

The absence of risk preferences in health economic evaluations - what can we learn from transport economics?

Ulf Persson¹, Sara Olofsson^{1*}

¹The Swedish Institute for Health Economics, Lund, Sweden.

*Presenting author (sara.olofsson@ihe.se)

ihe.se

BACKGROUND AND OBJECTIVE

- There is an ongoing debate in health economics about the lack of consideration to individual preferences for risk in the traditional model with quality-adjusted life-years, QALYs (Lakdawalla et al. 2018).
- Beginning at the end of the 1980's, the National Road Administration (NRA) in Sweden adopted economists' methods for estimating individuals' preferences for new and safer roads.
- The objective was to perform a narrative review of the approaches used to incorporate risk preferences in transport economics to identify possible learnings for health economics. Literature included references previously known to the authors and additional references identified from a targeted review of reference lists.

A BRIEF HISTORY OF THE VALUATION OF HEALTH (NON-FATAL ROAD TRAFFIC INJURIES) IN TRANSPORT ECONOMICS

Indirect valuation

- *The first attempt to estimate the value of preventing non-fatal road injuries was inspired by health economics.*
- Persson (1983) estimated the average loss of quality-adjusted life-years (QALYs) lost for a selection of typical non-fatal injuries and these were put in relation to the QALYs lost for fatal injuries, so called fatality risk equivalents.
- The fatality risk equivalents were then applied to the value of reducing the risk of experiencing a fatal event.
- The value of reducing the risk of a fatal event (the value of a statistical life, VSL) was solicited from a representative sample of the general population of their maximum willingness-to-pay (WTP) for a defined magnitude of risk reduction using the contingent valuation (CV) method.

Direct valuation

- *In the 1990's, the value of reducing the risk of non-fatal traffic injuries were derived by directly asking a sample of the general population for their willingness-to-pay.*
- Results from Persson et al 1995 show that initial risk, the size of the risk reduction, and severity of the injury influence willingness-to-pay for non-fatal injuries.
- The WTP does not, however, increase in proportion with the initial risk, the size of the risk reduction, or severity of the injury.
- For example, respondents were willing to pay less than twice the amount (median value SEK1,000) for a 50% reduction in the risk of a serious disabling injury than for a 25% reduction in the risk for the same disabling injury (median value SEK600).

Chained valuation

- *In the 2020's, innovative methodologies have been developed to capture individuals' preferences for risk.*
- The chained approach was developed to avoid tradeoffs between money and very small risk reductions (Carthy et al. 1999) and applied in a survey of a sample of the Swedish general population to estimate the value of reducing risk of non-fatal road traffic injuries (Olofsson et al. 2019).
- The generalized risk-adjusted cost-effectiveness (GRACE) model was developed to incorporate diminishing marginal returns for health (Lakdawalla and Phelps 2021).
- The authors of this poster are currently involved in a research project with the aim of applying (an adapted version of) the GRACE model to value a reduction in the risk of non-fatal road traffic injuries.

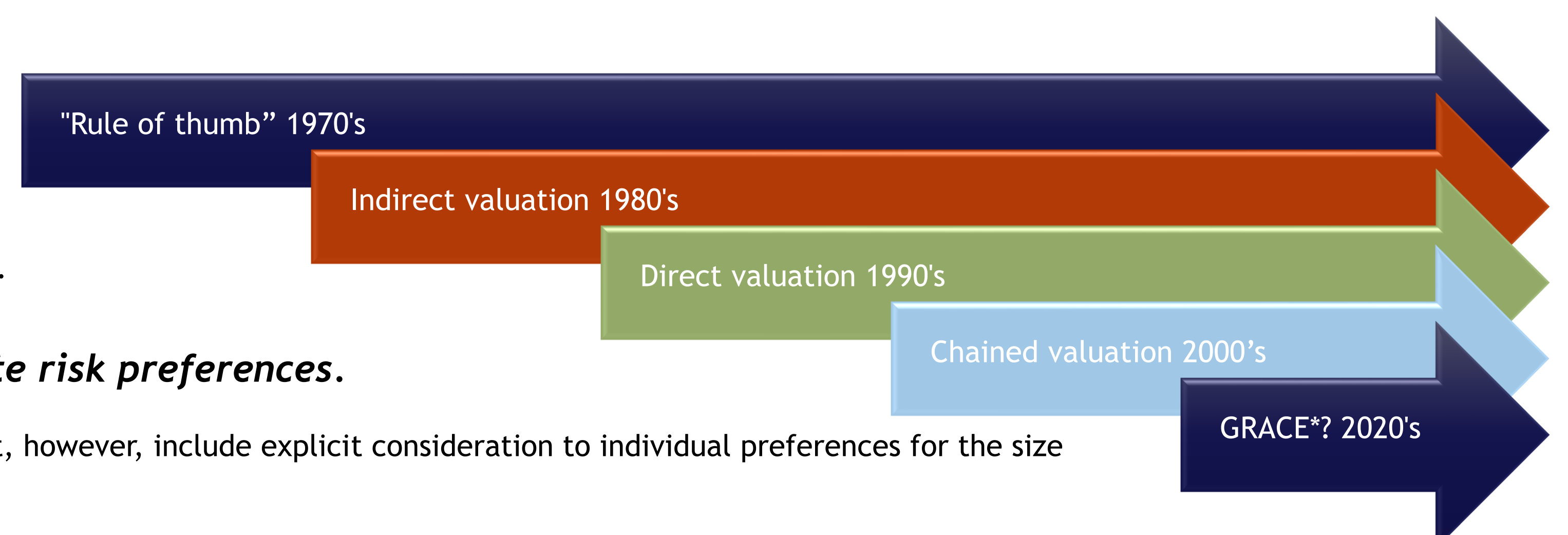
Fatality risk equivalents for non-fatal traffic injuries based on different methodologies

Degree of severity	"Rule of thumb" National Road Administration 1980	"Indirect valuation" Persson 1983	"Direct valuation" Persson et al 1995	"Chained valuation" Olofsson et al 2019	Value of reducing risk of one case (€)
Fatal injury	1	1	1	1	3,740,000*
Serious disabling injury	0.200	0.632	0.637	0.619	2,244,000
Serious temporary injury	0.020	0.085	0.093	0.077	299,200
Slight injury	0.002	0.004	0.014	0.013	48,620

*VSL accepted by the Swedish Transport Administration (Trafikverket).

WHAT ARE THE LEARNINGS FOR HEALTH ECONOMICS?

- Transport economists have developed several approaches to measuring individual preferences for risk based on economic theory.
- Risk preferences are substantial, representing around 25-50% of the total value of new and safer roads.
- **To truly represent individual preferences, value of health should incorporate risk preferences.**
- The GRACE model incorporates individual preferences for risk in health outcomes. The model does not, however, include explicit consideration to individual preferences for the size of the baseline risk or risk reduction.



*Generalized Risk-Adjusted Cost-Effectiveness

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