Determine VTTS for the German Federal Transport Infrastructure Planning

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Abstract short

In the course of compiling Germany's new Federal Transport Infrastructure Plan in 2015 the Federal Ministry of Transport, Building and Urban Development intents to carry out CBAs for several infrastructure projects. On this account the valuation for travel time saving (VTTS) and travel time reliability (VOR) are redetermined. On the basis of collected RP data, a SP questionnaire is designed. Beside experiments concerning mode choice, route choice and departure time, long term decision are taken into consideration as well. Likewise business traffic should be given particular attention in the future, emphasising on the effect of travel time on companies mode choice decisions. The collected data is analysed with discrete choice methods.

Keywords

Value of Travel Time Savings, Value of reliability, business traffic, German Federal Transport Infrastructure Plan, residential and work place choice, discrete choice modeling

Preferred citation style

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1   Introduction

In the course of compiling Germany's new Federal Transport Infrastructure Plan in 2015, the Federal Ministry of Transport, Building and Urban Development (BMVBS) intends to carry out cost-benefit analyses to evaluate the effect of transport policies and investments for several infrastructure projects. Travel time savings often have the largest share in gains on the utility side of CBAs (Mackie et al. 2001). On this account a research group consisting of the IVT of the ETH Zurich and TNS Infratest redetermines the valuation for travel time saving (VTTS) and travel time reliability (VOR) for the BMVBS. The aim of the project is, among other things, to estimate a model for modal relocation in passenger and business travel. An individualized stated choice survey is the reasonable and established approach for an empirical answer to the core issues (e.g. Small 2012). On the basis of collected revealed preference (RP) data, a stated preference (SP) questionnaire is designed in a second step. Beside experiments concerning mode choice, route choice and route choice and departure time, long term decisions which will have an influence on future trips are also taken into consideration. This involves residential choice as well as work choice decisions. A secondary literature review focuses on the state of the art concerning small travel time savings (less than five minutes) and if those need special treatment for VTTS estimation. Likewise business travel should be given particular attention in the future, emphasizing on the effect of travel time on companies mode choice decisions besides logistic, fiscal, marketing and other influences. To complete scientific research, and also to take practical experience into account, several qualitative interviews focusing on employees' mode choice are conducted with decision makers in different companies.

2   Study design

The two step survey was carried out in seven wave from July to September 2012 (after a pretest in May). For non- commercial traffic first a representative sample of respondents over eighteen were recruited for a CATI interview and randomly assigned a focus trip and a long term decision experiment. The origin and destination and the exact route of the trip were determined, as well as detailed information on residential or work choice decisions. Additionally, details on one long distance trip, the everyday destinations and an average trip were compiled. Second, the stated preference questionnaires were constructed based on the focus trips from the RP experiments. Respondents received at least two SP game sets of either mode choice, route choice or route and departure time choice. Table 1 gives an overview of the different attributes used in the SP sets. The SP questionnaires included as well attitudinal questions and were either sent by post to the respondents or could be completed online. Participants in the business travel survey were preselected online and afterwards interviewed in a

CATI as well. Each of the respondents reported their last three business trips from which the most recent one became the focus trip. Based on that trip the SP game set was conducted as described for the non-commercial survey. The SP questionnaire for business trips was completed online. To validate if employees are the right respondents to address, the abovementioned expert interviews with decision makers were conducted to find out how mode and route choice decisions are made in companies. For later estimations it was of importance to ascertain if small travel time savings (in general less than 5 minutes) require special treatment or can be integrated equally in the model estimations. Therefore a secondary literature review on the state of the art of specific research was conducted.

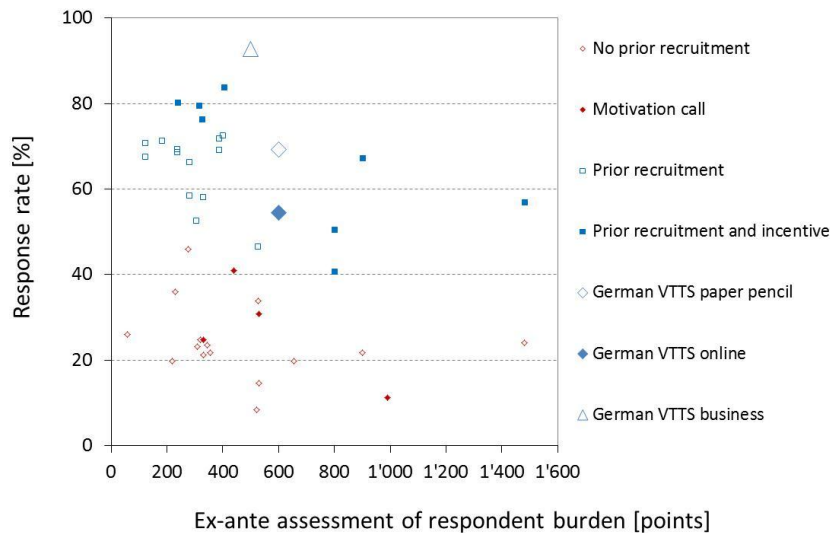Table 1   Overview attributes mode and route choice and route choice and departure time

attributes					mode choice		route choice		route choice and departure time	
	walk	bike	car	put	bus	plane	car	put	car	put
time	x	x	x	x	x	x	x	x	x	x
access time			x	x	x	x	x	x	x	x
congestion/waiting time			x	x	x	x			x	
congestion							x			x
waiting time								x		x
cost			x	x	x	x	x	x	x	x
parking costs							x			
change				x	x	x		x		x
frequency				x	x	x				
share delayed trips			x	x	x	x	x	x		
travel time distribution									x	x

3   First results

Including the pretest data 2'420 non-commercial and 839 commercial respondents completed the full questionnaire. Hence the sample contains almost 65,000 observations. Figure 1 shows the predicted response burden and response rates following Axhausen and Weis (2010). It can be asserted that all three alternatives are settled in the expected range.

Furthermore first general mode and route choice MNL models have been estimated including linear terms for all attributes, non-linear (logarithmic) terms for travel time and cost and interaction terms between income, cost and time and travel time, number of transfers and headway. The estimated parameters showed the expected signs and plausible sizes and ratios. The goodness of fit test achieved good results as well.

Figure 2   Response rate German VTTS

A total of 24 decision makers participated in the qualitative interviews. It turned out that employees clearly have the freedom to choose their preferred travel routes, as 22 experts agreed to that question. Mode choice decisions are made jointly by employees and decision makers of a company. However, the employee's constraints are often more of a higher general order than a direct advice by the decision makers. Nevertheless it can be stated that interviewing individual employees for mode and route choice SP experiments is a plausible and valid approach for commercial traffic.

Taking the state of the art of international research into account, the recommendation to the BMVBS is to treat small value of travel time savings equally (Ehreke 2012). However the collected SP data would be sufficient if an additional analysis appears desirable.

4   Outlook

The first MNL runs showed plausible results with a convincing goodness of fit. As a next step further discrete choice models will be estimated including socio-economic data or mode choice preferences to spot possible heterogeneities in the valuation of time. Mixed logit models will provide information about randomly distributed preferences and valuations. A general model for the whole sample containing all RP and SP data promises even more robust goodness of fit. Finally estimating latent class models including attitudinal valuations is conceivable.

5   References

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