Analysis of the Danish Travel Survey data on private and public transportation

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Abstract

This paper is motivated by a growing interest in providing greater insight into the travel habits of Danish travellers. The analysis is conducted on the data collected in the Danish Travel Survey (in Danish: Transportvaneundersøgelsen, TU) from 2006 to 2009. The investigation of these data enables pointing out which travellers' and trips' characteristics to pay special attention to when examining the choice between private and public transportation. This is important for the future estimation of public route choice models, but also for the general knowledge about which issues should be taken into account when trying to improve the conditions for public transport users and which initiatives could convince more people to travel by public transport.

1 Introduction

This paper illustrates and discusses results from the analyses of the TU data. The main issue in the analysis is the choice of transportation mode and different aspects are investigated in order to be able to describe this choice. The choice between public and private transport modes is an important issue in a planning context. The use of the private car is much more polluting than the use of public transportation (e.g., bus, train) depending on occupancy rate. In fact, cars induce congestion that has a great cost for the travellers and the society. The investigated aspects for affecting the mode choice range from aspects concerning the trip, the traveller, the home, the workplace, etc.

In literature, the analyses of the TU have often focused on a specific aspect of the survey and a more detailed analysis of one issue.

Christensen (2000) investigates the impact of the public transportation service on the behaviour of travellers in order to understand the possibilities of transfer from car to public transportation modes. Christensen (2001) analyses the effects on private transport and the environmental impact of urban size, structure and localisation, and focuses on the three main areas of the locations of residential areas, workplaces and centre functions. Christensen (2001) looks at transport mode and amount of generated traffic. Christensen and Jensen (2008) focus on the potential of switching short car trips up to 22 km to walk and bike.

The study described in this paper was carried out in order to prepare data for an initial public transport route choice model. The analyses point to important aspects of the mode choice and are important input to the following designing of transportation models. The study will be presented as frequency and distribution analyses and concern trip distance, trip purpose, gender, age, and many other traveller and trip characteristics.

The paper starts with an overview of the TU data used from this in section 2. Section 3 describes the different analyses made on the data and discusses the results from these. Finally, section 4 sums up the discussions on the study and presents ideas for further research.

2 Data

In the TU survey, respondents are a representative sample of the Danish population between 10 and 84 years who are asked to describe all their trips with both private and public transportation modes on the day before the interview. This survey is ongoing and 56,210 people have answered the questionnaire whereof 54,695 interviews are in the dataset and 166,994 observations of trips have been collected from May 2006 to December 2009.

Respondents provide information on all their trips during the day (e.g., selected modes, time duration, length travelled, trip purpose) and all their demographic characteristics (e.g., gender, age, income, place of residence and workplace). The data are a great source of information and enable revealing many interesting details about travellers' choices in transportation networks.

The TU survey is unique in Denmark since it links information on actual travel behaviour to a list of background variables. From an international perspective this is unique because of the detailed information level of the trips (especially the routes for public transportation) and coordinates of the destination for all trips.

2.1 The interviews in the Danish Travel Survey

The information in the TU survey is in six head subjects: household, person, car, journey, trip, and stage characteristics. For each of these subjects a table is representative in the survey database.

- **Household.** The household table contains information on the family members of the respondent in terms of gender, age, driver's license and position in family.
- **Respondent.** The respondent table includes information on the socio-economic data of the respondent, the residence, the household and the family. The respondent lists his/her gender, age, occupation, education level, home address, workplace (address, working hours, public or private employment), ownership of bicycle, public transport season ticket, driver's license, car availability, car ownership, handicaps, income (also for spouse, family, household). The exact locations of the home and the workplace with coordinates are registered. The information is confidential and only accessible for specific modelling purposes.
- **Car.** The car table describes information about each car available to the respondent, car ownership, model year, and fuel type.
- **Trip.** The trip table contains information for every trip during the day namely departure time, trip purpose, destination, travel companions, payment of fare for public transport, passenger or driver of car.
- **Stage.** Alongside the trip table, the stage table includes details about the main components of the trip. Each trip is divided in parts for each transportation mode. Information is about mode, being driver or passenger, respondent's conception of length, time, and waiting time. For trip parts using public transportation modes, information on bus lines, as well as access to and egress from train stations, is also listed, thus enabling the reconstruction of the chosen route.
- **Journey.** The journey table comprises aggregated data from the trip table. A journey is also defined as trip chain and both start and end at the home or the location of origin for the day. The journey is at least twice the length for the shortest of the trips (if more than one trip is in the journey) and the journey purpose is the purpose at the destination with the longest stay.

2.2 Definitions used in the TU Survey and in the analysis

The following definitions are used in this paper and are shortly described here.

A *trip* is the combination of *stages* that are defined as the travelling between two locations (e.g., from home to work, from work to the supermarket, from the supermarket to home). In many previous analyses made on the TU data (Christensen 2000, Christensen 2001, Christensen and Jensen 2008), the analyses have been based on the *journeys*. In this survey, it was important to have the information on the exact trip since, for example, feeder modes can be very different when travelling from home to work and from work to home. This means that the majority of the trips, and consequently trip parts, are generated and attracted to home. In fact, after work people leave for their home, after shopping they return home, and after sport activities in the evening they go back home.

The p*rimary mode* (also called m*ode* or t*ransportation mode*) is the mode used by the traveller for the longest part of the trip (in km). In the analyses referring only to public transportation, a few trips (330 of 9,600) with this mode used for the second longest and private used for the longest part of the trip (e.g., car as access mode to train) were also defined as using public transportation as primary mode.

When using distances between two points (e.g., from the origin to the destination of the trip, from either home or work to the closest station), the straight line distance between the two points was calculated. The question was whether travellers access the distance between two points as a straight line or as the length in the transport network. However, to find the travelled distance the route actually travelled needs to be identified and the reconstruction of this route is a rather difficult task. For trips using public transportation, information on the route choice is in the data and could be used for reconstruction of the route and calculation of the exact travelled distance. For trips using private vehicles, the route choice is not known and many assumptions had to be made to reconstruct routes. When answering the questionnaire, people describe how long each part of the trip is in kilometres and minutes. This measure is very uncertain since people often have an incorrect perception of especially their travel length (Ankomah et al. 1995, Walmsley and Jenkins 1992) and is therefore also deselected. When using straight line distance, there is a problem in the fact that short and long distances may not be exactly comparable since people travelling long distances often use the primary road network for a great part of the trip, making it possible to travel in rather straight lines, while for the short trips people use the secondary road network with more detours. Considering the above, it was chosen to use the straight line distance. The coordinates given in the TU data is an exact measure and the straight line distance is comparable from one trip to another.

The following introduces the classification of some transportation modes and trips purposes into more convenient categories.

Respondents in the TU have the possibility of selecting one of 21 transportation modes when describing each trip part. These 21 modes cover the supply of modes but in order to ease the overview of the tables and the graphs presented in the paper they are divided into the six categories described in Table 1. It should be noted that *car driver* and *car passenger* are not listed as separate transportation modes in the TU, but the purpose of this analysis advised to introduce this differentiation. Similarly, the *ferry* mode was also separated in car ferry and passenger ferry since these two modes satisfy different requirements for the travellers.

Table 1: Classification of the transportation modes from the TU

Name	Description
Walk	Walk, skateboard
Bike	Bike
Car Driver	Car (driver), van, MC, ferry (car ferry)
Car Passenger	Car (passenger)
Public	Bus, S-train, other train, metro, telebus, passenger ferry, boat, airplane
Other	Moped (30,45 km/h), horse wagon, truck, tractor, taxi, tourist bus, (blank)

In the TU, respondents can select among 25 trip purposes. Similarly to trip mode, trip purposes are divided in six categories in order to simplify the description and the discussion of the data, according to the classification presented in Table 2.

Table 2: Classification of the 25 trip purposes from the TU

Name	Description
Home	Home
Work	Work
Education	School, education,
Errand	Shopping, bank, library, social/health
Leisure	School care, youth club, visiting family/friends, sports, entertainment, weekend cottage, holiday, private meetings, evenings school
Business	Meeting, conference, customer visit, handcraft, business trip, business transport of goods or persons, roadwork, police trips

3 Analysis

In this section, the different analyses are illustrated and discussed. The discussion is kept to a minimum only bringing out the most important issues as much information can therefore only be read from the graphs and tables and not from the text.

3.1.1 Analysis of primary mode share and distance

Table 3 shows the average distances between origin and destination of the trips for the six categories in which modes have been differentiated. Average lengths are significantly different for each category with respect to the others.

Table 3: Average and standard deviation of the distance between origin and destination by mode category

Primary Mode	Avg. Distance [km]	St. Dev. distance	No. observations
Walk	0.68	1.00	27,891
Bike	2.01	3.12	27,414
Car Driver	12.17	21.85	77,142
Car passenger	15.89	28.81	20,710
Public	17.30	31.39	9,581
Other	14.53	31.25	4,256

Quite interestingly, trips using public transport as primary mode are the longest, and trips as car passenger are longer than trips as car driver, suggesting that people most likely drive alone on shorter distances and have passengers in their vehicles on longer distances. Leisure and holiday trips are often performed over long distances, and people often travel with friends or family and therefore more people are in the car.

Figure 1 shows the choice of transportation mode related to the distance between origin and destination. Mode choices are very different according to the distance, especially for shorter trips. When considering trips of a few kilometres, the order of the mode shares is obvious and the choice from approx. 8 km and exceeding is relatively stable. Car as driver is chosen by the majority, but at distances exceeding 40 km the car as passenger is also rather high. Even though the share of car trips as drivers and passengers are alike, it does not mean that all car drivers have a passenger in the car. Often when people have passengers in the car, they have more than one and in most cars it is possible to transport 3-4 people as passengers. The longest trips are often leisure and holiday trips having a higher number of people travelling together.

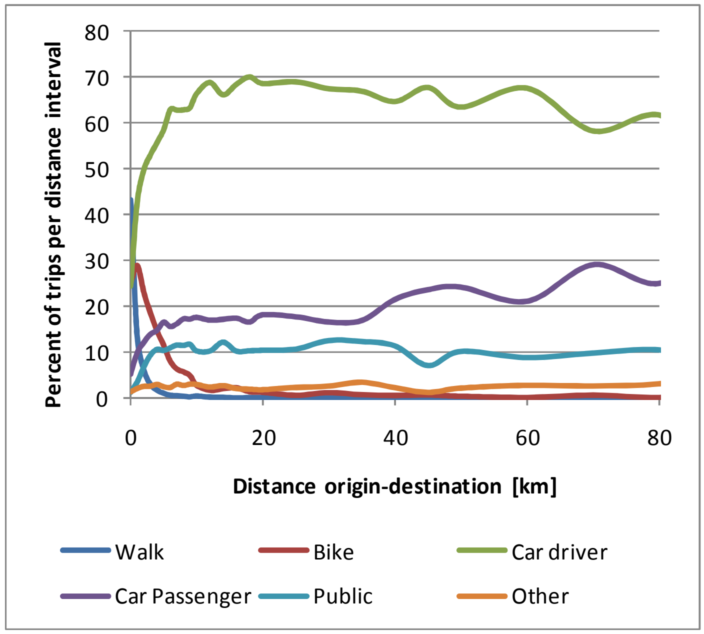

Figure 1: Choice of mode related to the distance between origin and destination of the trips

For all distances between origin and destination exceeding a few kilometres, public transportation is used for approximately 10 percent of the trips. The public transportation classification covers many different transportation modes used for different trip lengths. At the shorter OD distances, bus and local trains are used for the majority of the trips. At longer distances, regional and national trains and airplane are used. The choice of public transportation can be caused by convenience of using these modes or the fact that a car is not available. When exceeding 4 and 8 km, respectively, the distance gets too long for the traveller to walk or bike and he/she chooses car or public transport instead. At long distances, the use of train can be more comfortable than car since it is possible to read, sleep, etc.

Car driving is often an easy choice for longer distances if a car is available to the traveller. Travelling as car passenger can be difficult at the ends of the trip. At the start point, the traveller perhaps has to travel to a pickup point. The passenger is also dependent on the desired departure time of the car driver. At the end point, the passenger is perhaps dropped off at a point different from the destination point and the arrival time is perhaps not the optimal. These difficulties cancel out at greater distances because the passenger obtains benefits closer to the benefits of the driver at longer distances.

Figure 2 shows a zoom of the first 8 km of the graph in Figure 1. This is the part of the previous graph where the mode shares really change. From this point on, the shares are rather stable. Walking trips drop from 65 to 8 percent within the first two kilometres. For trip distances of 500-750 m there are equal shares of people walking, biking and driving a car. At the shortest distances it is easier to walk, bike or drive a car, but for distances of 3 km and higher the public transport share reaches 10 percent. If the traveller has to walk or bike to either the bus stop or the train station, it might be easier to walk or bike for the whole trip, but at longer distances the benefit of public transport is higher and therefore this mode has a higher share. The share is stable from this point on because not all people consider public transport and for many people living in the countryside using public modes is very difficult. Even though the trip with public modes is short it can contain many transfers. Studies show that the majority of travellers have impedance against transfers between public modes and therefore try to minimize the number of transfers (see Daly and Gunn 2002, Fosgerau et al. 2007). Public modes are more often chosen for trips where it is possible to have no or few transfers (use of train and high class bus) and less often for trips that would include many transfers. Car as driver increases in the whole interval, and for longer distances this mode is much more practical than walking or bicycling and has greater benefits in terms of comfort, travel time, etc.

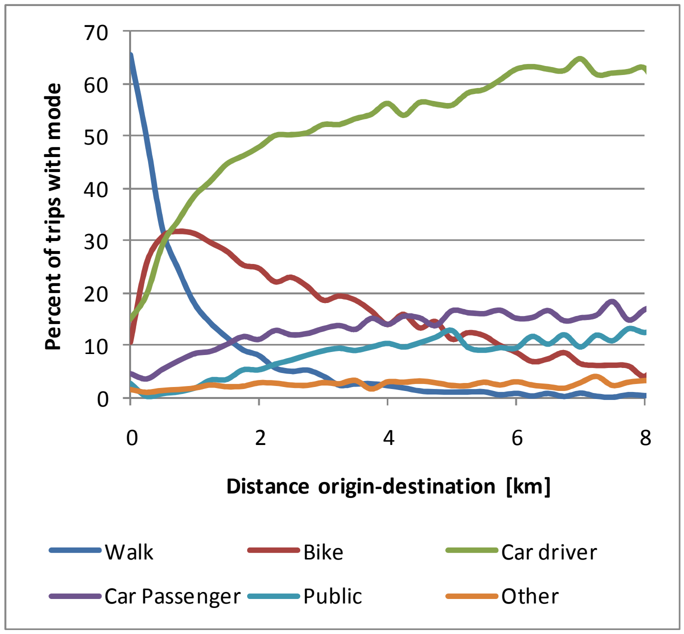

Figure 2: Choice of mode related to the distance between origin and destination of the trips (zoom of Figure 1)

3.1.2 Analysis of trip purposes

Table 4 shows the distances between origin and destination and the number of trips for the six destination purposes in the survey data. The average trip distances of all purposes are significantly different from the others except the comparison of education and errands having a t-value of 0.7. Business trips are the longest trips, since people travel longer distances for meetings, seminars etc.

Work trips are the second longest and are not significantly different from the car driver trips in Table 3. The highest number of trips are homebound, for example if a person goes to work, then home, then to a secondary activity and then back home, two trips that day have been with destination home. Errands and leisure trips are the next most numerous. Only 18,000 trips are to work compared to the 26,000 employees in the sample because of weekends, vacations, people working from home or being sick, self-employed people, etc.

Table 4: Average distance and standard deviation between origin and destination by destination purpose

Destination purpose	Avg. distance	St. Dev. distance	No. observations
Home	10.12	23.59	67,401
Work	12.31	18.62	17,946
Education	6.07	12.47	5,548
Errand	5.94	13.72	38,329
Leisure	9.71	21.65	34,572
Business	21.51	36.08	3,105

In Figure 3 the choice of transportation mode in relation to trip purpose is observed. For all trip purposes except education, most people travel by car. For education purposes, most people use the bike. The highest share using public transportation (over 20%) is also found among the students. Most likely, students have lower car ownership and therefore choose other transportation modes.

The reason for the high shares of public modes might be that there is often a high public transport level of service at schools and universities, making it more convenient to choose these modes. However, the most significant factor for this difference is the low income among students.

The highest share of car passengers is found in the leisure purpose group, which also has the second lowest car driver share. This is probably caused by many people driving together for leisure purposes (e.g., visiting family, sport events). Walking is also popular for leisure trips, possibly because of low distances and more time to spend on the trips because the travelling itself can be a great part of the trip.

Most people drive by car (or vans, trucks) for business purposes, since this is often the most flexible solution when carrying goods, going to several specific addresses in a short time, etc.

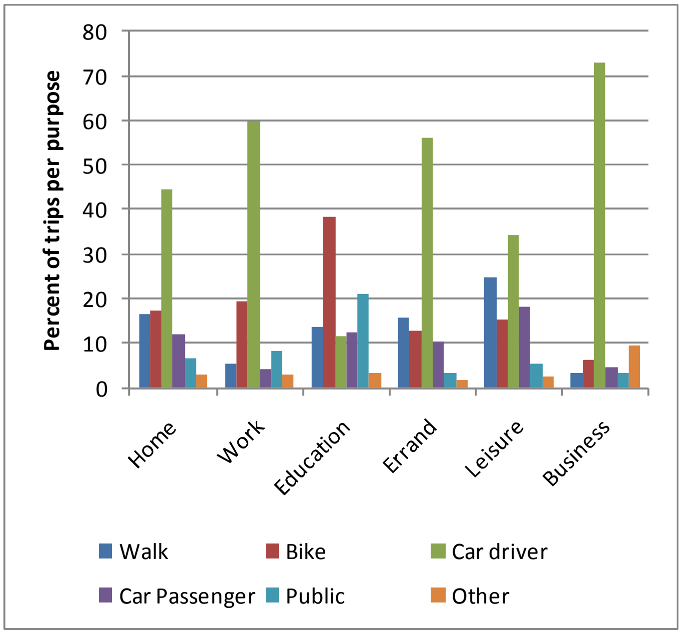

Figure 3: Choice of transport mode in relation to purpose at destination

Figure 4 shows the cumulative distributions of the trips divided by trip purpose. The graph cuts at 50 km since at this point five of the six purpose categories have reached a level of over 95%.
The business trips are below 90 percent and do not reach 95 % before 137 km. Business trips have the flattest curve all along, meaning not only that they hold the highest share among long trips, but also that the average length is the highest.
The figure shows that 70% of the errand and education trips are shorter than 5 km. This is also the case for 60% of the home and leisure trips. The education trips are rather short since school trips are a part of this category and pupils often go to school close to their home. For higher education students, residential location (e.g., apartments for students, dorms) is placed close to the university and therefore gives some of the students a short distance to their education place. People often select a destination close to the origin of their trip when going for errands, which explains the short errand

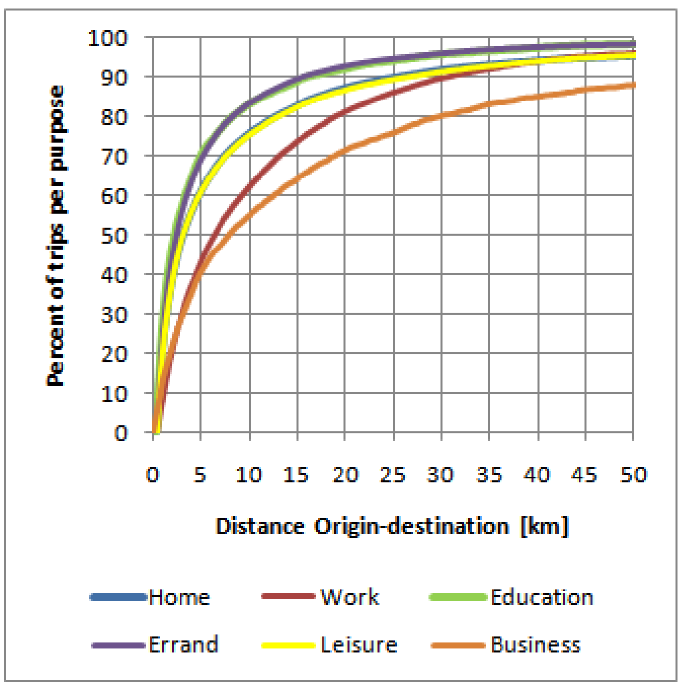

Figure 4: Cumulative distributions of the share of trips

trips. Shopping malls and the like also attract people, thus explaining why some of the errand trips are relatively long.

80% of the work trips are up to 20 km. The commuting distances are longer than the other trips (except business) because the choice of workplace is not as flexible as other choices (e.g., errands). People are willing to travel longer to reach a better job. The curve for work trips starts as the curve for business trips and approaches the curves for home and leisure at 35 km.

3.1.3 Analysis of gender differences

The women in the survey perform a higher number of trips than the men. Considering that in the TU survey there are more female than male participants (i.e., 28,444 versus 26,251), the total number of trips by gender allows to conclude that women perform 3.13 trips per day while men perform 2.96 trips per day.

In Table 5 the average distance between origin and destination for men and women are shown. In average, men travel 2.5 km longer than women. The men also have a higher standard deviation for the distance.

Table 5: Average distance and standard deviation between origin and destination for men and women

Gender	Avg. Distance [km]	St. Dev. Distance	No. observations
Men	10.74	23.02	78,099
Women	8.22	18.88	88,895

Figure 5 illustrates the mode shares for each gender. Car driver is the most chosen mode by both genders, with more than half of the men and 40% of the women choosing this mode. This might imply that, in households with only one car, men most often use this car and women either get a lift or choose alternatives such as walk, bike or public transport.

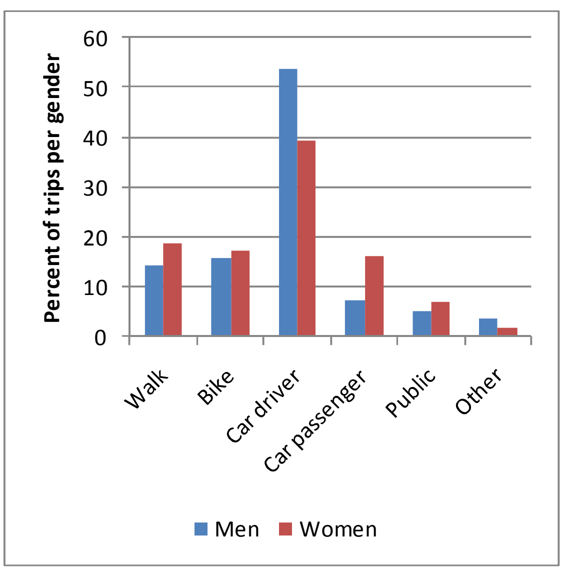

Figure 5: Mode shares for men and women

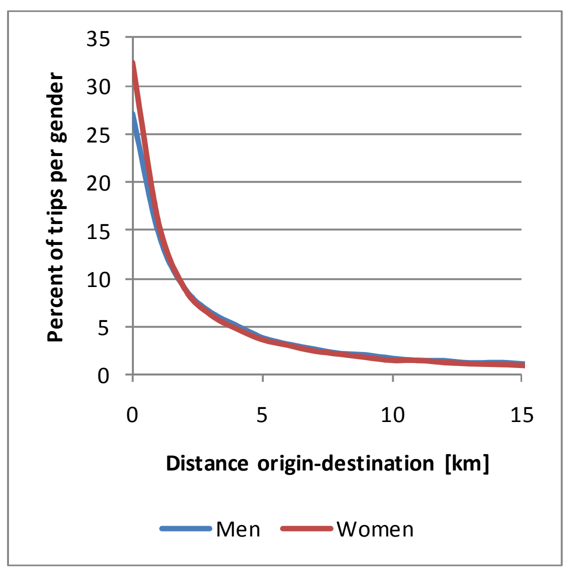

Figure 6: Percent of trips for each gender

With the exception of the category *other*, all remaining categories are chosen by a greater part of women rather than men. The higher share of women walking or biking could possibly indicate that women work closer to home and therefore have a better chance of either walking or bicycling to work (also see Figure 6). Other explanations could be that women perform tasks such as shopping, bringing and collecting children, close to home and therefore the majority of their trips are short and the fact that women in average have smaller income than men.

Figure 6 shows the percentage of travellers by gender according to the trip distance measured between origin and destination. It should be noted that the graph is for distances between origin and destination up to 15 km, since shares approximate zeros for both genders for longer distances.

For shorter distances, women have a higher share of trips than men, a finding that confirms the aforementioned hypothesis of women travelling more by walk and bike because of the shorter distances covered. The difference is relatively rapidly decreasing and the shares for the two genders are almost equal for trips exceeding 1.5 km. For trips with distances exceeding two kilometres, men seem to have a slightly higher share of trips.

3.1.4 Analysis of age differences

Figure 7 shows the percentage of people with a specific age choosing the different transportation modes. People younger than 18 years old have a very different pattern from the rest, since they have not yet had the chance to obtain a driving license. The young population often travels as car passengers or by bike. The bike use is increasing up to 12 years (40 %) and then decreasing to a rather constant share of 15 %. The share of public modes is increasing up to 18 years of age, and then dropping after the possible achievement of driving license. This share increases again with age and the elderly population’s share of public transportation is almost as high as the young one. The car as driver is the most often chosen mode from the age of 18 to 77 years, with a peak at 40 years of age.

Walk is increasing from the age of 40 and a very high share of the trips conducted by the elderly in the survey is by walking. The people in the middle age group are often employed and therefore have a high demand for transportation. They often can afford one or more cars and, because of the convenience of using the car, this choice is superior to the rest. The older people have more time when travelling and often feel safer when being a passenger (both public and private) than when driving. The curve is clearly turning around the point of retirement (60-67 years of age) where the demand for transportation is changing and perhaps decreasing.

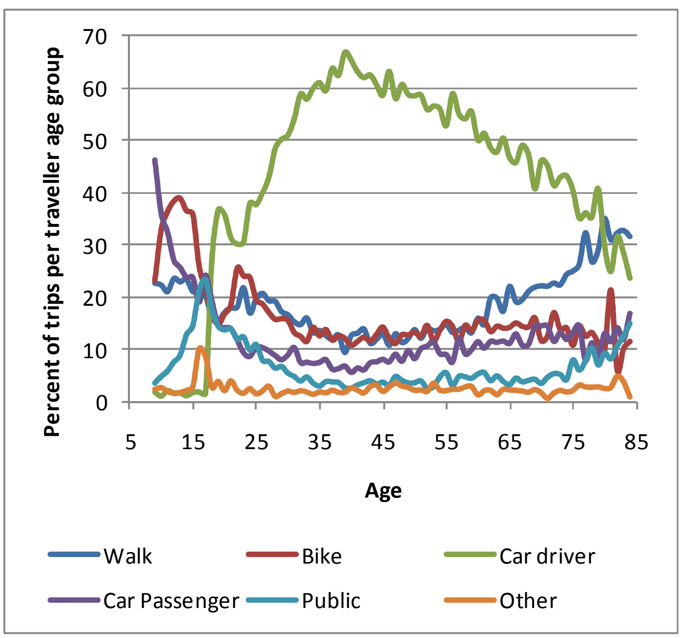

Figure 7: Choice of transport modes in relation to the age of the respondent

Table 6 shows the average OD distances for the trips in each age group. The two age groups which are very different from the others are the youngest (9-17) and the oldest (70-85). The two groups have an average of less than 6.0-6.8 km compared to the third lowest of 9.3 km. The reason for the short trips for both groups is the decreased possibility to use the same transportation modes as the other age groups. The youngest have not yet had the chance to obtain driver's licenses and among the elderly more people have lost their license, not renewed it, etc. The oldest respondents probably feel safer when walking because they can choose their own pace and have more time to assess the surroundings when walking. The average distance for the travellers in the age groups 18-29, 30-39 and 60-69 are not significantly different from each other at the 0.01 confidence interval, which is also the case for the groups of 40-49 and 50-59 years.

Table 6: Average distance and standard deviation between origin and destination for age groups

Age Group	Avg. Distance [km]	St. Dev. Distance	No. Observations
9-17	5.97	16.85	20,581
18-29	9.34	20.29	21,328
30-39	10.02	21.40	27,010
40-49	10.82	22.47	29,671
50-59	11.10	22.36	24,902
60-69	9.34	21.76	19,507
70-85	6.79	17.79	10,887

3.1.5 Analysis of car ownership

In Figure 8 the choice of transport mode is compared to the number of cars owned in the household. Logically, the use of walk, bike and public is greater for the people without car than people with car.

The high use of walk and bike points to the fact that households without cars are placed close to the traveller's destination points (e.g., in a city) or that non-car owners walk and bike longer distances than car owners. The use of car as driver rises with the number of cars in the household, but car as passenger shows the same share of people with cars. Interestingly, travellers from households without cars travel as car passenger less often than people with car, pointing to the fact that car passengers often drive along with another household member.

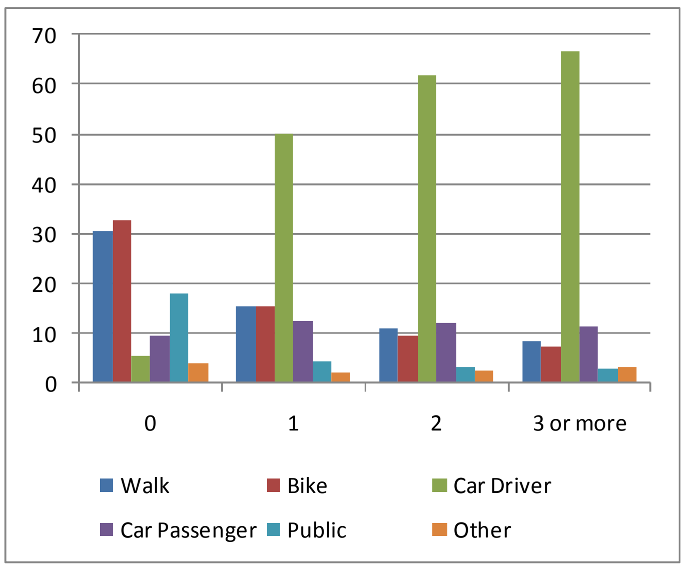

Figure 8: Choice of transport mode in relation to car ownership

Figure 9 shows the average number of cars for each household in the 98 municipalities in Denmark. In the municipalities of the Greater Copenhagen area (east) and around the greater cities; Aarhus, Aalborg, Odense and Helsingør, the car ownership is the lowest with less than 0.9 cars per household. The people living there have good access to public transport and some do not have parking possibilities around their home, and therefore people minimize the number of cars in the household. In the areas around Copenhagen households own approximately one car, likely because also these people have better public service than the rest of the country. The other green zones are spread around the country and most of these are in municipalities where the inhabitants earn less than the average and therefore can afford fewer cars. The municipalities with the highest number of cars per household are found with some distance from the larger cities and are most likely people who have to commute for long distances.

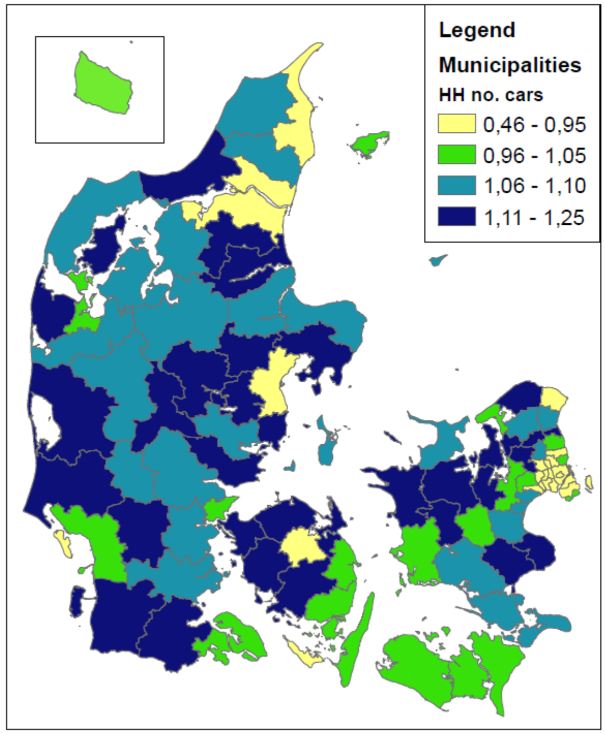

Figure 9: Average number of cars in households in each municipality

3.1.6 Analysis of income differences

Figure 10 shows the choice of transportation mode related to the income of the respondent's household. For small income groups, the choice of car is very low and the choice of public transport is the highest. These groups can often not afford to have a car and therefore have to choose other transport modes. For household earning more than 100,000 DKK per year, the choice of car as driver is the most often selected. The share of travellers using public transport is decreasing with increasing income and is rather stable at 3-4% for respondents from households with income exceeding 400,000 DKK per year. For most of the mode choices, the curves are rather stable from 500,000 DKK per year, meaning that the income does not have a great effect on the mode choice when exceeding a certain amount of income.

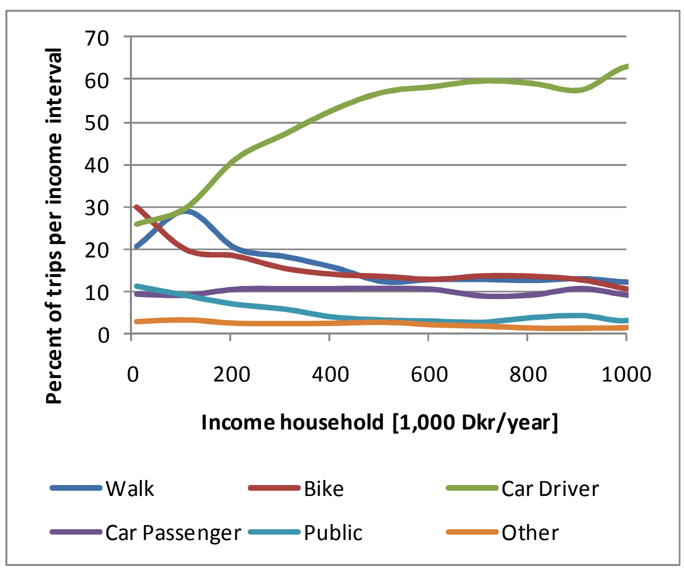

Figure 10: Choice of mode related to the household income of the traveller

3.1.7 Analysis of the distance to the nearest train station

Data on the exact location of home and work were only available for the Copenhagen region, and hence the analyses in this section are made only for this area. Figure 11 and Figure 12 show the choice of transport mode related to the distance to the nearest train station from home and work, respectively. In these analyses, the public transport modes are split in bus and train since graphs with public modes as one category showed clear signs of a difference between bus and train. Also the distance to stations should explain more about the use of train than the use of bus. The graphs are cut at 5 km since only few people have greater distances to a train station from home or work in the Copenhagen area.

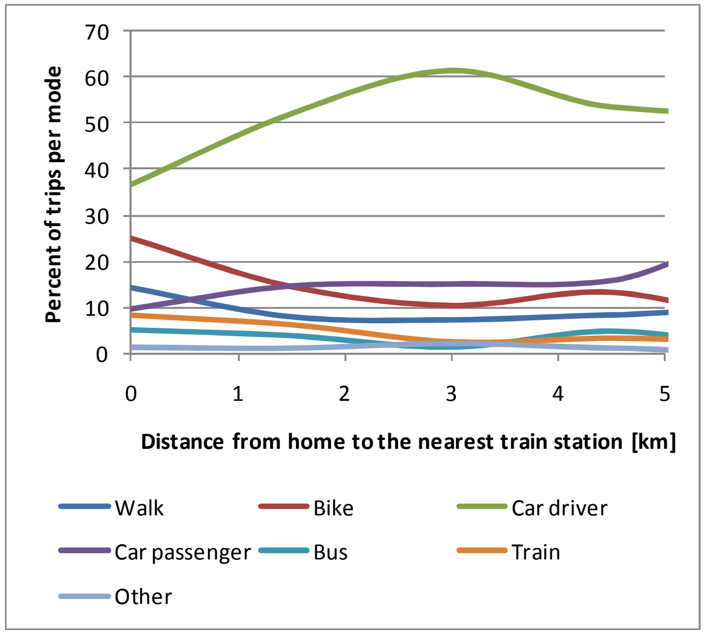

Figure 11: Choice of primary mode at different distances to the nearest train station from home

At all distances to train stations, most people choose to drive by car. The use of public transport is higher at small distances. From home (Figure 11), the use of the bus is higher at short distances to stations, but drops to half within the first 2 kilometres. The same applies also to train. From work (Figure 12), the use of the train is rather high at small distances and the bus use is low compared to trips from home. The use of the bus increases with the distance and peaks at more than 15% with a distance of 3-4 km to a train station.

The car as driver is chosen much more often from work than from home (this choice is also dependent on the choice the traveller did in the morning).

Overall, the use of transport mode from home and from work is very different. A reason for this is likely the different accessibility to transport modes from the two origins. The private transport modes as car and bike are accessible from home, but from work only if the traveller "brought" the mode from home in the morning.

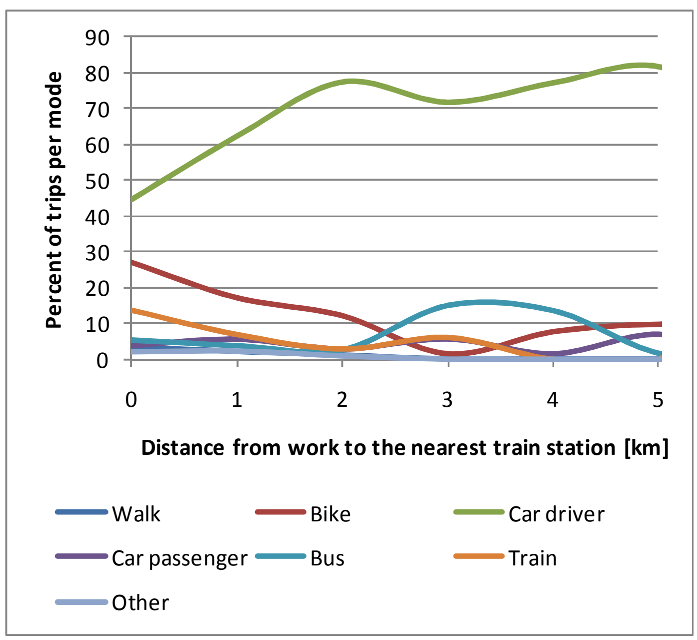

Figure 12: Choice of primary mode at different distances to the nearest train station from work

3.1.8 Analysis of geographical location and kilometrage

Figure 13 and Figure 14 show the number of kilometres each person in the different Danish municipalities travel in public transport modes and car per year. Note that the scales for the two figures are not the same since the kilometrage for cars is approximately 7 times higher than for public transport.

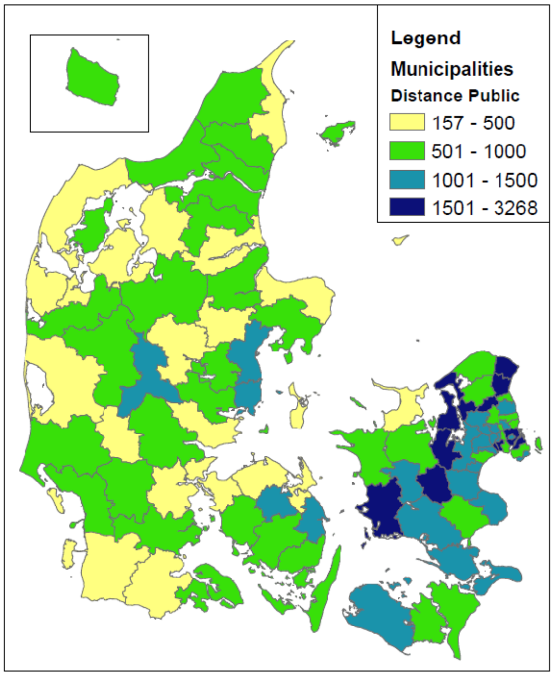

Figure 13: Distance travelled in public transport modes for inhabitants in each Danish municipality [km/person/year]

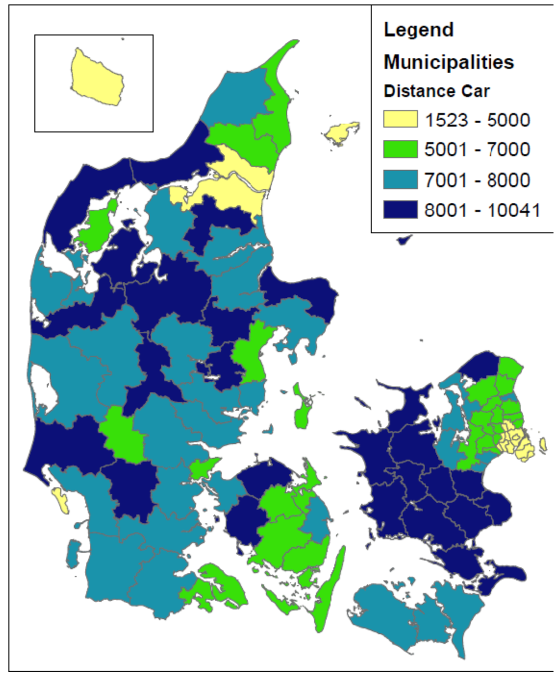

Figure 14: Distance travelled in car for inhabitants in each Danish municipality [km/person/year]

Figure 13 shows that the people on Zealand travel more often with public transportation than people in the rest of the country. Especially inhabitants from the Greater Copenhagen area, as described in figure 9, also often do not have a car. People from northern Zealand and around Roskilde also travel many kilometres with public transport. This can be caused by the fact that they have quite a distance commuting to Copenhagen and the train service between the cities and Copenhagen is rather good, so they often choose public transport modes instead of driving cars on the congested main roads of Copenhagen. In almost every zone in Jutland people are using public transport for less than 1,000 km/person/year because of the less good train service and the higher car ownership.

Figure 14 shows the number of kilometres per person with car. The smallest scale is up to 5,000 km/person/year and only the areas closest to Copenhagen, the area around Aalborg and some of the islands fall in this category. These areas do either have good public service or a travel pattern with short commuting distances. In the south-west part of Zealand people drive long distances with car, perhaps commuting to Copenhagen.

4 Summary and conclusions

This paper has presented and discussed different analyses from the TU, where different aspects which can influence the choice of mode were touched upon.

The distance between origin and destination influences the choices, especially between short (primarily walk and bike) and long (primarily car and public) distances. For both car and public transport, the shares increase with the length and are rather stable from five kilometres. The distance does not directly influence whether the travellers chooses car or public transport.

The choice of mode for the different trip purposes is very different. For all purpose categories but education, the most often chosen mode is car, but for example for leisure one third drive car compared to the two thirds for business trips. Education has the lowest share of car drivers and the highest share of public transport user.

The analysis of gender differences show that far more men than women drive cars, whereas women are more often passengers in a car. Women also have a higher share of public transportation users than men.

The mode choice showed to be very different among the different age groups. The car driving is highest at the age of 40 and lowest for the young and the elderly population. For public transport, the pattern is very different showing the lowest share from 35-65 years and the highest for the young and the elderly population.

The car ownership also affects the choice of transportation mode. When no car is owned, the use of car is of course very low and use of public modes is the highest for this group. When owning at least one car, its use increases with the number of cars and the use of public transport decreases accordingly. The geography of car ownership shows the lowest number around Copenhagen and the highest number at some distance from the largest cities (but not in less wealthy rural and remote areas).

The income of the respondent's household has an effect on the mode choice, and especially the choice is very different between the lowest and highest income groups. The share using public transport is the highest for the lowest income travellers and share decreases with increasing income, while the car driver share shows opposite tendency. From 500,000 DKK per year, the choice is stable and additional income only affects the mode choice very little.

The geographical analyses of the kilometrage for car and public transportation show that public modes often substitute car since many of the zones have a high number for one mode and a low number for the other. This is especially the case for areas around the largest cities. Farther away from these cities, people have a higher demand for transport and especially some areas in Zealand have a higher kilometrage for both car and public transportation.

The analyses have shown that many of the investigated factors do have an effect on the mode choice on the choice between private and public transportation. The examined factors are all concerning the characteristic of the traveller or the trip, and some of these can be difficult to modify in order to change the mode choice of the traveller. However, all these factors are important to be aware of when planning transportation service and when informing about these services.

The way of analysing the data can be used for further analyses of the TU data and this paper also proposes ideas for future research. The characteristic of the respondents and the trips can be investigated further, also going more into details about for example the public transport, service level, distance to public transportation, etc.

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