

Summary:

Valuation of time, reliability and comfort factors adapted to NTM6

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In this study we estimate the value of time, reliability and comfort factors for passenger transport with length intervals adapted to the Norwegian transport models NTM6 and RTM. In accordance with the Norwegian value of time study from 2010 we find that the value of travel time savings is higher for long trips than for short trips. The unit prices estimated in our study are nevertheless not directly comparable with the unit prices estimated in the Norwegian value of time study. One reason for this is that we use another division between short and long trips. In addition we use a different travel survey to weight the estimated unit prices.

In connection with the development of the national model for passenger transport NTM6 and the regional model RTM we have estimated a new set of unit prices for passenger transport that correspond to the length intervals used in these models. In this study we have estimated unit prices for the following length intervals:

- Short trips: Below 70 km (< 70 km)
- Long trips: 70 km and above (≥ 70 km)
- Long trips: Between 70-200 km (≥ 70 km & < 200 km)
- Long trips: 200 km and above (≥ 200 km)

We have estimated unit prices for the value of travel time savings, reliability and comfort factors. For short trips the estimations are performed for the modes car, public transport, ferry and speed boat. For long trips the estimations are performed for the modes car, train, bus and speed boat.

Our study adopts the approach of the Norwegian value of time study by Samstad et. al. (2010) in TØI-report 1053. We use the same data set and method as in the previous study, but with the boundary for short trips set at 70 km rather than 100 km.

One of the findings in our study is that the value of travel time savings is higher for long trips than for short trips. This is in accordance with the results from the Norwegian value of time study.

Further, our estimates shows that the value of travel time savings for short trips with car is somewhat lower when the boundary for short trips is changed from 100 to 70 km. For public transport the estimate for the value of travel time savings is slightly higher than in Samstad et. al. (2010).

For long trips 70 km and above we find that the value of travel time savings for car and bus are a little lower than the values estimated in the Norwegian value of time study for long trips 100 km and above. The travel time savings for train, on the other hand, shows higher values than in Samstad et. al. (2010).

The results from our study indicates that the value of travel time savings for car are quite equal for long trips 70 km and above, between 70-200 km and 200 km and above. Thus, for long trips the value of travel time savings for car seems to be stable

over trip length. We estimate a higher value of travel time savings for train for long trips between 70-200 km than for long trips 200 km and above. The implication of this is that the value of time for train most likely is decreasing with trip length for long trips. For bus we estimate a slightly higher value of travel time savings for long trips 200 km and above than for long trips between 70-200 km. This indicates that the value of time for long bus trips seems to be increasing with trip length.

There are several reasons why our estimations of the value of travel time savings could diverge from Samstad et. al. (2010). One reason is that we use another definition of short and long trips in this study, setting the boundary at 70 km rather than 100 km. Unlike the Norwegian value of time study, we here divide the dataset into additional length intervals for long trips. This will lead to different subgroups of travelers who might have another socioeconomic background and thus different value of travel time savings. Another reason could be that the data set is weighted according to the national travel survey from 2009 (Vågane et. al. 2011) rather than 2005 (Denstadli et. al. 2006).

The following tables summarizes the results from the estimations carried out in this study. All unit prices are presented in 2009 Norwegian kroner (NOK).

The value of travel time savings

Short trips

Table 1 shows the estimated values of travel time savings for short trips under 70 km for car, public transport, ferry and speed boat.

Table 1: In-vehicle values of time (2009 NOK/hour) for short trips below 70 km by mode and trip purpose

| | Car driver | Public transport | Ferry | Speed boat |
|------------------------|------------|------------------|-------|------------|
| Trips to and from work | 85 | 59 | | |
| Other private trips | 72 | 54 | | |
| All private trips* | 74 | 56 | 124 | 84 |
| Business trips | 380 | 380 | 380 | 380 |
| All trips* | 85 | 62 | | |

*Aggregated using shares from the Norwegian Travel Survey 2009. For ferries and speed boat, the sample sizes in the travel survey are too small to allow disaggregated values

Long trips 70 km and above

Table 2 shows the estimated values of travel time savings for long trips 70 km and above for car, train, bus, speed boat and air.

Table 2: In-vehicle values of time (2009 NOK/hour) for long trips 70 km and above by mode and trip purpose

| | Car driver | Train | Bus | Speed boat | Air** |
|------------------------|------------|-------|-----|------------|-------|
| Trips to and from work | 173 | 147 | 85 | | 288 |
| Other private trips | 140 | 94 | 69 | | 180 |
| All private trips* | 145 | 104 | 70 | 122*** | 204 |
| Business trips | 380 | 380 | 380 | 380 | 445 |
| All trips* | 171 | 145 | 105 | | 305 |

* Aggregated using shares from the Norwegian Travel Survey 2009 **The values for air travel are based on Samstad et. al. (2010) ***We recommend one common unit price for speed boat for all length intervals containing long trips due to small sample size

Long trips between 70-200 km and long trips 200 km and above

Table 3 shows the estimated values of travel time savings for long trips between 70-200 km for car, train, bus, speed boat and air. The corresponding values for long trips 200 km and above is shown in table 4.

Table 3: In-vehicle values of time (2009 NOK/hour) for long trips 70-200 km by mode and trip purpose

| | Car driver | Train | Bus | Speed boat | Air |
|------------------------|------------|-------|-----|------------|-----|
| Trips to and from work | 184 | 167 | 80 | | 288 |
| Other private trips | 143 | 106 | 67 | | 180 |
| All private trips* | 150 | 124 | 69 | 122 | 204 |
| Business trips | 380 | 380 | 380 | 380 | 445 |
| All trips* | 178 | 172 | 115 | | 305 |

*Aggregated using shares from the Norwegian Travel Survey 2009

Table 4: In-vehicle values of time (2009 NOK/hour) for long trips 200 km and above by mode and trip purpose

| | Car driver | Train | Bus | Speed boat | Air |
|------------------------|------------|-------|-----|------------|-----|
| Trips to and from work | - | - | - | | 288 |
| Other private trips | 143 | 81 | 82 | | 180 |
| All private trips* | 145 | 82 | 83 | 122 | 204 |
| Business trips | 380 | 380 | 380 | 380 | 445 |
| All trips* | 168 | 110 | 100 | | 305 |

*Aggregated using shares from the Norwegian Travel Survey 2009 **Sample size too small to estimate separate unit prices for trips to and from work for car driver, train and bus

We have not estimated separate unit prices for trips to and from work for car, train or bus because the sample size for this travel purpose is too small for this length interval. We recommend that the corresponding values for trips to and from work estimated for long trips 70 km and above is also used for long trips 200 km and above.

Value of travel time savings for long trips with public transport

Table 5 shows the aggregated value of travel time savings for train, bus and speed boat for long trips.

Table 5: Aggregated in-vehicle values of time (2009 NOK/hour) for long trips with public transport

| | ≥ 70 km | 70-200 km | ≥ 200 km |
|------------------------|---------|-----------|----------|
| Trips to and from work | - | - | - |
| Other private trips | - | - | - |
| All private trips* | 93 | 103 | 85 |
| Business trips | 380 | 380 | 380 |
| All trips* | 132 | 149 | 111 |

*Aggregated using shares from the Norwegian Travel Survey 2009 **We have not estimated separate unit prices for different travel purposes

The value of reliability and comfort factors

We recommend that the estimated values for long trips 70 km and above shown in table 6 and 8 are used for all length intervals containing long trips.

Travel time variability

Table 6 shows the estimated weight factors for travel time variability. The weights give the value of a reduction (increase) in the standard deviation of travel time as a share of an equivalent reduction (increase) in expected travel time. Hence a reduction in the standard deviation of ten minutes for short car trips to and from work is valued by the 85 NOK value of travel time savings multiplies by (10/60) and by the weight 0,40. This yields 5,7 NOK per car trip.

Table 6: Weight factors for travel time variability. Short trips below 70 km and long trips 70 km and above.

| Mode | Weight |
|---------------------------------|--------|
| Short trips (< 70 km) | |
| Car driver | 0,40 |
| Public transport | 0,68 |
| Ferry | 0,45 |
| Speed boat | 1,04 |
| Long trips (≥ 70 km) | |
| Car driver | 0,26 |
| Train | 0,54 |
| Bus | 0,43 |
| Speed boar | 0,55 |
| Air | 0,20 |

Comfort factors

Table 7 shows the estimated value of having a seat on short trips with public transport below 70 km.

Table 7: Valuation of having a seat on short public transport trips below 70 km. Base case is having to stand on the whole trip. NOK per trip.

| | Short public transport trips |
|-------------------------------|------------------------------|
| Seat on a quarter of the trip | 3,6 |
| Seat on half of the trip | 12,1 |
| Seat on most of the trip | 20,8 |
| Seat on the whole trip | 23,9 |

Weight factors for driving in heavily congested conditions

The weights in table 8 give the value of time spent driving under heavily congested conditions as a share of the value of expected in-vehicle travel time.

Table 8: Weight for driving in heavily congested conditions

| | < 70 km | ≥ 70 km |
|----------------|---------|---------|
| Weights | 3,5 | 3,0 |