Estimating intercity rail passengers' willingness to pay for shifts in departure times in a competing rail market

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Abstract

Willingness to pay (WTP) figures for various characteristics of the transport supply are key parameters for travel demand forecast models and cost-benefit analysis. In the case of intercity rail, such characteristics are mostly travel time, departure/arrival time and comfort/service levels. If substantial literature exists concerning the valuation of travel time savings, little is known about the application of the scheduling model to intercity rail. Using a stated-preference survey on certain Swedish intercity lines, we applied the scheduling model to determine the WTP for displacements in departure time (scheduled delays). The figures obtained highlight several elements. First, the diversity of our results show that departure time flexibility highly depends on trip purpose and traveller's socioeconomic background. In addition, the insignificance of certain figures reveals the complexity of capturing time scheduling processes. Finally, potential interview biases and non-linear effects in scheduling restrict the usage of our WTP estimations to orders of magnitude only. To conclude, despite our methodological limitations, we succeeded in providing sufficiently reliable WTP figures to fill the gap in the literature and include the scheduling question in demand modelling and public policy appraisal for intercity rail.

1. Background and research objective

The liberalisation of rail passenger markets is still quite recent in Europe. Consequently, policy makers are still searching for efficient regulatory measures to increase the benefits for rail passengers, freight customers and the rest of the society. This raises the need for tools that can forecast the detailed travel demand for each train departure and evaluate the benefits and losses between several regulation scenarios. To implement such models, rail passengers' willingness to pay (WTP) for the main attributes of rail supply should be known. In the case of intercity rail, such characteristics are travel time, departure/arrival time and comfort/service levels in relation to the ticket price.

Although substantial literature exists concerning the WTP for travel time savings, i.e. the value of time (VoT), little is known about the application of the scheduling model to intercity rail in an open market. The scheduling model is introduced by Small (1982) and consists of estimating the scheduled delays, defined as the time difference between passenger's ideally desired departure/arrival time and the actual departure/arrival time. The preferred departure/arrival time can be evaluated as a specific time or a time window (Proussaloglou and Koppelman, 1999). In the scheduling model, WTP are estimated for the reduction of the scheduled delay.

As far as we know, scheduled delays have been quite extensively studied for commuting trips (using car and public transport). For instance, see Börjesson et al. (2012), Hendrickson (1984), Wilson (1989), Peer et al. (2015), Jou et al. (2008), and Thorhauge et al. (2015). However, only few research articles have been published about scheduled delays for intercity rail: two for a transport model in Italy (Nuzzolo et al., 2000), (Crisalli, 1999), and one concerning a transport model in Sweden (Rosenlind et al., 2001). These three articles have been written approximately 20 years ago, when no competition on the tracks was present in the rail market. In addition, they don't cover the influence of socioeconomic background factors in detail. Consequently, more complete and up-to-date figures in a competitive rail market are needed.

Therefore, our research objective is to achieve an in-depth study of WTP for scheduled delay reduction within the context of a Swedish open rail market. We aim to both improve the understanding of travel scheduling and provide up-to-date figures for timetable design, transport modelling and policy evaluation.

2. Method

The chosen field for this case study is three intercity rail routes in Sweden: Gothenburg−Stockholm, Skövde−Gothenburg and Gothenburg−Lund/Malmö. We chose these three routes as they cover different distances and travel times coupled with the presence of several rail services in competition. The main characteristics of these routes are presented in Table 1.

Table 1: Main characteristics of the chosen field for the SP-survey

Rail routes studied	Railway distance	Shortest travel time	Number of direct trains per day	Number of different rail services
Skövde−Gothenburg	144 km	1:02	36	6
Gothenburg−Lund/Malmö	284/300 km	2:01/2:13	24	2
Gothenburg−Stockholm	455 km	2:56	35	3

Following the established method for the discrete choice analysis (Ben-Akiva and Lerman, 1985), we designed a stated-preferences (SP) survey to estimate the WTP. We chose SP instead of revealed preferences because of the difficulties to get commercial data from operators. Many background questions were included in the survey to study the influence of different socioeconomic factors and travel patterns in detail.

We conducted the SP-survey through passenger interviews in Skövde and Gothenburg Central stations. The respondents answered to a questionnaire on a tablet while waiting for their train on the platform. The questionnaire was implemented in *SnapSurveys*, which allowed questions to adapt to previous respondent's answers. This enabled us to adapt departure/arrival times and other questions to each respondent characteristics, thus improving substantially the usability of the questionnaire and reducing survey biases.

The chosen SP attributes were travel time, ticket price and scheduled delay. Travel time and ticket price were calculated based on the train ticket information entered by each respondent in the software. This enabled to capture an important diversity for prices and travel times, thus improving the accuracy of the method. We included the travel time in the SP attributes in order to calculate the VoT in addition to the WTP for a shorter scheduled delay. This estimation allows both to control the results with previous knowledge and to test the relation between the WTP for shorter scheduled delay and the VoT.

Concerning the scheduled delay, we made several assumptions to simplify our work:

1. We chose to focus the scheduled delay on the departure time shift only;
2. We decided to remove the travel time reliability from our scope, i.e. we assume that respondents believed in the departure and arrival times presented to them;
3. We defined the preferred departure time as a specific time and not a time window.

Considering the previous assumptions, a potential confusion can occur with the definition of scheduled delays used for car and public transport commuting where travel time reliability plays a major role. Therefore, inspiring from Rosenlind et al. (2001), we preferred to rename our application of the scheduled delay concept as the *departure time displacement*. The departure time displacement is defined in this paper as the difference between each train departure time in the timetable and the desired departure time of the passenger. As for the scheduled delay, the departure time displacement can be separated in two components, as represented on Figure 1:

1. The *departure time displacement earlier* (DTDE) for earlier departures than preferred;
2. The *departure time displacement later* (DTDL) for later departures than preferred.

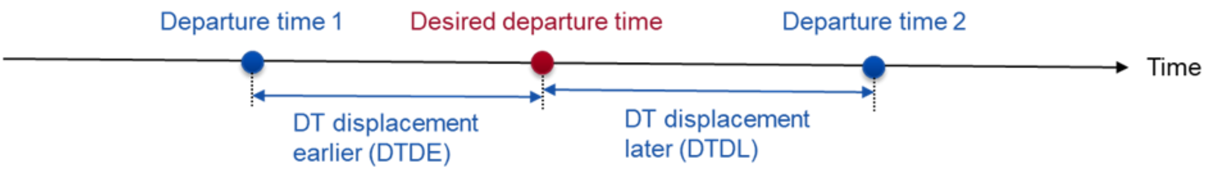

Figure 1 : The departure time displacement earlier/later definitions

The respondents were presented with ten pairwise choices in the questionnaire. Each alternative had a different departure time, arrival time, travel time and ticket price. The SP attribute levels applied are presented in Table 2. In order to display the relevant departure and arrival times, we asked each respondent to state his or her favourite departure time in the questionnaire. The corresponding departure time levels were then estimated for the SP choices by adding/subtracting one hour (the departure time displacement) to/from the desired departure time. The arrival time was subsequently calculated by adding the travel time to the departure time.

We designed the SP choice sets using *Ngene* by applying an orthogonal design method with removal of dominant cases. We processed the answers using a regular multinomial logistic regression with *BisonBiogeme* to estimate WTP.

Table 2: SP levels for each route. The percentages are applied to the respondent's ticket value.

Levels	Travel time	Ticket price	Departure time displacement (scheduled delay)
		Gothenburg – Stockholm	
1	-9.5%	-23.5%	0
2	Current	Current	-60 min
3	+19%	+47%	+60 min
		Skövde – Gothenburg	
1	-7%	-12%	0
2	Current	Current	-60 min
3	+14%	+24%	+60 min
		Gothenburg – Lund/Malmö	
1	-6%	-11%	0
2	Current	Current	-60 min
3	+12%	+22%	+60 min

3. Results and discussion

A summary of the main WTP values are presented in Table 3. For more detail, the complete tables are presented in the appendix with one table per route (Table 5, Table 6, Table 7).

To illustrate our findings, imagine the business passengers who want to ideally depart from Stockholm at 6.45 and arrive at 9.45 in Gothenburg. Let us assume that only the two nearest train departure options are considered; they are the following: the train A, leaving at 6.00 and arriving at 9.30 (DTDE of 45 minutes, 3:30 of travel time) with a fare of 300 SEK; the train B, leaving at 7.15 and arriving at 10.15 (DTDL of 30 minutes, 3:00 of travel time) with a fare of 700 SEK. Using our results (Table 3; business trips for the Gothenburg-Stockholm route), we can now determine the generalized costs (GC). Train A: $GC_A = 1395*3.5 + 585*0.75 + 300 = 5621.25$ SEK. Train B: $GC_B = 1395*3 + 476*0.5 + 700 = 5123$ SEK. Then, using a binomial logit model, we can estimate the probability for these passengers of choosing the train A as in Equation 1 ($P_A = 36\%$) and the train B as $P_B = 1 - P_A = 64\%$.

$$P_A = \frac{1}{1 + \exp(\beta_{cost,business} * (GC_B - GC_A))} = \frac{1}{1 + \exp(-0.00117 * (5123 - 5621.25))} = 36\% \qquad \text{Equation 1}$$

Several elements should be highlighted regarding the WTP obtained for departure time displacements:

- The significant values vary importantly according to the segmentation category. Some categories clearly appear to be more flexible than others. As an illustration, the categories with the lowest and highest flexibility are presented in Figure 2.
- Most of the DTDE/DTDL figures found for the Gothenburg-Lund/Malmö route are insignificant due to the low number of respondents.
- The Gothenburg-Stockholm route has a special composition with a vast majority of business trips. Consequently, the values for this route should be interpreted carefully; there might be overestimated for certain categories.
- For the other routes, some figures are insignificant as well. This insignificance may be explained by the small sample size for certain categories, and likely by a high heterogeneity of the WTP within the other categories. Limitations of the method, e.g. the survey design or uncontrolled interview biases may also matter.
- A substantial correlation is found between the VoT and departure time displacement. Such a correlation is not surprising as travellers with a higher value of time usually have a tighter schedule or a higher budget to afford the departure time they desire.
- Similarly, a correlation is observed between DTDE/DTDL and the shortest travel time / distance. This can be interpreted as that the scheduling for long trips is less flexible than for short ones. This interpretation looks reasonable as a short trip takes less space in one's schedule and therefore can be more easily shifted than a long trip.
- The comparison of our figure with the limited existing literature is difficult because the segmentations, fields and data collection methods can be quite different. However, we observe that most of the comparable figures are of the same order of magnitude, see Table 4.

In addition, most of the VoT figures obtained are of the same order of magnitude than the ones found in the national reference guide (Bångman, 2016). Furthermore, the alternative specific constant is almost always found insignificant in the logistic regression. These two elements support the validity of the method used.

However, some surveying limitations exist, and they might influence WTP values in both directions:

1. By thinking aloud, we noticed that respondents had difficulties to link the hypothetical departure/arrival times of the SP choice tasks to their current trip situation. Consequently, they would not relate their scheduling constraints to the choice task alternatives, thus selecting alternatives they could not choose in reality. Therefore, the WTP for DTDE and DTDL are probably a little underestimated.
2. On the other hand, the WTP for DTDE/DTDL may be overestimated due to the surveying moment: it is too late for respondents to reschedule their complete day to fit the departure times available in the choice tasks when they are on the verge to board their train. As a result, respondents' schedule would be more constrained when answering the survey than when planning the actual trip.

This uncertainty on the estimation of WTP for DTDE/DTDL raises the need for future studies solving these surveying issues. For instance, we suggest a survey that would be answered directly when purchasing the ticket, e.g. on the ticket selling platform online or at the ticket office in rail stations. This survey would contain background questions that would be combined with the revealed preferences of the ticket purchases to estimate the WTP more precisely.

Another important limitation exists regarding the usage of our WTP figures for smaller departure time displacements: they can't be easily used for DTDE/DTDL very different from 60 min. Indeed, it is very likely that there are significant non-linear effects with time scheduling: our experience showed that a DTDE/DTDL of 15 minutes is usually nearly not considered, i.e. is not estimated as one quarter of a DTDE/DTDL of 60 minutes. Therefore, future research is needed to study this non-linearity of DTDE and DTDL valuations. A simple idea is to realise a similar survey presenting departure time displacements of 30 minutes, 90 minutes or even 120 minutes to respondents.

Nevertheless, despite the limitations mentioned above, we consider that our WTP figures seem sufficiently reliable for use as orders of magnitude in cost-benefit analysis, timetable design and demand modelling.

Low flexibility on departure time → High flexibility on departure time

Low flexibility on departure time:

Business trips,
Declaring not to be flexible,
Employed (and self-employed),
Early morning and late afternoon trips,
Aged over 45 years old,
With children,
Middle and high incomes,
Large households.

High flexibility on departure time:

Declaring to be flexible,
Single or live-apart,
Without higher education,
Low income,
Without children.

Figure 2 : The segmentation categories with the highest and lowest flexibility on departure time

Table 3: Willingness to pay figures obtained for travel time savings and departure time displacements (scheduled delays) for the three different routes.

Travelers\WTP[1]	VoT (SEK/h)	DTDE (SEK/h)	DTDL (SEK/h)	DTDE/VoT	DTDL/VoT	β_{cost} [2] (SEK^{-1})	Sample size
Skövde-Gothenburg (≈144 km, 1:02 shortest travel time)							
All trips	98	32	48	33%	49%	-0,0146	162
Leisure trips	102	*	13 (p=0.09)	*	13% (p=0.09)	-0,0218	67
Business trips	*	149	177	*	*	-0,007	52
Commuting + Study trips	86	28	54	33%	62%	-0,0145	43
Leisure + Commuting + Study trips	95	13	26	13%	27%	-0,0187	110
Low income (17k-51k SEK/household)	82	22	25	27%	30%	-0,0213	59
Middle income (51k – 80k SEK/household)	70 (p=0.06)	44	71	63% (p=0.06)	101% (p=0.06)	-0,0122	67
High income (>80k SEK/household)	208	39	66	19%	32%	-0,0106	37
Gothenburg-Lund/Malmö (≈ 284-300km, 2:01-2:13 shortest travel time)							
All trips	407	*	107	*	26%	-0,00567	71
Leisure trips	174	*	*	*	*	-0,0192	18
Business trips	772	196	378	25%	49%	-0,00265	40
Commuting + Study trips	429	*	*	*	*	-0,00602	13
Leisure + Commuting + Study trips	245	*	*	*	*	-0,0118	31
Low income (17k-51k SEK/household)	166	*	*	*	*	-0,015	16
Middle income (51k – 80k SEK/household)	593	*	179	*	30%	-0,00447	32
High income (>80k SEK/household)	544	142 (p=0.06)	192	26% (p=0.06)	35%	-0,00356	23
Gothenburg-Stockholm (≈455 km, 2:56 shortest travel time)							
All trips	783	205	148	26%	19%	-0,00177	259
Leisure trips	177	*	*	*	*	-0,00646	49
Business trips	1395	585	476	42%	34%	-0,00117	178
Commuting + Study trips	548	*	*	*	*	-0,00185	32
Leisure + Commuting + Study trips	271	*	*	*	*	-0,00383	81
Low income (17k-51k SEK/household)	270	*	*	*	*	-0,00384	57
Middle income (51k – 80k SEK/household)	759	286	273	38%	36%	-0,00185	114
High income (>80k SEK/household)	1808	508	377	28%	21%	-0,000946	88

[1] The insignificant valuations with a p value greater than 10% are replaced by "*". Those having a p value between 5% and 10% have their p value indicated.

[2] β_{cost} is the cost coefficient (in SEK^{-1}) found in the logistic regression

Table 4: Comparison of the WTP obtained with equivalent figures from the literature[1].

Rail route or source	VoT (SEK/h)	DTDE or SDE[2] (SEK/h)	DTDL or SDL[3] (SEK/h)	DTDE/VoT or SDE/VoT	DTDL/VoT or SDL/VoT
All trips					
Skövde-Gothenburg	98	32	48	33%	49%
Gothenburg-Lund/Malmö	407	*	107	*	26%
Gothenburg-Stockholm	783	205	148	26%	19%
Rosenlind et al. (2001)[4]	226	132	*	58%	*16%
Commuting and study trips					
Skövde-Gothenburg	86	28	54	33%	62%
Peer et al. (2015)[4,5]	152	48 - 65	39 - 54	32% - 43%	26% - 36%
Crisalli (1999)[4,6]	12 - 58	32 - 114	26 - 91	197% - 267%	157% - 217%
Leisure, commuting and study trips					
Skövde-Gothenburg	95	13	26	13%	27%
Gothenburg-Lund/Malmö	245	*	*	*	*
Gothenburg-Stockholm	271	*	*	*	*
Rosenlind et al. (2001)[4]	117	84	*	72%	*28%
Business trips					
Skövde-Gothenburg	*	149	177	*	*
Gothenburg-Lund/Malmö	772	196	378	25%	49%
Gothenburg-Stockholm	1395	585	476	42%	34%
Rosenlind et al. (2001)[4]	412	170	*	41%	4%
Crisalli (1999)[4,6]	61 - 143	163 - 380	155 - 362	266% - 267%	254% - 266%

[1] The insignificant figures with a p-value greater than 10% are replaced by "*" in the table.
[2] Scheduled Delay Early (SDE), i.e. for earlier departure time than preferred.
[3] Scheduled Delay Late (SDL), i.e. for later departure time than preferred.
[4] Adjusted to price levels in 2018 according to the price indices found in www.scb.se.
[5] With 1€ = 9.36 SEK (average rate in 2015).
[6] With 1$ = 8.26 SEK (average rate in January 1999).

4. Conclusion

To summarize, we developed and implemented a method that enabled the estimation of the WTP for scheduled delay reduction in the case of Swedish competing intercity rail services. Before this study, only few old and brief WTP figures existed for intercity rail, and none in open rail markets; our results answer this lack in the literature. The diversity of our figures emphasizes that certain passenger categories are clearly more flexible than others, e.g. low-income travellers compared to business passengers. However, the insignificance of certain figures reveals the complexity of capturing time scheduling processes. In addition, interview biases and non-linear effects in scheduling limit the precision of our WTP. This calls for future in-depth studies solving our methodological issues (examples are suggested in section 3).

To conclude, we succeeded in estimating WTP for scheduled delays, i.e. shifts in departure times, at a high level of detail. Our results provide reliable orders of magnitude for demand modelling, transport policy appraisal and travel behaviour analysts to improve rail market regulations.

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Appendix

Table 5: Willingness to pay figures obtained for travel time savings and departure time displacements (scheduled delays) for the Skövde-Gothenburg route (144 km railway distance, 1:02 shortest travel time).

Travelers\WTP[1]	VoT (SEK/h)	DTDE (SEK/h)	DTDL (SEK/h)	DTDE/VoT	DTDL/VoT	β_{cost} [2] (SEK^{-1})	Sample size
All trips	98	32	48	33%	49%	-0,0146	162
Leisure trips	102	*	13 (p=0.09)	*	13% (p=0.09)	-0,0218	67
Business trips	*	149	177	*	*	-0,007	52
Commuting trips	*	*	*	*	*	*	24
Study trips	*	*	31	*	*	-0,0432	19
Commuting + Study trips	86	28	54	33%	62%	-0,0145	43
Leisure + Commuting + Study trips	95	13	26	13%	27%	-0,0187	110
Can't depart 1h earlier	96	86	74	90%	78%	-0,0108	63
Can't depart 1h later	79	35	70	45%	88%	-0,0119	74
Can depart 1h earlier	107	*	35	*	33%	-0,0174	85
Can depart 1h later	114	35	31	31%	27%	-0,0166	72
Using normal tickets	124	25	40	20%	32%	-0,0144	84
Using other tickets than normal	77	40	56	52%	72%	-0,0149	78
Morning departures (before 10.00)	*	56	100	*	*	-0,0126	67
Afternoon departures (after 15.00)	136	59	35	44%	26%	-0,015	37
Midday departures (between 10.00 and 15.00)	135	*	*	*	*	-0,0183	58
Male	102	43	43	42%	42%	-0,0153	68
Female	92	24	51	26%	56%	-0,0145	92
0- 24 years old	*	*	21	*	*	-0,026	38
25-44 years old	116	27	38	23%	33%	-0,0138	62
45-64 years old	136	126	133	92%	97%	-0,00941	54
Aggregated ≥45 years old	142	101	106	71%	75%	-0,0106	62
Single/Live-apart	109	25	24	23%	22%	-0,0175	59
Cohabitation/Married	90	38	65	43%	73%	-0,0132	103
Single household	138	49	29 (p=0,06)	36%	21% (p=0,06)	-0,0177	25
Couple household	133	21 (p=0.10)	48	16% (p=0.10)	36%	-0,0135	52
Large household (≥3 pax)	64	33	53	51%	83%	-0,0147	85
No child	83	20	39	24%	47%	-0,0176	98
Have children	127	63	71	50%	56%	-0,0107	64
Can take car instead of train for the trip	99	39	59	40%	60%	-0,0124	84
Cannot take car instead of train for the trip	96	27	39	28%	40%	-0,0171	78
Employed	182	96	102	53%	56%	-0,00828	103
Self-employed	-	-	-	-	-	-	3
Not employed (pensioner, unemployed, students…)	36	*	22	*	61%	-0,0338	56
No higher education	86	17	29	20%	34%	-0,0197	71
Higher education	118	54	74	46%	63%	-0,0108	91
Low income (17k-51k SEK/household)	82	22	25	27%	30%	-0,0213	59
Middle income (51k – 80k SEK/household)	70 (p=0.06)	44	71	63% (p=0.06)	101% (p=0.06)	-0,0122	67
High income (>80k SEK/household)	208	39	66	19%	32%	-0,0106	37

[1] The insignificant valuations with a p value greater than 10% are indicated with "*" only. Those having a p value between 5% and 10% have their p value indicated.

[2] β_{cost} is the cost coefficient (in SEK^{-1}) found in the logistic regression.

Table 6: Willingness to pay figures obtained for travel time savings and departure time displacements (scheduled delays) for the Gothenburg-Lund/Malmö route (284-300 km railway distance, 2:01-2:13 shortest travel time).

Travelers\WTP[3]	VoT (SEK/h)	DTDE (SEK/h)	DTDL (SEK/h)	DTDE/VoT	DTDL/VoT	β_{cost} [4] (SEK^{-1})	Sample size
All trips	407	*	107	*	26%	-0,00567	71
Leisure trips	174	*	*	*	*	-0,0192	18
Business trips	772	196	378	25%	49%	-0,00265	40
Commuting trips	390	*	*	*	*	-0,00605	11
Study trips	-	-	-	-	-	-	2
Commuting + Study trips	429	*	*	*	*	-0,00602	13
Leisure + Commuting + Study trips	245	*	*	*	*	-0,0118	31
Can't depart 1h earlier	336	*	137	*	41%	-0,00544	37
Can't depart 1h later	388	*	128	*	33%	-0,00534	30
Can depart 1h earlier	404	*	71 (p=0.07)	*	18% (p=0.07)	-0,00672	31
Can depart 1h later	326	*	80	*	24%	-0,00661	35
Using normal tickets	383	*	109	*	28%	-0,00564	68
Using other tickets than normal	-	-	-	-	-	-	3
Morning departures (before 10.00)	*	*	*	*	*	*	12
Afternoon departures (after 15.00)	*	*	*	*	*	*	32
Midday departures (between 10.00 and 15.00)	217	*	34 (p=0.10)	*	16% (p=0.10)	-0,0137	27
Male	274	*	157	*	57%	-0,005	33
Female	494	*	69 (p=0.06)	*	22% (p=0.06)	-0,00652	38
0- 24 years old	269	*	92 (p=0.08)	*	34% (p=0.08)	-0,0117	8
25-44 years old	344	*	*	*	*	-0,0096	25
45-64 years old	*	*	*	*	*	-0,00242	31
Aggregated ≥45 years old	536	*	250	*	47%	-0,0031	38
Single/Live-apart	169	*	75	*	44%	-0,0131	24
Cohabitation/Married	686	*	141	*	21%	-0,0035	47
Single household	164	*	84	*	51%	-0,0125	15
Couple household	583	*	180	*	31%	-0,00397	24
Large household (≥3 pax)	509	*	*	*	*	-0,00493	32
No child	368	*	128	*	35%	-0,00538	40
Have children	453	*	81 (p=0.06)	*	18% (p=0.06)	-0,00608	31
Can take car instead of train for the trip	723	*	241	*	33%	-0,00346	31
Cannot take car instead of train for the trip	236	*	*	*	*	-0,00916	30
Employed	555	100	159	18%	29%	-0,00416	50
Self-employed	-	-	-	-	-	-	3
Not employed (pensioner, unemployed, students…)	198	*	61	*	31%	-0,0116	18
No higher education	276	*	*	*	*	-0,00963	20
Higher education	500	74 (p=0.08)	153	15% (p=0.08)	31%	-0,00442	51
Low income (17k-51k SEK/household)	166	*	*	*	*	-0,015	16
Middle income (51k – 80k SEK/household)	593	*	179	*	30%	-0,00447	32
High income (>80k SEK/household)	544	142 (p=0.06)	192	26% (p=0.06)	35%	-0,00356	23

[3] The insignificant valuations with a p value greater than 10% are indicated with "*" only. Those having a p value between 5% and 10% have their p value indicated.
[4] β_{cost} is the cost coefficient (in SEK^{-1}) found in the logistic regression.

Table 7: Willingness to pay figures obtained for travel time savings and departure time displacements (scheduled delays) for the Gothenburg-Stockholm route (455 km railway distance, 2:56 shortest travel time).

Travelers\WTP[5]	VoT (SEK/h)	DTDE (SEK/h)	DTDL (SEK/h)	DTDE/VoT	DTDL/VoT	β_{cost} [6] (SEK^{-1})	Sample size
All trips	783	205	148	26%	19%	-0,00177	259
Leisure trips	177	*	*	*	*	-0,00646	49
Business trips	1395	585	476	42%	34%	-0,00117	178
Commuting trips	644	*	*	*	*	-0,00149	26
Study trips	-	-	-	-	-	-	6
Commuting + Study trips	548	*	*	*	*	-0,00185	32
Leisure + Commuting + Study trips	271	*	*	*	*	-0,00383	81
Can't depart 1h earlier	1126	554	330	49%	29%	-0,0013	130
Can't depart 1h later	1429	456	568	32%	40%	-0,000903	103
Can depart 1h earlier	603	*	*	*	*	-0,00228	107
Can depart 1h later	631	165	*	26%	*	-0,00251	131
Using normal tickets	741	194	144	26%	19%	-0,00187	239
Using other tickets than normal	*	*	*	*	*	*	20
Morning departures (before 10.00)	1206	518	554	43%	46%	-0,00108	106
Afternoon departures (after 15.00)	900	361	180 (p=0.07)	40%	20% (p=0.07)	-0,0016	82
Midday departures (between 10.00 and 15.00)	483	*	*	*	*	-0,00328	71
Male	800	293	222	37%	28%	-0,00171	139
Female	759	116 (p=0,08)	*	15% (p=0,08)	*	-0,00185	119
0- 24 years old	152	-148 (p=0.07)	*	97% (p=0.07)	*	-0,00455	14
25-44 years old	554	142	*	26%	*	-0,00262	109
45-64 years old	1574	592	510	38%	32%	-0,00101	124
Aggregated ≥45 years old	1290	452	391	35%	30%	-0,00113	136
Single/Live-apart	556	152 (p=0,06)	*	27% (p=0,06)	*	-0,00189	71
Cohabitation/Married	876	231	202	26%	23%	-0,00174	188
Single household	336	*	*	*	*	-0,00245	47
Couple household	757	*	*	*	*	-0,00191	99
Large household (≥3 pax)	1102	449	326	41%	30%	-0,00147	113
No child	540	*	*	*	*	-0,00231	148
Have children	1382	650	529	47%	38%	-0,00119	111
Can take car instead of train for the trip	805	301	202	37%	25%	-0,0017	99
Cannot take car instead of train for the trip	768	148	115 (p=0.06)	19%	15% (p=0.06)	-0,00182	160
Employed	996	348	220	35%	22%	-0,00159	195
Self-employed	937	*	451	*	48%	-0,00137	34
Not employed (pensioner, unemployed, students…)	94	-78 (p=0.07)	*	-83% (p=0.07)	*	-0,0058	30
No higher education	701	*	*	*	*	-0,00191	77
Higher education	820	281	178	34%	22%	-0,00172	182
Low income (17k-51k SEK/household)	270	*	*	*	*	-0,00384	57
Middle income (51k – 80k SEK/household)	759	286	273	38%	36%	-0,00185	114
High income (>80k SEK/household)	1808	508	377	28%	21%	-0,000946	88

[5] The insignificant valuations with a p-value greater than 10% are indicated with "*" only. Those having a p-value between 5% and 10% have their p-value indicated.
[6] β_{cost} is the cost coefficient (in SEK^{-1}) found in the logistic regression.