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Effects of peer influence, satisfaction and regret on Car Purchase Desire

Prawira Fajarindra Belgiawan*, Jan-Dirk Schmöcker, Satoshi Fujii

aKyoto University, Katsura Campus, Kyoto 615-8540, Japan

Abstract

Car ownership levels are increasing rapidly in developing countries, leading to unsustainable developments. Following previous research, we suggest that peer influences are important determinants of desires to purchase cars. Using data from 134 undergraduate students who own a car from Bandung, Indonesia, this study constructs through principal component analysis four groups that partly explain the desire to trade in one's current car to a better one: Friends, Commercial, Siblings and Parents. These four factors, along with the degree of satisfaction and regret of having bought one's current car, are used in correlation analysis to determine their correlations with the desire to purchase a different car. Our results suggest that the influence of siblings is a significant determinant. We discuss that this might highlight the importance of peers in car purchase decision.

1. Introduction

Car ownership levels are increasing rapidly in many developing countries. Increasing income levels allow in particular citizens of the major cities in developing countries to purchase more and larger vehicles. One particular trend of South-East Asian countries is the "upgrade" process from current motorcycles owners to purchase cars. Other negative side effects, such as air and noise pollution, accidents and land-use developments trends, are also well known.

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* Corresponding author. Tel.: +81-75-383-3242; fax: +81-75-383-3236.
E-mail address: belgiawan@trans.kuciv.kyoto-u.ac.jp.

In Indonesia and other developing countries, this trend towards more and larger vehicles appears to keep continuing despite the lower average speeds of cars compared to motorcycles in the already congested cities and despite the well observable other environmental side effects. Indonesia, with a total population of 230 million people, is the world's fourth most populous country [1]. In line with population growth, the number of motorized vehicles rapidly increases according to Indonesian Central Agency of Statistics [2]. In 1987, there were around 6 million motorcycles; while in 1995, there were already 10 million and by 2009, there were 60 million motorcycles brands that have been passed. Car numbers also keep increasing, though not as fast as motorcycle in numbers. In 1987, there were around 1 million cars and by the end of 2009, there were already 10 million private cars on Indonesian streets.

Almost all cities in Indonesia, except for Jakarta, do not have an advanced mass transportation system, such as bus rapid transit (BRT). In Bandung, according to Joewono [3], 61.2% of public transports (PT) operated are in forms of Para-transit (Angkot), while the rest are bus, taxi and rickshaw. In Jakarta, despite the development of BRT, investments in public transport do not seem to have a significant effect (yet) on motorisation as car ownership level increases [4]. This study, therefore, aims to better understand car purchase motivations of individuals.

The structure of this paper is as follows: After this introduction, the second part of this paper will discuss previous research about peer influence in car owning decision, which is also the main objective of this paper. The following part discusses our survey among students in Bandung regarding their peer influence to buy cars. We, then, describe first some aggregate statistics before employing correlation analysis. The results are discussed and some conclusions drawn.

2. Literature Review

One of the studies about peer influence on car ownership is conducted by Goetzke and Weinberger [5]; they study social network effects on car ownership. They particularly distinguish endogenous and contextual effects following Manski [6]. Endogenous effects refer to the case where one's behaviour is influenced by the behaviour of others in one's peer group. Contextual effects refer to characteristics (not behaviour) of the peer group that may influence an individual's behaviour. Their experiment that incorporates both effects on the models finds that the peer effect coefficient (endogenous effect) is highly significant. This suggests that the probability of owning a car is affected by the behaviour of socio-economic peers and physical neighbours, meaning that people have a higher probability to go car-less if they are surrounded by other households who do not have cars. Gaker et al. [7] study the effect of others on a person's car type choice by computer laboratory experiments with a large number of subjects, most of whom are undergraduate students. The results show that the subjects are influenced by the decision of their peers in the experiments, leading the authors to conclude that social norms are amongst the most powerful influences on auto ownership decisions, including whether to buy a car and what type (hybrid or conventional). Ozaki and Sevastyanova [8] analyzed the market share of Prius in the U.K. They conducted a survey among people who had purchased a Toyota Prius in the 24 months prior to January 2009 and their results also suggest that purchases are related to what people have seen others buy. They discussed that, hence, promoting the message that hybrid cars are normal should be more widely employed.

All the studies mentioned above are evidence for the importance of peer influence on car ownership decisions in developed countries which motivates this research to confirm the peer influence on the desire to purchase another or better car in an Indonesian context. Although, our motivation is broader, we aim to understand not only the influence of peers but, more generally, which groups are likely to be important for students' decision making. Since there has not been much research that specifically discusses the influence of others on "car upgrading", in this study, we, therefore, test three hypotheses. Firstly, we test

whether group's influence and car satisfaction are related. Our hypothesis is that a stronger group's influence is associated with lower satisfaction level with their current car, because higher group influence means that one is more likely to have bought a car that does not necessarily suit one's needs but rather bought a car to fit with others' expectations. Secondly, we hypothesize that satisfaction and regret are negatively correlated and that regret is positively correlated with group influence. Thirdly, since satisfaction and regret will influence the desire to own a different car and following from previous two hypothesizes we test whether (past) group influence positively influence the desire to purchase a different car.

3. Methodology

3.1. Respondents

To understand whether there is a significant influence of peer group on car owning decision, a survey was conducted in February 2011 in Bandung, Indonesia. Bandung is chosen as the target area because currently it is the densest city in Indonesia and therefore experiences the most severe transportation problems in Indonesia. The targets of the survey are students of Bandung Institute of Technology (ITB). Students of ITB come from many regions in Indonesia so most of them do not share the same background. Our survey focuses on undergraduate students between 17 until 23 of age, as they often purchase cars within their four years at university. The majority of the samples were obtained through surveys in classrooms at the end of lectures. Some additional surveys were obtained through randomly approaching students in communal areas. In total 500 complete surveys (282 male and 218 female) could be obtained. The respondents come from 25 departments; that means that most departments of ITB are represented. 134 respondents are car owners, while 366 do not have car. From this point on, we focus only on the 134 car owning students.

3.2. Questionnaire

We asked car owners to recall how much certain groups of people influenced their decision to buy the car they currently own. The choices were given on a 7 points Likert scale, starting with "he/she never talked to me about this car" followed with "he/she suggested me to buy this car" as a middle point, and ended with "he/she strongly recommended me to buy this car". These groups of people are father; mother; partner; brother; sister; friends; classmate; student association mate and virtual network. Since they are students we assumed that aside from family and probably partner, if they have one, they directly interact a lot with campus mates and also virtual network mate; thus, friends, classmate, student association mate and virtual network are incorporated here. They are also asked how certain group of media influences their decision to buy a car. The answer range is also given on a 7 point Likert scale from "no influence at all" to "strong influence". These groups are newspaper; TV commercial; radio commercial; internet commercial and car expo. The next question for them is "are you satisfied with your car?" the answer range is 7 point likert scale from "not at all" until "yes, very much". The same answer range is also used for another question "do you regret having bought a car?" And, finally, they have to answer whether they will buy a new car or not in the future.

4. Summary Statistics

4.1. Descriptive Statistics

From the result of the survey, we obtained 97 students who have a desire to upgrade their car and 37 students who have no desire to upgrade their car. We derived the desire to upgrade a car from the question asked to car owners whether they want to buy another car or not. Thus we imply that students who answered with "yes" have a desire to upgrade their car. The mean and standard deviation of satisfaction and regret can be seen in Table 1. From the table we can see that most of the students are quite satisfied with their current car and most students have few regrets that they bought their current car.

Table 1. Descriptive statistic of satisfaction and regret.

Variable	N	Mean	Std. Deviation
Satisfaction with current car	134	5.49	1.175
Regret with the car bought	134	1.94	1.175

For the group influence on past car owning decision, we decided to distinguish two samples. In the first sample, we treated a "no" answer as a missing value and omitted these respondents in the subsequent analysis. For example, one might have no sister, and, so, might not have answered the question relating to influence of sister. We note that this introduces a bias in our sample towards students from larger families. For the second scenario, we treated the missing value as "no influence" which means that we consider for example no brother as the same as no influence from a brother. The descriptive statistic can be seen in Table 2.

Table 2. Descriptive statistic of influence group

Influence Group	Biased Sample			Full Sample		
	N	Mean	Std. Dev	N	Mean	Std. Dev
Father	133	4.71	1.918	134	4.68	1.937
Mother	133	4.19	2.049	134	4.16	2.060
Partner	108	2.12	1.678	134	1.90	1.570
Brother	114	3.14	2.013	134	2.82	2.007
Sister	118	2.91	2.013	134	2.68	1.987
Classmate	118	2.00	1.612	134	1.88	1.546
Student Association Mate	118	1.75	1.530	134	1.66	1.456
Friends	118	2.34	1.887	134	2.18	1.822
Virtual Network	116	1.55	1.253	134	1.48	1.181
Newspaper	124	3.60	1.719	134	3.41	1.791
TV Commercial	125	3.90	1.934	134	3.70	2.004
Radio Commercial	122	2.48	1.478	134	2.35	1.473
Car Expo	128	4.76	1.894	134	4.59	2.008
Internet Commercial	124	3.77	1.900	134	3.56	1.968

Based on the table in both samples, we can see that father and mother have high values which mean that strong suggestions to buy their current car were given by parents. For partners and siblings, the values are not so high implying that these groups did not give strong suggestion/influence on the decision to buy the current car. But, it is interesting to note that 114 out of 134 answer the question regarding

influence of brothers. There is a possibility that many without brother will also have answered "he/she never talked to me about this car" which is supporting our second sample. At current state, we cannot confirm whether they have siblings or not.

As we mentioned before, since the respondents are undergraduate students, we assumed that they directly interact with their classmate and also student association mate; hence, there is high possibility that these peer groups influence the decision of students to purchase cars. But, from the result, we can see classmates and student association mate influence decisions less than friends. We do not give clear definition about the term friends, while classmate, as well as student association mate, is clear by definition; but, for friends, it can have a wider scope or range from campus until neighbourhood. For virtual network friends, we mentioned Facebook or Twitter as an example since almost all Indonesian students have Facebook and/or Twitter accounts; we assumed that the influence to purchase car from this virtual network friends is high; but, based on the table, we can see that virtual network friends give low influence.

For commercial sources, such as newspapers, TV and internet commercials, quite high influence values are reported, although below the mid points. The similarity between these three media is in the visual part – they can see the product and they can read the information about certain types of car; in case of TV, they can listen to the explanation. For radio commercial, although they can get much information regarding car, but they might not be attracted to it since it is not visualized. Car Expo is different from any other media mentioned before; the respondents can actually see the product. They can get information regarding the product and experience it; thus, it gives higher influence in the decision to purchase car (as can be seen in the table).

4.2. Principal Component Analysis

Table 3. Descriptive statistic of influence group

Influence Groups	Friends	AV Commercial	Parent	Text Commercial	Siblings
Classmate	.846				
Student Association Mate	.821				
Virtual Network	.782				
Friends	.777				
Partner	.712				
Car Expo		.781			
TV Commercial		.781			
Radio Commercial		.515			
Mother			.852		
Father			.774		
Newspaper				.830	
Internet Commercial				.631	
Brother					.800
Sister					.568

For the biased sample, a principle component analysis (PCA) with varimax rotation was performed on the 14 influence variables to construct uncorrelated groups of peer influence toward decision to upgrade cars. The results are reported in Table 3.

All groups with eigen-values more than 1 are selected, which leave us with five constructions which explain 69.4% of the variance. For ease of presentation, only measures that have group loadings larger than 0.5 are used. The first group accounted for 24.99% variance. Variables loaded on this group mostly refer to friends group, such as classmate, student association mate and virtual network. Therefore, this group was named *Friends*. The second group accounts for 13.52% of variance. Variables loaded on this group partly include audio and visual commercial, such as car expo, TV and radio commercials. Therefore, this group was named *Audio Visual (AV) Commercial*. The third group accounts for 10.74% of variance and include father and mother; thus we named this group *Parents*. The fourth group accounts for 10.67% of variance and include newspaper and internet commercial; thus, we named this group *Text Commercial*. And finally, the last group accounts for 9.48% of variance and include brother and sister; thus we named this group *Siblings*.

For full sample, a principle component analysis with varimax rotation was performed on the 14 influence variables to construct uncorrelated groups of peer influence toward decision to upgrade cars. All groups with eigen-values more than 1 are selected which leaves us with four constructs which explain 62.4% of the variance. For ease of presentation, only measures that have group loadings larger than 0.5 are reported in Table 4. The first group accounted for 24.5% variance. Variables loaded on this group mostly refer to friends group, such as classmate, student association mate, virtual network, etc. Therefore, this group was named *Friends*. The second group accounts for 16.46% of variance. Variables loaded on this group include commercials, such as car expo, TV and radio commercials. Therefore, this group was named *Commercial*. The third group accounts for 10.75% of variance and include brother and sister; thus we named this group *Siblings*. And finally, the last group accounts for 10.68% of variance and include father and mother; thus, we named this group *Parents*.

Table 4. Descriptive statistic of influence group

Influence Groups	Friends	Commercial	Siblings	Parents
Student Association Mate	.852			
Classmate	.850			
Partner	.763			
Friends	.738			
Virtual Network	.692			
Internet Commercial		.730		
Newspaper		.704		
TV Commercial		.674		
Car Expo		.574		
Radio Commercial		.571		
Brother			.805	
Sister			.633	
Mother				.887
Father				.768

4.3. Correlation Analysis

For biased sample, the correlation between desire to upgrade, influence group, satisfaction and regret can be seen in table 5 below. As can be seen, car upgrading desire does not have any significant correlation with any influence group nor with level of satisfaction of current car. But it has significant negative correlation with regret of having bought the current car. The level of satisfaction of current car has a significant correlation with the influence group, particularly parent and siblings. This might imply that family influence has a significant correlation on the level of satisfaction on current car. The level of satisfaction also has strong negative correlation with regret of having bought a car. The regret of having bought the current car has a negative significant correlation with influence groups particularly parents as well as monthly income. Since their parents suggested them to buy a car, probably they have no objection hence regret less. While for monthly income, the higher monthly income means they probably buy more expensive cars and hence regret less.

Table 5. Correlation Between Desire To Upgrade, Influence Group, Satisfaction, Regret, Monthly Income and Gender for Biased Sample

| Variable | Influence Group | | | | | Satisfy | Regret | Monthly Income | Gender (Male) |
	Friends	AV Commercial	Parent	Text Commercial	Siblings				
Car upgrading desire	-.128	.157	.126	.057	.153	.117	-0.16*	-.110	.135
Satisfaction with current car	-.115	-.032	.246**	.152	.207**		-.474***	.105	-.046
Regret of having bought a car	.144	-.057	-0.178*	-.118	-.067			-.196*	.083
Monthly Income	.164	.198	.135	.042	.096				-.056
Gender (Male)	.135	-.116	-.088	.021	-.033				

***. Correlation is significant at the 0.01 level (2-tailed).
**. Correlation is significant at the 0.05 level (2-tailed).
*. Correlation is significant at the 0.1 level (2-tailed).

For full sample, the correlation between desire to upgrade, influence group, satisfaction and regret can be seen in Table 6 below. As can be seen, car upgrading has a significant correlation with influence groups particularly siblings. It has no significant correlation with level of satisfaction and regret of current car. Level of satisfaction of current car has significant correlation with the influence group particularly commercial; it might imply that commercial influences the higher level of satisfaction with the current car vice versa. Aside from that, level of satisfaction also has positive correlation with siblings and parents group, almost the same as biased sample. Furthermore, also same as for the biased sample, there is a strong negative correlation with regret. Also, in this sample regret of having bought the current car, it has a significant negative correlation with monthly income. The higher monthly income means they probably buy more expensive cars and, hence, regret less. Beside with regret, monthly income has significant correlation with influence from friends. We might say that students with higher income have "less self confidence" and worry more about influence from friends. Finally, we find that male students are more likely to be influenced by siblings; it is possibly because they discuss car purchase decisions more with their siblings.

Table 6. Correlation Between Desire To Upgrade, Influence Group, Satisfaction, Regret, Monthly Income and Gender for Full Sample

| Variable | Influence Group | | | | Satisfy | Regret | Monthly Income | Gender (Male) |
	Friends	Commercial	Siblings	Parent				
Car upgrading desire	-.043	.128	.232***	.073	.117	-.160	-.110	.135
Satisfaction with current car	-.059	.178**	.177**	.168*		-.474***	.105	-.046
Regret of having bought a car	.076	-.137	-.105	-.078			-.196*	.083
Monthly Income	.183*	.107	.125	.143				-.056
Gender (Male)	-.131	-.018	.173*	.059				

***. Correlation is significant at the 0.01 level (2-tailed).
**. Correlation is significant at the 0.05 level (2-tailed).
*. Correlation is significant at the 0.1 level (2-tailed).

5. Conclusion

Regarding influence constructed by PCA in this research (except for siblings), we find that these groups might not be the determinant variables for a desire to upgrade to a new car. Note that since these influence groups are constructed by their past experience, there is a possibility that they might be determinants if they are constructed from student present situation; however, this should be studied more. Regarding satisfaction level and regret level, we found from the correlation analysis that satisfaction level has a significant correlation with siblings and parents, while regret level also has slightly negative correlation with parent (family); this might imply that the suggestion from siblings and parents (family) is in accordance with what students need since parents might be the ones who understand better what students need. Therefore, we recommend that parents should get involved in student's "car choice" at this age to avoid later frustration as these young students might otherwise purchase "dream cars" without considering costs and their usefulness.

In general, our second important result is that the satisfaction level does not appear to influence the decision to upgrade to a new car, even though it is highly correlated with other variables such as influence and regret. The influence of siblings might hint at other factors such as comparing oneself to others are important factors.

This research cannot confirm whether peer influence exists in car owning desire particularly car upgrading desire. Further research is needed to study peer influence using different methods and a different questionnaire. This research incorporates students' past interaction with their peers as a basis of the analysis; while it might explain why they bought their current cars, it cannot explain well their future decisions. The new survey should incorporate the attitudes of students peers towards students owning cars, also the expectation of peers towards students car owning decision in the future and, lastly, how important these peer groups are in the decision to own a car in the future. Hopefully, by considering these three important points, the new survey, which is currently under preparation, might be able to explain peers influence on student's car owning decisions better.

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