MONETARY VALUE OF ROAD ACCIDENTS IN HUNGARY

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Abstract: *The aim of this paper is to clarify the monetary value and the statistical analysis of road accidents for Hungary. Firstly we had to face with the problem of underreporting. Values and factors for correcting underreporting for road accident risks based on accident statistics and EU research. We had calculated and analyzed the total social cost of road transport sector for 2002 – 2005 on the aspect of growing GDP and motorisation.*

Keywords*: road safety, externalities, internalization, EU tendencies*

1. INTRODUCTION

Generally the road safety has increased in the EU thanks to the new initiatives, there are less lethal accidents, less pertinent social cost. For further increasing of safety or efficiency of safety a social level of agreement is necessary. The increase of safety of road transportation is closely connected to strategical economical regulations, so the „users should pay the bill" EU guideline is equitable and economically explainable as a link between economy and the increase of road safety.

The increasing of road safety is a very important part of the EU common transport policy. Four areas can be separated:

- Building or Rebuilding of road infrastructure
- Vehicle construction (active and passive safety)
- Traffic control and monitoring
- Controlling of driver behaviour.

2. GENERAL APPROACH

The aim of this article is to calculate the total sum of social cost of road accidents in Hungary by the method and data created by EU funded research project HEATCO [6th Framework of EC (referencnumber: SSP8B/502481/2003), Hungarian partner of the research consortium BUTE Department of Tranport Economics, Head of department: Prof. Katalin Tánczos]. Traffic accidents belong to the most visible and important negative impacts of transport. The reduction of the number of accidents and the associated damages and costs is one of the most important criteria. The costs due to accidents can be expressed [1]:

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$$\sum_{i=1}^{n} (r_i \cdot c_i \cdot m) \tag{1}$$

with

i = accident impact (fatality, serious injury, slight injury, material damage)
r_i = risk of accident impact type i per vehicle-km
c_i = cost per accident impact type i
m = mileage in vehicle kilometers

From the equation (1) above it can be seen that besides the kilometers driven the accident costs are determined by:

- the change in accident risks due to the project, and
- the valuation of the accident risks.

The former includes the model used to predict changes in accident risks due to the project, and the question whether accident risks derived from observed accident data should be adjusted due to underreporting. For reasons of transparency and accuracy it is preferable to estimate and value clearly defined endpoints and the associated risks. In the case of accidents these are:

- Fatality: death for causes arising out of the accident.
- Serious injury: casualties who require hospital treatment and have lasting injuries, but who do not die within the recording period for a fatality.
- Slight injury: casualties whose injuries do not require hospital treatment or, if they do, the effect of the injury quickly subsides.
- Damage-only accident: accident without casualties.

It is recommended to apply the correction factors for unreported accidents.

$$A_{all} = r \cdot A_{reported} \tag{2}$$

with, r: ratio of unreported accidents
A_{all}: All accidents
$A_{reported}$: Reported accidents

3. VALUING ACCIDENT COSTS

The valuation of an accident can be divided into direct economic costs, indirect economic costs and a value of safety per se. The direct cost is observable as expenditure today or in the future. This includes medical and rehabilitation cost, legal cost, emergency services and property damage cost. The indirect cost is the lost production capacity to the economy that results from premature death or reduced working capability due to the accident. However, direct and indirect economic costs alone do not reflect the well-being of people. People are

willing to pay large amounts to reduce the probability of premature death irrespectively of their production capacity. This willingness-to-pay indicates a preference to reduce the risk of being injured or even die in an accident. In the following this aspect is called the value of safety per se.

Different ways of presenting the components relevant for valuing accident risks can be found in the literature. For instance European Commission (1994) distinguishes the cost categories:

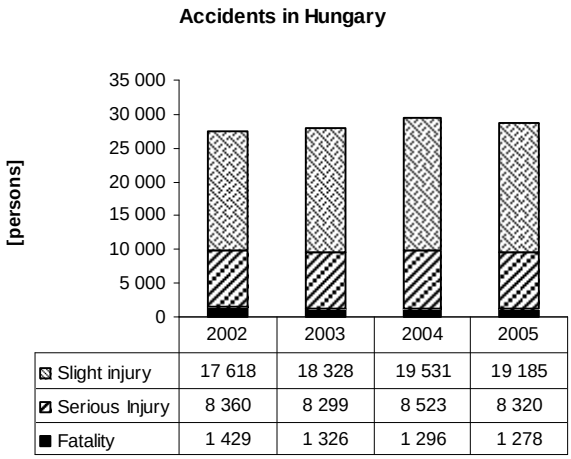
1. medical costs
2. costs of lost productive capacity (lost output)
3. valuation of lost quality of life (loss of welfare due to crashes)
4. costs of property damage
5. administrative costs

These however comprise the same effects in a different categorisation. The categories 1, 4, and 5 are part of the direct economic costs, category 2 belongs to the indirect economic costs and category 3 represents what we called the value of safety per se. When discussing fatalities it is important to note that in the long run all people will die. What we estimate is the cost of lost life expectancy (measured as life years lost), not the life per se. When comparing different life saving programs differences in life years lost should be taken into account. In general, traffic accidents kill a relatively large share of young persons while, for example, air pollution mainly reduces the lifetime of elder persons. Values for traffic accidents should not simply be transferred to other life saving programs.

In the following we describe the method to estimate the direct and indirect economic accident cost by cost component:

- Medical and rehabilitation cost: The major direct cost of accidents is medical and rehabilitation costs. The cost consists both of the cost the year of the accident and future cost over the remaining lifetime for some injury types.
- Legal court and emergency service cost: The administrative cost of an accident consists of the cost for police, the court, private crash investigations, the emergency service and administrative costs of insurances.
- Material damages: compared to the values for casualties, material damages are of minor importance.
- Production losses: The indirect economic cost of accidents consists of the value to society of goods and services that could have been produced by the person, if the accident had not occurred. The (marginal) value of a person’s production is assumed to be equal to the gross labour cost, wage and additional labour cost, paid by employer.

4. APPLICATION OF CALCULATION METHOD IN HUNGARY



	2002	2003	2004	2005
Slight injury	17 618	18 328	19 531	19 185
Serious Injury	8 360	8 299	8 523	8 320
Fatality	1 429	1 326	1 296	1 278

Figure 1. *Accidents in Hungary [2]*

According to the method described above, we calculated the total value of casualties in Hungary in 2002-2005 (Figure 1.). The values for Hungary has been multiplied with the corrected number of persons injured or dead in accidents.

The number of vehicles has increased in Hungary as the GDP, because there is a well-known positive correlation between them. The number of accidents has slightly increased, but the value of casualties has been decreased dramatically, because the set of endpoints of accidents has been changed. (Figure 2.).

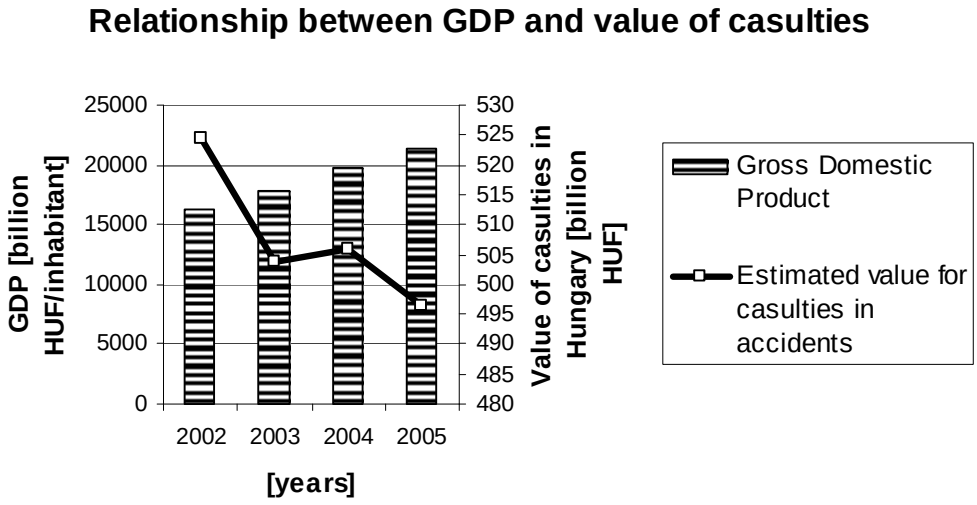


Figure 2. *Relationship between GDP and value of casualties in Hungary [3]*

5. CONCLUSION

Generally the road safety has increased in the EU thanks to the new initiatives, there are less lethal accidents, less pertinent social cost. For further increasing of safety or efficiency of safety a social level of agreement is necessary. The increase of safety of road transportation is closely connected to strategical economical regulations, so the „users should pay the bill" EU guideline is equitable and economically explainable as a link between economy and the increase of road safety.

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6. REFERENCES

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2. KSH database – Data of road accidents in Hungary (www.ksh.hu)

3. MABISZ database – Hungarian Association of Insurance Companies