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Laboratoire d'Economie des Transports
Unité Mixte de Recherche du CNRS n° 5593
Université Lumière Lyon 2 - ENTPE

TRANSPORT RESEARCH CENTRE

Evaluation of negative externalities caused by traffic

Alena Daňková

Transport research centre

ECTRI
European Conference of Transport Research Institutes

FERSI
Road Safety Research

Overview

1. Research goal
2. Current state in the Czech Republic and abroad
3. New methodology development
4. Result - own calculation of losses from traffic accidents on the road
5. Impact of negative externalities
6. Recommendation
7. Conclusion

1 Research goal

- Identification of drawbacks of the used methodology for the calculation of losses from road traffic accidents **in the Czech Republic**.
- Creation of new methodology
- Own calculation of losses caused by traffic accidents on the road according to this methodology

Need to have → **Accurate and actual losses**

Comparison with EU states

2 Current state

What is economic evaluation of negative externalities caused by traffic?

- Inputs to analysis
- Expressed in money

ABROAD

- Germany – methodology “Volkswirtschaftliche Kosten der Personenschäden im Strassenverkehr”
  - methodology is based on method of the „human capital“
  - include human costs

- Outcomes of the project HEATCO
  - the same methodology
  - include „unregistred“ accidents

2 Current state

CZECH REPUBLIC

Methodology of Calculation of Losses Caused by Road Traffic Accidents in the Czech Republic

Deficiencies:

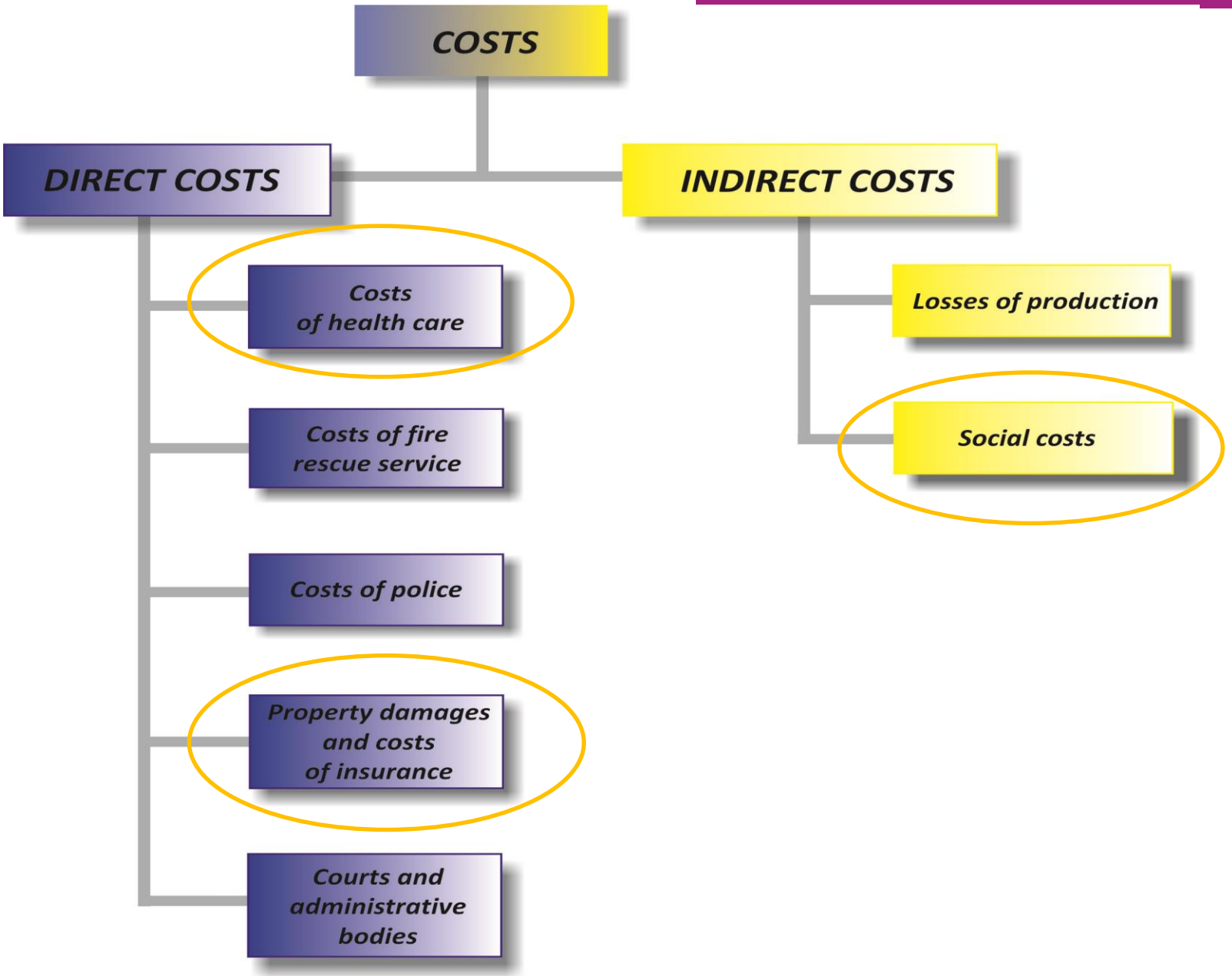
- Impossible to collect all data for calculation of costs of health care.
- Does not include costs of fire rescue service, „unregistered accidents,
- Not complete methodology for calculation of cost of insurance.
- Does not consider changes of legislative (social costs).
- Does not include subjective damage (human costs).

3 New methodology

- includes identified **deficiencies,**
- based on the methodology of „total output“ – method of human capital,
- identification, quantification and subsequent evaluation of cost.

Accidents with:

- Fatal injuries
- Serious injuries
- Slight injuries
- Material damage only accidents


COSTS
DIRECT COSTS
INDIRECT COSTS
Costs of health care
Losses of production
Costs of fire rescue service
Social costs
Costs of police
Property damages and costs of insurance
Courts and administrative bodies

Costs of health care (new methodology)

Total costs include:

1. arrival of emergency medical services to accident
2. hospital care
3. autopsy (in case of death)

1. Arrival of emergency medical services to accident

$$C_{vi\ (1-3)} = \frac{B_v}{n_v} \times P_{i(1-3)}$$

Accidents with
- fatal injuries – 100%
- serious injuries - 100%
- slight injuries - 80%

Costs of health care

2. Hospital care

$$C_{l2} = t_{l2(a-c)} \times P_{l2(a-c)}$$

3. autopsy (in case of death)

Costs for one autopsy x autopsy frequency

TOTAL COSTS OF HEALTH = sum of costs 1, 2 and 3. (according to injury severity)

Property damages and costs of insurance

(new methodology)

- It is not possible to use traffic police data only
- Adjustment of this data about total annual paid sum

Coefficient k =

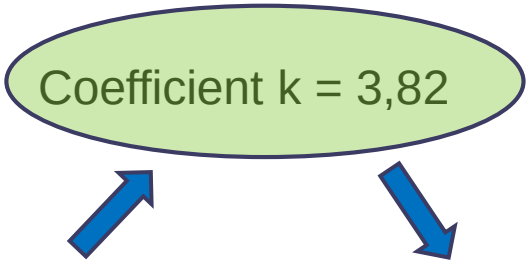
$$k = \frac{k1\ x\ (C1 - C2 - C3)}{C4}$$

$$k = \frac{1{,}25\ x\ (730\ 216\ 486 - 155\ 758\ 607 - 27\ 520\ 462)}{179\ 105\ 263}$$

k = 3,82

k1 – a coefficient expressing % increase of material damage and administration costs of insurance and material damage uncovered by insurance
C1–paid insurance per year
C2– costs of healthcare which are paid from liability insurance
C3–costs of fire rescue service which are paid by a commercial insurance company
C4–Police estimate of the total damage

Property damages and costs of insurance



Total property damages for 1 injury (1 accident) in EUR

	Property damages according to policy	Total number of accidents	Property damages accordint to policy for 1 accident	**Total property damages for 1 injury (1 accident)**
Fatally injuries	5 624 740	650	8 653	33 109
Serious injuries	9 523 278	2 666	3 572	13 635
Slight injuries	49 058 974	17 170	2 857	10 907
Property damages only accidents	114 898 301	54 651	2 102	8 025

4 Result

Total losses for one accident according to type of costs in 2011 (in EUR)

	Costs	Accident with			material damage only accident
		fatal injurie	serious injurie	slight injurie	
direct costs (EUR)	Costs of health care	7 090	52 485	1 740	0
	Costs of fire rescue service	1 689	2 764	1 228	246
	Cost of police	1 873	523	340	340
	Material damages include costs of insurance	33 109	13 635	10 907	8 025
	Courts and administrative bodies	371	371	161	161
	Total direct costs	**44 132**	**69 778**	**14 377**	**8 772**
indirect costs (EUR)	Losses of production	667 435	98 257	4 974	0
	Social costs	7 175	17 073	339	0
	Total indirect costs	**674 610**	**115 330**	**5 313**	**0**
TOTAL loss for one accident		**718 742**	**185 108**	**19 690**	**8 772**

5 Impact of negative externalities

- State budget – 41%
- Commercial insurance company – 49%
- Health insurance company – 5,6%
- Person responsible for accident (culprit) – 2,6%
- Victim of traffic accident – 1,8 %

6 Next step - recommendation

- Including **subjective damages** **to calculation**



WTP method (willingness to pay)

- Target group
- Questions (not direct)
- Evaluation

Civil code - the amount of compensation for damage to health

7 Conclusion

- New Methodology of Calculation of Losses Caused by Road Traffic Accidents in the Czech Republic
- Economic losses are 1,4% GDP in the Czech Republic.
- New and actual research - Including **subjective damages** to calculation

Thank you for your attention

Alena Daňková
alena.dankova@cdv.cz