STATISTICS

D-Level thesis 2007

Dalarna University

The Impact of Driving Fee on the Car Usage

------- An Empirical research on the Falu Bilpool

Author: Shanshan Yang

Register Nr: 811120-P482

Supervisor: Kenneth Carling/Ola Nääs

Moudud Alam

Date: 2007-05-17re

Abstract

In the latest century, automobile has become a cornerstone in the world development. With increasing on the amount, the disadvantages of the automobile are also becoming more and more manifest. At the same time, owing a private car is also a heavy economic burden for the ordinary families. Car sharing is one of the practical ways on easing these problems. This way of using cars means that a number of persons share the use of one or more cars.[2] It is a win-win solution both for society and individual. Falu Bilpool is one of the car sharing organizations in Sweden. The aim of this thesis is to estimate the sensitivity of changes in driving fees for members in the Falu Bilpool. Two items are considered in this paper; the "***distance fee***" and the "***time fee***". Several control variables are also included in the models. Using mixed-effect models, this thesis shows that members are insensitive to changes in driving fees.

Key Word: Car sharing, Linear Mixed Model, Usage, Distance Fee, Time Fee, Sensitivity

1. Introduction

With the quantity increasing, the automobile has become a burden of the city environment and road transport system. Therefore, this problem calls a heavily attention of all governments in the world[1]. As a practical way of easing this problem, car sharing has been introduced in more and more countries. Nowadays, Germany and Switzerland have the longest and best success of car sharing in the world. Here follows a precise definition of car sharing given in the document of Swedish National Road Administration: “Car-sharing means that a number of persons share the use of one or more cars. Use of a car is booked beforehand, the user paying a fee based on the distance driven and the length of time the car was made use of.”

How does car sharing relieve the transport and environment problems caused by the automobile? The main reason is car sharing can help people to use the automobile more efficiently. For the sake of saving money and time, people who participate in the car sharing organization will be more likely to choose any other way of travel rather than automobile, compared with the ones who have private cars. These travel modes are typically less negative to the city environment and road transport system. For instance, traveling by bicycle and walking can eliminate the carbon dioxide emissions. And public traffic can reduce the risk of traffic jams. Thus, car sharing was promoted by the Swedish National Road Administration.

In May 2002 the Swedish National Road Administration published the report ”Bilpooler –nyckeln till flexibelt resande” ("Car-sharing - the key to combined mobility"). Much has happened since then, the development of car-sharing in Sweden having accelerated. Based on the advantages of itself and the encouragement of the government, car sharing was adopted by many cities in Sweden such as Stockholm, Gothenburg, Uppsala and Lund. As an important city in the region Dalarna, Falun also followed this trend. The economic association Falu Bilpool was formed by some 10 founder-members on October 11, 2000. Now it has 45 members (divided by families) and 3 cars are in use. Furthermore it is a nonprofit organization and any

[1] In Jun 19 2001, Swedish National Road Administration Environmental Department published a report named ”National Environmental Programme 2002-2005 of the Swedish National Road Administration”. In this report carsharing was mentioned as a practical project of improving environment.

person, company and organization can join the association.

1.1 The current pricing scheme of Falu Bilpool[2]

For the research reason, I should make clearly about the regulations and the procedures of payment. The entrance fee is 2000 SEK for each member and 500 SEK for the person who lives with a member in the same household. The annual fee is 500 SEK for each person. The following are the detailed prices: Firstly, you pay 200 SEK for the key as a deposit. Secondly, there is 20 SEK for each time a car is booked for usage. Thirdly, the cost of driving is 10 SEK/hour (160 SEK/day) plus (19 SEK, 20 SEK or 21 SEK)/10km (which depends on the type of cars). This price includes the petrol fee. And from 23:00 to 7:00 the time fee is for free in this period.

1.2 Aim

The aim of this thesis is to estimate the sensitivity of changes in driving fees for members in the Falu Bilpool. In these six years, the driving fees of Falu Bilpool have changed several times. How do members react to the price changing? We hope the "*usage*" of each member can show some evidence of these potential wills. Two study pricing items are employed in this paper. They are "*distance fee*" and "*time fee*" which are the driving fees of hiring cars.

2. Data description

This paper uses data stored by the association Falu Bilpool for the years 2001-2006. The original data provide the information of members, price changes, changing in parking place, information of private car and financial accounts in these 6 years. Part of these original data is displayed in Appendix C. In the membership data, it is listed the entire members' names, registered numbers, personal numbers, enter and exit times and the types of membership. The data contain 67 registered members, but the number of users is more than that. That is because, each registered member stands for a family not a single person. Thus one member may have several users. For example,

[2] More information on the detailed history of Flun Bilpool can be found in http://www.falubilpool.dn/historik.asp

member 12611 has two users one is Mattias Ahlstedt and the other is Susanna Ahlstedt. Therefore, these data have two types of numbers. One is the type of person who pays 2000 SEK for entrance fee, denoted by M in the list. It shows that this person is the first person in the family who joined in the Falu Bilpool, that is Mattias Ahlstedt in the example. The other type is the one paying 500 SEK for entrance fee, denoted by B. These persons are the families of the bilpool's members. So they can get a discount on entrance fee and use the same member number as family. In the example Susanna Ahlstedt is a type B member. These two types of memberships are charged the same price of using cars.[2] So there is no difference between these two type members. In view of the aim of this paper, I can deal with the booking data on family, in another word registered number.

As the data of price changing I have got the changes in the price index in these six years. The price scheme has four items, annual fee, starting fee, distance fee and time fee. For the years 2001-2006, the annual fee changes three times from 200 to 500 and the starting fee also has three modifications 0, 10, 20SEK. The time fee does not change a lot in these 6 years retaining at 10SEK per one hour. Appendix A shows all these changes in the table. On the contrary, the distance fee changes five times in this period. In these six years, the parking places have changed several times. For example, in Jan 2003 one parking place has change from RYJ417-A to RYJ417-C. At the same time the quantity and type of cars do not change. But it is still can be regarded as a change of this variable. In Eleven combinations are founded from the original data. As for the data of financial accounts, it contains a lot of information on the income and expense of this organization. There are three kinds of accounts in these data; one kind stand for personal accounts as the members' registered numbers, one is a Swedish company named SWECO with number "40600", the last one is Falu Bilpool denoted by number "0". All these accounts concentrate on the money transfers. Thus it contains a lot of information of the members, the company and Falu Bilpool. For example, in the personal and company accounts: some record booking information, some record money deposit, some concentrate in annual fee. In the Falu Bilpool all these records show the expenditure of this organization.

For the purpose of analysis, some rearrangements, modifications and deletions of data are necessary. Our topic is about the pricing schemes and the car pool members' usage.

The paper deals only with the records of personal bookings in the financial account. Thus records of the company and Falu Bilpool are excluded. Moreover the irrelevant records are removed from the original data. For example, the records of recharge, amendments and annual fee. I also eliminate all the activities related to company SWECO and Falu Bilpool. Eventually, I obtain the final records of bookings which have following items: registered numbers, user's names, date, total hours, total distance (measured by ten kilometers), type of cars, invoice number, charge fee, and VAT.[3] Several false records are also corrected at the same time. For instance, the data item of registered number 26334 was falsely recorded. The booking day was not 23-7-2006 but 23-6-2006. All these corrections are listed in Appendix B. Besides that when doing the analysis a special situation should be considered. Some records can not show the actual booking situations. For example registered number 13809 have two booking records from 28-10-2006 to 29-10-2006. But the starting fee is paid for only once, it is because these two records are the same booking. The booking lasted for more than one day, so it was recorded as two bookings in two days. According to these data, I can construct our model to analysis the relationship between price changing and booking.

Because booking situation contains two parts. One is booking time, the other is distance. Both of these two parts may effect on the booking situation. In order to involve in these two part together. A variable "*usage*" was introduced into the data which will be discussed in detail in the following part. In this thesis, the analysis data are conditioned on bookings. That means this analysis do not consider the situation that member did not book cars, in another words usage can not equal to zero.

After these processing we can get some rough summary on the process data. For the dummy variable, for example month, there are 425 records on the June, 396 records on the October, 374 for the September, 363 for May. That is the first 4 popular

[3] VAT: Value-added tax.

month in all the records. All these information is presented in the Table 1. And all the summaries on other dummy variables are present in the following Table 2:

Table 1: Summary of the records quantity on month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
342	302	332	320	363	425	309	347	374	396	349	355
Total: 4214											

Table2: Amount of records on each level for dummy variables

Level	Annual fee	Level	Private car	Level	season
200SEK	148	NO	3717	Autumn	1118
400SEK	3231	Yes	497	Spring	1015
500SEK	835			Summer	1082
				winter	999

For the continuous variables the information on the mean, median, 1st quartile, 3rd quartile, minimum and maximum are showed in the Table 3:

Table 3: Information on continuous variables

	min	1st Qu	median	mean	3rd Qu	Max
Usage(SEK)	5	59.5	101.5	225.1	190.5	8010.0
Distance Fee/km	1.5	1.8	1.8	1.893	2	2.1

In this paper, the response variable is the "*usage*" on every booking. In the analysis the "*usage*" of this model is constructed by two parts. One part is the driving time, the other is driving distance. The attempt of analysis these two parts simultaneous is quiet difficult. Thus, this thesis employs a measurement "*usage*" to combine time and distance. At the very beginning, time fee and the distance fee are set as 10SEK/hour and 1.5SEK/km. So I use this relationship to construct a vector named "*usage*" as a

combination of driving time and driving distance. It is the actual response variable of the final model. And it is represented as a form of cost. The equation is as follows:

Usage = 1.5*distance+10*time

In the primary study, the members' usage did not follow the Normal distribution as shown in FIGURE 1.

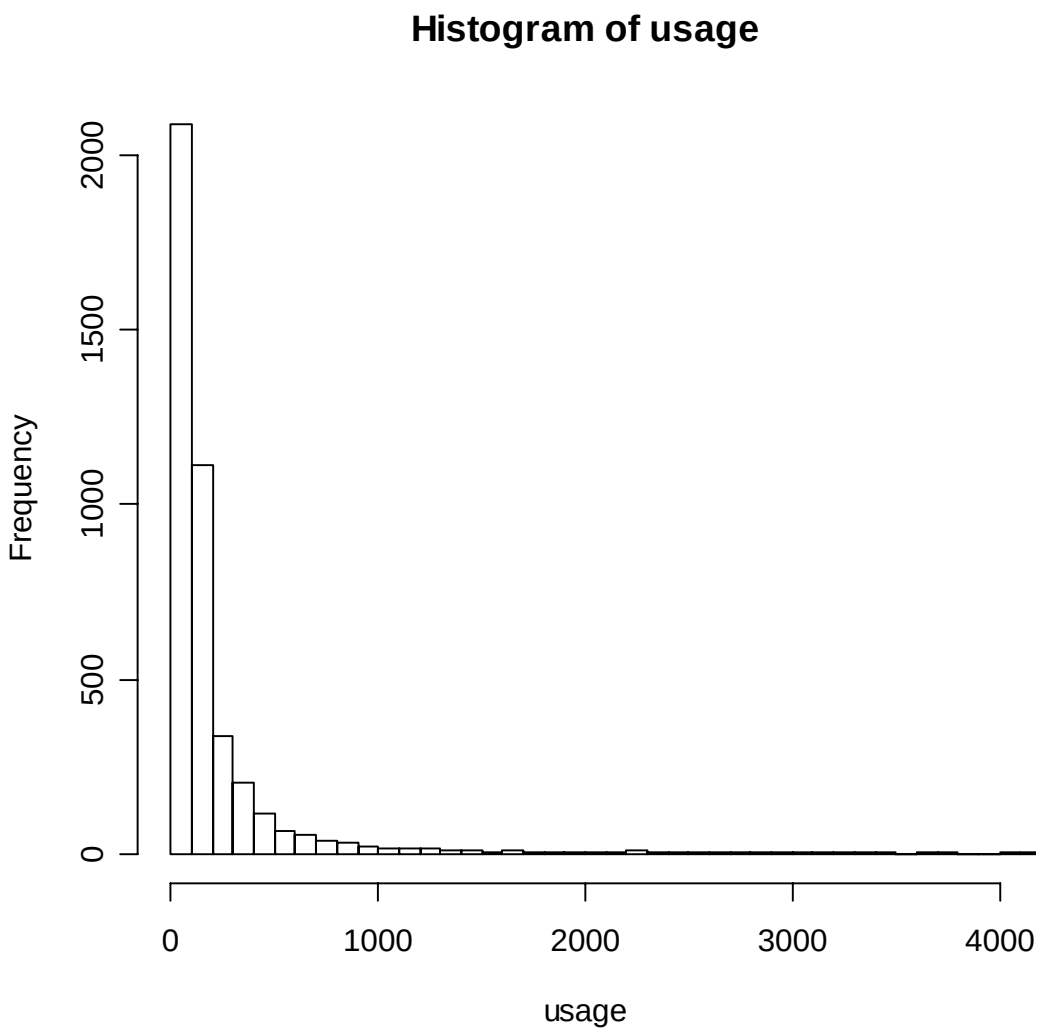

FIGURE 1: The Histogram of usage with breaks equal to 30.

Using "log" transformation, usage can be transformed to achieve normality. The following histogram (figure 2) and Normal QQ plots (figure 3) can be used to demonstrate this.

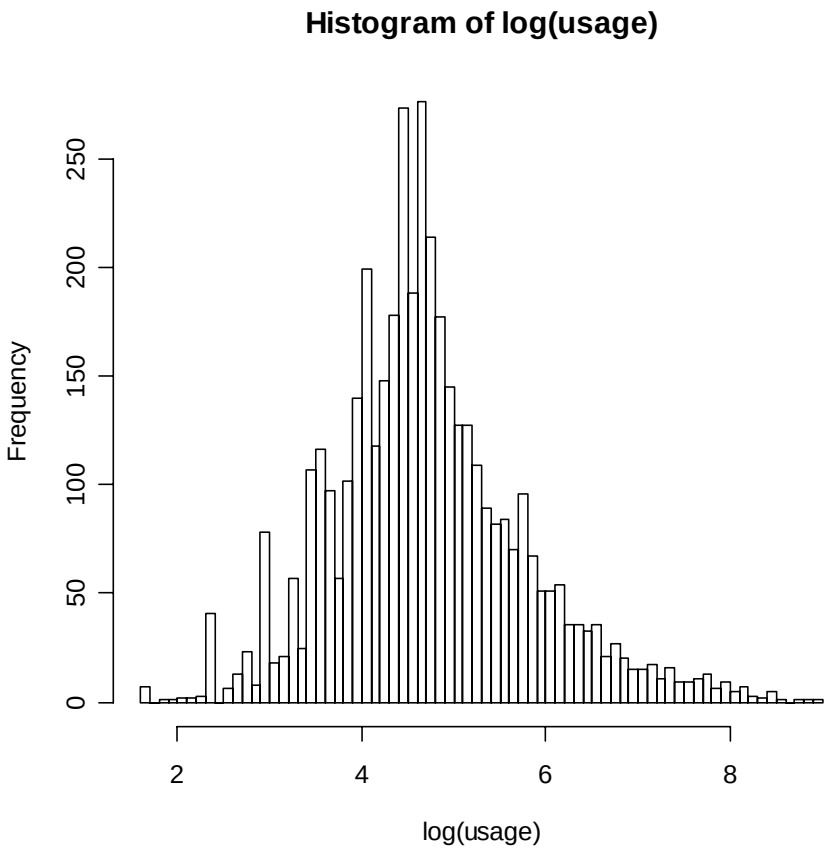

FIGURE 2: Histogram of usage with “log” transformation.

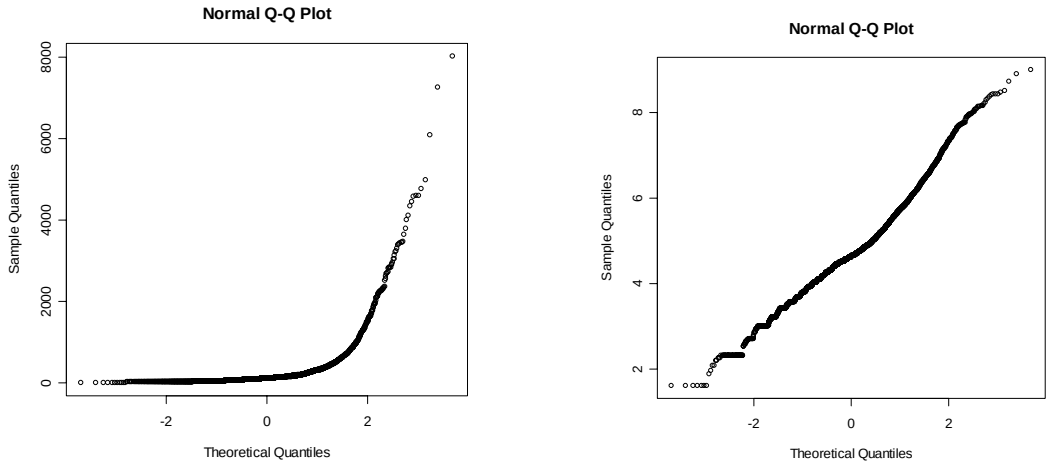

FIGURE 3: Normal QQ Plot on usage before and after transformation with “log” transform.

3. Mixed Models:

This paper employs a Mixed-Effect model to deal with the data analysis. Here I will introduce some basis knowledge, relating to this paper, on the Linear Mixed model

(LMM) and Generalized Linear Mixed model (GLMM). Mixed-effects models provide a flexible and powerful tool for the analysis of grouped data, which arise in many areas as diverse as agriculture, biology, economics, manufacturing, and geophysics. [5] The data included in this paper are repeated measures on the members as there are several bookings per member.

Mixed models are models where some of the independent variables are assumed to be fixed, i.e. chosen beforehand, while others are seen as random sampled from some population or distribution. [6] Thus mixed models are constructed by two part: fixed part and random part. A common single level of linear mixed model can be written as following functions:

$$y_i = X_i\beta + Z_i u_i + e_i$$

Where, y_i is a vector response. β is the vector of fixed effects. u_i is the vector of random effects, X_i is the design matrix for the fixed effect. Z_i is the design matrix of the random effect. e_i is the raw residual of this model. Here u_i and e_i all have normal distribution, with mean equal to zero and variance equal to $Var(u_i)$ and $Var(e_i)$, respectively.

Then I can extend LMM to the GLMM with two assumptions: data can belong to the exponential family need not be a normal distribution. Some functions of E(Y) (i.e. the mean of response variable) can be a linear combination of independent variables and need not be it self. [7] Based on these assumptions, I can find out the generalized linear mixed model from common linear mixed models.

4. Model construction:

The members can be regard as groups, and the records of usage are the repeated measures for one person. Thus, the data can be regard as grouped data with group indicator “Registered number”. As mentioned in the “method” section, mixed model is a powerful tool for grouped data analyze. Therefore, mixed model can be quoted in the model construction. Moreover, at the data description part, we have confirm that

after “log” transformation the response variable “*usage*” follows normal distribution. Thus, linear mixed model is suitable to the data analysis.

4.1 Model discription

This paper chooses the linear mixed model to analysis the relationship between usage and driving fees. The result of the model is showed below:

$$\log(usage) = \beta_0 + \beta_1 kilometerfee + \beta_2 timefee + \beta_3 privatecar + \beta_4 month + \beta_5 StartFee$$
$$+ \beta_6 Numberofmember + \beta_7 AnnualFee + \beta_8 parking + randompart + \varepsilon$$

Where, the number of observations is 4214 and the group quantity is 67. Time fee is a dummy variable. The AIC value of this model is 11904.42. And the standard deviations of random effect are 0.3726 (intercept) and 0.9628 (residual). That means the standard deviation of the residuals for the random intercept is 0.3726. For the raw residuals, the standard deviation is 0.9628. The P-values of T-test on kilometer fee and time fee are 0.336 and 0.443. Thus result shows these two variables are insignificant in the model. The following Table 4 shows the output of coefficient and corresponding test statistics.

Table 4: Coefficient and test statistics on Linear Mixed Model

	Fixed Effect			
	Estimate	Std Error	t-value	p-value
Causal variable				
Distance Fee	0.095	0.099	0.961	0.336
Time Fee	-0.199	0.260	-0.767	0.443
Control variable				
(Intercept)	3.692	1.521	2.426	0.015
Private car (Yes)	-0.001	0.121	-0.016	0.987
Nr of member (2)	0.021	0.093	0.222	0.823
Nr of member (2)	0.089	0.167	0.535	0.592
Start Fee (10)	0.054	0.145	0.372	0.709
Start Fee (20)	-0.235	0.203	-1.159	0.246
Annual Fee	0.0008	0.0009	0.962	0.354
Parking	See Appendix E			
Month	See Appendix F			

Random Effect		
	Name	Std Dev
Member	(Intercept)	0.3726
Residual		0.9628
Groups: 67 (labeled by "*Register Number*")		

4.2 Examining the model

Using function "qqnorm(residuals())", I can check the residuals of this model (FIGURE 4). The following picture is the QQ-plot of the residuals. It tells that the residuals of this model follow the normal distribution.

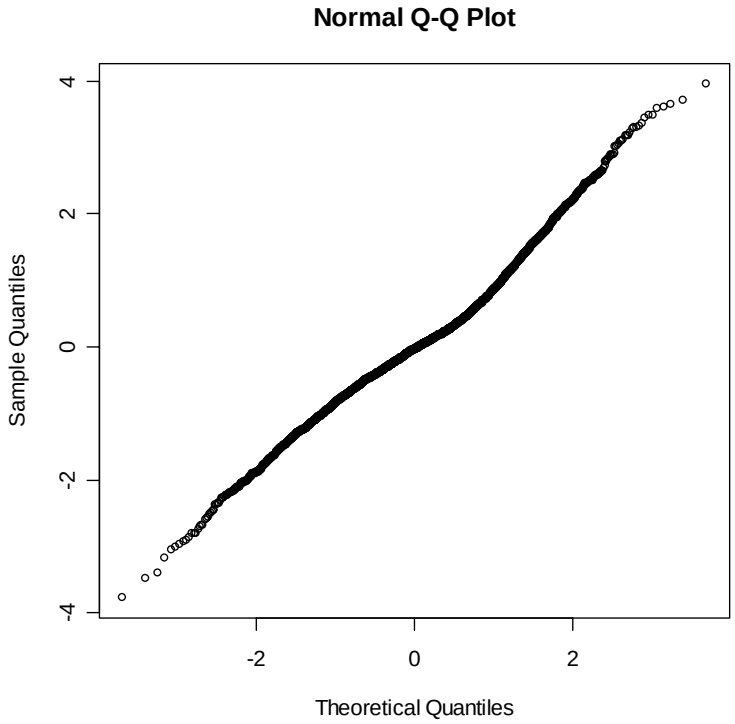

FIGURE 4: The QQ-Plot of the final model.

A common diagnose on the raw residuals is the plot of residuals against the fitted response (FIGURE 5) which can test the constant assumption of the raw residuals.

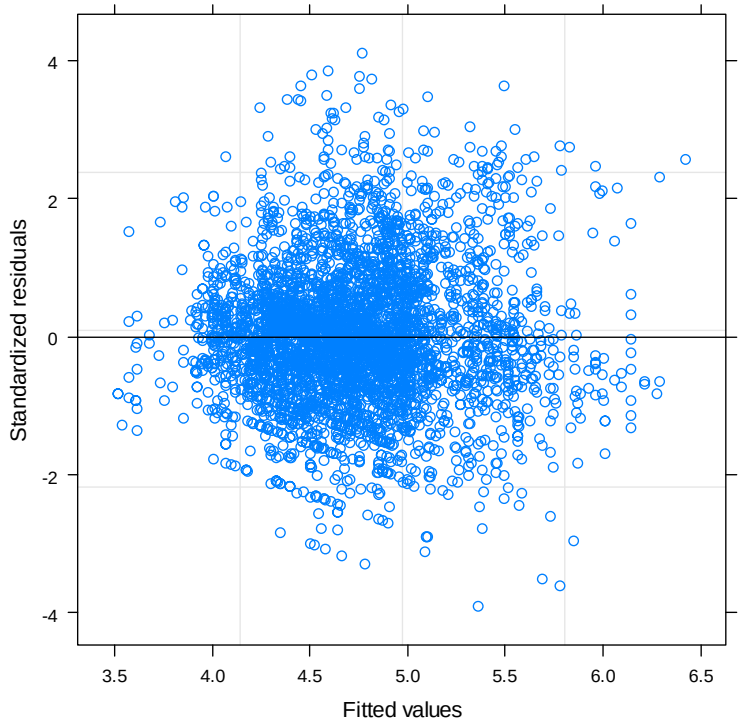

FIGURE 5: The plot of raw residuals against fitted responses

Here, the standardized residuals are calculated by “raw residuals/estimated standard deviation of raw residuals”. And the estimated standard deviation of raw residuals in this model is 0.9628037.

4.3 Model construction

The research topic of this thesis is the relationship between driving fees and Car-pool members’ usage. In consider of this research aim, distance fee and time fee are introduced into the model as causal variables. For the sake of avoiding confounding, several control variables are also included in the model. In order to limit two causal variables, this paper introduces private car, month, number of users in the family, start fee, annual fee and parking place as background variables. All these control variables can help us set the causal variables at the same condition. (1) Private Car: This variable indicates whether each member’s household owns a private car. It is a dummy variable with two levels Yes and No. “Yes” means this member owns a private car. And “No” means this member do not have a private car. The member who owns private car may behave different on car usage comparing to the member who

does not. (2) Month: This factor has twelve levels. Each level indicates a month. Different month may change member's habit of car usage. (3) Number of users: In the previous part, I have mentioned the difference between the member and users. In the analysis data, the register numbers are labeled by families. That means one member may contain several users. Thus the number of users include in each member is also concerned in the model. (4) Start fee: When a booking is made, members should pay the start fee first. The price of start fee influences members' usage a lot. Therefore, I employed this item into the model. (5) Annual fee: To keep the membership, people should pay annual fee each year. In the past six years, the annual fee has change three times. So this factor has three levels. (6) Parking place: Actually, it does not only mean the actual changing of parking places. It also includes the information of car changes. For example, in April 2003, Falu bilpool has added a new car TYF975 which means a new parking place TYF-E. Thus this variable is a combination of parking place and car changes. In the past six year, the unit variable has changed eleven times. So it is a factor with 11 levels. All the changes are shown in Appendix D.

In the data description part, the "log" transformation of response variable "*usage*" has been proved following normal distribution. Therefore, linear mixed model can be used to analysis the two research variables and six control variables against the usages. Then the output of this LMM shows that the changes of distant fee and the time fee are insignificant in the model. And the P-values are 0.336 and 0.443 with coefficient 0.095 and -0.199 separately.

5. Sensitive analysis

In the previous analysis, the causal variable distance fee is the real price which has five values 15,16,18,20 and 21. Here I deflate the distance fee with CPI (Consumer Price Index) to test whether it has a visible influence on the model result. In the original data the Consumer Price Index (CPI) is collected by annual average from 1980~2006. The base year is 1980 which is regarded as 100. For analysis reason this paper just use six years. And the 2000 is regarded as base year with value "1". Here

this paper chooses the transport Consumer Price Index to deflate the distant fee where the transport CPI has grown faster than the overall CPI. Then we get the comparing model which is as follows:

$$\log(usage) = \beta_0 + \beta_1 kilometerfee(CPI) + \beta_2 timefee + + \beta_3 \Pr ivatecar + \beta_4 month + \beta_5 StartFee$$

$$= \beta_6 Numberofme\,mber + \beta_7 AnnualFee + \beta_8 parking + randompart + \varepsilon$$

Where the only difference between this model and the previous one is that the "*distance fee*" is deflated with CPI.

The output of this model is shown in Table 5:

Table 5: Coefficient and test statistics on Comparing Linear Mixed Model

Fixed Effect				
	Estimate	Std Error	t-value	p-value
Causal variable				
Distance Fee	0.0186	0.0857	0.2169	0.8283
Time Fee	-0.0576	0.2564	-0.2248	0.8221
Control variable				
(Intercept)	4.8477	1.3539	3.5804	0.0003
Private car (Yes)	-0.0054	0.1214	-0.0447	0.9643
Nr of member (2)	0.0206	0.0935	0.2205	0.8225
Nr of member (2)	0.0931	0.1669	0.5578	0.5770
Start Fee (10)	0.1426	0.1737	0.8211	0.4116
Start Fee (20)	-0.1323	0.2154	-0.6141	0.5392
Annual Fee	0.0009	0.0008	1.0881	0.2766
Parking			See Appendix G	
Month			See Appendix H	

Random Effect		
	Name	Std Dev
Member	(Intercept)	0.3738
Residual		0.9628
Groups: 67 (labeled by "*Register Number*")		

From the output showing above, we can find that there is no significant difference between the original model and the comparing model. That is "*distance fee*" and "*time fee*" are still insignificant in the model just as the result of previous one.

6. Conclusion:

Based on the model construction part, the final result tells us that the driving fee is insignificant in the model. This means that the strategy of prolonging free time from (24:00~6:00) to (23:00~7:00) does not have effect on members' usage. After this change members do not increase usage on each booking on their own initiative.

For the random part, the output shows that the standard deviation of the 67 groups (labeled by registered number) is 0.3726285. And the standard deviation of the raw residual term is 0.9628037 corresponding to the log-restricted-likelihood of -5920.212. The Akaike Information Criterion (i.e. AIC value is 11904.42). Where, AIC is calculated by the log-restricted-likelihood value. This value can be used to compare the models.

The fixed part of this model has two causal variables: one is "*distance fee*" which is a continuous variable; the other is "*time fee*" which is a dummy variable with two levels 0 and 1. For the "*distance fee*" the coefficient of this variable is 0.0953. That means when the price increase one unit, the corresponding usage is also increase exp(0.095)-1=0.099 percentage. However, the estimate is not very precise. Because the result of "interval" function shows that the minimum and the maximum estimates of the distance fee are -0.0990 and 0.2896 which does not rule out a zero-effect. Now consider the fact, in the past six years, the distance price per kilometer has just increase 0.6SEK. Comparing to the result that 1SEK increase on the distance price just increase 10 percent usage each time the strategy of increasing the distance price in these six year did not make the usage change a lot. The sensitive analysis also indicates the same conclusion. Using transport CPI to deflate with the distance fee, the output shows that the distance fee is insignificant in the model when other conditions are held constant. Hence, it appears that the members are insensitive to changes in the driving fee given that analysis data are conditioned on bookings.

Reference

[1] Merritt Polk, (March 2000), Carsharing in Sweden: A case study of the implementation of an internet booking system in Majornas car cooperative in Goteborg

[2] National Road Administration, (July 2003), Make space for Car-Sharing!, Pub. No. 2003:88E

[3] www.falubilpool.nu, Apr 1 2007

[4] http://www.falubilpool.nu/kostar.asp, Apr 1 2007

[5] Jose C.Pinheiro and Douglas M. Bates (2000), Mixed-Effects Models in S and S-PLUS, Springer-Verlag New York

[6] U Olsson (2002), Generalized Linear Models - an applied approach, Lund, Sweden

[7] Charles E. Mcculloch and Shayle R. Searle, (2001), Generalized, Linear, and Mixed Model, John Wiley & Sons

Appendix A:

Date		Fee				
Decide day	**Apply day**	**Annual Fee**	**Start Fee**	**Time Fee**	**Ten Km price Common car**	**Ten Km price Small car**
VAT is included in all prices						
2000-10-11			0.00	10.00	15.00	
2001-4-26	2001-1-1	200.00				
2001-5-22	2001-6-1				16.00	
2002-2-7	2002-3-1				18.00	
2002-3-25	2002-1-1	400.00				
2003-4-2	2003-1-1	400.00				
2004-4-27	2004-1-1	400.00				
2004-9-13	2004-10-1		10.00		20.00	
2005-4-20	2005-1-1	400.00				
2005-12-13	2006-1-1		20.00			
2006-4-26	2006-1-1	500.00				
2006-8-22	2006-9-1				21.00	
2006-11-30	2006-11-15					19.00

Appendix B

1. "-4" the Km record of Member 20737 (Ingrid Haglund) in 2005-7-25 should correct the record on the same datum with Registered number 05212.
2. in 2001 for Member 10003(Marit Radman), the Time record in 2001-10-17 should correct the record in 2001-9-28 with Registered number 01151.
3. In 2006 for Member 26334/ Eva Andersson, the Time record in 2006-5-14 with Vernr 06189 should correct the raw with same datum and car type but registered number 06140. And the Time record in 2006-7-23 with registered number 06189 should correct the record in 2006-6-23 and registered number 06152.
4. Note that the date in the correction row should be 2006-06-23 and not 2006-07-23!
5. in 2006 for Member 19347 /Ulf , the time record in 2006-7-23 with registered number 06186 should correct the record in same datum but registered number 06177.

Appendix C:

Nr	Namn	Datum	Beskrivnin	Tim	Mil	Vernr	Belopp	Moms	Bil
23483	Ewa Sundh	02/01/2003	Inbetalning	0.0	0.0	03002	500.00	0.00	
30194	Kjell Nerhagen	03/01/2003	Insättning	0.0	0.0	03003	500.00	0.00	
26822	Ingemar Elb	19/01/2003	Frimärken	0.0	0.0	03010	110.00	0.00	
10689	Anders Villumsen	22/12/2002	Debitering dec City	97.0	63.0	03013	-2104.00	0.00	CR
12611	Mattias Ahlstedt	08/12/2002	Debitering dec City	6.0	3.0	03013	-114.00	0.00	CR

Appendix D:

type	bil	date	parking place
1	RYJ417	2001.3-2002.7	RYJ417-A
2	RYJ417&TCL147	2002.7-2003.1	RYJ417-A, TLC-B
3	RYJ417&TCL147	2003.1-2003.4	RYJ417-C, TLC-B
4	TYF975&RYJ417&TCL147	2003.4-2003.10	RYJ417-C, TLC-B, TYF-E
5	UKW605&TYF975&RYJ417&TCL147	2003.10-2004.3	RYJ417-C, TLC-B, TYF-E, UKW-C
6	TLC147&TYF975&UKW605&UPL136	2004.3-2005.5	TLC-B, TYF-E, UKW-C, UPL-C
7	TLC147&TYF975&UKW605&UPL136	2005.5-2005.7	TLC-D,TYF-E,UKW-C,UPL-C
8	TYF975&UKW605&UPL136	2005.7-2005.9	TLC-B, TYF-E, UKW-C, UPL-C
9	TYF975&UKW605&UPL136	2005.9-2006.4	TYF-D,UKW-C,UPL-C
10	UKW605&UPL136&XMM778	2006.4-2006.11	UKW-C,UPL-C,XMM-C
11	UKW605&UPL136&XMM778&UBB788	2006.11-2006.12	UKW-C,UPL-C,XMM-C,UBB-D

Appendix E:

	Estimate	Std Error	t-value	p-value
Parking 2	-0.569	0.118	-4.799	0.000
Parking 3	-0.589	0.121	-4.934	0.000
Parking 4	-0.611	0.114	-5.331	0.000
Parking 5	-0.5124	0.140	-3.653	0.0003
Parking 6	-0.670	0.145	-4.625	0.000
Parking 7	-0.801	0.186	-4.301	0.000
Parking 8	-0.787	0.206	-3.816	0.0001
Parking 9	-0.461	0.214	-2.149	0.031
Parking 10	-0.499	0.233	-2.143	0.032
Parking 11	-0.430	0.252	-1.708	0.087

Appendix F:

	Estimate	Std Error	t-value	p-value
Month Jan	-0.299	0.083	-3.589	0.0003
Month Feb	-0.222	0.083	-2.690	0.007
Month Mar	-0.250	0.079	-3.162	0.001
Month May	-0.112	0.081	-1.393	0.163
Month Jun	-0.065	0.085	-0.759	0.447
Month Jul	-0.214	0.092	-2.313	0.021
Month Aug	-0.004	0.090	-0.052	0.958
Month Sept	-0.073	0.093	-0.785	0.432
Month Oct	-0.226	0.099	-2.268	0.0233
Month Nov	-0.384	0.105	-3.658	0.0003
Month Dec	-0.288	0.108	-2.677	0.007

Appendix G:

	Estimate	Std Error	t-value	p-value
Month Jan	-0.299	0.083	-3.589	0.0003
Month Feb	-0.222	0.083	-2.690	0.007
Month Mar	-0.250	0.079	-3.162	0.001
Month May	-0.112	0.081	-1.393	0.163
Month Jun	-0.065	0.085	-0.759	0.447
Month Jul	-0.214	0.092	-2.313	0.021
Month Aug	-0.004	0.090	-0.052	0.958
Month Sept	-0.073	0.093	-0.785	0.432
Month Oct	-0.226	0.099	-2.268	0.0233
Month Nov	-0.384	0.105	-3.658	0.0003
Month Dec	-0.288	0.108	-2.677	0.007

Appendix H

	Estimate	Std Error	t-value	p-value
Month Jan	-0.2997	0.0837	-3.5793	0.0003
Month Feb	-0.2263	0.0828	-2.7302	0.0064
Month Mar	-0.2543	0.0791	-3.2114	0.0013
Month May	-0.1086	0.0815	-1.3315	0.1831
Month Jun	-0.0528	0.0858	-0.6147	0.5387
Month Jul	-0.2256	0.0929	-2.4275	0.0152
Month Aug	-0.0146	0.0881	-0.1662	0.8680
Month Sept	-0.0415	0.0871	-0.4763	0.6339
Month Oct	-0.1765	0.0846	-2.0860	0.0370
Month Nov	-0.3283	0.0862	-3.8050	0.0001
Month Dec	-0.2328	0.0899	-2.5878	0.0097