

Parking choices

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Context

This case study aims at analyzing car driver's behaviour when choosing a parking place. The objective was to assess the economic viability of an underground car park that the municipality of Santoña (Spain) was planning to construct in order to solve the lack of available parking.

Santoña is a small coastal town of about 10,000 inhabitants in Cantabria, Spain (in 2007). The economy of the town revolves around food preserves and tourism, the latter being especially important during the summer when the population grows considerably. The Regional Government of Cantabria, the local council and the private sector, put forward a project for constructing an underground car park to solve the lack of available parking in the study area. The local authorities asked the University of Cantabria to prepare an economic viability plan for the proposal.

The GIST (Grupo de Investigacion de Sistemas de Transportes, University of Cantabria, Spain) conducted a stated-preferences survey that consisted of eight choice scenarios based on the following alternatives:

- Free on-street parking (FSP),
- Paid on-street parking (PSP), and
- Paid parking in an underground car park (PUP).

Additional explanations on the performance of the survey and the consequent study can be found in [Ibeas et al. \(2014\)](#).

Data Collection

The sample size of roughly 200 respondents was selected after the design of the definitive version of the survey became available. Respondents were contacted on the streets of the study area, either when they were in the process of parking, or about to start a car journey. Due to the difficulty of recruiting a random sample in wide and open areas, the sampling method was specified as follows: each interviewer was assigned a certain zone and was instructed to approach every driver encountered. Although not all drivers accepted to participate in the survey, a very high (90%) response rate was obtained.

The method was designed to be random among the individuals who parked in the study area and, although it is always essential to account for the difficulty of isolating the subpopulation affected in any given study, in this case it is certain that all individuals interviewed would have experienced the policy if it had been already implemented, thereby ensuring the realism of the choice experiment.

Variables and Descriptive Statistics

The experimental design finally considered the following three variables:

- access time to parking (AT), i.e., the time a user takes once arriving to the parking area, to find an empty space and park,
- access time to destination (TD), i.e., the time a user takes from the parking space to his/her real destination, and
- parking fee (FEE), i.e., the amount paid for parking, either in the street or in the underground car park.

The defined scenarios are the following:

Scenario	FSP			PSP			PUP		
	AT	TD	FEE	AT	TD	FEE	AT	TD	FEE
1	10	10	0	10	10	0.6	5	10	0.8
2	10	15	0	10	15	0.6	5	10	0.8
3	15	15	0	10	10	0.8	5	10	0.8
4	15	10	0	10	15	0.8	5	10	0.8
5	15	15	0	10	10	0.6	5	10	1.5
6	15	10	0	10	15	0.6	5	10	1.5
7	10	10	0	10	10	0.8	5	10	1.5
8	10	15	0	10	15	0.8	5	10	1.5

Table 1: SP scenarios based on the AT, TD and FEE variables

Thus, there are 8 responses per individual, each of them associated with a different choice scenario. The number of observations is 1576.

The variables of the dataset are described in Table 2, and the descriptive statistics are summarized in Table 3.

Name	Description
OBSID	Unique numerical identifier for each observation
ID	Unique numerical identifier for each respondent
SCENARIO	Id of the scenario
CHOICE	Id of the chosen alternative
GENDER	1 if the respondent is female, 0 otherwise
A20	1 if the age of the respondent ≤ 20 ; 0 otherwise
A2130	1 if the age of the respondent is $\in [20, 31]$; 0 otherwise
A3140	1 if the age of the respondent is $\in [31, 40]$; 0 otherwise
A4150	1 if the age of the respondent is $\in [41, 50]$; 0 otherwise
A5160	1 if the age of the respondent is $\in [51, 60]$; 0 otherwise
A61	1 if the age of the respondent ≥ 61 ; 0 otherwise
RESIDENT	1 if the respondent is resident in the town; 0 otherwise
OINT	1 if the origin of the trip is in the town; 0 otherwise
DINT	1 if the destination of the trip is in the town; 0 otherwise
ODINT	1 if the origin and the destination of the trip are in the town; 0 otherwise
AVEH3	1 if the age of the vehicle is 3 years or less; 0 otherwise
AVEH2	1 if the age of the vehicle is 2 years or less; 0 otherwise
INCM	Income level (monthly, in euros)
INCH	Income level (hourly, in euros)
AT1	Access time to the parking space of alternative 1 (FSP)
AT2	Access time to the parking space of alternative 2 (PSP)
AT3	Access time to the parking space of alternative 3 (PUP)
TD1	Access time to the destination from the parking space of alternative 1 (FSP)
TD2	Access time to the destination from the parking space of alternative 2 (PSP)
TD3	Access time to the destination from the parking space of alternative 3 (PUP)
FEE1	Parking fee of alternative 1 (FSP)
FEE2	Parking fee of alternative 2 (PSP)
FEE3	Parking fee of alternative 3 (PUP)
LI	1 if the level of income is low; 0 otherwise
MI	1 if the level of income is medium; 0 otherwise
HI	1 if the level of income is high; 0 otherwise

Table 2: Description of the variables

Variable	Min	Max	Mean	St. Dev.
OBSID	1	1576	788.50	455.10
ID	1	201	101.12	57.90
SCENARIO	1	8	4.50	2.29
CHOICE	1	3	1.89	0.97
GENDER	0	1	0.27	0.44
A20	0	1	0.05	0.22
A2130	0	1	0.25	0.43
A3140	0	1	0.25	0.43
A4150	0	1	0.19	0.39
A5160	0	1	0.15	0.36
A61	0	1	0.07	0.25
RESIDENT	0	1	0.53	0.50
OINT	0	1	0.45	0.50
DINT	0	1	0.84	0.37
ODINT	0	1	0.31	0.46
AVEH3	0	1	0.38	0.48
AVEH2	0	1	0.27	0.45
INCM	300	3000	1172.59	763.86
INCH	1.88	18.75	7.33	4.77
AT1	10	15	12.50	2.50
AT2	10	10	10.00	0
AT3	5	5	5.00	0
TD1	10	15	12.50	2.50
TD2	10	15	12.50	2.50
TD3	10	10	10.00	0
FEE1	0	0	0.00	0
FEE2	0.6	0.8	0.70	0.1
FEE3	0.8	1.5	1.15	0.35
LI	0	1	0.70	0.46
MI	0	1	0.20	0.40
HI	0	1	0.10	0.30

Table 3: Descriptive statistics

References

- Ibeas, A., dell’Olio, L., Bordagaray, M. and de D. Ortúzar, J. (2014), ‘Modelling parking choices considering user heterogeneity’, *Transportation Research Part A: Policy and Practice* **70**, 41 – 49.
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