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Publication date:
2004-10

Permanent link:
https://doi.org/10.3929/ethz-b-000023559

SWISS VALUE OF TRAVEL TIME SAVINGS

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1 INTRODUCTION

This paper describes the survey methods and results of a recent Swiss study to estimate values of travel time savings (VTTS) for passenger transport. The study was conducted by the Institute of Transport Planning and Systems (IVT), ETH Zurich and Rapp Trans AG, Zurich in collaboration with J.J. Bates and M. Bierlaire on behalf of the Swiss Association of Transport Engineers (SVI). It implements the recommendation of the scoping study on Swiss VTTS (Abay und Axhausen, 2001). While staying within the recent tradition of such studies with respect to the basic methodology, it pursued a number of new departures with respect to the choice contexts and the estimation of the VTTS, in particular through the inclusion of directly estimated income and trip distance elasticities.

Older Swiss results were derived from revealed preference (RP) sources or by transfer from other estimates (See the second half of Table 1). While the more recent estimates here and elsewhere are based on stated preference (SP) data. Table 1 summarizes these results and shows the wide variability which depends on national context, choice situation, modes and trip purpose, but also on the modelling methodology.

The structure of the paper is as follows. The next section describes the survey approach and the field work experiences, in particular the drift in the composition of the sample. After a brief discussion of the multinomial logit model, the paper outlines the development of the estimates and the final specification. The differences between sample and population means resulting from the final non-linear specifications are discussed before a final section concludes with an outlook and further recommendations.

Table 1: Overview of Estimated and assumed VTTS [CHF/h]

Study	Year	Private car				Public transport			
		Commuter	Business	Other	All	Commuter	Business	Other	All
UK[1]	1994	8.70	13.60	7.80					
UK[2]	1994	8.20		7.80					
The Netherlands[3]	1990	14.00		7.50		10.00	12.50	5.50	
Sweden[4]	1994	5.50		4.50		9.50		7.00	
Norway[5]	1997		32.80	15.30			26.30	11.00	
Finnland[6]	1995	5.70	33.80	3.30					
Denmark[7]	1992	10.00	21.00			6.00	20.00		
Lüthi[8]	1980	6.30	28.00		12.00				
NUP[9]	1981	18.00	19.00	11.00					
ASTRA[10]	1998	25.00	100.00+	10.00					
Ex-post evaluation of forecasting methods[11]	2002				28.00	8.70	55.80		17.00

Values are not corrected for inflation. Exchange rates of the year of the study were applied

[1]: Hague Consulting Group, Accent (1999)
[2]: Mackie, P.J. et al. (2003)
[3]: Hague Consulting Group (1990)
[4]: Algers, S., J. Lindqvist and S. Wildert (1995)
[5]: Ramjerdi, F., L. Rand, I. Saestermo and K. Saelensminde (1997)
[6]: Knurri, J. and Pursula, M. (1995)
[7]: Jovicic, G. and C. O. Hansen (2003)
[8]: Lüthi, W. (1980)
[9]: NUP-Kommission (1982)
[10]: Keller, M., R. Iten, C. Aebi, S. Altheer and R. Frick (1998)
[11]: Vrtic, V., K.W. Axhausen, R. Maggi und F. Rossera (2003)

2 SAMPLE AND DATA COLLECTION APPROACH

2.1 Survey design

In line with current practise (Louviere, Hensher and Swait, 2000 or the recent European studies cited in the table above) the stated preference survey was based on observed trips, which were available as the participants were recruited as part of an ongoing and continuous survey (KEP) of the Swiss Federal Railways (SBB). The socio-demographic characteristics of the respondents and the information about their trips were made available for all respondents of the KEP. Addresses were only available for those who agreed to participate in the SP survey. The experiments were customised using one of the trips reported in the KEP survey as their base. The reasonableness of the surveys was tested in two pretests, with estimation results serving as the basis for the assessment. Various modifications in the survey design, wording of the questions and the variable characteristics were made as a result.

Initially the questionnaire of this study consisted of four parts: three SP experiments with six or nine choice situations of each plus a fourth part covering various socio-demographic and trip-related questions, which had not been raised during the KEP-interview. The levels of the choice variables vary in each experiment, as they are calculated as relative changes to the reported values. The orthogonal design was generated by the statistical software SPSS 10.2.

The SP 1 is a mode choice experiment (car and bus or rail), which was presented to those participants, who have a car available. SP 2 is a route choice experiment. Some participants received choice experiments with the mode they chose for the reported trip. It had also been planned to present one group of persons with a route choice experiment for the mode they had not chosen. Estimation results of two pretests showed that this was productive only with car drivers who had to select public transport routes. For public transport users (with driving licence) choosing car routes no plausible results could be estimated.

SP 3 was a destination choice experiment. The participants were asked to choose between two shopping centres. One was cheaper but further away then the other. Unfortunately this new approach resulted in VTTS estimates too high to be plausible. This SP was dropped from the main study.

Table 2 shows the final form of the mode and route choice experiments and also destination choice experiment, which had to be dropped.

The mode choice and the route choice car experiments used the same variables and the same presentation of the variables. Although only three variables: cost, travel time in congested and travel time in uncongested flow were used, two pretests were needed to find a satisfactory presentation.

Table 3 shows these three formulations and the resulting estimation results. The first pretest presented a total travel time and the congested time as percentage The result was a very high valuation of the congested part of the trip and a low ratio of the values for uncongested and congested times. This ratio was not consistent with other results, for example the recent UK study (about 1/1.5). This indicated that the respondents had had difficulty with this presentation, most likely with the calculation of the percentage into the absolute value. This calculation was undertaken for them in the second pretest. The estimation result gave lower absolute values but a ratio between uncongested and congested parts of the travel time which was even lower than in pretest 1. A reason for this could be the emphasis on the congested part because of the missing mention of the uncongested part. This gap was closed in the main study by presenting all three elements: total, congested and uncongested times. The VTTS of the congested times was reduced by more than a half. The VTTS in free flow traffic is less influenced by the type and the complexity of the presentation.

Table 2: Types of SP-experiments

Mode choice car – rail (main study version)

Car		Rail	
Travel costs:	18 Fr.	Travel costs:	23 Fr.
Total travel time:	40 minutes	Travel time:	30 minutes
... congested:	10 minutes	Headway:	30 minutes
... uncongested:	30 minutes	No. of changes:	0 times

☐	¬ **Your choice** ®	☐

Route choice rail (main study version)

Rail		Rail	
Travel costs:	20 Fr.	Travel costs:	23 Fr.
Travel time:	40 minutes	Travel time:	30 minutes
Headway:	15 minutes	Headway:	30 minutes
No. of changes:	1 times	No. of changes:	0 times

☐	¬ **Your choice** ®	☐

Destination choice (pretest only)

Shopping center A		Shopping center B	
Travel time:	9 minutes	Travel time:	30 minutes
Travel costs:	22 Fr.	Travel costs:	20 Fr.
Price basket of goods:	120 Fr.	Price basket of goods:	100 Fr.

☐	¬ **Your choice** ®	☐

Table 3 Comparison of different versions of the car route choice experiments and the related VTTS estimates (MNL with only the experimental variables in the systematic utility function)

Pretest 1: Presentation of car travel		Estimated VTTS for car travel [CHF/h]	
Route A			
Travel time:	40 minutes	...in uncongested traffic:	38.87
Travel costs:	18 Fr.	...in congested traffic:	122.51
Share of congestion:	25%	Ratio:	1 / 3.15
Pretest 2: Presentation of car travel		**Estimated VTTS for car travel [CHF/h]**	
Route A			
Travel costs:	18 Fr.	...in uncongested traffic	27.74
Travel time:	40 minutes	...in congested traffic	99.86
...congested:	10 minutes	Ratio:	1 / 3.59
Main study: Presentation of car travel		**Estimated VTTS for car travel [CHF/h]**	
Route A			
Travel costs:	18 Fr.	...in uncongested traffic	32.79
Total travel time:	40 minutes	...in congested traffic	40.40
... congested:	10 minutes	Ratio:	1 / 1.23
... uncongested:	30 minutes		

Another sensitive point in the design of VTTS studies is the selection of the presented values of the variables and their distribution. For the measurement of monetary values of travel time with SP-experiments at least one time and one cost variable must be presented for each alternative. That gives the respondent the opportunity to evaluate the trade-off between cost and time while considering the remaining variables. The distribution of these trade-offs could influence the VTTS obtained through various respondent strategies: e.g. slightly biased random answers leading to a pattern of choosing the alternatives in about half the cases; the same effect could occur, if the respondents want to please by splitting the choices half and half.

Two concerns exist: First the distribution of the trade-offs in the sample should be uniform in the best case and must at least cover a sufficient range. Second the values covered must be credible for the respondents. Table 4 shows the development of the trade-offs presented in the two pretests and the main study for the returned questionnaires. The pretests offered many large trade-offs. That was corrected in the main study. The range of values was limited from 5 to 100 CHF/h for the benefit of smaller values, but the range of the trade-offs covers the VTTS values reported in others studies. Without a formal test it is difficult to say, if the observable impact is significant.

Table 4 Presented trade-offs and estimated VTTS (route choice car experiments)

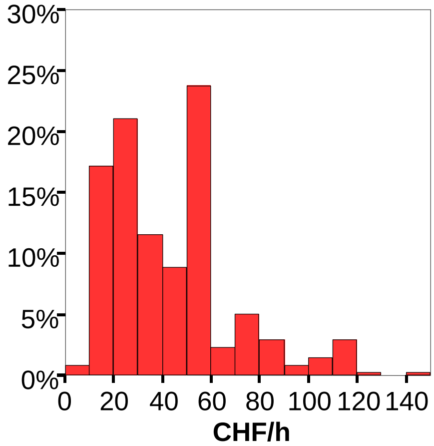
Pretest 1:

Trade-offs presented in the returned forms:

Mean [CHF/h]: 58.9
Std. Dev. [CHF/h]: 32.1
Sample size [ ]: 336

MNL estimate with only experimental variables in the systematic utility function:

VTTS [CHF/h]: 47.7



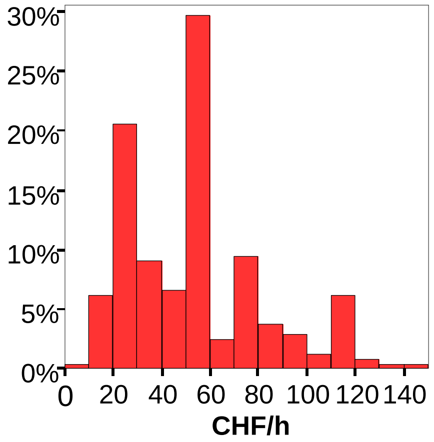
Pretest 2:

Trade-offs presented in the returned forms:

Mean [CHF/h]: 46.5
Std. Dev. [CHF/h]: 25.9
Sample size [ ]: 246

MNL estimate with only experimental variables in the systematic utility function:

VTTS [CHF/h]: 35.4



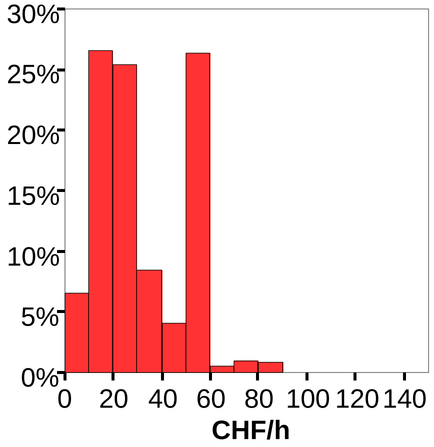
Main study:

Trade-offs presented in the returned forms:

Mean [CHF/h]: 34.9
Std. Dev. [CHF/h]: 19.2
Sample size [ ]: 2317

MNL estimate with only experimental variables in the systematic utility function:

VTTS [CHF/h]: 31.2



2.2 Field work experiences

Six different combinations of the SPs were dispatched depending on the personal car availability and the mode chosen for the reference trip. As mentioned above, one subgroup of car drivers received route choice rail experiments to balance possible biases arising from only considering experiments based on chosen modes. The respondents received between 9 and 15 choice situations. Table 5 shows these combinations and the number of choice situations involved and the response rates for each subgroup. The overall response rate of 53% is satisfactory, but the differences between the subgroups are noticeable, in particular of rail users in comparison with the bus users; also the drop for the car drivers which were requested to respond to the rail route choice SP.

Table 5: Questionnaire combinations dispatched and returned and number of SP-choice situations per person

Mode of KEP-Trip	Car avail.	MC Car/Rail	MC Car/Bus	RC Car	RC Bus	RC Rail	Dis-patched	Returned	Response rate [%]
Car	Yes	6		6			904	473	52.2%
Car	Yes	6				9	471	229	48.6 %
Bus/Tram	Yes		6		9		147	80	54.4%
Rail	Yes	6				9	399	262	65.7%
Bus/Tram	No				9		143	54	37.7%
Rail	No					9	253	127	50.2%
Total		964	80	473	134	618	2317	1222	52.7%

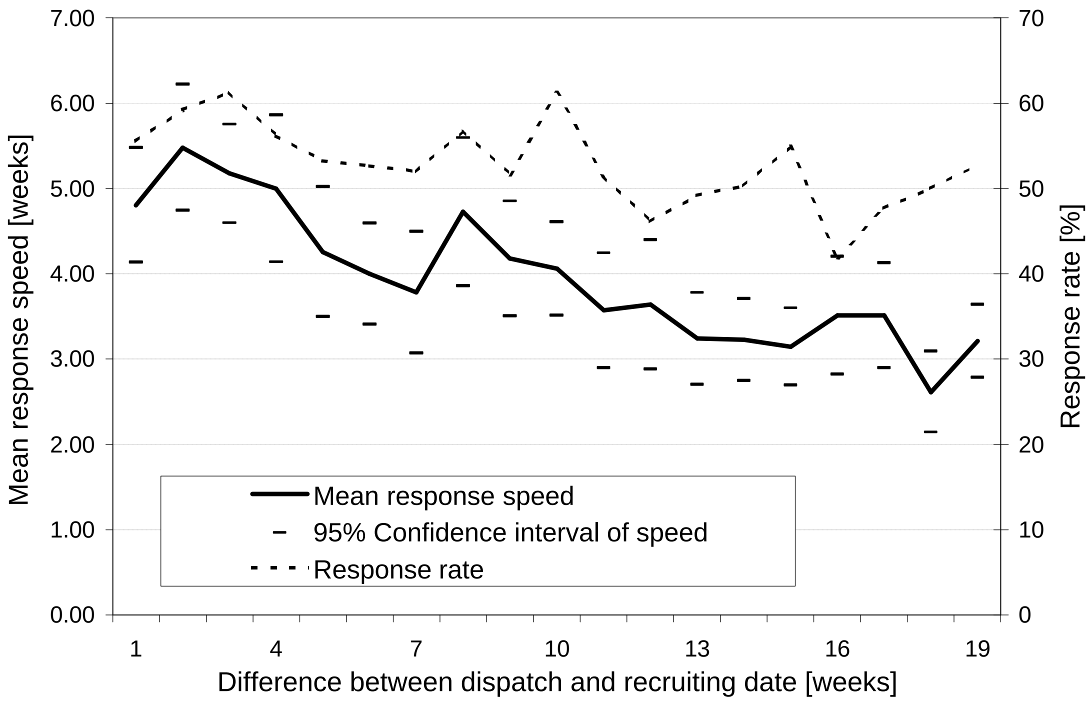
MC: Mode choice experiment; RC: route choice experiment

The time between the recruiting interview and the dispatch of the SR surveys varied from seven to twenty – five weeks. While there is about 10% reduction in the response rates between the fastest and slowest dispatch, the pattern is stronger for the response speed (the mean time to return the surveys after dispatch) (see Figure 1). Here it is clear, that the response speed is nearly twice as fast for those facing a long wait between recruitment and SR – survey. A reasonable interpretation of these two trends is that one continues to obtain the answers of the committed responders, but only those, if one waits too long.

The socio-demographic structure of the sample obtained is considerably different in comparison with the Swiss mean represented by the recent national travel survey (Mikrozensus Verkehr 2000). Table 6 shows this comparison between the KEP, the national travel survey, those willing to participate, those receiving a survey and those responding. The gap between the recruited sample and the sample receiving a survey arises from quote considerations or the lack of relevant trips. The quota was imposed to concentrate the survey resources on rarer, i.e. longer trips and business trips.

Obviously there is a shift to male, well educated and employed public transport users. Recruited by the KEP on behalf of the Swiss Railways this circle of people in particular is motivated to contribute to the improvement of their daily transport system. The fact that nearly all participants answered all questions including those concerning the household income underlines this point too.

Figure 1: Main study: Response rate and response speed by time between recruitment and dispatch of the survey



With these differences the question of sample reweighting needs to be addressed. For descriptive and linear analysis data sets have to be weighted to emphasize less represented person groups. Ben-Akiva and Lerman (1985) drawing on McFadden have shown that for the non-linear logit choice models no reweighting is required, if the variables relevant for the selectivity are included in the model. Nevertheless, a comparison of results with and without weighting showed only small undefined differences of the VTTS of 3 to 5% evaluated at the sample means, as expected.

Table 6: Socio-demographic characteristics of the different samples

	KEP	Re-cruited sample	Dis-patched to	Main study	MZ'00[1]
PT-discount:					
Halbtax-ownership	36.3	43.1	52.3	47.4	34.8
GA-ownership	6.9	13.9	10.7	11.8	6.0
Car availability					
always	61.3	59.2	73.1	66.7	77.3
sometimes	14.7	23.8	13.9	18.4	13.9
never	24.0	17.0	14.0	14.9	7.1
Education					
Primary + lower secondary	21.3	11.0	9.9	10.4	34.0
Vocational training	51.5	48.3	46.2	50.6	40.7
A-Level, tertiary	26.2	40.7	43.9	39.0	25.3
Working Status					
None	41.2	30.7	28.3	31.8	47.4
Part-time	14.8	18.6	15.7	16.3	13.8
Fulltime	37.3	42.7	49.2	45.3	33.0
Self-employed	6.7	9.0	6.8	6.6	5.8
Household income [CHF/Year]					
less than 20 000				5.8	3.1
20 000 – 40 000				8.3	14.8
40 000 – 60 000				12.9	22.5
60 000 – 80 000				16.3	16.2
80 000 – 100 000				16.7	9.7
100 000 – 125 000				10.8	5.2
125 000 – 150 000				5.3	2.6
more than 150 000				7.0	4.0
no response				16.9	21.9

[1]Bundesamt für Raumentwicklung and Bundesamt für Statistik (2001)

3 MODEL ESTIMATION AND RESULTS

Random utility discrete choice models are the standard tools to model transport behaviour. First approaches were developed by Domencich and

McFadden (1975) and later extended by Ben-Akiva and Lerman (1985). The most common model family is the logit model with its extensions. It is assumed that the respondent calculates the subjective individual utility for all alternatives. The alternative with the highest utility will be chosen. As perception differences between individuals exist, and as the modeller does not observe all relevant variables, there is a need to allow for the random elements of the utility; clearly, it is only random for observer/modeller. To consider this, the utility is divided into a systematic observable part, which is modelled by the variables available, and a random, subjective part, which is modelled by assuming its distribution, e.g. Gumbel or Normal (see also Ortuzar and Willumsen (1994). The utility U_{jq} is calculated as follows:

$$U_{jq} = V_{jq} + e_{jq}$$

- Measurable, systematic part V_{jq}, representing the value of the objective utility of an alternative j for a person q considering the attribute of the alternatives, the choice situation of the user and the characteristics of the user
- One stochastic part respectively error ε_{jq}, of V_{jq} considering the individual unobserved characteristics of each user

The results obtained here use the basic multinomial logit formulation, as well as different extensions which allow for taste differences between individuals, as well as for error scale differences between the different SPs. The details of the mathematical formulations are discussed in a forthcoming paper by Bierlaire and others.

A stepwise modelling strategy was adopted, which increased the complexity by adding different groups of variables and later by estimating joint models for the different SP data sets. All calculations were performed with Biogeme (See Bierlaire, Bolduc and Godbout, 2004 or http://roso.epfl.ch/biogeme). So the final utility function incorporates those blocks of variables which had improved model fit, if tested individually with the basic model including only the stated choice experimental variables:

- Inertia variables (car and PT-season ticket ownership, mode of the reported trip)
- A random parameter formulation of the travel cost variable
- Elasticity of the cost parameters with respect to income and trip distance
- Interactions between travel time and trip purpose

The analysis of the basic model showed that the travel times in public transport and with the private car were valued significantly different, but there was no significant difference between travel in congested and uncongested conditions.

The recent re-analysis of the last UK value of time study has suggested that the cost parameter can be elastic with respects to income and trip distance (Mackie, Wardman, Fowkes, Whelan, Nellthorp and Bates, 2003). This formulation:

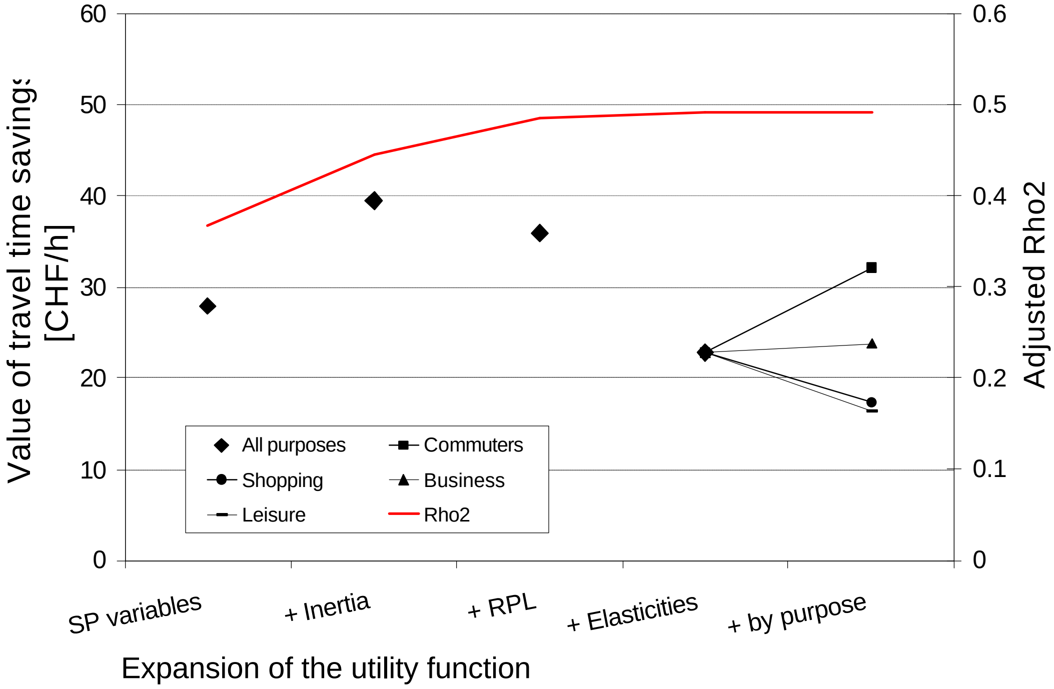
$$b_{costs} * \left(\frac{Income}{mean\ Income} \right)^{l_{Income}} * \left(\frac{\text{Distance}}{\text{mean Distance}} \right)^{l_{Distace}} * Costs$$

was successfully included in our models as well. The elasticities ? were estimated simultaneously with the other parameters of the models.

After accounting for income and distance elasticities and for the inertia variables, no significant impacts of other socio-demographic variables, such as sex, age, type of residential location, etc. could be detected.

All these different model formulations were tested separately and increased model fitness throughout. The parameters were significant in all cases and have the expected sign. Figure 2 shows the change in the goodness of fit and of the VTTS due to the increasing complexity of the model formulation for the mode choice experiments of public transport users. The sensitivity of the VTTS estimate is striking, and was also observed for the other SP experiments.

Figure 2 Model development: Mode choice public transport users



The used Software Biogeme 0.7 allows a joint estimation of different samples by calculating a scaling parameter for each data set (see Bierlaire, Bolduc and Godbout, 2004), which accounts for the differences in the error distributions Using this facility the mode choice SPs, the route choice SPs and finally all experiments were consolidated (Table 8) (See Table 7 for the final recommended formulation). In this final model all estimated parameters are significant, this would still be true for all but one of the variable (car used in the RP experiment), if one were to correct – too conservatively given the random parameter formulation - the t-statistic by the square root of the number of choices obtained from each respondent. They all have the right sign. The inertia variables have as expected a strong influence. Especially the public transport season ticket ownership and the car availability influence the choice in the experiments.

Table 7: Utility function: Recommended models

U_{PT} =	β_{cost} [σ_{cost}] * (Income/80000) $^{?Inc}$ * (Distance/43) $^{?dist}$ * Travel costs + ($\beta_{time\ PT\ comm}$ * Purpose Commute + $\beta_{time\ PT\ shop}$ * Purpose Shopping + $\beta_{time\ PT\ Busi}$ * Purpose Business $\beta_{time\ PT\ leisure}$ * Purpose Leisure) * Travel time $_{PT}$ + β_{change} * No. of changes + β_{hw} * Headway
U_{Car} =	*a_{Car}* + β_{cost} [σ_{cost}] * (Inc./80000) $^{?Inc}$ * (Distance/43) $^{?dist}$ * Travel costs + ($\beta_{time\ Car\ comm}$ * Purpose Commute + $\beta_{time\ Car\ shop}$ * Purpose Shopping + $\beta_{time\ Car\ Busi}$ * Purpose Business $\beta_{time\ Car\ leisure}$ * Purpose Leisure) * Travel time $_{Car}$ + *$b_{discount}$ * Discount card ownership + $b_{network}$ * Network card ownership + $b_{car\ avail.}$ * Car available + $b_{car\ chosen\ for\ reported\ trip\ (KEP)}$ * Mode Choice Car for reported trip*

Cursive Terms only in mode choice experiments

The scale parameter indicate, that the responses to mode choice experiments had larger error terms in comparison to the route choice rail experiment, while the reverse is true for route choice car experiment. This is consistent with the literature and general expectations.

The following Figure 3 and Figure 4 illustrate the range of different VTTS depending on income, trip distance and purpose by two examples showing the substantial impact of the respective elasticities. Table 9 shows the mean VTTS of the sample by trip purpose using the results above. The value for business travel is based on a rather small number of respondents and there were doubts that the business trips do indeed conform the usual understanding of the term. It was not clear to what extent the KEP had coded trips of trades people as business trips. The values for the business trips are clearly not consistent with expectations.

Table 8 Mixed logit estimates including income and trip distance elasticities for the combined SP experiments

Model type		Mode choice		Route choice		Combination	
Model characteristics		Coeff.	t-stats.	Coeff.	t-stats.	Coeff.	t-stats.
N		5784		8400		14184	
L (C) resp. L (0)		-3701		-5822		-9831	
L (β)		-2044		-4505		-6576	
LL – Ratio test		3314		2636		6510	
ρ^2		0.447		0.226		0.331	
Variables	Unit	Coeff.	t-stats.	Coeff.	t-stats.	Coeff.	t-stats.
Constant PW	-	-0.710	-4.49			-0.874	-3.96
Travel costs	CHF	-0.106	-8.45	-0.199	-7.68	-0.241	-12.80
Sigma travel costs		-0.066	*-1.05*	-1.777	*-1.61*	-0.330	-8.55
Travel time PT * Purpose Commute	min	-0.057	-8.18	-0.064	-9.09	-0.120	-14.18
Travel time PT * Purpose Shopping	min	-0.031	-4.05	-0.069	-5.39	-0.102	-9.77
Travel time PT * Purpose Business	min	-0.042	-5.97	-0.075	-8.50	-0.104	-13.10
Travel time PT * Purpose Leisure	min	-0.029	-8.99	-0.036	-10.09	-0.069	-15.54
Travel time Car * Purpose Commute	min	-0.073	-7.85	-0.090	-5.48	-0.096	-15.87
Travel time Car * Purpose Shopping	min	-0.046	-4.22	-0.092	-4.97	-0.078	-9.62
Travel time Car * Purpose Business	min	-0.054	-6.58	-0.051	-5.08	-0.089	-13.22
Travel time Car * Purpose Leisure	min	-0.039	-9.20	-0.056	-6.63	-0.054	-16.33
No. of changes	-	-0.721	-13.56	-1.680	-14.51	-1.437	-15.69
Headway	min	-0.026	-11.24	-0.055	-12.99	-0.036	-25.98
Income elasticity ?	-	-0.116	4.93	-0.226	*-1.73*	-0.316	-7.75
Distance elasticity ?	-	-0.612	-14.00	-0.366	-7.94	-0.359	-10.06
Discount card ownership	j/n	-0.898	-8.81			-1.456	-8.38
Network card ownership	j/n	-0.947	-5.85			-1.602	-5.90
Car available	j/n	0.260	2.60			0.489	3.02
Car chosen in KEP trip	j/n	1.032	10.22			1.594	8.51

Table 8 Continued

Model type	Mode choice	Route choice		Combination	
Scaling parameters		Coeff.	t-stats.*	Coeff.	t-stats.*
Mode choice				0.657	-8.57
Route choice Car		1.819	3.10	1.389	2.47
Route choice PT (by car drivers)		0.973	*-1.19*	1.049	*0.83*
Reference: Route choice PT		1.000		1.000	

* For β ≠ 1.000

Figure 3: Sensitivity of VTTS for car commuters (joint model of all SP experiments)

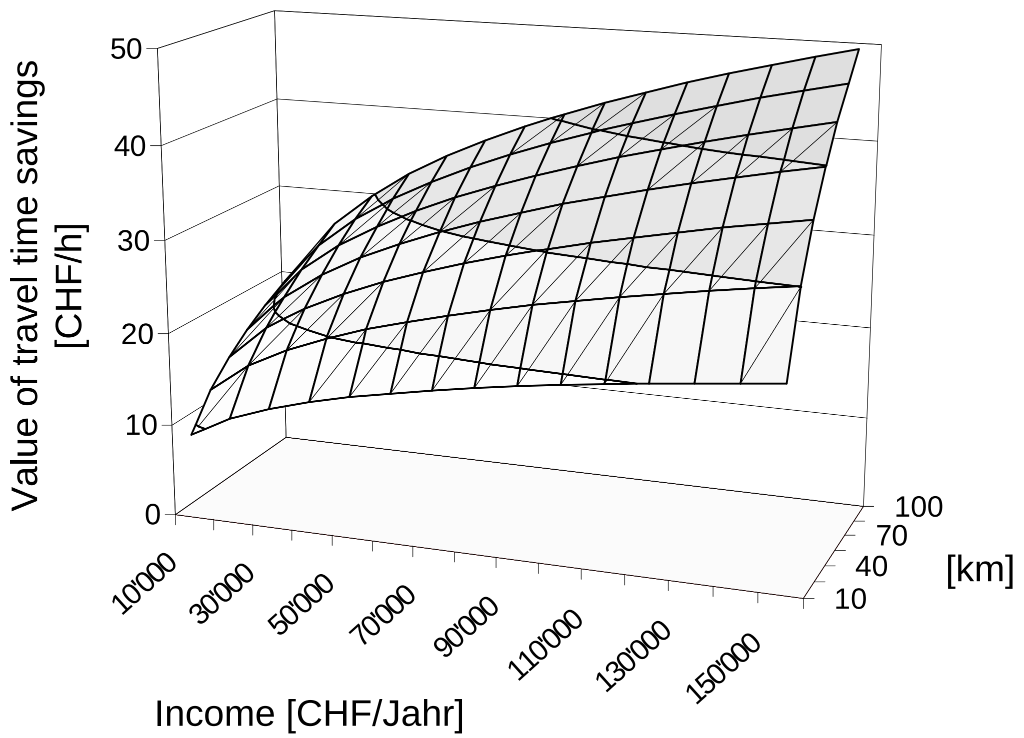


Figure 4: Sensitivity of VTTS for public transport leisure trips (joint model of all SP experiments)

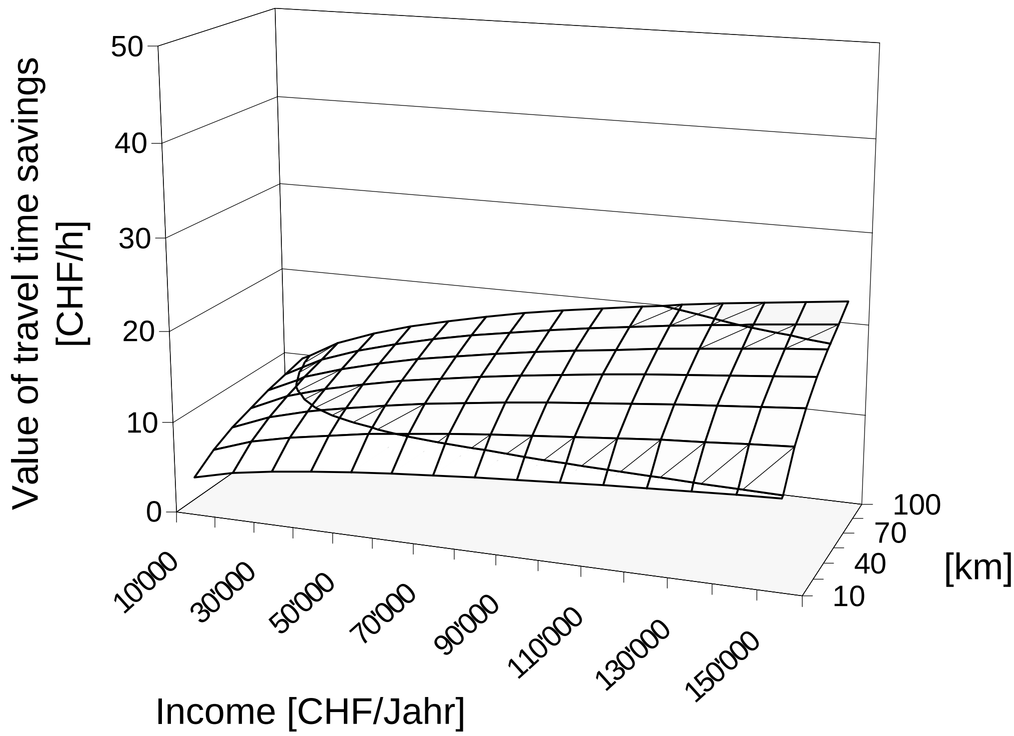


Table 9: Estimated values of travel time savings from the recommended model (mean and 95% confidence intervals) [2003 CHF/h] at the sample mean

Purpose	Car	PT
Commuting	29.9 (±6.7)	23.9 (±3.8)
Shopping	25.4 (±9.1)	19.4 (±4.8)
Business	25.8 (±5.4)	22.3 (±3.9)
Leisure	17.2 (±1.5)	13.5 (±0.8)

The values presented above have to be reweighted to reflect the true population averages. Table 10 presents these values after weighting with the distribution of trips by distance and income of the traveller derived from the national travel survey (Mikrozensus) 2000. The value for business trips was calculated using the median of the ratio between the VTTS for non-commuting trips and business trips found in a series of recent VTTS studies (1:2.3 for car and 1:3 for PT). The value for non commuting trips was calculated for the Swiss case as the weighted average of shopping trips (30%) and leisure trips (70%). The overall mean values are equivalent to between 25 and 30% of the average hourly wage in Switzerland.

Table 10: Recommended values of travel time savings (mean and 95% confidence intervals) [2003 CHF/h] for the population mean (at mean trip distance for the representative traveller)

	Commute		Shopping		Business	Leisure		Total	
Car	21.4	(±2.9)	18.1	(±3.7)	32.5	12.3	(±0.8)	18.2	(±2.1)
PT	17.7	(±1.8)	13.8	(±2.1)	30.3	9.7	(±0.5)	14.9	(±1.3)

4 CONCLUSIONS AND OUTLOOK

The paper presented the core results and the methodology employed to estimate new VTTS values for Switzerland. The results show clearly how dependent the values are on trip purpose, mode used, but also income and trip distance. They will be integrated in a new set of Swiss norms for the cost-benefit-analysis of road projects.

The field work experiences during the pretests raised again the issue of how dependent the results are on the exact formulation of the experiments and prior expectations of the researchers. The dependence of the mean VTTS on the trade-offs offered visible in Table 4 are suggestive. It would be good, if more studies report such results to build up a broader picture. A detailed study would certainly be justified. The exclusion of the shopping destination experiments is more worrisome, as it was clearly motivated by our unsufficient understanding of this choice context. While this project did not have the resources to explore the question in depth, there is a need to verify the consistency of VTTS estimates across all short-term choice contexts, and ideally across choice contexts.

The dependence of the VTTS estimates on the model formulation is nothing new, but it is worthwhile to point out, that comparisons over time or between countries are only possible if the model formulations are identical. The results here reflect very recent advances in the abilities in discrete choice model estimation, which set the results apart. To allow later re-analysis the data have been archived at the NESSTAR-based data archive of the IVT (see http://www.ivt.ethz.ch/vpl/publications/ethtda/index_EN for details). It would be good practise if other studies followed suit.

5 ACKNOWLEDGEMENTS

The work reported here was commissioned by the SVI as part of the SBT research programme of the Swiss Highways Agency (ASTRA). We are grateful for the suggestions and help of the steering committee chaired by Prof. Ulrich Weidmann. The KEP data was made available by Phillipe Müller (SBB), which is gratefully acknowledged.

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