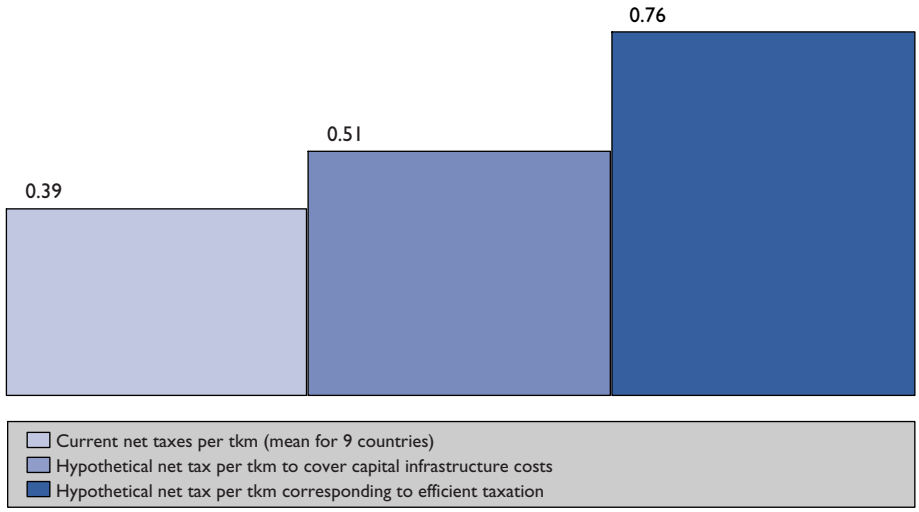
Table 8-I and Figure 8.1 compare current rates of transport charges in Euro cents per t-km with hypothetical rates corresponding to a) a benchmark value for full coverage of capital infrastructure, and b) a supplementary benchmark value for efficient taxation (full marginal social costs pricing). The results show that current net rates would have to be increased by one third to arrive at the fist benchmark and doubled to reach the second benchmark. More detailed, country specific analysis would be necessary to assess how current taxation compares with optimal taxation in individual countries. This would be feasible for most of the countries studied but was beyond the resources available for the present report.

It should also be noted that raising revenues equal to costs does not amount to internalisation. Structuring charges so that they operate on economic actors in ways that reduce external costs is also necessary, and probably more important than the precise level of charges.

Table 8-I. **Net taxes in t-km in relation to book transfers in infrastructure accounts and in relation to efficient taxation taking into account external costs**
(€ cents per t-km)

	Current net taxes	Hypothetical level of net taxes that would raise revenues equal to capital infrastructure costs	Hypothetical level of net taxes that, in a context of optimum pricing, would raise revenues equal to full social cost coverage
Basis of calculation	Chargeable expenditure	130% of chargeable expenditure	150% of capital infrastructure costs
Mean for Austria, Belgium, Czech Republic, France, Germany, Netherlands, Spain, Switzerland and United Kingdom	0.39	0.51	0.76

♦ Figure 8.1. ***Net taxes in relation to efficient levels of taxation*** *(€ cents/t-km)*



Source: ECMT, 2000.

NOTES

1. INFRA/IWW 1995 *External Effects of Transport* published by UIC, 1995, Paris. See also Annex C.3 of *Efficient Transport for Europe*, ECMT, Paris, 1998.

2. Douglas Mc Williams, "Treating Roads as a Public Utility", in CEBR, *The Economic Report*, March 1997, and the summary provided in Roy (1998), p. 46 ;
Roy (ed.), *Revenues from marginal social cost pricing: Evidence from selected EU Member States*, UIC/CER/EC study, forthcoming.

3. Government infrastructure expenditures can be calculated on the basis of capital expenditures or on the basis of current expenditures (chargeable expenditure). The latter have been chosen as the basis of our calculations (for lack of data reasons). As national road accounts are not systematically available for road haulage, some were rebuilt (Ecosys, 1998).

4. Rana Roy, *Infrastructure Cost Recovery under Allocatively Efficient Pricing*, UIC/CER Economic Expert Study March 1998, UIC, Paris, 1998;
Roy (ed), *Revenues from marginal social cost pricing: Evidence from selected EU Member States*, UIC/CER/EC study, forthcoming.

ANNEX

Exchange rate as at 04/01/99 : 1 euro = ... national currency

Countries	Exchange rates
CH	1.60778
F	6.55957
E	166.386
A	13.7603
D	1.95583
NL	2.20371
UK	0.71316
I	1936.27

ROAD HAULAGE SCENARIOS

Data for the analysis presented in this report can be downloaded in spreadsheet form from the ECMT web site: http://www/oecd.org/cem/.

Workbooks

An Excel workbook for running scenarios was developed for automatically calculating all charges (vehicle and fuel taxes, tolls, user charges, VAT) and rebates (relating to weight, itinerary and VAT) paid for freight transport by road on a specified hauls. The types of truck (weight, fuel consumption, nationality) and haulage (countries visited, roads used, days spent, speed) must be specified by the user. The workbook was used for two kinds of scenarios:

– 500 km, 40 t country specific — national — "ECMT standard scenarios", and

– 40 t flag specific — international — "ECMT customised scenarios".

"Standard scenarios" by country

One main hypothesis: 40 t trucks performing a virtual haul of 500 km within the boundaries of their country of registration. There is no specified itinerary.

"Customised scenarios" by flag

Two different scenarios

The workbook "ECMT customised scenarios" was created for two international itineraries:

– Manchester – Reims – Stuttgart – Basle – Milano

– Manchester – Rotterdam – München – Zurich – Zaragoza.

The itineraries were proposed by members of the ECMT working group steering the work. Cities of departure, stages and arrival were then specified and entered using Microsoft's AutoRoutes Express software. This program constructed the trips (the shortest routes favouring highways) and calculated kilometres covered.

Hypotheses

– Trucks: All the trucks have the same characteristics. Their weight, speed and fuel consumption were entered as input into the programme. The only thing that differs is nationality.

– Diesel: For the same trip, all trucks fuel the same way: the same amount at the same place (where fuel prices are the lowest on the route).

All data were stored in the Excel workbook "ECMT customised scenarios", along with data relative to the charges and rebates relating to vehicle, road, fuel and VAT in the different countries.

Using the workbook

The user chooses which haul he wishes to visualise (1 or 2) and the nationality of truck to run. Data (how much fuel was bought and where, how many kilometres on which road were covered, how many "fiscal days" were spent and where, …) appear in one table (page "Scenarios", entries by countries). Charges to be paid and rebates are also shown: one table for each country (pages "D", "A", "B", …, entries by type of charge).

Results for the whole haul are shown on page "Global results": a table picks up — by country visited — all charges (on vehicle, fuel and road) and rebates for the haul and the nationality of truck chosen. Total charges and net taxation are calculated. The last table of the workbook (page "Further information") gives an overview of how many kilometres were covered by type of road and country, how many fiscal days were spent by country and how much fuel was bought in each country.

Comments with respect to "ECMT customised scenarios"

– *User charge in Switzerland*: Both trips go through Switzerland and this country is about to introduce a new road charge: heavy vehicle fee, or HVF. Taxation under this charge depends on the kilometres covered and the maximum weight of the truck. The user can choose whether he wants to account for the new HVF charge or not. The current charge is called RTPL and is calculated on a "per day" flat rate basis.

– 40 *tonnes in Switzerland*: 40 t trucks are not yet allowed to operate in Switzerland. Nevertheless, the following calculations were made :

a) HVF: amount calculated for a 40 t truck in 2004, when 40 t trucks will be permitted, at the rate of CHF 0.0247/t-km.

b) RTPL and vehicle tax: amount calculated for a 28 t truck, times two (no tax scales available for 40 t trucks).

c) Fuel consumption: calculated for a 40 t truck.

– E*nvironmental category*: If the user chooses a German or a Swedish truck, the environmental category must be specified.

– N*ational taxes on vehicles*: All vehicle taxes are national, therefore foreign trucks do not pay these charges. There is one exception: Swiss trucks must pay a daily charge (FRF 52.00/day) in connection with the national axle tax in France. EU vehicles are exempted.

– R*ebates for trips in foreign countries*: only French trucks get a rebate against national vehicle taxes for time spent working abroad. This takes the form of a reduction in their national axle tax payments. Swiss trucks can qualify for rebates when the amount paid in RTPL is high but in practice very few rebates are awarded.

– E*urovignette*: The Eurovignette is valid in six countries (Germany, Belgium, Netherlands, Denmark, Luxembourg and Sweden). Itinerary number two crosses Belgium, the Netherlands and Germany. One eurovignette is bought for 1 day in Belgium and is valid for the Netherlands and Germany (day 2). On day 3 and 4, the truck crosses Germany; therefore, one eurovignette is also bought in Germany valid for 2 days. (An alternative hypothesis would have been to buy one eurovignette valid for 3 days in Belgium).

Calculations

Results obtained from these scenarios (charges, rebates, net taxation per country and per itinerary) constitute inputs for further calculations; net taxation (see 3.2) and marginal effective tax rates (METRs, see 3.4).

PAIRED FLAGS

Scenarios were built up in the perspective of further examining the impact of taxes on the competitiveness between flags. Scenarios were realised with the same patterns as for chapter 4, but for 200 km-hauls (instead of 500 km national hauls).

French flags haul over 200 km in France and then the same distance in the United Kingdom while "paired" UK flags haul over 200 km in the United Kingdom as well as in France. Crossed results are obtained.

Calculations were done for six pairs of flags. The following table shows calculations and results for the F and the UK pairs of flags.

Pairs of flags, example for the UK – F pair, over 200 km
(euros/haul, cents/t-km, and ad valorem rates)

Calculations	UK truck in UK	Semi-trailer 40 t, 200 km, 1 day	Calculations	UK truck in F	Semi-trailer 40 t, 200 km, 1 day
	Euros/l	Euros/64 l		Euros/l	Euros/64 l
Tax on diesel (1):	0.630852457	40.37	Tax on diesel (total acc. DTT. 15.02.99)	0.37350009	23.90
Tax on diesel (2):	–	0.00	Tax on diesel (2):	–	0.00
	%	Euros/64 l		%	Euros/64 l
VAT diesel:	17.50%	8.67	VAT diesel:	20.60%	6.89
			Non-deductible VAT on tolls	6.00%	0.96
	Euros/year	Euros/day		Euros/year	Euros/day
Vehicle tax	7011.029752	19.48	Vehicle tax	7011.02975	19.48
	Euros/km	Euros/100 km		Euros/km	Euros/100 km
User charges:	–	0.00	User charges: tolls (on 100 km)	0.16921841	16.92
	Euros/year	Euros/day		Euros/year	Euros/day
Other taxes or charges	–	0.00	Other taxes or charges	–	0.00
	%	Euros/64 l		%	Euros/64 l
VAT diesel (–):	17.50%	8.67	VAT diesel (–):	20.60%	6.89
Results			Results		
Euros total (40 t, 200 km)		59.85	Euros total (40 t, 200 km)		61.26
Cents per		0.748	Cents per		0.766
ad valorem		667.96%	*ad valorem*		638.11%

RESOLUTION 2000/3 ON CHARGES AND TAXES IN TRANSPORT PARTICULARLY IN INTERNATIONAL ROAD HAULAGE

The Council of Ministers of the ECMT, meeting in Prague on 30 and 31 May 2000:

NOTING the conclusions reported in document CEMT/CM(2000)14/FINAL and CEMT/CM(99)15 (which comprise the present report) and recalling the mandate in document CEMT/CM(99)14;

ACKNOWLEDGING that every ECMT Member state has the sovereign right to introduce and apply taxes and fiscal charges on international road haulage services, and that this is primarily the responsibility of Ministers of Finance;

CONSIDERING that it is, however, incumbent on Ministers of transport to provide advice on fiscal issues because they affect the efficiency of the transport sector both domestically and in international traffic;

CONVINCED that charges and taxes on international road haulage services should comply with the principle of non-discrimination between national and foreign road haulage operators;

CONVINCED that transparency is an essential condition for guaranteeing non-discrimination -– and that this requires avoiding a multiplicity of charges and ensuring a reasonable degree of predictability in the level and structure of charges;

CONVINCED that charges and taxes should be structured and set at levels that promote the efficiency and sustainability of transport;

NOTING that transport charges and taxes will be most efficient when based on marginal social costs, to the extent that these can be identified;

NOTING that, although important, efficiency is not the only criteria on which decisions relating to transport charges are made and that Governments may take other objectives, such as cost recovery targets related to financing infrastructure investments, into account in determining the level of charges;

CONVINCED that the principle of reciprocity on which bilateral road haulage arrangements are based may introduce discrimination between hauliers from different Member countries since the obligation to pay (or exemption from) charges is based on nationality;

RECOMMENDS in consequence, that recourse to bilateral agreements is gradually phased out as measures are taken to eliminate other sources of discrimination and in order to improve the effectiveness of multilateral frameworks for international transport such as the ECMT;

RECOMMENDS gradually shifting the structure of taxation in transport to increase the share of more territorially based taxes and charges (e.g. tolls and km-charges) -- i.e. taxes that are not related to the place where a haulier is established or to the type of transport operation carried out -- as this contributes at the same time to:

- ensuring non-discrimination;
- improving efficiency;
- avoiding problems of competitiveness between national haulage industries;
- and promoting sustainability.

AGREES to support measures to simplify the system of charges levied on international haulage, reducing the number and variety of specific charges, as a practical step in reducing the scope for discrimination;

INSTRUCTS the Committee of Deputies to examine progress in Member countries towards the goals of guaranteeing non-discrimination and non-accumulation of charges in international haulage and improving efficiency in the taxation of transport, reporting to Council within 3 years.