

Impact of car share on household car ownership: Empirical evidence from Melbourne, Australia

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Abstract

Car sharing has been available in Australian cities since the early 2000s. While international studies show that car sharing leads to reduced dependence on personal cars (Martin et al., 2010, Lane, 2005), Australian academic research is missing. This paper is based on an electronic questionnaire survey of car share members (n=651) and non-members (n=290) in Melbourne, Australia. The study found that car share leads to a net reduction in car ownership among members. Car share members, specially fleet based car share members, own significantly fewer cars than non-members. These results are relevant for guiding future policy regarding this emerging form of transportation.

1 Introduction

Car share refers to services which allow its members to borrow cars from a fleet of vehicles parked in on-street or off-street car parks. While fleet based shared cars are provided by commercial operators such as Goget who maintain the fleet, peer to peer (P2P) operations are provided by operators such as Car Next Door who assimilate spare capacity on spare vehicles. In Melbourne, the number of car share users has quadrupled in the last five years, with most vehicles concentrated in inner and middle Melbourne. Policy analysts lack a thorough understanding of whether car share is complementary to or conflicting with current transport objectives. This study aims to answer these questions and directly inform public policy.

2 Aims and Objective

This study aims to investigate how car share affects car ownership. This aim will be achieved through two research questions. Firstly, how does the car ownership of members compare with non-members? Secondly, how does the car ownership of members change after becoming car share members?

3 Data and Method

Survey requests were circulated through 3 largest car share operators to car share members across Melbourne. Survey requests for members and non-members were also circulated on social media, RACV magazine and through a market research panel. The total number of valid responses included 617 car share members and 290 non-members. Non-members were recruited from areas within a 10-minute walking distance of car share locations, to only select individuals who had an option to use car share. Data was analysed using SPSS statistical package.

4 Results

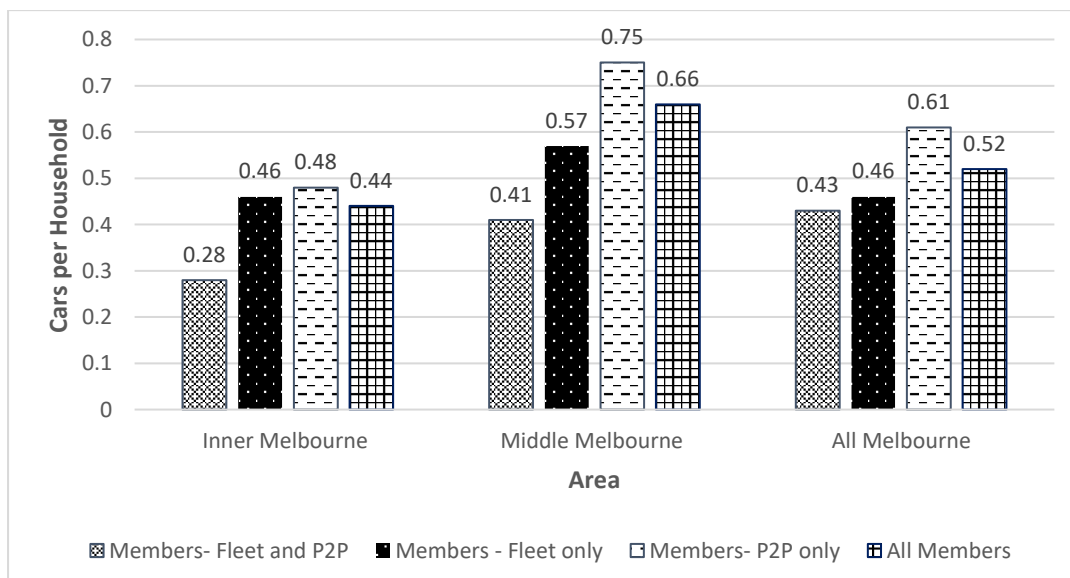
4.1 Comparing car ownership for member and non-member households

Unlike most previous literature (Cervero et al., 2007) car share member and non-member comparison was designed to account for geographic and socio-demographic bias. Geographic bias was accounted for by selecting non-members from areas within 10-minute walking radius from a car share location. Members and non-ere sampled in the same ratio from inner and middle Melbourne so that the two groups were geographically comparable.

There was a significant difference in socio-demographic criteria between the two groups as members were more likely to be younger, child-free, high-income full-time workers. To account for socio-demographic bias between the two groups, non-members were statistically weighted across several socio-demographic parameters to ensure they matched the member sample.

Post geographic and socio-demographic adjustment, it was found that member households owned significantly fewer cars (0.52) than non-member households (1.21), as per Mann Whitney U Test ($p < 0.00$). Member households with both P2P and fleet-based membership had the lowest household car ownership. Member households with only P2P memberships had the highest car ownership levels among all member participants. However, the P2P average was still lower than the car ownership rate of comparable non-members.

Figure 1: Comparing car ownership for different type of car share members



Further, examination of psycho-social variables (based on confirmatory factor analysis of 35 attitudinal variables) highlighted differences in attitudes between members and non-members. However, this study did not control for these variables. There is a hence a possibility that the difference in car ownership could be partially due to attitudinal self-selection. Future studies could benefit by conducting attitudinal market segmentation for members and non-members and then conducting car ownership comparisons within each market segment, to control for attitudinal differences.

4.2 Comparing car ownership for members, before and after joining car share

Though findings in section 4.1 depict that members own fewer vehicle, they do not justify the 'impact' of car share, as it is likely that non-car owners self-select as car share members to get access to a vehicle. Hence, members were asked to report their household car ownership level at three points of time:

- One year before joining car share
- On the day they joined car share
- At the time of the survey

For all member respondents (n=651), one year before joining car share, the average car ownership per car share member household was 0.70. By the time of joining car share, this dipped to 0.51 and remained the same until the time of the survey. A paired t-test was run on the car share members to determine whether there was a statistically significant mean difference between the number of cars owned a year prior to joining car share and at the time of joining car share. Members reduce cars per household from 0.163 to 0.224; a statistically significant reduction of 0.194 (95% CI, 0.0909 to 0.1802) cars per household, $t(650) = 12.490$, $p < .000$. Differences in car ownership between the time of joining car share and the time of survey were not found to be significant (95% CI, -.038 to 0.38), $t(650)=0.000$, $p=1.000$.

Respondents who experienced no change in car ownership, between the time of joining car share and the time of the survey, were asked if they would have increased their car ownership level if car share was not an option. Hence, adding forgone car purchases to the car savings, this brings down the total car savings from 0.70 to 0.40 per household. This translates to an average reduction of 0.3 cars per household or in simpler terms 1 in 3 car share member household had sold or forgone a car purchase. Fleet based members (n=343, excluding P2P only members) experienced a reduction of 0.37 cars per household, which is slightly higher than the 0.30 cars per household for all car share members.

Although the change in net impact of car share is valuable, it does not help in exploring the underlying range of impacts. Considering actual changes in car ownership for all members (n=651) (excluding forgone purchases) only a small proportion (6%, n=39) experienced a net increase in car ownership. Almost three-quarters of car share members (72%, n=469) did not experience a net change in car ownership. About a quarter of all respondents (22%, n=143) experienced a net reduction in car ownership. 57% (n=82) of these, who reduced car ownership) would not have reduced car ownership, in the absence of car share.

5 Conclusion

The results presented in this paper are the result of the first independent academic assessment about the impacts of car sharing in Australia. Comparison of members with census data found that the former group has a significantly fewer number of cars per household. Using retrospective car owning data, it was confirmed that one in three car sharing households had reduced car ownership by one car. However, most of these reductions could be attributed to cars sold prior to joining car share or to forgone purchases. This is in contrast to research from other countries where a sizeable proportion of members sold off their cars after joining car share. This is partly explained by the fact that 60% of members joining car share were non car owners, as per this study. These results are highly relevant for policymakers at the state and local levels and can aid car share policy in the future. Future research should focus on motivators and barriers of car share adoption so that even car owners can be encouraged to adopt car share and reduce car ownership.

6 References

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