
Carsharing Stated Preference (SP)

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Travel Survey Metadata Series

47
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Abstract

A recent study aimed to estimate the potential of carpooling in Switzerland. Part of this study was a survey in which the attitude of the public towards this transport option was investigated using both multi-response questions and stated preference (SP) experiments. In order to gain an insight on how innovative modes are perceived in general, the SP part was composed of two different experiments, one of them including carsharing as alternative. In the first experiment respondents were choosing among car, public transport, carpooling as driver and carpooling as passenger. In the second experiment respondents were choosing among car, public transport and carsharing. This paper reports on the multinomial logit choice models, which were estimated based on participants' responses. Both SP experiments were based on a trip reported by participants during a phone interview. For each experiment two specifications, a linear and a nonlinear one were estimated. The nonlinear specification allows investigating the impact of selected socio-demographic variables, in this case income and travel time, on the parameters of the models and on willingness to pay indicators. Such indicators permit to complement the qualitative discussion of the results with quantitative analyses and provide a useful background for policy evaluation and planning.

Experiment 2: Carsharing

In the second SP experiment the alternatives considered were car, public transport and carsharing. In this case all respondents received the same set of alternatives while the number of situations was limited to six. An issue which had to be tackled was the cost of carsharing travel. The norm in SP experiments with car and public transport as available modal options is to take into account the cost of the ticket for public transport travel and the cost of the gasoline for car travel. It is commonly accepted that gasoline cost is what car users perceive as the cost of a trip with that mode. The parking cost can be eventually added. In the case of carpooling this was appropriate, since carpooling implies the use of a private car. In the case of carsharing the usage fee covers other costs which are not usually taken into account in such experiments, nor generally by the driver of a private car as cost of a particular trip; car insurance and amortization costs are the most important. For that reason, in the second SP experiment total kilometer costs were used. The kilometer cost was calculated using appropriate tables available on the web page of a Swiss automobile club (14). In order to have personalized costs, twelve different categories were considered according to the type of car (using price as proxy, with four levels) and to the yearly mileage (with three levels). Consumption, as in the previous exercise, was the one declared by the respondent. The cost for carsharing usage was calculated using the current prices of the Swiss operator Mobility (15). The carsharing car was, as far as possible, of the same or similar category as the respondent's own car. Mobility's fleet includes most, but not all car types. Another issue is how to take into account the duration related part of the carsharing fee. Carsharing users, in general, pay a fee, which is the sum of a distance dependent

fee and a duration dependent fee. The latter depends on the rental time, which broadly corresponds to the duration of the round-trip tour; at least in the case of carsharing systems like Mobility which do not allow one-way rentals. Ideally, one would compare tours and not trips; however, since it was not possible to have the precise information needed for the whole tour, the experiment is based on a choice at the trip level. The ranges for the second experiment are reported in Table 2. They were chosen with the same criteria as for the first experiment.

Keywords

CarSharing

Preferred citation style

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1.0 Document Description

Citation

Title: CarSharing SP

Identification Number: CarSharingSP

Authoring Entity: Dr. Francesco Ciari (IVT, ETH Zürich)
Prof. Dr. Kay W. Axhausen (IVT, ETH Zürich)

Date of Production: 2013-04-08

Software used in Production: Nesstar Publisher

2.0 Study Description

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Study Scope

Abstract: A recent study aimed to estimate the potential of carpooling in Switzerland. Part of this study was a survey in which the attitude of the public towards this transport option was investigated using both multi-response questions and stated preference (SP) experiments. In order to gain an insight on how innovative modes are perceived in general, the SP part was composed of two different experiments, one of them including carsharing as alternative. In the first experiment respondents were choosing among car, public transport, carpooling as driver and carpooling as passenger. In the second experiment respondents were choosing among car, public transport and carsharing. This paper reports on the multinomial logit choice models, which were estimated based on participants' responses. Both SP experiments were based on a trip reported by participants during a phone interview. For each experiment two specifications, a linear and a nonlinear one were estimated. The nonlinear specification allows investigating the impact of selected socio-demographic variables, in this case income and travel time, on the parameters of the models and on willingness to pay indicators. Such indicators permit to complement the qualitative discussion of the results with quantitative analyses and provide a useful background for policy evaluation and planning. Experiment 2: Carsharing In the second SP experiment the alternatives considered were car, public transport and carsharing. In this case all respondents received the same set of alternatives while the number of situations was limited to six. An issue which had to be tackled was the cost of carsharing travel. The norm in SP experiments with car and public transport as available modal options is to take into account the cost of the ticket for public transport travel and the cost of the gasoline for car travel. It is commonly accepted that gasoline cost is what car users perceive as the cost of a trip with that mode. The parking cost can be eventually added. In the case of carpooling this was appropriate, since carpooling implies the use of a private car. In the case of carsharing the usage fee covers other costs which are not usually taken into account in such experiments, nor generally by the driver a of a private car as cost of a particular trip; car insurance and amortization costs are the most important. For that reason, in the second SP experiment total kilometer costs were used. The kilometer cost was calculated using appropriate tables available on the web page of a Swiss automobile club (14). In order to have personalized costs, twelve different categories were considered according to the type of car (using price as proxy, with four levels) and to the yearly mileage (with three levels). Consumption, as in the previous exercise, was the one declared by the

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3.0 File Description

File: CarSharing SP.NSDstat

- Number of cases: 4350
- No. of variables per record: 41
- Type of File: NSDstat 200501

4.0 Variable Description

Variable Groups

- [Person](#)
- [SP CarSharing](#)

Person

Variables within *Person*

- [Interview-Nummer](#)
- [Choice](#)
- [Car Sharing Cost](#)
- [Car Sharing Parking Cost](#)
- [Geschlecht](#)
- [Alter](#)
- [alter \(ungruppiert\)](#)
- [Frage 4.10: Wieviele Personen leben in ihrem Haushalt, Sie eingerechnet?](#)
- [Frage 43.00: Sind Sie erwerbstätig?](#)
- [Frage 1.45: Haben Sie persönlich ein Bahn - oder Verbundabonnement?](#)
- [Frage 32.00: Wieviele Autos sind in Ihrem Haushalt vorhanden?](#)
- [Frage 47.00: Welche Schule haben Sie zuletzt besucht?](#)
- [Frage 1.51: Sie besitzen also ein GENERAL-ABONNEMENT. Handelt es sich dabei um das normale Erwachsenen GA, das Partner GA, ein Familien GA oder um ein anderes spezielles GA? \(Original\)](#)
- [Car Sharing Member](#)
- [Car Sharing genutzt](#)
- [Car Pooling](#)
- [Muttersprache](#)
- [Frage 33.00: Wie können Sie - auch wenn im Haushalt nicht vorhanden - über ein Auto verfügen? Sie können mir sagen immer, gelegentlich - oder nie.](#)
- [Frage 613.10: Benutztes Verkehrsmittel](#)
- [Frage 615.00: Zurückgelegte KM \(1 Kommastelle\)](#)
- [Frage 613.00: Zu welchem Hauptzweck haben Sie diesen Weg unternommen?](#)
- [Car Pooling Erfahrung](#)
- [Einkommen](#)
- [Mode](#)
- [im Besitz eines Ga's?](#)
- [Anderes Abo für OEV?](#)
- [Einkommen in CHF](#)
- [Wahl bei Car Pooling SP](#)
-

SP CarSharing

Variables within *SP CarSharing*

- [Interview-Nummer](#)
- [Choice](#)
- [Car Sharing Cost](#)
- [Car Sharing Parking Cost](#)
- [Car Sharing Travel Time \(in Vehicle\)](#)
- [Car Sharing Walking Time](#)
- [Car Sharing Public Transport Time](#)
- [Private Car Cost \(Gasoline\)](#)
- [Private Car Parking Cost](#)
- [Private Car Travel Time \(in Vehicle\)](#)
- [Private Car Walking Time](#)
- [Public Transport Cost \(Ticket\)](#)
- [Public Transport Travel Time \(in Vehicle\)](#)
- [Public Transport Walking Time](#)
- [Public Transport Waiting Time](#)
- [Public Transport Transfers](#)

Variables

Variable: Interview-Nummer

Location: *Range of Valid Data Values: 201038307 to 201135436*

Width: 8 *Range of Invalid Data Values: 9999*

Summary Statistics:

Minimum : 201038307

Maximum : 201135436

Mean : 201105379.264

Standard deviation : 20182.112

Variable Format: numeric

Variable: Choice

Location: **Value** **Label** **Frequency**

Width: 8 1 . 646

2 . 2228

3 . 1476

Range of Valid Data Values: 1 to 3

Summary Statistics:

Minimum : 1

Maximum : 3

Mean : 2.191

Standard deviation : 0.672

Variable Format: numeric

Variable: Car Sharing Cost

Location: *Range of Valid Data Values: 0.832 to 439.67*

Width: 17 **Summary Statistics:**

Minimum : 0.832

Maximum : 439.67

Mean : 41.448

Standard deviation : 49.317

Variable Format: numeric

Variable: Car Sharing Parking Cost

Location: Range of Valid Data Values: 3.2 to 252

Width: 16 **Summary Statistics:**

Minimum : 3.2

Maximum : 252

Mean : 10.516

Standard deviation : 20.627

Variable Format: numeric

Variable: Car Sharing Travel Time (in Vehicle)

Location: Range of Valid Data Values: 3.2 to 308.4

Width: 16 **Summary Statistics:**

Minimum : 3.2

Maximum : 308.4

Mean : 36.849

Standard deviation : 38.015

Variable Format: numeric

Variable: Car Sharing Walking Time

Location:	Value	Label	Frequency
Width: 16	0 .		1688
	5 .		1564
	10 .		1098

Range of Valid Data Values: 0 to 10

Summary Statistics:

Minimum : 0

Maximum : 10

Mean : 4.322

Standard deviation : 3.944

Variable Format: numeric

Variable: Car Sharing Public Transport Time

Location:	Value	Label	Frequency
Width: 19	0 .		1094
	3 .		1802
	6 .		1454

Range of Valid Data Values: 0 to 6

Summary Statistics:

Minimum : 0

Maximum : 6

Mean : 3.248

Standard deviation : 2.283

Variable Format: numeric

Variable: Private Car Cost (Gasoline)

Location: *Range of Valid Data Values: 0.549 to 747.4*

Width: 18

Summary Statistics:

Minimum : 0.549

Maximum : 747.4

Mean : 44.834

Standard deviation : 63.491

Variable Format: numeric

Variable: Private Car Parking Cost

Location: *Range of Valid Data Values: 3.2 to 6*

Width: 3

Summary Statistics:

Minimum : 3.2

Maximum : 6

Mean : 4.777

Standard deviation : 1.161

Variable Format: numeric

Variable: Private Car Travel Time (in Vehicle)

Location: *Range of Valid Data Values: 3.2 to 318*

Width: 4

Summary Statistics:

Minimum : 3.2

Maximum : 318

Mean : 40.787

Standard deviation : 37.339

Variable Format: numeric

Variable: Private Car Walking Time

Location: **Value** **Label** **Frequency**

Width: 17

0 .

1702

5 .

979

10 .

1669

Range of Valid Data Values: 0 to 10

Summary Statistics:

Minimum : 0

Maximum : 10

Mean : 4.962

Standard deviation : 4.402

Variable Format: numeric

Variable: Public Transport Cost (Ticket)

Location: *Range of Valid Data Values: 0.64 to 244.8*

Width: 18 **Summary Statistics:**

Minimum : 0.64

Maximum : 244.8

Mean : 15.039

Standard deviation : 20.531

Variable Format: numeric

Variable: Public Transport Travel Time (in Vehicle)

Location: *Range of Valid Data Values: 3.2 to 418.8*

Width: 17 **Summary Statistics:**

Minimum : 3.2

Maximum : 418.8

Mean : 61.996

Standard deviation : 50.662

Variable Format: numeric

Variable: Public Transport Walking Time

Location: *Range of Valid Data Values: 0 to 118.8*

Width: 20 **Summary Statistics:**

Minimum : 0

Maximum : 118.8

Mean : 11.193

Standard deviation : 9.235

Variable Format: numeric

Variable: Public Transport Waiting Time

Location: *Range of Valid Data Values: 0 to 116.4*

Width: 18 **Summary Statistics:**

Minimum : 0

Maximum : 116.4

Mean : 9.988

Standard deviation : 11.309

Variable Format: numeric

Variable: Public Transport Transfers

Location:	Value	Label	Frequency
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Width: 17	0 .	1703
	1 .	599
	2 .	963
	3 .	294
	4 .	478
	5 .	27
	6 .	212
	8 .	54
	10 .	19
	12 .	1

Range of Valid Data Values: 0 to 12

Summary Statistics:

Minimum : 0

Maximum : 12

Mean : 1.692

Standard deviation : 1.924

Variable Format: numeric

Variable: Geschlecht

Location:	Value	Label	Frequency
Width: 8	1 .	1 Männer	2447
	2 .	2 Frauen	1903
	9999 .	9999 Keine Angabe	0

Range of Valid Data Values: 1 to 2

Range of Invalid Data Values: 9999

Summary Statistics:

Variable Format: numeric

Variable: Alter

Location:	Value	Label	Frequency
Width: 8	15 .	15 - 19 Jahre	72
	20 .	20 - 29 Jahre	306
	30 .	30 - 39 Jahre	716
	40 .	40 - 49 Jahre	1298
	50 .	50 - 59 Jahre	1023
	60 .	60 - 69 Jahre	629
	70 .	70 - 84 Jahre	306
	9999 .	9999 Keine Angabe	0

Range of Valid Data Values: 15 to 70

Range of Invalid Data Values: 9999

Summary Statistics:

Minimum : 15

Maximum : 70

Variable Format: numeric

Variable: alter (ungruppiert)

Location: Range of Valid Data Values: 16 to 84

Width: 8 Range of Invalid Data Values: 9999

Summary Statistics:

Minimum : 16

Maximum : 84

Mean : 48.348

Standard deviation : 13.74

Variable Format: numeric

Variable: Frage 4.10: Wieviele Personen leben in ihrem Haushalt, Sie eingerechnet?

Location:	Value	Label	Frequency
Width: 8	1 .		440
	2 .		1773
	3 .		673
	4 .		1034
	5 .		341
	6 .		77
	7 .		12

Range of Valid Data Values: 1 to 7

Range of Invalid Data Values: 9999

Summary Statistics:

Minimum : 1

Maximum : 7

Mean : 2.849

Standard deviation : 1.243

Variable Format: numeric

Variable: Frage 43.00: Sind Sie erwerbstätig?

Location:	Value	Label	Frequency
Width: 8	1 .	1 Ja, vollzeitlich (ab 37 Std. pro Woche)	2246
	2 .	2 Ja, Teilzeit (bis 36 Std. pro Woche)	1093
	3 .	3 Nein	1011
	9999 .	9999 Keine Angabe	0

Range of Valid Data Values: 1 to 3

Range of Invalid Data Values: 9999

Summary Statistics:

Variable Format: numeric

Variable: Frage 1.45: Haben Sie persönlich ein Bahn - oder Verbundabonnement?

Location:	Value	Label	Frequency
Width: 8	0 .		603

1 .	1 Ja	2438
2 .	2 Nein	1309
9999 .	9999 Keine Angabe	0

Range of Valid Data Values: 0 to 2

Range of Invalid Data Values: 9999

Summary Statistics:

Variable Format: numeric

Variable: Frage 32.00: Wieviele Autos sind in Ihrem Haushalt vorhanden?

Location:	Value	Label	Frequency
Width: 8	0 .	0 Keines	169
	1 .	1 Auto	2066
	2 .	2 Autos	1720
	3 .	3 Autos	306
	4 .	4 Autos	72
	5 .	5 Autos	6
	6 .	6 Autos	11
	7 .	7 Autos	0
	8 .	8 Autos	0
	9 .	9 Autos	0
	9999 .	9999 Keine Angabe	0

Range of Valid Data Values: 0 to 9

Range of Invalid Data Values: 9999

Summary Statistics:

Minimum : 0

Maximum : 6

Variable Format: numeric

Variable: Frage 47.00: Welche Schule haben Sie zuletzt besucht?

Location:	Value	Label	Frequency
Width: 8	1 .	1 Primar-/Sekundar-/Real-/Bezirksschule	241
	2 .	2 Berufsschule/Lehre/Gewerbeschule	2076
	3 .	3 Mittelschule/Gymnasium/höhere Schulen (UNIVETH)	2033
	9999 .	9999 Keine Angabe	0

Range of Valid Data Values: 1 to 3

Range of Invalid Data Values: 9999

Summary Statistics:

Variable Format: numeric

Variable: Frage 1.51: Sie besitzen also ein GENERAL-ABONNEMENT. Handelt es sich dabei um das normale Erwachsenen GA, das Partner GA, ein Familien GA oder um ein anderes spezielles GA? (Original)

Location:	Value	Label	Frequency
Width: 8	0 .		3934
	1 .	01 GA Erwachsene	314
	2 .	02 GA-Plus Duo Partner	24

4 .	04 GA-Plus Familia Jugend (16-25 Jahre)	6
5 .	05 GA-Plus Familia Partner	6
6 .	06 GA Familia Kind (bis 15 Jahre)	0
7 .	07 GA Junior (16-25 Jahre)	18
8 .	08 GA Junior für Studierende 25-30 J.	12
9 .	09 GA Senior	30
10 .	10 GA Behinderte	6
11 .	11 Schnupper-GA	0
12 .	12 GA Lernende (wird durch Firma gestellt)	0

Range of Valid Data Values: 0 to 12

Range of Invalid Data Values: 9999

Summary Statistics:

Variable Format: numeric

Variable: Car Sharing Member

Location:	Value	Label	Frequency
Width: 1	1 .		196
	2 .		4130
	9 .		24

Summary Statistics:

Variable Format: character

Variable: Car Sharing genutzt

Location:	Value	Label	Frequency
Width: 1	1 .		59
	2 .		131
	3 .		199
	4 .		3961

Summary Statistics:

Variable Format: character

Variable: Car Pooling

Location:	Value	Label	Frequency
Width: 1	1 .		368
	2 .		134
	3 .		223
	4 .		905
	5 .		2714
	9 .		6

Range of Valid Data Values: 1 to 9

Summary Statistics:

Variable Format: numeric

Variable: Muttersprache

Location:	Value	Label	Frequency
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Width: 2	1 .	3097
	2 .	707
	3 .	546

Range of Valid Data Values: 1 to 3

Summary Statistics:

Variable Format: numeric

Variable: Frage 33.00: Wie können Sie - auch wenn im Haushalt nicht vorhanden - über ein Auto verfügen ? Sie können mir sagen immer, gelegentlich - oder nie.

Location:	Value	Label	Frequency
Width: 8	1 .	1 immer	3742
	2 .	2 gelegentlich	566
	3 .	3 nie	42
	9999 .	9999 Keine Angabe	0

Range of Valid Data Values: 1 to 3

Range of Invalid Data Values: 9999

Summary Statistics:

Variable Format: numeric

Variable: Frage 613.10: Benutztes Verkehrsmittel

Location:	Value	Label	Frequency
Width: 8	0 .	0 Taxi	6
	1 .	1 Auto als Fahrer	2554
	2 .	2 Auto als Beifahrer	984
	3 .	3 Tram/Bus	84
	4 .	4 Motorrad/Töff	18
	5 .	5 Bahn / Bergbahn	692
	6 .	6 Car (Ohne Fahrplan)	12
	7 .	7 Flugzeug	0
	8 .	8 Schiff	0
	9 .	9 Seilbahn	0
	9999 .	9999 Keine Angabe	0

Range of Valid Data Values: 0 to 9

Range of Invalid Data Values: 9999

Summary Statistics:

Variable Format: numeric

Variable: Frage 615.00: Zurückgelegte KM (1 Kommastelle)

Location: *Range of Valid Data Values: 2 to 333*

Width: 8 *Range of Invalid Data Values: 9999*

Summary Statistics:

Minimum : 2

Maximum : 333

Mean : 42.623

Standard deviation : 47.94

Variable Format: numeric

Variable: Frage 613.00: Zu welchem Hauptzweck haben Sie diesen Weg unternommen?

Location:	Value	Label	Frequency
Width: 8	0 .	0 Rückfahrt nach Hause	0
	1 .	1 Arbeit	1726
	2 .	2 Ausbildung	102
	3 .	3 Geschäftsreise	203
	4 .	4 Freizeitfahrt Ausflug / Nutzfahrt	2223
	5 .	5 Ferien	96
	9999 .	9999 Keine Angabe	0

Range of Valid Data Values: 0 to 5

Range of Invalid Data Values: 9999

Summary Statistics:

Variable Format: numeric

Variable: Car Pooling Erfahrung

Location:	Value	Label	Frequency
Width: 8	0 .		3891
	1 .		459

Range of Valid Data Values: 0 to 1

Summary Statistics:

Minimum : 0

Maximum : 1

Mean : 0.106

Standard deviation : 0.307

Variable Format: numeric

Variable: Einkommen

Location: Range of Valid Data Values: 1 to 9

Width: 3 **Summary Statistics:**

Minimum : 1

Maximum : 9

Mean : 4.571

Standard deviation : 1.939

Variable Format: numeric

Variable: Mode

Location:	Value	Label	Frequency
Width: 8	1 .	miv	2554
	2 .	cpm	984
	3 .	oev	704
	4 .	other	108

Range of Valid Data Values: 1 to 4

Summary Statistics:

Minimum : 1

Maximum : 4

Variable Format: numeric

Variable: im Besitz eines Ga's?

Location:	Value	Label	Frequency
Width: 8	0 .	nein	3934
	1 .	ja	416

Range of Valid Data Values: 0 to 1

Summary Statistics:

Minimum : 0

Maximum : 1

Variable Format: numeric

Variable: Anderes Abo für OEV?

Location:	Value	Label	Frequency
Width: 8	0 .	nein	1912
	1 .	ja	2438

Range of Valid Data Values: 0 to 1

Summary Statistics:

Minimum : 0

Maximum : 1

Variable Format: numeric

Variable: Einkommen in CHF

Location: Range of Valid Data Values: 1500 to 17000

Width: 8 **Summary Statistics:**

Minimum : 1500

Maximum : 17000

Mean : 8238.23

Standard deviation : 3834.21

Variable Format: numeric

Variable: Wahl bei Car Pooling SP

Location:	Value	Label	Frequency
Width: 8	0 .		1079
	1 .		3271

Range of Valid Data Values: 0 to 1

Summary Statistics:

Variable Format: numeric

Variable:

Location: *Range of Valid Data Values: 0 to 330*

Width: 8

Summary Statistics:

Minimum : 0

Maximum : 330

Mean : 38.621

Standard deviation : 47.838

Variable Format: numeric