

Summary:

Public transport in the Osloregion - Travellers' valuation of time

Background

In connection with the work with NTP and Oslopakke 2, it has become necessary to update the TØI-report Better public transport. The passengers' valuing of service improvements in Oslo (Norheim and Stangeby 1993). The purpose is to analyse passenger preferences and evaluations of the quality of public transport, as well as finding out whether passenger evaluations have changed over time. Improvements in design which can be recommended on the basis of the previous study (Fearnley og Sælensminde 2002) have been included in this survey. This has involved using the Internet to collect data and to extend the sample to apply to the whole of Oslo and Akershus. This is one of the first studies to use the Internet for this type of survey in Norway.

The focus has been primarily on journey times with and without seats, delays, changing or not changing and surface coverage in relation to frequency.

Method

The sample has been chosen at random from the population register. Those selected were aged 14 years or above, i.e. born in 1988 or before. All had addresses in Oslo or Akershus. The data from the public register contained information about names, addresses, year of birth and gender. Everyone who was selected received a letter by post with an internet address and a user name/password to log into the survey. Those who did not have access the internet were given the opportunity to fill out a form on paper. Those who had not use public transport in the previous month or had not travelled by public transport were given a shorter form than those who had used public transport in the previous month.

The response rate was 29.4%, while in 1992, replies were received from 28% of those who were contacted.

The replies are relatively evenly distributed between Oslo and Akershus and between the sexes.

The younger age groups used the Internet most often for their replies, while those over 60 preferred to answer on paper. Men used the Internet for their replies more often than women.

The method which was used to chart preferences is called stated preference analysis. Stated preference analyses are based on hypothetical choices, and in order to make the situation as realistic as possible, we based this on the first journey, the last day the respondent travelled with public transport.

Those interviewed were asked to choose between different "packages". Each "package" describes different characteristics of a journey. The choice of "package" forms the starting point for charting the factors which are given the greatest weight. From these choices we calculate how much price, journey times, frequency and departure times mean for the choice of public transport.

Journey time

The total journey time by public transport consists of the time taken to get to or from bus-stop, the waiting time (actual and hidden¹) and the time on board the vehicle. If it is necessary to change buses, the waiting time between the two buses is also included. In total, the average journey time is 42 minutes in Oslo and 62.5 minutes in Akershus (table 1).

The passengers' evaluation of the journey time on board public transport does not only depend on the length of journey but also whether they have to stand or whether they get a seat. About 80% of those involved in the study state that they have a seat for the whole journey. The disadvantage of standing is associated with so much discomfort that the disadvantage of a journey without a seat is valued almost twice as much as a journey time with a seat in Akershus.

The evaluation of reduced journey time without a seat is about twice as high in Akershus as in Oslo. On

¹ See section 4.2

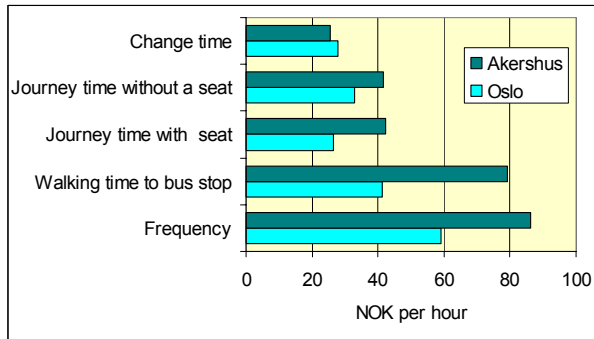
average, journeys in Akershus are longer and the disadvantage of standing is thus greater. In addition public transport in Akershus is less suitable for passengers who have to stand than public transport in Oslo.

Table 1: Average journey time on the first form of transport. Minutes. Source: Stated preference analysis for Oslo and Akershus 2002 and Better Public transport 1992

	Akershus 2002	Oslo 2002	Oslo 1992
Walking time to bus stop	8	6	10
Actual waiting time at bus stop	5	5	5
Hidden journey time	17.5	8	7,5
Journey time on board public transport	32	23	20
Total	62.5	42	42,5

TØI report 633/2003

In Oslo, the disadvantage of departure times is regarded as greater than the disadvantage of the journey time on board public transport, even if one has a seat. In Akershus, the disadvantage of walking to the bus stop is almost the same as the disadvantage of the journey time on board public transport with a seat.



TØI report 633/2003

Figure 1: Evaluation of frequency, walking time to bus stop, journey time on board public transport and waiting time between buses. NOK per hour. Source: Stated preference analysis Oslo and Akershus 2002

Delays

About 1/3 of passengers said that they experienced delays in relation to the timetable on the journey itself. 58 % of the delays in Oslo and 49 % of delays in Akershus are five minutes or less.

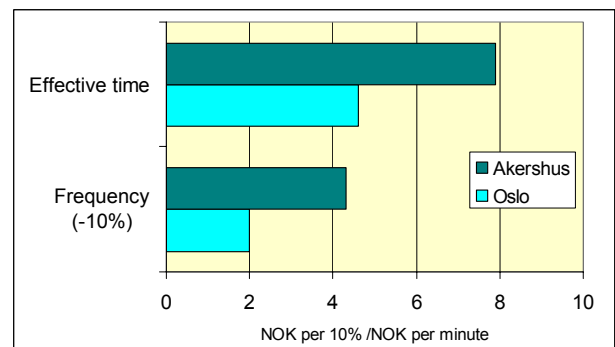
An average delay is eight minutes in Oslo and nine minutes in Akershus. Bearing in mind that the average

journey time is longer in Akershus compared with Oslo, the relative delay is shorter in Akershus than in Oslo

Passengers regard delays as a major disadvantage. If the frequency of the delays is reduced from 20% of departures to 10% of departures, this is valued at NOK 2 per journey in Oslo and NOK 4.30 per journey in Akershus (figure 2).

When a delay actually occurs, a one minute reduction in the delay is valued at NOK 4.60 in Oslo and NOK 7.90 in Akershus (effective time).

Based on this, it can be seen that passengers evaluate the disadvantage of an incurred delay of 20 minutes at NOK 92 in Oslo and NOK 158 kroner in Akershus.



TØI report 633/2003

Figure 2: Evaluation of delays – Evaluation of a reduction in frequency of 10% and evaluation of a one minute reduction in delay once a delay has occurred. NOK per 10% and NOK per minute. Number of observations = 5,914. Source: Stated preference analysis for Oslo and Akershus 2002

Changing buses

It is neither possible or rational to develop a public transport system where all passengers can travel from door- to- door without changing buses. This would mean a public transport service with low frequency and parallel routes on a number of stretches. It is therefore necessary to develop junctions, where passengers can change buses during their journey in order to give the best possible, most frequent and cost-effective service.

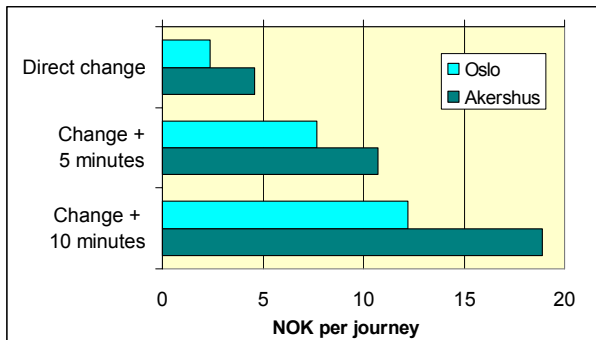
Around 1/3 of passengers have to change buses in the course of their actual journey, 29% in Oslo and 36% in Akershus respectively. The vast majority only have to change once during their journey.

For passengers who regard changes during their journey as a disadvantage, the disadvantage can be divided into two:

1. **Resistance to changing**, which can be due to the disadvantage of having to get up and move, uncertainty as to whether one will get a seat on the new form of transport and uncertainty regarding whether both vehicles are in operation.
2. **Extra waiting time** which occurs when having to change. The waiting time associated with changes cannot be chosen, in contrast to the waiting time for the first form of transport.

Resistance to changing buses is relatively high (figure 3). The disadvantage of changing without waiting time (direct change) is valued at NOK 2.40 per journey in Oslo while in Akershus the resistance is valued at NOK 4.60. The evaluation of changing without waiting time is thus almost twice as high in Akershus as in Oslo

In the analysis, the disadvantage of a change with 5 minutes waiting time between buses is valued at NOK 7.70 per journey for Oslo and NOK 10.90 per journey in Akershus. If the waiting time is 10 minutes, the figures are NOK 12.20 and NOK 18.90 respectively (figure 3).



TØI report 633/2003

Figure 3: Evaluation of the disadvantage of changing buses during the journey, depending on waiting time at the junction. NOK per journey. $N^{Oslo}=3265$, $N^{Akershus}=2958$. Source: Stated preference for Oslo and Akershus 2002

The longer the journey time, the greater the disadvantage which passengers experience when changing buses.

This means that a strategy for developing junctions in Oslo and Akershus must seek to reduce waiting times when changing as far as possible, with higher

frequency, links between waiting buses and accessibility measures which ensure a high degree of punctuality.

The rail factor

An interesting problem is whether there is a "rail factor", i.e. whether public transport users choose transport by rail rather than buses when they travel.

The form of public transport chosen by the individual passenger depends on comfort, information and personal general preference for the form of transport.

We find that public transport users have a general preference for rail transport rather than buses (table 2). Willingness to pay for rail rather than bus is NOK 2.80 in Oslo and NOK 5.50 in Akershus.

Table 2: Passengers willingness to pay for public transport by rail rather than bus, with similar increases in fares and demand effect. Non-weighted average for conjoint nos. 1,2 and 3. NOK per journey, 95% confidence interval and percentage. Source: Stated preference analysis for Oslo and Akershus 2002

	Evaluation	Confidence interval	Fare increase	Effect ¹
Oslo	2,80	1,8-3,8	12%	5%
Akershus	5,50	2,6-8,4	12%	5%

¹ Demand effect with elasticity of -0.4
TØI report 633/2003

Changes from 1992

The results from a similar study in 1992 (Norheim and Stangeby, 1993) can be compared with the Oslo segment in the study from 2002.

The change from 1992 – 2002:

- the disadvantage of changing buses is still valued highly
- the disadvantage of delays is still valued highly
- -the evaluation of the disadvantage of walking time to the bus-stop has been reduced
- the evaluation of journey times with a seat has increased
- the evaluation of having a seat instead of standing has gone down

Table 3: Evaluation of walking time to bus stop, journey time on board public transport, frequency, resistance to changing, and waiting time between buses. NOK per hour. 95% confidence interval. Source: Stated preference analysis Oslo and Akershus 2002 and Better Public transport 1992.

	Oslo1992		Oslo2002		Akershus2002	
Walking time	0,70	(-2,6)-4,0	0,55	0,4-0,7	0,69	0,5-0,9
Journey time with a seat	0,35	0,1-1,4	0,44	0,44-0,44	0,70	0,5-0,9
Journey time without a seat	0,70	0,5-1,2	0,69	0,69-0,69	1,32	1,1-1,5
Frequency	0,60	(-0,4)-1,6	0,47	0,47-0,47	0,42	0,42-0,42
Direct change	2,81	2,6-3,1	2,37	1,6-3,2	4,55	2,8-6,3
Change time	0,98	0,7-1,2	1,06	0,6-1,5	1,44	0,5-2,4