Why Do People Rent Passenger Vehicles? Evidence from Canada

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Introduction

The remarkable increase in vehicle ownership over the past six decades has placed great emphasis on studying travel demand in urban areas. The transportation literature has traditionally focused on the decisions made by households to own private vehicles. However, there is a clear absence of any study which looked into the temporary rental of vehicles to meet personal travel needs. The majority of the existing studies on rental fleets have been focused on the optimization of fleet logistics to maximize revenue, which is highly dependent on proper logistics management for car rental companies (e.g. Fink and Reiners, 2006).

Understanding consumers' motivations behind renting a vehicle is as important as fleet optimization. The rationale behind this is that rental vehicle companies would normally invest in acquiring vehicles that are in great demand by their clients. This is particularly the case since rental vehicle companies, like all other businesses, are primarily driven by profit maximization which is dependent on consumers' demand for particular goods. In this paper, the analysis strives to fill the existing gap in the literature by determining the characteristics of vehicle renters and evaluating the factors influencing the purpose for renting vehicles for temporary use in the Canadian market.

An online survey targeting 1,000 Canadians across the country was conducted in early 2016. The survey collected socio-economic information about the respondents. Further, the survey posed questions about the reason for renting a vehicle, the nature of the rental location, the vehicle rental price, the number of days the vehicle was rented, and the distance driven by the rental vehicle.

Data Collection

Table 1 provides the distribution of respondents by province as a share of the total population. Except for Quebec and New Brunswick, the calculated figures suggest comparable provincial shares between the surveyed sample and the total population in 2016. The noticeably low representation of respondents from Quebec and New Brunswick in the sample was potentially due to administering the survey in the English language only.
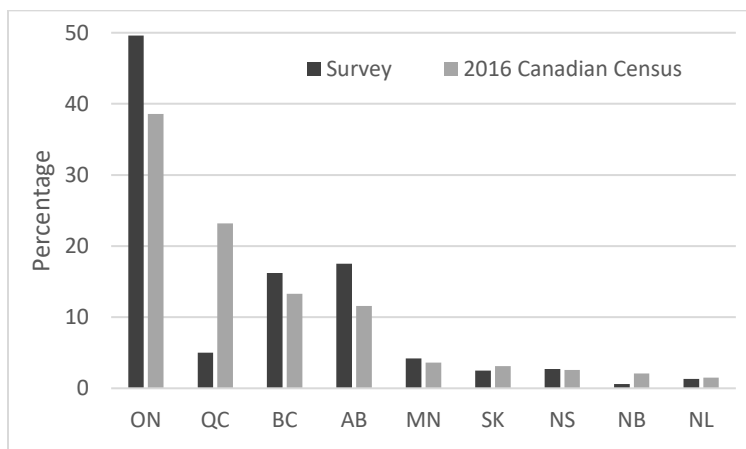

Figure 1: Distribution of Respondents by Canadian Province

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Table 1 summarizes some key demographic and socio-economic characteristics of respondents in comparison to the 2016 Canadian census. The characteristics of the respondents differ from those portrayed by the Canadian census, but this is expected since the sample is solely focused on people who rented vehicles within 12 months from the date of the survey. As such, the sample pertains to specific population segments that are more likely to rent vehicles compared to the general Canadian population.

Table 1: General Characteristics of Respondents

		Respondents (%)	2016 Census (%)
Gender	Females	47.9	51.3
	Males	51.1	48.7
	Prefer not to say	1.0	-
Marital status	Married/common law	70.8	57.6
	Never married	18.4	28.1
	Widowed/divorced/separated	8.6	14.2
	Prefer not to say	2.2	-
Education	High school or lower	16.3	44.7
	College diploma or alike	30.0	32.0
	Bachelor degree	31.2	15.5
	Gaduate school	21.0	7.7
	Prefer not to say	1.6	-
Age group	18 to 24	5.7	14.6
	25 to 34	20.1	15.7
	35 to 44	24.2	15.5
	45 to 54	20.0	17.2
	55 to 64	18.4	16.8
	65 and up	11.6	20.3
Household income	Less than $50,000	15.6	67.0
	$50,000 - $99,999	37.6	24.8
	$100,000 - $149,999	20.5	5.4
	Greater than $150,000	13.3	2.8
	Prefer not to say	13.0	-

Rental Vehicle Purpose Modeling

The multinomial logit (MNL) model has been extensively used in transportation research to identify and explain the significant factors influencing the choice behavior of decision-makers. In this paper, an MNL was specified and estimated to explain the reason for temporarily renting a private vehicle by a Canadian consumer. The online survey presented respondents with four choices: 1) renting to make a business trip; 2) renting to make a leisure trip; 3) renting to have a temporary replacement; and 4) renting for other reasons. The choice process for any consumer r can be modeled by assigning a utility function U_{ir} to each choice i:

$$U_{ir} = V_{ir} + \varepsilon_{ir}$$

where $V_{ir} = \beta X_{ir}$ is the deterministic part of utility that depends on the parameter vector β associated with the vector of explanatory variables X_{ir}, and ε_{ir} is the unobserved random term. According to Ben-akiva and Lerman (1985), consumer r will choose the alternative with the highest utility. If ε_{ir} is assumed to be iid and follows the Gumbel Distribution, then the probability P_{ir} of renting a vehicle for purpose i can be formulated as the MNL model:

$$P_{ir} = \frac{\exp(V_{ir})}{\sum_j \exp(V_{jh})}$$

Results

Table 2 presents the parameters of the developed MNL model, which was estimated in the NLOGIT 5 econometric software.

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Table 2: Parameter Estimates of the MNL Model

	Variable Description		β	t-stat
Rented Vehicle	Alternative-specific constant	T	1.831	4.39
	1 if the renter rented a medium-size sedan; 0, otherwise	B	0.650	3.35
	1 if the renter did not rent a truck; 0, otherwise	L	1.454	5.01
	1 if the renter rented a small-size sedan or an SUV; 0, otherwise	T	0.668	2.93
	1 if the renter rented a luxury sedan or a truck; 0, otherwise	O	0.729	1.79
Rental Vehicle Location	1 if the renter rented the vehicle in an airport or train station; 0, otherwise	B, L	3.251	8.11
		O	3.110	5.47
	1 if the renter rented the vehicle near his/her place of residence; 0, otherwise	L	0.773	3.25
		T	1.120	3.64
		O	1.535	3.73
Rental Vehicle Plan	1 if the renter is part of a car rental loyalty program; 0, otherwise	B	0.940	8.11
		L	0.457	2.17
	1 if the renter considers discounts when renting a vehicle; 0, otherwise	L	1.204	6.24
	Number of days the renter rented the vehicle	L	0.082	2.43
		T	0.133	3.68
	1 if the renter rented the vehicle for 1 or 2 days; 0, otherwise	B	0.768	3.16
	1 if the renter rented the vehicle for only 1 day; 0, otherwise	O	1.577	4.40
	1 if the renter spent $41-$60 on the vehicle per day; 0, otherwise	B	0.457	2.35
	1 if the renter spent less than $60 on the vehicle per day; 0, otherwise	T	0.630	2.44
	1 if the renter spent more than $80 on the vehicle per day; 0, otherwise	O	0.911	2.23
	1 if the renter travelled for more than 200km; 0, otherwise	B, L	0.637	3.08
	1 if the renter travelled for less than 50km; 0, otherwise	T, O	1.059	3.12
Socio-economic Characteristics	1 if the renter is male; 0, otherwise	B	1.222	4.49
		L, O	0.609	2.83
	1 if the renter is single and never married; 0, otherwise	B	0.557	1.68
		L	1.047	4.00
	1 if the renter has bachelor degree or higher; 0, otherwise	B	0.550	2.22
		L	0.415	2.11
	1 if the renter is 44 years old or younger; 0, otherwise	B	0.458	2.30
	1 if the renter is 55 years old or older; 0, otherwise	T	0.590	2.17
	1 if the renter has household income of more than $75,000; 0, otherwise	B	0.517	2.04
		L	0.428	2.13
	1 if the renter has fulltime business or management occupation; 0, otherwise	B	0.538	2.66
	1 if the renter is retired; 0, otherwise	L	1.300	4.28
		O	1.581	3.38
L(0)			-1389.067	
L(c)			-1042.848	
L(β)			-760.322	
Pseudo R²			0.271	

* B = business; L = leisure; T = temporary replacement; O = other purpose

Individuals renting a vehicle to make a business trip accounted for 16% of the surveyed consumers. This group are more likely to rent medium-size vehicles, all things being equal. In addition, the revealed choices suggest that rentals for business trips are more common near airports or train stations and tend to be associated with long travel that is greater than 200 km. These results are in line with the idea that out of town trips for business purposes are common. Further, consumers engaging in renting vehicles to make business trips are affiliated with rental loyalty programs. This is not surprising since these programs provide exclusive offers and promotions which cut the cost of renting. Understandably, people making business trips with rental vehicles tend to work in business- or management-related sectors. The results also indicate that individuals renting to make business trips are more likely to have higher income. They are also more likely to be middle-aged or younger, singles, males, and with bachelor's degree or higher.

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Individuals renting vehicles for leisure purposes accounted for the majority (62%) of all consumers in the sample. These consumers, as in the case of business trip makers, are more likely to pick up their rental vehicles from airports or train stations. To a lesser extent, this group also tend to pick up their rental vehicles from companies near their place of residence. Leisure vehicle rentals are affiliated with long travel (i.e., more than 200 km), suggesting out-of-town vacations or long road trips. This further supports the idea that consumers travelling for leisure purposes are likely to rent any vehicle class, except trucks. Furthermore, the longer these individuals rented the vehicle, the more likely they are renting for leisure purposes. This consumer group, as in the case of business trip renters, tend to be part of car rental loyalty program. They also consider discounts when renting vehicles in order to save money. In addition, people within this consumer group tend to be retired individuals or males. Finally, people with high income and with high education are also likely to rent vehicles for leisure purposes.

Individuals renting vehicles as a temporary replacement accounted for 18% of the consumers in the surveyed sample. According to the alternative-specific constant, factors other than those observed in the model increase the probability of renting vehicles as temporary replacements. Consumers renting temporary replacement vehicles are more likely to gravitate towards small vehicles or SUVs. This could be due to decisions made by vehicle insurance companies that often dictate the type of vehicles an individual could rent as a temporary replacement when their owned car is involved in an accident. In such case, insurance companies will offer to cover the rental cost of an economic vehicle (i.e. small size vehicle) or a same vehicle class like the one the consumer owns (i.e. SUV). The model further suggests that consumers renting for a temporary replacement tend to spend less than $60 on the rental price, other things being equal. People renting a temporary replacement vehicle tend to pick the rental vehicles from a company close to their home. In addition, renting a temporary replacement vehicle is associated with longer periods of rental when compared to renting for other purposes. Temporary replacement vehicle rentals are associated with shorter traveled distances of less than 50 km. This is expected since temporary replacements are meant to be used for intra-urban daily mobility (i.e. short trips within the city).

Only 5% of the total sample rent vehicles for other purposes than the three highlighted above. The model suggests that people renting for other purposes tend to gravitate toward luxury sedans or trucks. The choice of these vehicle types could be attributed to testing new cars (in the case of luxury) or relocation (i.e. moving services in the case of trucks). This idea is further supported by the other parameters which suggest that these renters get the vehicle for only one day and travel less than 50 km. The results further suggest that consumers renting for other purposes tend to spend a substantial amount on the rental price. The results also suggest that males and retired individuals have a higher propensity of renting for other purposes.

Conclusion
This paper offers new results that will fill one of the existing gaps in the transportation literature by modeling the purpose associated with renting a passenger vehicle in Canada. Findings from the conducted modeling exercise could be used to develop certain marketing strategies to potentially maximize the revenue of vehicle rental companies. The developed model could also be used in travel demand modeling to identify the percentage of travelers that make use of rental vehicles in urban areas.

References
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