

PARC-AUTO PANEL: WHO RENTS? WHO SHARES?

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Abstract:

The objective of our communication is to analyse both of these activities: who rents a car and why? Which households share the driving of their cars? For that, the Parc-Auto database, built from annual postal surveys conducted with a panel of 10 000 French households, is processed. Among circa one hundred questions in the survey, two key questions have been crossed against many social, economic, demographic, geographic or time variables. KQ1: "During the last 12 months, did you — or another person from your home — rent a car in France for personal purpose?". KQ2: "Is this car occasionally used by other persons?" Models have been derived to hierarchise variables explaining rental and sharing behaviour. Car rental is mainly a bourgeois and occasional practice. Car sharing within households is very regular as soon as the number of licences exceeds the number of cars.

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Breaking the « car & owner » paradigm:

Wide-spread car ownership within western societies has led to the dominant paradigm where nearly all adults who can drive and afford a car do own a car and drive it most of the time. The owner rarely rides other vehicles and seldom lets somebody else drive his/her car. The car and owner form a harmonious couple. Nevertheless, the huge burden that excessive solo driving puts on the natural, urban and human environment has made researchers, planners and maybe politicians think of alternative ways of travelling. While enhancing public transit, promoting non motorised modes and integrating urban and transport planning are important ingredients to attract drivers off their cars, research has shown that average mileage per car remains roughly constant (Hivert, 2001, *Le parc automobile des ménages*, ADEME-INRETS). So reducing car use also implies reducing car ownership and breaking the dominant paradigm. But to make not owning a car attractive, alternative modes may not be always convenient; therefore other means of driving a car, when needed, should be considered. Recently, emphasis has been laid on car sharing clubs, whose members can borrow one of the club vehicles against an annual membership fee and a per ride fare. Daring the risk of

disappointment, this paper will not address these schemes, but will consider more ordinary multi-driver behaviour.

In fact, surprisingly, more traditional methods for driving a car that is not personally owned have received little attention: car rental and sharing the driving of a car within households have existed for a long time. Travel behaviour according to the availability of the car and other modes has been investigated after the French transport survey (Papon, 2001, *The walking classes in France*, 9th WCTR): drivers belonging to households with fewer cars than licences drive only 69% of their trips instead of 82% for persons individually owning a car.

Tissier-Desbordes, Cova & Manceau (2005, *Projet Possession/Location*, City on the Move) have comprehensively addressed the rental-ownership relationship in an international comparison between France, Italy, Germany and the UK, reviewing sociologists' and economists' literature, highlighting etymology, analysing frequently rented articles, surveying consumers and interviewing companies. In France, the car rental market scored 1.6 billion euros in 2002; "rent-a-car" societies, insurance companies, car manufacturers seem very interested in this market evolution. But existing travel behaviour survey data have not been processed to study car rental practice.

The objective of our paper is to analyse both of these activities : who rents a car and why? Which households share the driving of their cars? Is it possible to model such behaviours? Is there any trend over several years?

The French « Parc-Auto» database:

Our methodology is greatly data driven. The Parc-Auto database has been built from annual postal surveys conducted by SOFRES with a panel of 10 000 French households since 1983. The renewal rate of the sample is approximately 1/3 per year. The answers are weighted according to criteria: region, agglomeration size, number of persons in the household, age and occupation of household head, so as to be representative of French households and cars. Circa one hundred questions have been asked in the survey about car ownership, car characteristics, main and secondary users, previous car characteristics, car use behaviour, attitudes towards automobile, opinion vis-à-vis car brands, purchasing intents.

The key question about car rental is: "During the last 12 months, did you — or another person from your home — rent a car in France for personal purpose?". A total of 2308 answered "Yes" representing 4.2% of a sample of non weighted 54 742 households-years made by fusing data from 1994 to 2001¹. This answer has been detailed by year and by the number of short and long rentals, then crossed with variables relating to household socio-economics, demographic structure, residential location, car ownership level, household car type, rental context, car rental formulas. A model has been derived to hierarchise variables explaining rental behaviour.

The key question about car sharing within households says: "Is this car occasionally used by other persons?" It does not specify whether these other persons are members of

¹ This fusion of eight annual waves, supposing that there is no long term temporal effect or trend, was useful to have more observations, so that the share of renting households could be known with a rather good precision; the semi-amplitude of the 95% confidence interval is 0.17%.

the household or not. Overall, the answer to this question is “Yes” for 3256 cars (40%) out of a sample of non weighted 8177 cars for the year 2001. This answer is very dependent on whether the considered car is the unique car in the household, the main car in the household, or a secondary car, and on whether the number of licences is one, more than one while not exceeding the number of cars, or exceeding the number of cars. Other household variables have also been selected to elucidate sharing behaviour.

Car rental: no trend and occasional practice

The proportion of households renting a car on a particular year averages 4.2%, with no significant trend from 1994 to 2001. During the same eight year period, several general indicators about demography and motorisation appear to show a more regular (monotonous) trend: the number of households increased by 1% per year, the French car fleet increased by almost 2% per year (1.83), while the number of non motorised households decreased by 0.7% per year, and the number of multi-motorised households increased by 2.7% per year.

About two thirds of them rent a car only once during the year.

A similar proportion of hires are for a short period (one to four days).

Car rental is mainly an occasional practice: only 29% of those renting a car on a particular year, rent again the year after. But 51% of those renting on two consecutive years rent again on the third year, meaning that for a minority of renters, renting has become a sustained habit. Those renting several times on a particular year are also more likely to rent again the year after than those renting only once (47% vs 22%), but if they do, they do it only once for again two thirds of them. Not renting on a particular year (which is the overwhelming behaviour) decreases the probability of renting the year after by only one third as compared to the general population.

Car rental: high profile households

The profile of households renting a car is high. Half of renters belong to the highest quartile of income, and only 10% to the lowest quartile.

As far as geography is concerned, 38% of renters live in the Paris agglomeration which represents only 16% of the French population; on the contrary, rural areas which account for 25% of the nation is home of only 14% of renters.

As regards the demographics of the household heads, age groups 25-39 and 40-64 tend to be more represented among renters (respectively 39% and 46%) than in the general population (respectively 29% and 41%), which shows a lower interest in renting for the other, youngest and oldest.

When looking at the occupation of the heads of households renting a car, a much greater proportion of upper position (31%) than in the whole population (10%) is evidenced, while the reverse is true for pensioners (18% of renters vs 33% of all).

When the size of households is considered, an increased renting proportion is monitored for households with two or four adults or persons above 15, while one person households record the lowest renting percentage (3.6%).

Finally, renting households hold more often several driving licences, and expectedly hardly include households with no driving licence which represent 11% of the general population.

Car rental: not a substitute to a lack of owned good cars

Households owning one car only are less frequent among renters (44%) than among all households (50%), but the car ownership variable proves not significant.

On the contrary, the type of owned cars has a significant effect on renting: those owning young cars (less than three years old), large engine cars, or high quality cars do rent more often.

Car rental: different contexts including moving house

13% of renters against 7% of all households moved house during previous year (probably influenced by renting the year of moving), and those moving house rented a car twice more often. Similarly, those renting a van rented a car 2.5 more often and those renting a car rented a van 2.5 more often. Among van renters, 59% of respondents declared that the last time they rented a vehicle was for moving house, other contexts (weekend, vacation, regular use, other) bringing low percentages. Unfortunately, due to a flaw in the survey, this question was only asked to van renters, while it would have been useful to ask it to all car renters. Another group of questions dealing with the appreciation of car rental formulas were also only asked to van renters, and results are not reported here.

Car rental: modelling stress the primacy of income, habitat and head age

Finally, different procedures were applied to select the most significant variables explaining renting behaviour. Here are the results:

Summary of Backward Elimination						
Step	Effect Removed	DF	Number In	Wald Chi-Square	Pr > ChiSq	
1	#working	1	18	0.0000	0.9977	
2	#over 18	1	17	0.0017	0.9672	
3	zone type	1	16	0.0312	0.8597	
4	#cars	1	15	0.1133	0.7364	
5	region	1	14	0.5220	0.4700	

Summary of Forward Selection						
Step	Effect Entered	DF	Number In	Score Chi-Square	Pr > ChiSq	
1	income	1	1	628.6530	<.0001	
2	habitat	1	2	241.5569	<.0001	
3	head age	1	3	154.8652	<.0001	
4	head position	1	4	39.5618	<.0001	
5	#persons	1	5	21.4154	<.0001	
6	#licences	1	6	24.1829	<.0001	
7	#young cars	1	7	15.1814	<.0001	
8	#large engine	1	8	11.7215	0.0006	
9	#over 15	1	9	6.5337	0.0106	
10	#high quality	1	10	4.0310	0.0447	

Summary of Stepwise Selection						
Step	Effect Entered	Effect Removed	DF	Number Number In	Score Score Chi-Square	Wald Pr > ChiSq
1	income		1	1	628.6530	<.0001

2	habitat	1	2	241.5569	<.0001
3	head age	1	3	154.8652	<.0001
4	head position	1	4	39.5618	<.0001
5	#persons	1	5	21.4154	<.0001
6	#licences	1	6	24.1829	<.0001
7	#young cars	1	7	15.1814	<.0001
8	#large engine	1	8	11.7215	0.0006
9	#over 15	1	9	6.5337	0.0106
10	#high quality	1	10	4.0310	0.0447

Odd ratios, with confidence interval bars, were also calculated for different variables so as to give the probability of renting a car as compared to a reference. For example, rural areas show only 40% of renting activity of the Paris agglomeration, while upper position heads induces a renting proportion multiplied by 1.4 as compared to middle position heads.

Who rents?

Renting households are mainly working, high income middle-aged households, living in the core of big cities, and in particular in Paris. Most of them hold several driving licences, have two wage-sheets and generally recent, high power, high quality cars. Car rental is mainly an occasional practice, and no monotonous trend can be observed, such as an increase over years. Yet for a minority of renters, it is a sustained habit: 30% of households renting a car on year n rent again on year $n+1$.

Car sharing: a confrontation of licences and cars

First of all, for studying car sharing according to the questionnaire, a rather wide or fuzzy concept of car sharing has been used here: on the one hand because the "other driver" occasionally using the car is not necessarily part of the household, but on the other hand because the structure of the questionnaire survey wholly refers to the last twelve months: this sharing can correspond to the loan of a car for certain trips (or purposes), regular or not, but also with the division of driving, for example during a long trip (that can be, for example, more often seen for the main vehicle and in the case of departure on holiday). Besides, only drivers sharing the car are considered here, passengers are not turning cars into shared cars.

Car sharing behaviour within households is highly dependent on the comparison between the number of cars and the number of licences in the household. More precisely considering motorised households only, the considered car can be the unique car in the household, the main car (as freely defined by the respondent, usually household head) out of several cars, or a secondary car out of several cars. This variable is called car rank. The number of licences can be one (since the household is motorised), comprised between two and the number of cars, or greater than the number of cars. In the latter case, the proportion of shared cars is much higher, and decreasing with the number of cars. In all cases, the proportion of shared cars is slightly lower for secondary cars than for main cars. One licence households share the least, because they have to share with drivers outside the household. They share slightly more if they own two cars: one can assume that in this case, the second car is intended to be driven by a relative, friend or neighbour outside the household.

Among all cars, most cars are owned in households where the number of drivers does not exceed the number of cars, especially if there are several cars. But among shared cars, this proportion is lower: for example, 10% of shared cars are owned by households

owning only one car and holding one licence, when this proportion is 26% for all cars. Overall, households with more licences than cars own 41% of shared cars but only 23% of all cars.

Another way of studying this licence-car relationship is to consider the household structure by licence holders and adults with no licences. Many combinations are possible. The most frequent are: double licence couple, with an average sharing behaviour at 45%; triple licence family, with the highest sharing proportion at 61%; single licenced adult, who seldom (19%) shares; double licence head and other person in household, with unlicensed partner, with 52% sharing; licensed head, with unlicensed partner, with the lowest sharing proportion at 11%.

Considering again the car rank variable, whatever the licence structure, the secondary car is less shared than the main car, which in turn is in general less shared than the unique car, except for single licence households who may prefer sharing this main car when they own two cars. But there is a significant drop in sharing from 75% to 39% for double licence couples when they upgrade from one to two cars.

Car sharing: enhanced by higher wages

High income households share more their cars, but this is mainly a structural effect since they own more cars and hold more licences. Nevertheless, when the licence-car structure is given, high income households also share more, in particular their secondary cars.

On the contrary, sorting sharing proportions by the occupation of household head and the car licence-structure yields a forest of proportion buildings with no significant disparity.

More complexly, the proportion of shared cars increases when the number of working persons in the household increases, but this is again a structural effect, as when the licence-car structure is given, the reverse is observed: multi-income household working persons do need their car all day when they use it, and can share less; other income earners have to rely on other modes if the number of cars is not sufficient.

Car sharing: gender prejudice

Investigating which users share their car, it is found that when the main user of the car is the head of household, the car is less shared (38%) than when the main user is the head's partner (47%). When the main user is another person in the household (mainly a grown-up child), the proportion of shared cars is again lower.

As household heads are more often male than female, it is interesting to directly consider the gender of the main user. The women share more often than men, except when they are the main user of the unique car in households with other drivers; in this case, the reason for not having a male main user as it is ordinary the case may explain the lack of sharing (husband with no licence or unable to drive).

The role of gender for driving cars can further be analysed by plotting on a graph with x-axis representing the proportion of shared cars and the y-axis the proportion of female users, both for the main user and the first secondary user, by licence-car structure. The main user of the unique car in one-car-one-licence households is more often female

(54%) because such households are mainly single women. In households with two or more cars, and no more licences, the plotted points for the two users of the two cars form an interesting trapezium showing that the main user of the main car is more often male, and the secondary user of the main car female, and the reverse is true for the secondary cars, otherwise slightly less shared. A similar pattern is observed when the number of licences exceeds the number of cars, but with less gender difference for the secondary car as there are more often children driving this car. Finally, when one car is shared by several drivers, in 74% of households a man is the main driver, and a woman the secondary driver.

The gender can also be examined through the household head with similar results: households with a female head share more.

Car sharing: age related

Age is another characteristic of the household head: in the youngest households (18-24), cars are shared the most with a given car-licence structure, and then sharing decreases over time as households get older, with a renewal of sharing in the 40-64 age group when household children begin to drive.

Considering now the age of the main user, a slightly different picture is obtained: as the youngest main users share less when they do not form a household, the proportion of shared cars increases with the age of the main user, as there are more partners and children with whom to share.

Car sharing: decreasing and mainly a matter of car ownership matching licences

The proportion of shared cars has been decreasing over time between 1994 and 2001. This movement is the mirror image of the proportion of household owning several cars which has increased (2.7% per year) during the same period: as households own more cars, there is less need to share; or the French are becoming more individualistic or the car is becoming a more personal item.

When modelling the proportion of shared cars, eliminating less significant variables such as head position, and selecting the most significant variables explaining sharing behaviour, most of likelihood is explained by two variables: the number of licences and the number of cars: one more licence quintuples the proportion of shared cars, while adding one car halves it.

Who shares?

Households with more licence holders than cars share the most: about three quarters of them share their cars. On the contrary, single driver-single car households have less opportunity to share: only 15% share. Car sharing shed light on the gender role within households: while 58% of the main users of the shared cars are male, 55% of secondary users are female. Car sharing is mainly a regular practice: four cars out of ten are shared on year n , three of them are shared again on year $n+1$.

Who cares?

Finally, without diminishing the merits of innovative transport solutions proposed here and there, it is not a waste of time to give some insight on self established behaviour within households. This reveals that complex patterns have been built over time by the people themselves, to cope with diverse situations that cannot be easily handled by

straightforward classifications. The car cannot be reduced to a personal object, even it seems to become more and more personal. Car sharing also carries strong links with the issue of car dependency. Developing renting practices can result in decreasing the volume of the overall fleet, while sharing can also be used as a short-term solution for those who do not have alternatives. According to the results of this study, however, these activities do not necessarily decrease the overall car traffic. But sharing and renting may support a depersonalisation of the object, resulting in managing it more jointly, and perhaps in pooling it more often and in curbing households' behaviours into a more collective sense. Sifting car availability and choice universes may also be useful for fitting disaggregated models of sharing.

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