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Summary

Modelling distributions of trip purpose and preferred arrival time for train trips

Why and when people are traveling by train can be assumed to vary with the characteristics of the departure and destination station (for example, number and type of jobs near the stations) and characteristics of the journey (journey time between the start and end station). We have identified how travel purpose (why) and arrival time (when) are distributed over various pairs of train stations and have built statistical models that can predict these distributions given explanatory variables.

Commissioned by the Norwegian Rail Administration (JBV), the Institute of Transport Economics (TOI) has established models for trip purpose and preferred arrival time distributions for personal train trips in Norway. The report documents the input data, methodology development and empirical analyzes that TOI has done in connection with the project.

The distributions are to be used in the modeling tool Trenklin which operates on a train station relation level. The model do therefor not explain how trip purpose vary on an individual level (by characteristics of the travelers) but by characteristics related to the train stations.

Distributions over trip purposes were established with logit models where the dependent variable is the travel purpose of trips reported in the National travel survey (NTS 2013-2014). The model uses travel time, number and type of jobs and population around train stations, type of train stations (e.g. station close to airports) and the number of hotels as explanatory variables. We find that trip purpose is largely explained by travel time. For example short journeys have an higher proportion of commuting trips than long journeys.

Distributions of preferred arrival time are modeled as mixtures of linear regressions with normally distributed components. For work trips we find a correlation between commuting patterns and the shape of distributions. For instance, the morning peaks will be greater for trips into Oslo where relative many working places are located.