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UNITE

UNIfication of accounts and marginal costs for Transport Efficiency

Valuation Conventions for UNITE

Version 1.0
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CHECKLIST

The following apply to both the Pilot Accounts and Marginal Cost Case Studies except where stated otherwise.

Basic Issues

- The **price base year** is 1998. ☐
- The **base year for discounting** is 1998 for the MCs and the 1998 Accounts. For the 1996 and 2005 Accounts, costs and revenues should be discounted to 1996 and 2005 respectively. Note that discounting is only likely to be necessary for the environmental cost and infrastruture cost calculations, where future costs are involved. ☐
- The unit of account is **factor cost**. This implies that costs and revenues expressed in market prices should be converted to factor cost. Advice on this is given in this paper (Chapter 3). ☐

Values of Time, Safety and the Environment

- In general, **values used should reflect state-of-the-art research findings**. Work package leaders have identified the key studies in each cost category, but these do not cover all UNITE countries. There is therefore a two-level approach:
  - to use the results of the state-of-the-art studies where possible;
  - as a second best solution, to transfer a value from the study countries to another country using the methodology given in this paper.

  Based on this approach, **values of time and statistical life** for UNITE countries are presented in Chapters 4, 5 and 6, and should be used in the main accounts tables. ☐
- Some partners have indicated a wish to make a set of calculations using their official national CBA values as a sensitivity test - these should be presented separately in a note to the Accounts/MCs, not in the main tables. ☐
- It should be assumed that **real values grow** over time in line with real incomes, that is, with an elasticity of 1.0 to the country's real GDP per capita. ☐

Exchange Rates and Price Indices

- UNITE Accounts entries and marginal costs should be expressed in 1998 Euros (strictly 'ecus' at that time). Exchange rates from local currency are as follows. For countries inside the Euro zone, **exchange rates** are now locked and all values can be expressed in Euro. For countries which were outside the Euro zone in 1998, exchange rates are required in order to express values in 1998 Euro. All these rates are given in Annex I. (Note that where UNITE values of time and statistical life are used, these are already in Euros.) ☐
- To inflate or deflate raw country data to 1998 prices, series for **price inflation** are given in Annex II. ☐

Discount Rates

- This issue has been hotly debated within the consortium. In order to secure consistency in the UNITE information, **a rate of 3%** should be used in all the main tables of the accounts, and in the marginal cost case studies where discounting is necessary. If alternative discounting rules are tested, they should be reported as sensitivity tests to the main results. ☐

Terms used in this Checklist are explained in the main text.

1 Overview

The purpose of the valuation conventions outlined in this note is to enable a basic level of consistency to be built into the UNITE Accounts and MC information. This consistency is needed so that users of the UNITE results can:

- compare the results from one MC case study with another;
- compare across cost categories within an account; and
- read the MC case studies and accounts together for a particular country; and
- read the results at an EU level.

The conventions are **not** meant to tie the hands of the individual account leaders and case study leaders. They relate only to basic items such as: the price base year (1998); values of time and statistical life; discount rates; and the unit of account (which is factor cost).

If partners have any problems accommodating the conventions - for example because their country data is based on a different definition - then there are a number of ways in which the empirical work can proceed, essentially by:

- adapting the data to the convention in appropriate ways where this can be supported by evidence and can be made transparent in the UNITE outputs - for example, conversion to the UNITE base year for prices (1998) by adjusting for inflation using price indices; or
- *only where there is no robust basis for adjusting the data*, making explicit in the UNITE outputs that the results are not based on the UNITE conventions, for example by using labels, notes to the tables, footnotes, etc to make clear what the inconsistency is.

This note identifies the conventions and aims to indicate how country-level data can be adapted if necessary. The co-ordinator (John Nellthorp or Tom Sansom) will be happy to help resolve any outstanding problems during the project.

Conventions are based on the methodology set out in Deliverables D1-3, with some additional material by the relevant Work Package leaders.

2 Basic Issues

It has been agreed by the UNITE partners that:

- the **price base year** will be **1998**. This means that any data incorporating the general price level *or* relative prices from any other year will need to be adjusted to a 1998 basis (see Annex II).
- the **base year for discounting** will be 1998 for the Marginal Costs and for the 1998 Pilot Accounts. For the 1996 & 2005 Pilot Accounts, the base years for discounting will be 1996 and 2005 respectively.

The following examples give an indication of how these conventions would be used.

Example 1

There is an account entry for 1998 which has to be based on 1997 data. For example, the price of one item of infrastructure costs is known only for 1997, on a 1997 price basis. In that case, the data would be inflated to 1998 by: (i) using a general price inflator to 1998 (see Annex I) and (ii) applying a relative price factor, if that item was expected to become more or less expensive in real terms.

Example 2

A MC Case Study is to include environmental costs in the future as a result of emissions in 1998. These costs would be discounted to the 1998 base year using the standard discount rates (see Section 10 below), and we should also consider how environmental values change over time (see Section 6 below).

3 Factor Cost or Market Prices?

Why it is necessary to decide

Factor cost and market prices are two different *units of account* (or *numeraires*). Items valued at *factor cost* and items valued at *market prices* cannot be compared directly and cannot be added together.

Cost and revenue data gathered for the UNITE pilot accounts and MCs is likely to include a mixture of units of account. If not dealt with at an early stage, this will lead to inconsistencies within the accounts tables and MC results.

What is the difference between factor cost and market prices?

In numerical terms, the difference varies from country to country - for example, in the UK in 1998 it was 21.9%. That is, the average rate of indirect taxation on consumer expenditure (henceforth τ) was 21.9%. Transport costs expressed in the market price unit of account were therefore 1.219 times those expressed at factor cost. Annex III gives values of τ for the UNITE countries.

The difference in definition is a common source of confusion. Essentially:

- consumption and production are subject to a range of indirect taxes, including VAT, fuel duty, vehicle ownership taxes, property taxes, etc;
- consumption and production may also be subsidised;
- in the *factor cost* unit of account, items are valued as if no indirect taxation or subsidy were applied; whereas
- in the *market price* unit of account, items are valued as if they were being traded in consumer markets with all indirect taxes and subsidies in place.

The numerical difference between the two is the average rate of indirect taxation (net of subsidy) on consumer expenditure. For practical purposes this can be estimated from Eurostat/OECD's datasets on "Taxes linked to production and imports minus subsidies" and "Actual individual consumption"[1] for each country.

The UNITE accounts could in principle be expressed in either unit of account.

However, since many of the items on the cost side of the account are conventionally measured at factor cost, and this is arguably the side of the accounts that will be used and studied the most, **it has been decided that the UNITE Accounts convention should be Factor Cost.**

The issue in compiling the UNITE accounts then becomes: **in which unit of account is the input data expressed?** If it is in market prices, an adjustment will be required.

What is the basic procedure to obtain Costs and Revenues in the Factor Cost unit of account?

The 2nd column of Table 1 shows the typical unit of account to be found in the input data for each main cost category. The adjustment required for each type of input data is outlined in the 3rd column.

This does not mean that input data will be in this unit of account in every country. Input data will often be from business accounts or national accounts, and may therefore be in any one of the bases listed in Annex IV. Appropriate adjustments can be deduced from the 'Difference' column of that table.

Taxes will always be shown separately in the accounts, as a transfer from the particular group (Users; Service Operators or Infrastructure Providers) to Government. Subsidies will appear as transfers in the opposite direction. Therefore all costs should be shown net of all taxes and subsidies.

Revenue will include all taxes. In order to compare costs and revenues:

- revenues obtained from other firms will generally be in the factor cost unit of account, so will require no adjustment;
- revenues obtained from final consumers will general be in the market prices unit of account, so the factor cost adjustment will need to be applied (divide by $1+\tau$).

[1] eg. see OECD (2000), *National Accounts of OECD Countries*; EUROSTAT Basic Statistics (annual to 1996).

Table 1: Adjustment to Put All Items in the Factor Cost Unit of Account

	Unit of account: input data	Adjustments needed	Unit of account: UNITE Accounts
Infrastructure Costs	Factor Cost	none	Factor Cost
Supplier Operating Costs	Factor Cost	none	Factor Cost
External User Costs	Factor Cost (working time & VOCs) Market Prices (non-working time & VOCs)	none Divide by 1+τ	Factor Cost
Accident Costs	Factor cost (healthcare costs) Market Prices (WTP for risk reductions)	none Divide by 1+τ	Factor Cost
Environmental Costs	Market Prices (for WTP data)	Divide by 1+τ	Factor Cost
Taxes, Charges and Subsidies	Factor Cost (for payments made by firms) Market Prices (for payments made by final consumers)	none Divide by 1+τ	Factor Cost

Assumption: net system of recording VAT

The above assumes a net system of recording VAT in the accounts: ie. where VAT is deductible (in most cases, for producers), only any outstanding *non-deductible* VAT is shown. Generally, therefore, most VAT is recorded as being paid by purchasers, not sellers, and then only by those who are not able to deduct it.

Much greater detail on the recording of VAT and the role of deductible taxes in accounts is given in the *System of National Accounts* Paragraphs 6.204-6.217.

4 Value of Statistical Life (Accident Risk Value)

There is today a reasonably widespread agreement that monetary values of risk reductions in the transport sector should be defined so they reflect individual preferences of the affected population. The value should be expressed as the affected individuals collective willingness to pay (WTP) for safety improvements or willingness to accept compensation (WTA) for increased risk.

It is also emerging an agreement that monetary values of risk reduction are context specific. To reduce the risk for workplace accidents, for reduced health status due to emissions or the risk of road accidents will have different values for the individuals. The WTP for a given reduction in number of deaths can vary by a factor of more than three for different contexts. Even accidents in different transport modes seems to have different values for the individuals; reduction in underground accidents has been found to be valued one and a half times the value placed on road accidents.

The revealed preference method, where the values are derived from actual choices, has been employed for especially workplace accidents. Given the emerging evidence on context specific values the transferability of these values could be questioned. A revealed preference study has to take place in the transportation market.

The WTP or WTA can be estimated by asking a sample of the affected population about the amount they would be willing to pay or accept as compensation for changes in the level of safety. This method is often referred to as the ‘contingent valuation’ (CV) method. A number of studies apply the CV method to estimate the WTP. From the WTP a ‘value of statistical life’ (VOSL) can be derived.

However, lately serious questions on the reliability of the results have been raised. In principle, it turns out that individuals when responding the CV question are not aware of the exact type of safety improvements that they are asked to pay for. Serious problem with embedding, scope and framing effects has been found. Embedding and scope effects refer to the tendency of respondents to report the same WTP for a larger safety improvement as for a smaller improvement. If the responses are only weakly dependent on the magnitude of the risk reduction, almost any VOSL can be derived from the studies.

Nevertheless, we believe that the CV-method is the right approach and that estimates that are more reliable can be found if these problems are taken into account in the study design. In fact, some studies are already now conducted with this problem in mind. Lately, studies have been using the CV-method to estimate a WTP for less severe outcomes and a risk/risk analysis to link the WTP to fatality. Instead of summing studies with uncertain quality and estimating an average we will base our recommendations on a few well-conducted studies.

While the use of European Standard value seems appropriate for a European Union project we instead propose for UNITE that;

- If a National value exists, if it is based on the WTP/WTA principle and if the basic study is well-designed it should be used in UNITE.

- In the absence of National values, a European Standard Risk Value (below) should be used, adjusted in accordance with real per capita income at purchasing power parity exchange rates for each country (see Table V.1).

Based on a limited number of well-designed studies we propose a European Standard Risk Value. We propose the value 1.5 million Euros per fatality measured as a Consumer value (ie. in market prices). To have the full value of a fatality the cost of net lost production, medical and ambulance cost should be added, which is approximately 10% of the risk value. To express it as a Factor cost it should be reduced with the proportion of indirect taxation (approximately 20%, see Annex III).

As a sensitivity test a higher VOSL of 2.5 M€ should be used. This value represent a less conservative approach and is at the upper end of reliable state-of-the-art studies. If also a low value would be tested the value 0.75 M€ can be used. The low sensitivity test could be said to represent a rough lost gross production approach.

- UNITE value *'Conservative State-of-the-art'* 1.50 M€
- High value *'Upper State-of-the-art'* 2.50 M€
- Low value *'Gross production approach'* 0.75 M€

Table 2: Proposed UNITE VOSL by Country and compared to official values (Consumer value - € 1998)

Country	*Official values in use A)* *million €*	***UNITE VOSL*** ***million €***	*(Official-UNITE)/Official* *%*
Austria	*1.52*	**1.68**	10%
Belgium	*0.40*	**1.67**	312%
Denmark(B)	0.52*)	**1.79**	244%
Finland	0.89*)	**1.54**	73%
France	*0.62*	**1.49**	141%
Germany	*0.87*	**1.62**	87%
Greece (B)	*0.14*	**1.00**	588%
Ireland	*1.04*	**1.63**	57%
Italy	*n.a.*	**1.51**	-
Luxembourg	*n.a.*	**2.64**	-
Netherlands	*0.12*	**1.70**	1269%
Norway (B)	*1.49*	**1.93**	29%
Portugal	*0.04*	**1.12**	2896%
Spain	*0.07*	**1.21**	1625%
Sweden (B)	1.48*)	**1.53**	4%
Switzerland (B)	*n.a.*	**1.91**	-
United Kingdom (B)	1.53*)	**1.52**	1%
Hungary (B)	*n.a.*	**0.74**	-
Estonia (B)	*n.a.*	**0.65**	-

Note: A) Based on Nellthorp, Mackie and Bristow (1998). HICPs for Eurozone has been used to adjust price level to 1998.
*) Latest available values from Tervonen (1999) has been used (For Sweden SIKA(2000)). Corresponding EUNET values are; DK 0.79; FIN 1.33; N n.a. ; S 1.80; UK 1.11.
B) Not in Eurozone, Exchange rate of 24 November 2000 used.

Further details of the VOSL methodology for accidents are given in Annex V.

5 Values of Time

It has been agreed that the first choice basis for values of time (VOTs) is to take them from a limited set of state-of-the-art research studies using a consistent methodology. The state-of-the-art studies identified by the Work Package leader (IWW) are given below. The second choice basis is to transfer values from these state-of-the-art studies to other settings. We present below the resulting values for all UNITE countries.

For passenger travel the following differentiation of the values of travel time should be made where the data permits:

- Travel purpose (business; commuting; leisure);
- Mode (car; bus; rail; air[2]);
- Travel distance (urban/local; inter-urban/long distance);
- Travel condition (expected travel time; delay time; in-vehicle/walk/wait).

The state-of-the-art studies are the Dutch national value of time studies 1986-1995 (Hague Consulting Group, 1996), the UK value of time study 1994 (Hague Consulting Group, 1994), the Swedish national value of time study (SNRA, 1996) and, for freight, the work carried out by De Jong and the Hague Consult Group in 1993 for the Netherlands (de Jong, 1996). Evidence on the relationship between values under different travel conditions in passenger transport is taken out of (Wardman 1998).

According to the methodology of these studies, freight VOT should ideally be differentiated by mode, type of goods and size of vehicles. However, the empirical results cannot support this level of disaggregation, and instead the values are split simply into:

- Road (values per vehicle hour):
  - Light goods vehicles (defined as units with an allowable gross-weight < 12t);
  - Heavy goods vehicles including truck-trailer combinations (defined as units with an allowable gross weight > 12t).
- Other modes (values per ton hour):
  - rail freight (here, in addition values per full train load and per coach and hour are provided);
  - inland waterway (in addition, values per ship-hour are given);
  - maritime (no evidence found, therefore, inland shipping values are proposed);
  - air freight (values per tonne-hour only).

The values presented in Table 3 are for expected travel time, in-vehicle. Evidence exists to suggest that the value of delay time in passenger transport is higher than this (eg. HCG, 1996; Wardman 1998; ATOC, 2000). Whilst this is an area which would benefit from much more in-depth study, for the moment the evidence would seem to support 1.5 as a conservative estimate of the factor on expected in vehicle time.

There is also plentiful evidence that changes in walk and wait time are valued more highly than changes in in-vehicle time. Based on the analysis in HCG (1996), in-

[2] inland waterways and maritime transport would ideally be covered, but data is lacking.

vehicle time values should be multiplied by a factor of 1.6 if walking or waiting values are required.

In order to apply the UNITE values in specific countries, the values should be adjusted in accordance with real per capita income at purchasing power parity exchange rates for each country. Transfer factors from the UNITE basis to each country are given in Table 4 overleaf. These are consistent with, but not identical to, the transfer factors for values of statistical life (Table V.1), because here the basis of the UNITE values is a Netherlands/Sweden/UK average, whereas in the case of VSL the basis of the UNITE values is an EU15 average.

Table 3 - Values of Time Based on State-of-the-Art Studies

Relevant VOT studies **Transport Segment**	HCG 1994	HCG 1998 Euro 1998	HCG 1998	SNRA 1997	EUNET 1998	UNITE Values Euro 1998
Inflation to 1998 Transfer to Euro						Normal travel
Passenger transport - VOT per person-hour						
Car / motorcycle		6,70		9,31		
Business	21,23	21,00		11,95		21,00
Commuting / private	5,53	6,37		3,91		6,00
leisure / holiday	3,79	5,08		3,10		4,00
Coach (Inter-urban)						
Business	21,23					21,00
Commuting / private	5,95			5,40		6,00
leisure / holiday	3,08			4,37		4,00
Urban bus / tramway						
Business	21,23					21,00
Commuting / private	5,95			4,94		6,00
leisure / holiday	3,08			3,22		3,20
Inter-urban rail		4,97		8,50		
Business		18,43		11,95		21,00
Commuting / private		6,48		6,21		6,40
leisure / holiday		4,41		4,94		4,70
Air traffic					40,60	
Business				16,20		28,50
Commuting / private				10,11		10,00
leisure / holiday				10,11		10,00
Freight VOT						
Road Transport						
LGV	39,68	30,75	40,76			40,00
HGV	39,68	30,75	43,47			43,00
Rail transport						
Full trainload		645,37	725,45			725,00
Wagon load		26,16	28,98			30,00
Average per tonne			0,76			0,76
Inland navigation						
Full ship load		178,55	201,06			200,00
Avberage per tonne			0,18			0,18
Maritime shipping						
Full ship load		178,55	201,06			200,00
Avberage per tonne			0,18			0,18
Air Transport						
Average per tonne						4,00

Finally, it is necessary to consider the unit of account. The UNITE accounts will present all costs and revenues in the ‘factor cost unit of account’ (see Chapter 3). Since business and freight values of time are sampled in the production sector of the economy, they are already at factor cost. However, commuting and leisure values of time are sampled among consumers, for whom the unit of account is ‘market prices’ (ie. including indirect taxation). Therefore **to reach a final UNITE value for commuting and leisure time, values of time should be divided by (1+τ) for the country concerned. The values in Tables 3 and 4 do not include this adjustment, and the adjustment must be made by partners using the values of t in Annex III.**

Table 4: Factors to Transfer Values from State-of-the-Art Studies (Time only)

Country	GDP/Capita at 1998 PPP	Value Transfer: Factor on UNITE VOT in Table 3
Austria	23900	1.079
Belgium	23677	1.069
Denmark	25459	1.149
Finland	21833	0.986
France	21132	0.954
Germany	23010	1.039
Greece	14171	0.640
Ireland	23194	1.047
Italy	21531	0.972
Luxembourg	37491	1.693
Netherlands	24141	1.090
Norway	27391	1.237
Portugal	15891	0.717
Spain	17223	0.778
Sweden	21799	0.984
Switzerland	27091	1.223
United Kingdom	21673	0.979
Hungary	10470	0.473
Estonia	9193	0.415
Netherlands+Sweden+UK	22149	1.000

Source: OECD GDP per Capita, PPP-adjusted, 1998 (www.oecd.org/std/gdpperca.htm).

6 Values of Environmental Effects

The environmental effects which have to be valued cover a wide range – from impacts on ecosystems and biodiversity to impairment of human health and amenity. In the current note, only the valuation of mortality risks in the environmental context is addressed, because mortality risks are of utmost importance for the quantifiable environmental costs.

Valuation of mortality risks

Valuation based on life years lost

The quantification of health risks due to air pollution in UNITE is based on exposure-response functions (ERFs). Such functions give a relationship between ambient pollutant concentrations and health effects. The central ERF for mortality risks is based on a study by Pope et al. (1995), which reports a relationship between mortality and ambient particles. This study establishes a relation between pollutant concentration and changes in age-specific mortality risks. And what is very important in the valuation context, it does *not* give fatalities.

To quantify the changes in mortality, the population affected by pollutant exposure has to be tracked over time, because the effects show in later years. This means that based on Pope et al. (1995), we can quantify lost life years and not so-called premature deaths. To account for this, the YOLL (Years of Life Lost) approach was adopted in ExternE, implying a valuation of lost life years and not fatality cases. So in the first place the use of the VLYL (Value of a Life Year Lost) follows the requirement of the underlying study.

In addition, this approach helps to more transparently handle the component of lost life expectancy, which is an issue when using the VSL approach in the environmental context. It has been suggested to decrease the VSL when applied to air pollution mortality due to the age of the affected persons. With the VLYL approach it is possible to explicitly consider lost life expectancy.

In the absence of empirical data on VLYL, the VLYL can be estimated from the VSL according to the following relationship:

$$VSL_a = VLYL(r) \cdot \sum_{i=a}^{T} \frac{{}_aP_i}{(1+r)^{i-a}} \qquad (1)$$

where

VSL_a	value of a statistical life
a	age of person whose VSL is being estimated
VLYL(r)	value of a life year lost (depending on discount rate r)
r	discount rate
T	maximum life expectancy (100 years in our calculations)
${}_nP_i$	(conditional) probability that a person of age n will reach age i

Clearly, this approach is based on a number of assumptions which are contestable. But the same would be the case for applying the VSL approach to the exposure-response function based on Pope et al. (1995). For example the average number of life years lost per case would have to be assumed. Uncertainties remain considerable in the monetary valuation of environmental mortality risks.

Context sensitivity of WTP for mortality risks

Context sensitivity of WTP has already been mentioned in Chapter 4 above. There is evidence suggesting that WTP for reducing environmental mortality risks is higher than for traffic accident risks. Jones-Lee et al. (1998) propose a factor of 2 to transfer the VSL for road accidents to the air pollution context. In the case of UNITE this means, that the VSL for road accidents is multiplied by 2 to account for the environmental context. Based on this value the VLYL is then derived according to equation 1 above. Starting from a value of 1.5 million Euros (as recommended in Chapter 4) this implies a value of a life year lost of 95 000 and 150 000 Euros for discount rates of 0% and 3% respectively. These values are applicable for acute effects, i.e. effects which appear immediately after pollutant exposure. For chronic effects, i.e. effects which occur with delay, the time lag between pollutant exposure and occurrence of effect has to be taken into account and discounted accordingly.

7 Common Values versus Country Specific Values

In general, common (ie. average) European values will be avoided because they hide genuine differences in willingness-to-pay between countries. Where national-level WTP-based studies exist and are consistent with the state-of-the-art studies identified by Work Package leaders, values from these studies can be adopted. Where these conditions are not fully met, the second best approach will be to take values from the state-of-the-art WTP studies and apply benefit transfer methods to other countries.

Summarising from the previous sections, this means that:

- values of time will be taken from national WTP studies in several countries, but transfers will be needed for many others (Chapter 5);
- values of statistical life will be taken from a very limited number of state of the art studies and transferred to all other UNITE countries (Chapters 4 & 6);
- benefit transfers between countries will generally be made in line with real GDPs per capita, including a Purchasing Power Parity adjustment, ie. to transfer a value from Country X to Country Y, the value will be multiplied by the ratio of real GDP per capita (at PPP) in Y to real GNP per capita (at PPP) in X.

The two exceptions to the above approach will be the costs of transboundary air pollution and costs of global warming. These have a European or global incidence, and it is appropriate that the valuation should reflect the values of the incident population, not the emitter. Therefore a single value based (as closely as possible) on European/global total WTP should ideally be used in the accounts and MCs. Example calculations for transboundary air pollution have shown, that the difference between using average European values and country specific PPP adjusted values in total makes about 10%.

If for global warming there is a need to substitute an avoidance cost approach for the (preferred) damage cost approach, the preference still remains for a common value across all countries.

8 Changes in Values over Time

In general, it should be assumed that values grow with real incomes, based on an elasticity of 1.0. After further discussion, this applies to all items of costs in UNITE unless there is robust evidence to the contrary.

9 Exchange Rates

For countries in the Eurozone, exchange rates are now locked and all values can be expressed in Euro. Note that for years before exchange rates were locked (the pilot accounts go back to 1996), data is likely to be in local currencies. To convert to the UNITE basis, adjustment should be made to the UNITE price base year of 1998 (as in Chapter 2 above), and then the 1998 euro exchange rates can be used in order to express values in Euro. These can be obtained from Eurostat's 'Official Annual ECU Exchange Rates' - see Annex I in this report

For countries outside the Eurozone, exchange rates are required in order to express values in Euro for all years. Again these should be obtained from the 'Official Annual Euro Exchange Rates' - see Annex I.

When transferring benefit values between countries, it is not sufficient to use these official (nominal) exchange rates because they do not reflect differences in purchasing power, which are the best guide we have to differences in WTP in different countries. A Purchasing Power Parity adjustment is required, specifically: multiplication of the value by the ratio of Real GDP per capita (at PPP) in the second country to Real GDP per capita (at PPP) in the first country. This adjustment is already included in the UNITE values given in Chapters 4-6. For countries in the Eurozone, only this PPP adjustment will be required - no exchange rate is involved. For countries outside the Eurozone, the exchange rate and PPP adjustments can be made simultaneously by using the OECD GDP per capita (at PPP) series (see Table V.1 below).

The issue of the sequence of events may arise: in general, starting with, say, 1999 data, the first step should be to deflate to the price base year (1998) using the country-level general price index for the first country, *then* apply PPP exchange rates for 1998.

10 Discount Rates

There is a distinction between discount rates for pure time preference and discount rates as a way of correcting for relative price changes and other compound growth trends over time. In general, we favour the use of the former but not the latter.

In the UNITE accounts and MCs, infrastructure costs should be valued on a social basis. This means that when discount rates are required they should be *social* discount rates. There are various possible bases, discussed at length in Lind (1982). Generally, we feel that a social opportunity cost rate is appropriate. Furthermore, all prices in UNITE are constant 1998 prices, so the discount rate should be a real rather than a nominal rate.

The ExternE project used a 3% rate, except for global warming, where 0, 3 and 6% were used as sensitivity tests. There are particular issues relating to discounting of global warming (Broome, 1992).

UNITE Interim Report 5.2 indicates that the interest rates used in national-level studies have ranged from 2.5% to 3% real (2 studies), and from 5.3% to 8.3% nominal (2 different studies).

In view of the evidence, the standard rate of discount in the main UNITE accounts should be a 3% real rate.

Where there is consistent, robust evidence in support of an alternative real social discount rate in a particular country, additional tables may be included using that rate as a sensitivity test. However, this is optional and most of the study resources should be devoted to tables using the 3% default rate. If such additional tables are included, the source for the alternative rate should be clearly stated at the foot of each table. In these cases, it would be helpful to readers of the tables to include a footnote discussing why the rate differs from the default rate.

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Annex I
Euro Exchange Rates 1998

Country	**Irrevocable € conversion rates from Dec 1998, local currency per €**	**Official annual exchange rate 1998†, local currency per €**
Austria	13.76	
Belgium	40.34	
Denmark		7.50
Finland	5.95	
France	6.56	
Germany	1.96	
Greece		330.73
Ireland	0.79	
Italy	1936.27	
Luxembourg	40.34	
Netherlands	2.20	
Portugal	200.48	
Spain	166.39	
Sweden		8.92
United Kingdom		0.68
Switzerland		1.62
Estonia		214.4††
Hungary		14.1††

Sources: European Central Bank; †Eurostat Yearbook (2000); ††UN Statistical Yearbook 44th edition (2000) - 1997 data.

Annex II
Price Inflation 1994-99

Country	% change from previous year					
	1994	1995	1996	1997	1998	1999
Austria	2.8	2.3	1.3	1.6	0.6	0.6
Belgium	1.8	1.8	1.2	1.3	1.6	0.9
Denmark	1.7	1.8	2.5	1.6	2.1	2.6
Finland	2.0	4.1	-0.2	2.1	2.9	1.0
France	1.8	1.7	1.4	1.2	1.0	1.0
Germany	2.5	2.0	1.0	0.8	1.0	1.0
Greece	11.2	9.8	7.4	6.7	4.9	2.5
Ireland	1.7	2.7	2.3	3.5	5.7	4.0
Italy	3.5	5.0	5.3	2.4	2.7	1.5
Luxembourg	4.8	0.3	1.7	3.3	1.5	1.2
Netherlands	2.3	1.8	1.2	2.0	1.9	1.3
Portugal	6.3	5.1	2.8	2.0	4.3	2.6
Spain	4.0	4.8	3.4	2.1	2.3	3.1
Sweden	2.4	3.5	1.4	1.2	1.3	0.5
United Kingdom	1.5	2.5	3.3	2.9	3.2	2.9
EU15	2.7	3.0	2.5	1.8	1.9	1.5
Switzerland	1.6	1.1	0.4	-0.1	0.2	0.7
Estonia	-	-	-	-	-	-
Hungary	19.5	25.6	21.2	18.5	12.6	9.0

Source: OECD Economic Outlook June 2000. Table 14 GDP Deflators.

Annex III
Average Rate of Indirect Taxation on Consumer Expenditure, τ

	τ	
Austria	0.230	
Belgium	0.189	*
Denmark	0.284	
Finland	0.239	
France	0.268	
Germany	0.173	
Greece	0.191	
Hungary	0.298	**
Ireland	-	
Italy	0.320	
Luxembourg	0.292	
Netherlands	0.213	
Portugal	0.231	**
Spain	0.142	***
Sweden	0.242	*
Switzerland	0.077	*
United Kingdom	0.219	
Estonia	-	

Notes:
Consumer expenditure = 'Actual Individual Consumption' (series P.41 in the SNA)
Indirect taxation = 'Taxes less subsidies on production and imports' (series D.2)

* Missing data: Consumer expenditure estimated from 'Final consumption expenditure'
** 1997 data (1998 not available)
*** 1995 data (1998 not available)

Source: Tables 1 and 3, OECD (2000), *National Accounts of OECD Countries: Main Aggregates Volume 1 1988-1998*. OECD: Paris.

Annex IV
Definition of Factor Cost, Market Prices and Other Accounts Bases

	Includes	Difference	Example cost item: fuel for nonEB travel	Example cost item: materials for a new bridge
Market price	Price paid by purchaser including any VAT, other taxes, less subsidies to consumers[a], and including any delivery charges	-	Pump price	Inc-VAT price charged by supplier
Purchaser's price	Price paid by purchaser including **non-deductible** VAT and other taxes, less subsidies to consumers, and including any delivery charges	Market price **minus** deductible VAT	Pump price	Ex-VAT price charged by supplier
Producer's price	Amount received by the producer minus any VAT[b], with subsidies still excluded and excluding delivery charges	Purchaser's price **minus** any non-deductible VAT	Pump price minus VAT	Ex-VAT price charged by supplier
Basic price	Amount received by the producer minus any tax levied *per unit of output*[c], with subsidies per unit of output added back, and excluding delivery charges	Producer's price **minus** other taxes *per unit of output* **plus** subsidies per unit of output	Pump price minus VAT and fuel duty	Ex-VAT price charged by supplier
Factor cost	Amount received by the producer minus any taxes paid plus any subsidies	Basic price **minus** 'other taxes on production'	Pump price minus VAT and fuel duty, minus the element of business rates and any VED in production costs	Ex-VAT price charged by supplier, minus the element of business rates and VED in production costs

Notes to the table:
[a] eg. concessionary fares
[b] or similar *deductible* tax
[c] 'taxes on a product' in SNA terminology'
Source: CEC, IMF, OECD, UN & World Bank (1993), *System of National Accounts (SNA).* Brussels/Luxembourg, New York, Paris, Washington D.C.

Annex V
Derivation of the Value of Statistical Life (Accident Risk)

State-of-the-art

We do not need to repeat that a growing body of evidences suggests that the mainstream opinion today is that the value of non-market goods can be estimated through asking a sample of the population for the willingness-to-pay for the good[3]. This is also true for the value of increased safety, or value of statistical life, and lately suggested by the European Commission[4] as the preferred method. This is a development from the more ambiguous discussion in previous Commission documents[5].

A number of different methods exist when this willingness-to-pay (WTP) shall be estimated. The pros and cons of these methods have extensively been discussed in the literature and we will not repeat this discussion here. However, lately shortcomings of the prevailing continent valuation method have been registered.

In previous UNITE reports we have discussed the problem of WTA and WTP, ex-ante and ex-post. The pragmatic recommendation was to use the ex-ante values based on WTP also in the discussion on accounts and marginal costs.

Context

The cost for lifesaving varies enormously between different life saving interventions. One conclusion could be that some interventions are inefficient; it would be more efficient if most cost-effective interventions where to be carried out. Tengs and Graham (1996) suggest that 60.000 lives are lost due to this type of inefficiency in USA.

However, as noted above, WTP values are based on individual preferences, which include perception and attitude to risk. It is not necessary that these preferences, perceptions and attitudes are the same for all types of risks[6]. The variation has been associated with the psychometric risk attributes dread and unknown[7]. To reduce the risk for workplace accidents, for reduced health status due to emissions or the risk of road accidents will thus have different values for the individuals. The WTP for a given reduction in number of deaths can vary by a factor of more than three for different contexts[8]. Though, this is a much smaller number than what is recorded for actual interventions, suggesting that the differences in WTP do not explain all the variations in costs.

Even accidents in different transport modes seems to have different values for the individuals; reduction in underground accidents has been found to be valued one and a half times the value placed on road accidents[9].

[3] Mitchell and Carson (1989), NOAA panel; Arrow et al. 1993…..)
[4] European Commission (1995), Lindberg (1999)
[5] European Commission (1994); Cost 313
[6] See Ramsberg (1999) for references and discussions.
[7] Savage, I. (1993)
[8] Mendeloff and Kaplan (1990), Cropper and Subramanian (1995)
[9] Jones-Lee and Loomes (1995). They also conclude that this factor is applicable also for rail accidents.

Revealed Preferences

The revealed preference method, where the values are derived from actual choices, has been employed for especially workplace accidents. Given the emerging evidences on contexts specific values the transferability of these values could be questioned. A revealed preference study has to take place in the transportation market.

Contingent valuation and recent problems

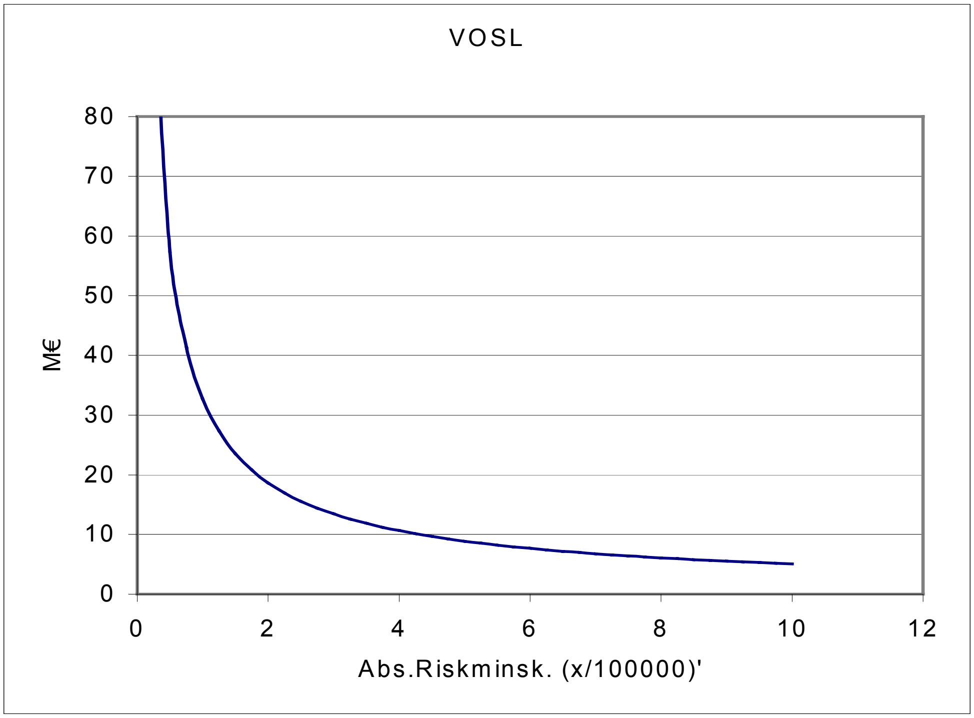
The WTP or WTA can be estimated by asking a sample of the affected population about the amount they would be willing to pay or accept as compensation for changes in the level of safety. This method is often referred to as the 'contingent valuation' (CV) method. A number of studies apply the CV method to estimate the WTP. The use of the Contingent valuation method has become the standard method when the WTP for increased safety in the transport sector shall be estimated. From the WTP a 'value of statistical life' (VOSL) can be derived.

Equation (1) VOSL = WTP/change in risk

However, lately serious questions on the reliability of the results have been raised. In principle, it turns out that individuals when responding the CV question are not aware of the exact type of safety improvements that they are asked to pay for. Serious problem with embedding, scope and framing effects has been found. Embedding and scope effects refer to the tendency of respondents to report the same WTP for a larger safety improvement as for a smaller improvement (see Figure V.1 below). If the responses are only weakly dependent of the magnitude of the risk reduction almost any VOSL can be derived from the studies (Figure V.2 - as follows from equation 1).

Figure V.1: Willingess to pay for different magnitude of the risk reduction (Converted to €=8,6 SEK) (Li, Lindberg (1999))

Figure V.2: VOSL for different risk reductions (Converted to €=8,6 SEK) (Li, Lindberg (1999))



In Beattie et al (1998), which explores this scope problem, the corresponding VOSL is 16,35 M € for the risk reduction 1/100.000 and 7,67 M € for the reduction 3/100.000.

Proposal

Nevertheless, we believe that the CV-method is the right approach and that estimates that are more reliable can be found if these problems are taken into account in the study design. In fact, some studies are already now conducted with this problem in mind. Instead of summing studies with uncertain quality and estimate an average, we will base our recommendations on a few well-conducted studies. However, these studies are probably only the first phase of new studies and are more pilot studies.

Carthy et. al. (1999), which is a follow up of the Beattie (1998) et al, use the CV-method to estimate a WTP for less sever outcomes and a risk/risk analysis to link the WTP to fatality. They concluded that a VOSL in the range of £ $0{,}5*10^6$ to $1{,}6*10^6$. This recommendation is based on untrimmed medians and trimmed means. The authors place more weight to the trimmed means and suggests that the range £ $1.0*10^6$ to $1{,}6*10^6$ is more likely with a point estimate around £ $1{,}0*10^6$ is appropriate.

This value includes the cost of net lost production, medical and ambulance cost. If these costs are reduced (approximately $0.1 *10^6$) their recommended value will be € $1.5 *10^6$.

Based on a limited number of well-designed studies we propose a European Standard Risk Value. We propose the value 1.5 million € per fatality measured as a Consumer value. The value is in line with other recent estimates but at the lower end of previous estimates. To have the full value of a fatality the cost of net lost production, medical and ambulance cost should be added, which is approximately 10% of the risk value. To express it as a Factor cost it should be reduced with the proportion of indirect taxation (20%).

Income elasticity within studies can be found around 0.3 (e.g. Persson et.al. (2000)).The age affects the value, with an inverted U, both as a theoretical and empirical conclusion. In addition, the value is probably affected by culture and social attributes. To transfer the value to other countries all these attributes should be taken into account. If only the estimate income elasticity within studies is used, we will not consider this. Miller (2000) estimated an 'income elasticity' between studies and countries. It is possible, but not necessary, that this approach capture some of these other attributes. Miller suggests an elasticity of 0.8. However, Miller uses a large number of studies, which we based on the discussion above, would reject as not fully reliable. We suggest adjusting the value linear with GDP/Capita, which implies an elasticity of 1.0.

The European Standard value should be adjusted according to GDP/Capita in each Country. The GDP/Capita is measured at PPP for 1998 (US$ Source: OECD). A European average is estimated for the EU-15 countries with a weight based on the population 1998 (Source: Eurostat). The relevant index will thus reflect the relative PPP adjusted GDP/Capita compared to a population weighted EU-15 average (see Table V.1).

Table V.1: Calculation of index to adjust for income differences

2000 Country	*Index GDP/Capita* index EU15=100	*GDP/Capita* US$ PPP 1998	*Population* 1998 Mill
Austria	112.08	23900	8.075
Belgium	111.03	23677	10.192
Denmark(B)	119.39	25459	5.295
Finland	102.38	21833	5.147
France	99.10	21132	58.727
Germany	107.90	23010	82.057
Greece (B)	66.45	14171	10.511
Ireland	108.77	23194	3.694
Italy	100.97	21531	57.563
Luxembourg	175.81	37491	0.424
Netherlands	113.21	24141	15.654
Norway (B)	128.45	27391	
Portugal	74.52	15891	9.957
Spain	80.76	17223	39.348
Sweden (B)	102.22	21799	8.848
Switzerland (B)	127.04	27091	
United Kingdom (B)	101.63	21673	59.09
Hungary (B)	49.10	10470	
Estonia (B)	43.11	9193 A)	

Source: GDP/Capita: www.oecd.org/std/gdpperca.htm 00/11/27, Population: Eurostat Yearbook 2000.
A) The relationship with Hungary has been used. The factor is estimated on GDP/Capita in Euro 1998 from Eurostat.
B) Not in Eurozone

Sensitivity test

The risk value 1.5 M€ is a conservative estimate based on state-of-the-art CV studies. Our main source (Carthy et. al. (1999)) suggested an interval, which includes a lower limit at 50% and an upper limit approximately 60% higher than the point estimate.

In addition to the conservative value, proposed above, reliable studies have found significant higher values. Persson et.al. (2000) is based on a postal questionnaire to a sample of 5,560 individuals in Sweden. The study was divided into two sets of questionnaires, one with the purpose of estimating VOSL and one with the purpose of estimating values for non-fatal injuries. In addition, information from a study of the loss of quality adjusted life years (QALY) has been used (Persson et al (1998)). The table below summarise the result from Persson et al (2000).

Table V.2: VOSL and value for non-fatal injuries based on Persson et al (2000).

	ISS	*Factor*	*M€*
Fatality		**1,000**	**2,51**
Severe Permanent	25+	0,505	1,26
Ditto	16-24	0,404	1,01
Ditto	9-15	0,404	1,01
Severe Temporary	9-15	0,133	0,33
Ditto	4-8	0,128	0,32
Ditto	1-3	0,029	0,07
Severe	**average**	**0,164**	**0,41**
Light	9-15	0,027	0,07
Light	4-8	0,018	0,05
Light	1-3	0,009	0,02
Light	1-3	0,018	0,05
Light	**average**	**0,015**	**0,04**

ISS=injury severity score

We suggest that a higher VOSL of 2.5 M€ should be tested as a sensitivity test. This value represent a less conservative approach and is at the upper limit of the reliable state-of-the-art.

If also a low value would be tested the value 0.75 M€ can be used. However, we believe that this is a very low value given that our main recommendation already is conservative, and we cannot recommend such a value based on the state-of-the-art of WTP studies.

Total lost (gross) production is in the Swedish official value approximately 0.65 M€ while the VOSL is at our recommended 1.5 M €. The low sensitivity test on VOSL could be said to represent an upper limit on a lost gross production approach.

The Risk Value for injuries

Following the latest development of studies of VOSL, which includes risk-risk studies, the relative value between different degrees of injuries can also be derived. Earlier recommendations include the ECMT (1998), which estimates the Risk Value for severe injuries at 13% and for light injuries at 1% of the Risk Value of fatalities.

The table below summarise state-of-the-art studies and official values in some countries. Our conclusion is that the evidences do not suggest that the ECMT values need to be updated. We therefore propose to use these relations also in UNITE. However, our survey also suggests that it would be appropriate to divide the group severe injury into two groups with permanent and temporary injuries. If values for the subgroup of severe injuries are to be used we recommend to use the factors from Persson et al (2000). When adopted to the ECMT factor 0.13 for an average severe injury the factor for permanent injury becomes 0.32 and for temporary 0.09.

Table V.3: Relation between risk value for fatality and injuries

	Fatalities	*Severe Injuries permanent*	*Severe Injuries temporary*	*Severe Injury average*	*Light Injuries*
ECMT (1998)	1			0.13	0.01
Jones-Lee (1995) CV	1	0.875	0.232		
ibid SG	1	0.151-0.233-	0.055		
Trawe'n et al (1999)CV	1	0.133-0.210			0.005-0.012
Ibid CA	1	0.187-0.276			0.010-0.011
Ibid SG	1	0.404-0.269			0.321-0.227
Ibid RR	1	0.382			0.023
Persson et.al (2000)	1	0.40	0.11	0.16	0.015
Finland official	1	0.457		0.005	0.001
Sweden official	1			0.154	0.007
UK official	1			0.114	0.009
Norway official	1	0.552		0.167	0.029

Note: CV = result from CV-method, SG = Standrad Gamble, RR =Risk-Risk,CA = Conjoint analysis

Consequences

Our recommendation is to use National values first, if they are of a high quality, and secondly to use the adjusted European Standard VOSL. In the table below we have compared, where available, our recommendation with official values and what we have judged as best estimates. The following studies has been judged as Best Estimates; Denmark - Kidholm (1995), Finland - Tervonen (1999), Sweden - Persson et al (2000), Switzerland - Schwab Sougel (1996) and for UK Carthy et al (1999). The studies have been adjusted to price level 1998.

Table V.4: The UNITE recommendation compared to national values

€ 1 998	*UNITE* M€	*Official A)* M€	*UNITE/Official* %	*Best Estimate* M€	*UNITE/BE* %
Austria	1,68	1,52	10%		
Belgium	1,67	0,40	312%		
Denmark	1,79	0,52	244%	2,93	-39%
Finland	1,54	0,89	73%	1,52	1%
France	1,49	0,62	141%		
Germany	1,62	0,87	87%		
Greece	1,00	0,14	588%		
Ireland	1,63	1,04	57%		
Italy	1,51				
Luxembourg	2,64				
Netherlands	1,70	0,12	1269%		
Norway	1,93	1,49	29%		
Portugal	1,12	0,04	2896%		
Spain	1,21	0,07	1625%		
Sweden	1,53	1,48	4%	2,48	-38%
Switzerland	1,91			2,70	-29%
United Kingdom	1,52	1,53	-1%	1,70	-10%
Hungary	0,74				
Estonia	0,65				

Note: A) Based on Nellthorp, Mackie and Bristow (1998). HICPs for Eurozone has been used to adjust price level to 1998.
*) Latest available values from Tervonen (1999) has been used (For Sweden SIKA(2000)). Corresponding EUNET values are; DK 0.79; FIN 1.33; N n.a. ; S 1.80; UK 1.11.

Our proposal is in line with the VOSL used in Sweden and UK and but is higher than the values used in other countries. However, it is in line with the latest Finish proposal and below the best estimate from Denmark, Sweden, Switzerland and UK. This is natural since our proposal is based on the WTP approach but at a rather conservative level.

However, our main concern is some countries where we seem to suggest a value far above the official value (from 1994). If no dramatic changes have taken place in the Netherlands, Portugal and Spain our proposal will generate costs 10 times higher than the National values suggest. Also compared to Greece and Belgium and Denmark our proposal is very high.

Table V.5: Year 1994 Appraisal values for road fatalities, EUNET.

OFFICIAL VALUE	M ECU 1994	Year of Study	M €
Austria	1,389	94	1,52
Belgium	0,368	93	0,40
Denmark(1)	0,716	92	0,79
Finland	1,214	95	1,33
France	0,562	94	0,62
Germany	0,789	89	0,87
Greece (1)	0,132	92	0,14
Ireland	0,945	94	1,04
Italy			
Luxembourg			0,00
Netherlands	0,113	92	0,12
Norway (1)			0,00
Portugal	0,034	96	0,04
Spain	0,064	94	0,07
Sweden (1)	1,643	98	1,80
Switzerland (1)			0,00
United Kingdom (1)	1,010	94	1,11
Hungary (1)			0,00

Source: Nellthorp, Mackie and Bristow (1998)
Note: Price index 1.097 HICP has been used. October 1994 to October 2000.

Table 6: Latest appraisal values for road fatalities.

loc.currency	**Fatality**		**Very Severe injury**		**Severe injury**		**Slight Injury**		**Price level**	**Price index**	**Source**
per actual case [1)]	VOSL	Mat.Cost	VOSL	Mat.Cost	VOSL	Mat.Cost	VOSL	Mat.Cost		to 1998	
Austria											
Belgium											
Denmark	3980000	1990000	na	na	119000	357000	6000	91000	1999	0,975	Tervonen (1999)
Finland	5100000	2700000	2330000	2470000	23800	59000	6100	12900	1995	1,036	Tervonen (1999)
France											
Germany											
Greece											
Ireland											
Italy											
Luxembourg											
Netherlands											
Norway	11122000	5478000	6139800	5230200	1852200	1927800	320000	180000	1995	1,078	Tervonen (1999)
Portugal											
Spain											
Sweden	13000000	1300000	na	na	2000000	600000	90000	60000	1999	0,99	SIKA (2000)
Switzerland											
United Kingdom	902500	139910	na	na	102880	21730	7970	4460	1997	1,018	Tervonen (1999)
Hungary											
Estonia											

Note: 1) Some MS corrects their values for underreporting. The values above are for actual case and not corrected
Price index based on 1997,1998

Table 7 Best Estimate – State of the art

loc.currency	FATALITY		Very Severe injury		SEVER INJURY		SLIGHT INJURY				
	VOSL	Mat.Cost	VOSL	Mat.Cost	VOSL	Mat.Cost	VOSL	Mat.Cost	Price level	Price index	
Austria										1	
Belgium										1	
Denmark	22401801,8								1993	1,048	Kidholm (1995)
Finland	8710000	2548800	4808000	1491400	1450000	35100	250000	24500	1999	0,985	Tervonen (1999)
France										1	
Germany										1	
Greece										1	
Ireland										1	
Italy										1	
Luxembourg										1	
Netherlands										1	
Norway										1	
Portugal										1	
Spain										1	
Sweden	21800000								1998	1	Study by Persson et al (2000)
Switzerland	4100000								1994	1	Schwab Soguel (1996)
United Kingdom	1000000								1999	1	Carhty et al (1999)
Hungary											
Estonia											

Table 8 Benefit Transfer

2000 Country	Local Currency	A Foreign exchange rate local currency/€	B=C/E GDP/Capita index EU15=100	C GDP/Capita US$ PPP 1998	D Population 1998 Mill	D/sumD EU15 Weight Eu15
Austria	ATS	13,7603	112,08	23900	8,075	0,022
Belgium	BEF	40,3399	111,03	23677	10,192	0,027
Denmark(1)	DKK	7,4598	119,39	25459	5,295	0,014
Finland	FIM	5,94573	102,38	21833	5,147	0,014
France	FRF	6,55957	99,10	21132	58,727	0,157
Germany	DEM	1,95583	107,90	23010	82,057	0,219
Greece (1)	GRD	340,32	66,45	14171	10,511	0,028
Ireland	IEP	0,787564	108,77	23194	3,694	0,010
Italy	ITL	1936,27	100,97	21531	57,563	0,154
Luxembourg	LUF	40,3399	175,81	37491	0,424	0,001
Netherlands	NLG	2,20371	113,21	24141	15,654	0,042
Norway (1)	NOK	8,022	128,45	27391		
Portugal	PTE	200,482	74,52	15891	9,957	0,027
Spain	ESP	166,386	80,76	17223	39,348	0,105
Sweden (1)	SEK	8,6883	102,22	21799	8,848	0,024
Switzerland (1)	CHF	1,5205	127,04	27091		0,000
United Kingdom (1)	GBP	0,5994	101,63	21673	59,09	0,158
Hungary (1)	HUF	264,46	49,10	10470		
Estonia (1)	EEK	15,6466	0,00	9193 2)		
			E = Weighted EU 15 average	**21325**	**374,582**	**1**

1) Not fixed rate with Euro. Source and date of rate: ECB 24 November 2000

2) Based on the relationship with Hungary. GDP per Capita in ECU 1998 from Eurostat is used. Factor=3.6/4.1

Source:www.oecd.org/std/gdpperca.htm 00/11/27