

# Factors influencing consumers' light commercial vehicle purchase intention in a developing country

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**Abstract.** *The main objective of this paper is to determine factors affecting the intention to purchase a light commercial vehicle that may be influential in a developing country. For this purpose, a self-administered survey was conducted on 408 people living in Erzurum city, North-Eastern Turkey. The data of the survey was analyzed using binary logistic regression model due to the discrete and categorical nature of the dependent variable. Results revealed that gender, age, monthly income, household size, type of driving license, type of fuel, a significant increase in the monthly income, and costs of having SRC-K licenses were significant determinants of consumers' light commercial vehicle demand. Whilst consumers' automotive demand has been extensively studied, little research has been concentrated on light commercial vehicle demand. In this respect, the outcome of this study may provide valuable insights for the existing consumer demand literature in terms of light commercial vehicle purchase intention.*

**Keywords:** consumer, demand, light commercial vehicle, logistic regression, Turkey.

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## Introduction

The automotive industry has a leading position in emerging economies because of the recent technological developments and significant changes in social life. Automotive industry has an extensive infrastructure and automotive products have relatively high demand from for many various purposes including transportation, production and defence. As the Automotive Distributors' Association and The Economic Research Foundation of Turkey reports (2013), the total endorsement in the automotive industry is equivalent to the sixth major economy worldwide with almost fifty million employees providing a 433 billion euros contribution to all capital budgets.

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As an emerging economy, the automotive industry in Turkey plays an important role in the manufacturing sector. However, according to the latest market evaluation of the Turkish Automotive Distributors' Association (2015), the Turkish passenger car and light commercial vehicle (LCV) total market decreased by almost 10% in 2014 with 767,681 units sold compared to 853,378 in 2013. Specifically, the number of LCV sales was 180,350 in 2014 with a 4.44% decrease compared to 2013. The main reasons of market share decline were associated with several indicators such as increases in exchange and interest rates, an increase in car special consumption tax rates, restrictions imposed by the Banking Regulatory and Supervisory Agency toward credit transactions, deceleration in economic growth, and weak private sector consumption and investments (Automotive Distributors' Association, 2015). Fortunately, the results of a very recent survey on nearly 200 automotive executives indicate that a new adjustment of taxes on automobile sales will be the top priority issue in the next five years. Moreover, most of the executives in the Turkish automotive industry foresee a market growth despite a decline of growth rate anticipation (KPMG Turkey, 2014). Another recent report on automotive demand forecast in Turkey (Kircova et al., 2012) exhibits that consumers' automobile demand in Turkey is strictly sensitive to Turkish economic progress. At this point, periodical analyses of consumer behaviour may provide valuable insights for both present and future automotive market policies.

Whilst consumers' automobile purchase decisions have been extensively studied in the existing literature, little research specifically examined their LCV demand. This paper aims to determine the key factors affecting consumers' purchase decisions in an emerging economy with an emphasis on LCV demand. The next section reviews the existing literature concentrating on consumers' purchase decision in the automotive industry. The methodology section gives theoretical information about the conceptual framework of the analysis used in the study. This section also introduces the sample and data collection. The results section interprets the results of the statistical estimations. This paper concludes with a discussion of the results and suggestions for policy makers.

## Literature review

There is a fairly large literature considering various aspects of factors that may influence consumers' vehicle purchase intention or decisions, regarding various types of vehicles. Especially, several demographic factors were frequently highlighted as significant contributors to consumers' motor vehicle purchase decisions. Not surprisingly, monthly household or individual income was found as one of the major determinants of consumers' vehicle ownership decisions (Ede and Panigrahi, 2000; Lam et al., 2000; Romilly et al., 2001; Yilmaz, 2001; Choo and Mokhtarian, 2004; Kumar and Krishna Rao, 2006; Potoglou and Kanaroglou, 2008a; Bhat et al., 2009; Nolan, 2010; Prieto and Caemmerer, 2013; Wong, 2013). Respondents' age group gave significant evidence to explain consumers' vehicle purchase decisions in early studies (Ede and Panigrahi, 2000; Choo and Mokhtarian, 2004; Cao et al., 2006; Hackbarth and Madlener, 2013; Prieto and Caemmerer, 2013; Sanko et al., 2014). Gender was found as an important factor that may influence consumers' vehicle demand (Ede and Panigrahi, 2000; Choo and Mokhtarian, 2004; Bhat and Sen, 2006, Cao et al., 2006; Prieto and Caemmerer,

2013; Sanko et al., 2014). Household size can be an important explanatory variable in examining consumers' purchase behaviour and many early studies (Choo and Mokhtarian, 2004; Kumar and Krishna Rao, 2006; Potoglou, 2008; Potoglou and Kanaroglou, 2008a; Bhat et al., 2009; Prieto and Caemmerer, 2013; Wong, 2013; Sanko et al., 2014) found significant association between household size and vehicle type ownership. There has been recent work in which respondents' educational level was demonstrated as the significant contributor to consumers' vehicle ownership (Ede and Panigrahi, 2000; Yilmaz, 2001; Choo and Mokhtarian, 2004; Cao et al., 2006; Potoglou, 2008; Hackbarth and Madlener, 2013; Prieto and Caemmerer, 2013). Apart from these determinants, several other key factors such as occupational status (Yilmaz, 2001; Bhat and Sen, 2006; Sanko et al., 2014), presence of children in the family (Bhat and Sen, 2006; Cao et al., 2006; Bhat et al., 2009; Wong, 2013), number of working adults (Potoglou and Kanaroglou, 2008a; Wong, 2013), number of persons with driving license (Potoglou and Kanaroglou, 2008b), and annual license fee (Lam et al., 2000) were also included as significant influence on the consumers' vehicle purchase decisions or intentions.

Recent works (Kircova et al., 2012) found that the yearly increase of automobile demand was related to the increase of monthly income and population along with income distribution, as high-income consumers were more likely to create automobile demand. Earlier research (Yilmaz, 2001; Choo and Mokhtarian, 2004; Cao et al., 2006; Potoglou, 2008; Potoglou and Kanaroglou, 2008a; Nayum and Klöckner, 2014) found that consumers' vehicle choice was differentiated by several factors such as gender, different age groups, educational or income levels, household size or occupational status for various type of vehicles. Bhat and Sen (2006) found that higher income consumers were more likely to have passenger cars, SUVs and minivans and they also stated that the presence of children had a significant effect on consumers' purchase decisions, because parents tend to have SUVs and minivans for safety and comfort. Gender and employment status were also found as statistically significant influencers. Another similar study (Bhat et al., 2009) found that high income consumers were less likely to buy an older vehicle. Household size was also associated with consumers' purchase decisions. Presence of children was also found as an important determinant of car ownership in a recent study (Nolan, 2010). Dargay (2001) suggested that a significant rise of the income level also increases consumers' car ownership. Recent studies (Matas and Raymond, 2008) underlined that car ownership increases with a decline of income elasticity and households from rural areas were less sensitive to lower income than their counterparts living in urban areas. Other studies (Dargay and Gately, 1999; Dargay, 2002; Medlock III and Soligo, 2002; Nolan, 2010) have also emphasized the impact of income elasticity on consumers' motor vehicle purchase decision. Consumers' purpose of car use, and attachment to cars were found as other specific indicators of purchase decisions (Baltas and Saridakis, 2013).

A very recent survey highlights that the top priority for purchasing motor vehicles for most of the consumers was fuel efficiency and almost 70% of them also mentioned longer lasting performance. The use of alternative fuel technologies were also associated with consumers' purchase decisions (KPMG International, 2014). Other previous works (Potoglou, 2008; Potoglou and Kanaroglou, 2008b; Bhat et al., 2009; Dagsvik and Liu, 2009; Qian and Soopramanien, 2011; Hess et al.,

2012; Hackbarth and Madlener, 2013; Mabit, 2014; Liu et al., 2014; Nayum and Klöckner, 2014; Tanaka et al., 2014; Xu et al., 2015) also demonstrated that fuel efficiency and rising fuel prices had an effect on consumers' vehicle choice as well as technological development and tax reforms. Apart from these key factors, the level of carbon emissions also had a significant impact on the buyers' decision (Nayum et al., 2013). The consumers' ecological car interests were also associated with the chosen car type in other earlier research (Oliver and Lee, 2010; Baltas and Saridakis, 2013; Xu et al., 2015). The country of origin was considered as one of the significant determinants of the consumers' motor vehicle purchase intentions (Alper and Mumcu, 2007; Urbonavičius et al., 2007; Thanasuta et al., 2009; Özçam and Sağlık Özçam, 2012). Comfort, safety and modernity were also found to be significant (Sedzro et al., 2014).

## Research methodology

### Logistic regression model

Some of the most interesting response variables in the social sciences are binary or dichotomous due to the crudeness of measurement. However, the theoretical idea that probabilities are linear in independent variables is not practically applicable and for a binary response, the use of a linear regression model does not seem to be the optimum strategy (DeMaris, 2004). The logistic regression model has been long employed in many fields over the last decade when the outcome is discrete and taking two or more possible values. Suppose the quantity  $\pi(x) = E(Y|x)$  represents the conditional mean of  $Y$  given  $x$  since the logistic distribution is used. In this circumstance, the specific form of the logistic regression model is the following:

$$\pi(x) = \frac{e^{\beta_0 + \beta_1 x}}{1 + e^{\beta_0 + \beta_1 x}} \quad (1)$$

Furthermore, the logit transformation in terms of  $\pi(x)$  can be defined as:

$$g(x) = \ln \left[ \frac{\pi(x)}{1 - \pi(x)} \right] = \beta_0 + \beta_1 x \quad (2)$$

In Equation (2),  $g(x)$  will have many of the properties of a linear regression model. This logit is linear in its parameters, may be continuous, and may range from  $-\infty$  to  $+\infty$  with respect to the behavior of  $x$  (Hosmer and Lemeshow, 2000). Actually, the sign of  $\beta_1$  determines whether the logit is increasing or decreasing when  $x$  increases. The odds increase multiplicatively by  $e^\beta$  for every one unit increase in  $x$ . In this respect,  $e^\beta$  is considered as the odds ratio (OR) which implies the odds at  $X = x + 1$  divided by the odds at  $X = x$  (Agresti, 2002).

Suppose a sample of  $n$  independent observations of the pair  $(x_i, y_i)$ ,  $i = 1, 2, \dots, n$ , where  $x_i$  denotes the value of the independent variable for the  $i$ th subject and  $y_i$  denotes the value of a binary outcome variable. Since the observations are assumed to be independent, the likelihood function can be obtained as follows:

$$l(\beta) = \prod_{i=1}^n \pi(x_i)^{y_i} [1 - \pi(x_i)]^{1-y_i} \quad (3)$$

and the log-likelihood function can be defined as the following:

$$L(\beta) = \ln[l(\beta)] = \sum_{i=1}^n \{y_i \ln[\pi(x_i)] + (1 - y_i) \ln[1 - \pi(x_i)]\} \quad (4)$$

This expression is differentiated with respect to  $\beta_0$  and  $\beta_1$  and set the resulting formulas equal to zero to find the value of  $\beta$  that maximizes the corresponding equation (Hosmer and Lemeshow, 2000). Due to the nonlinearity of the model, the discrete change in the predicted probabilities are highly recommended for a given change in an independent variable. Since  $\Pr(y=1|x, x_k)$  represents the probability of an event given  $x$ , noting in particular the value of  $x_k$  and  $\Pr(y=1|x, x_k + \delta)$  represents the probability of the event with only  $x_k$  increased by some quantity  $\delta$ , then the discrete change for a change of  $\delta$  in  $x_k$  equals to

$$\frac{\Delta \Pr(y=1|x)}{\Delta x_k} = \Pr(y=1|x, x_k + \delta) - \Pr(y=1|x, x_k) \quad (5)$$

which describes the marginal effect of an independent variable with dummy variables (Long and Freese, 2001).

### Study design, sample and data collection

This paper aims to ascertain factors affecting consumers' automotive demand and an emphasis is placed on consumers' LCV demand in Erzurum city, Turkey. For this purpose, a self-administered written survey was conducted on 408 respondents living in Erzurum city center, between November 2013 and February 2014. The corresponding survey performs a simple random sampling method to keep the level of representation both proportional and as high as possible. The corresponding survey involves detailed questions about demographic attributes of the respondents and possible factors that may influence their LCV demand. The Cronbach alpha value of the survey was found 0.88, satisfying the minimum 0.70 recommended by Nunnally (1978) for relatively high internal consistency. According to *Address Based Population Registration System Statistics* (TurkStat, 2013), the city center population of Erzurum was 394,684 during the sampling period. The minimum sample size of the survey was calculated with respect to the following formula:

$$n = \frac{NPQZ^2}{(N-1)d^2 + PQZ^2} \quad (6)$$

where  $n$  denotes the sample size;  $N$  denotes the population size;  $P$  = the probability of the occurrence for a given event;  $Q = 1 - P$ ;  $Z$  denotes the test statistic under the  $(1 - \alpha)\%$  significance level; and finally  $d$  denotes the tolerance. In this respect, the

minimum representative sample size of the survey can be calculated as follows (Yamane, 1967):

$$n = \frac{(394,684)(0.5)(0.5)(1.96)^2}{(394,684 - 1)(0.05)^2 + (0.5)(0.5)(1.96)^2} \cong 384 \quad (7)$$

As shown in Equation (7), 408 respondents exceed the number of minimum sample size.

The dependent variable of the survey was the LCV purchase intention in the near future where 1 accounts for 'yes' and 0 accounts for 'no'. As the dependent variable has the characteristics of a discrete and binary response variable, the utilized data was analyzed using the binary logistic regression model. The fitted model was statistically significant at 90% significance level and higher, which implies that the corresponding model is statistically correct. In addition, a multicollinearity test was performed before fitting the model and no serious multicollinearity was found among the independent variables.

## Research results

### Descriptive statistics

Table 1 presents the descriptive statistics for both the dependent variable and the independent variable used in the fitted model. As shown in Table 1, almost 38% of the respondents had an intention to purchase a LCV in the near future. Most of the respondents (83.58%) were men, and more than 40% of them (41.67%) were aged between 30 and 39. More than half of the respondents (62.50%) were highly educated, and 54.90% were, at that moment, working as office workers. The households of 43.87% of the respondents involved three or four individuals. Almost half of the respondents (40.93%) had a monthly individual income between 2,000 and 3,000 Turkish liras (TL) and more than half of them (56.13%) had more than 3,000 TL monthly household income. A majority of the respondents (73.28%) held a class B driving license which was used to drive a passenger car. Also 30.64% of them were using diesel fuel for their motor vehicles.

According to descriptive statistics, almost 68% of the respondents think that the price of a new vehicle would have a definite effect on their decision of purchasing or nor an LCV. Almost 68% of them said that the price of a second hand vehicle also had an effect on their purchase decision. Most of the respondents (65.93%) mentioned the importance of low special fuel consumption taxes (SCT) when talking about their LCV purchase intentions. The decision was made mostly considering the fuel consumption for 82.35% of the respondents. Most of them (76.12%) also think that maintenance and repair costs of a LCV would be decisive when purchasing a car.

More than half of the respondents (55.88%) think that joint vehicle costs would be influential or definitely influential on their LCV purchase intention. Most of the respondents think that passenger and carrier capacity (64.7%) and use of a LCV as a passenger car (69.86%) would significant or definitely significant on their purchasing intention. Nearly half of them think that costs of SRC and K licenses (46.32%), a significant increase on monthly income (48.53%), and a significant decrease on fuel prices (53.67%) would have a significant effect on their LCV purchase intentions. Descriptive statistics indicated that 24.02% think that a

future public transport improvement would be somewhat determinant on a LCV purchase intention, while 23.04% think that such an improvement would definitely not affect their future LCV demand. Finally, more than half of the respondents (51.47%) think that a decline in rental costs would not have a significant effect on their LCV future purchase decisions.

### Results of the statistical estimation

Table 2 exhibits the results of a binary logistic regression to determine key factors that may influence the respondents' LCV purchase intention. The model had respectable goodness of fit and McFadden R<sup>2</sup> values for a categorical data analysis. The confidence intervals (CI) in Table 2 present both lower and upper values of the ORs. Table 3 also represents marginal effect values of independent variables and both ORs and marginal effect values of the same variables would be interpreted simultaneously for simplicity and brevity.

The results of the statistical estimations revealed that gender was a significant contributor in consumers' LCV purchase intention in the near future. Accordingly, men were nearly four times (OR = 3.94,  $p < .001$ , 90% CI = 1.82 – 8.53) more likely to have future LCV purchase intentions than women. Marginal effects also indicated that the probability of a future LCV purchase intention increases by 24.8% for men. This result is not surprising since the relatively higher interest of men on various types of motor vehicles and higher rate of men respondents. The respondents' age group was also a significant influencing factor that may have an effect on a possible LCV purchase. Specifically, respondents aged between 30 and 39 were nearly 0.4 times (OR = 0.43,  $p < .10$ , 90% CI = 0.20 – 0.89) less likely to have a future LCV purchase intention than respondents older than 49 years. This probability decreases by 18.4% for the same age group. Similarly, respondents aged between 40 and 49 were 0.45 times (OR = 0.45,  $p < .10$ , 90% CI = 0.21 – 0.97) to have a LCV purchase intention than the reference age group. The probability of these respondents decreases by 16.1% with respect to marginal effects. All monthly individual income categories were found to increase respondents' future LCV purchase intentions. Particularly, respondents who had monthly individual income between 1,000 and 2,000 TL were nearly 2.5 times (OR = 2.53,  $p < .10$ , 90% CI = 1.04 – 6.16) more likely to have a future LCV intention than relatively low income respondents with monthly income less than 1,000 TL. Respondents who had a monthly income between 2,000 and 3,000 TL and more than 3,000 TL were also almost three (OR = 2.91,  $p < .10$ , 90% CI = 1.09 – 7.78) and almost 3.3 times (OR = 3.26,  $p < .10$ , 90% CI = 1.07 – 9.91) more likely to have an LCV demand in the near future than respondents who had less than 1,000 TL, respectively. The probability of having a future LCV demand increases by 24.1% for respondents who have a monthly income between 2,000 and 3,000 TL and by 27.7% for respondents who had monthly incomes more than 3,000 TL, respectively.

**Table 1.** Descriptive statistics of variables

Variable	Frequency (%)	Variable	Frequency (%)
<b>(1) Intention to purchase an LCV</b>		<b>(14) Fuel consumption</b>	
Yes	155 (37.99)	Definitely not influential <sup>a</sup>	14 (3.43)
No <sup>s</sup>	253 (62.01)	Not influential	17 (4.17)
<b>(2) Gender</b>		Somewhat influential	41 (10.05)

Male	341 (83.58)	Influential	104 (25.49)
Female <sup>s</sup>	67 (16.42)	Definitely influential	232 (56.86)
<b>(3) Age group</b>		<b>(15) Maintenance and repair costs</b>	
Age < 30	93 (22.79)	Definitely not influential <sup>a</sup>	16 (3.92)
30 ≤ Age ≤ 39	170 (41.67)	Not influential	25 (6.13)
40 ≤ Age ≤ 49	87 (21.32)	Somewhat influential	56 (13.73)
Age > 49 <sup>s</sup>	58 (14.22)	Influential	128 (31.27)
<b>(4) Educational level</b>		Definitely influential	183 (44.85)
Literate/primary education <sup>s</sup>	50 (12.25)	<b>(16) Vehicle costs as expenses</b>	
Secondary education	103 (25.25)	Definitely not influential <sup>a</sup>	54 (13.24)
Higher education	255 (62.50)	Not influential	42 (10.29)
<b>(5) Occupation</b>		Somewhat influential	84 (20.59)
Self-employed	158 (38.73)	Influential	97 (23.77)
Worker/officer	224 (54.90)	Definitely influential	131 (32.11)
Others <sup>s</sup>	26 (6.37)	<b>(17) Passenger and carrier capacity</b>	
<b>(6) Household size</b>		Definitely not influential <sup>a</sup>	35 (8.58)
Less than three individual(s) <sup>a</sup>	55 (13.48)	Not influential	34 (8.33)
3 - 4 individuals	179 (43.87)	Somewhat influential	75 (18.38)
More than four individuals	174 (42.65)	Influential	114 (27.94)
<b>(7) Monthly individual income</b>		Definitely influential	150 (36.76)
Income < 1000TL <sup>a</sup>	32 (7.84)	<b>(18) Use as a passenger car</b>	
1000 TL ≤ Income < 2000 TL	109 (26.72)	Definitely not influential <sup>a</sup>	20 (4.90)
2000 TL ≤ Income ≤ 3000 TL	167 (40.93)	Not influential	26 (6.37)
Income > 3000 TL	100 (24.51)	Somewhat influential	77 (18.87)
<b>(8) Monthly household income</b>		Influential	125 (30.64)
Income < 2000 TL <sup>a</sup>	58 (14.22)	Definitely influential	160 (39.22)
2000 TL ≤ Income ≤ 3000 TL	121 (29.66)	<b>(19) Cost of SRC and K licenses</b>	
Income > 3000 TL	229 (56.13)	Definitely not influential <sup>a</sup>	70 (17.16)
<b>(9) Driving license</b>		Not influential	55 (13.48)
Class B	299 (73.28)	Somewhat influential	94 (23.04)
Class E	74 (18.14)	Influential	88 (21.57)
Others <sup>a</sup>	35 (8.58)	Definitely influential	101 (24.75)
<b>(10) Type of fuel</b>		<b>(20) Significant increase of monthly income</b>	
Others/no motor vehicle <sup>a</sup>	115 (28.19)	Definitely not influential <sup>a</sup>	74 (18.14)
Diesel	125 (30.64)	Not influential	58 (14.22)
Oil	76 (18.63)	Somewhat influential	78 (19.12)
LPG	92 (22.55)	Influential	98 (24.02)
<b>(11) Price of new vehicles</b>		Definitely influential	100 (24.51)
Definitely not influential <sup>a</sup>	34 (8.33)	<b>(21) Significant decrease of fuel prices</b>	
Not influential	27 (6.62)	Definitely not influential <sup>a</sup>	60 (14.71)
Somewhat influential	70 (17.16)	Not influential	50 (12.25)
Influential	122 (29.90)	Somewhat influential	79 (19.36)
Definitely influential	155 (37.99)	Influential	97 (23.77)
<b>(12) Price of a second-hand vehicle</b>		Definitely influential	122 (29.90)
Definitely not influential <sup>a</sup>	29 (7.11)	<b>(22) Enhancements on public transport</b>	
Not influential	33 (8.09)	Definitely not influential <sup>a</sup>	94 (23.04)
Somewhat influential	88 (21.57)	Not influential	75 (18.38)
Influential	136 (33.33)	Somewhat influential	98 (24.02)
Definitely influential	122 (29.90)	Influential	81 (19.85)
<b>(13) Low SCT</b>		Definitely influential	60 (14.71)
Definitely not influential <sup>a</sup>	32 (7.84)	<b>(23) Decrease of rental costs</b>	
Not influential	28 (6.86)	Definitely not influential <sup>a</sup>	124 (30.39)

Somewhat influential	79 (19.36)	Not influential	86 (21.08)
Influential	132 (32.35)	Somewhat influential	74 (18.14)
Definitely influential	137 (33.58)	Influential	67 (16.42)
		Definitely influential	57 (13.97)

Source: Authors' own research. Notes: <sup>a</sup> Reference category

**Table 2.** Results of logistic regression for factors influencing consumers' LCV purchase intention

Independent variable	Coefficient	OR	Std Err	90% CI
Gender; male	1.371 <sup>a</sup>	3.94	1.851	1.82 – 8.53
Age group; 30 ≤ Age ≤ 39	-0.856 <sup>c</sup>	0.43	0.190	0.20 – 0.89
Age group; 40 ≤ Age ≤ 49	-0.703 <sup>c</sup>	0.45	0.209	0.21 – 0.97
Monthly individual income; 1000 TL ≤ Income < 2000 TL	0.929 <sup>c</sup>	2.53	1.368	1.04 – 6.16
Monthly individual income; 2000 TL ≤ Income ≤ 3000 TL	1.069 <sup>c</sup>	2.91	1.740	1.09 – 7.78
Monthly individual income; Income > 3000 TL	1.181 <sup>c</sup>	3.26	2.203	1.07 – 9.91
Household size; 3 – 4 individuals	0.926 <sup>c</sup>	2.52	1.231	1.13 – 5.63
Household size; more than four individuals	1.478 <sup>a</sup>	4.38	2.144	1.96 – 9.80
Driving license; class E	1.124 <sup>b</sup>	3.08	1.623	1.29 – 7.33
Type of fuel; oil	-0.878 <sup>b</sup>	0.42	0.171	0.21 – 0.82
Type of fuel; LPG	-0.950 <sup>b</sup>	0.39	0.152	0.20 – 0.74
Cost of SRC and K licenses; definitely influential	-0.200 <sup>c</sup>	0.82	0.086	0.69 – 0.97
Significant increase of monthly income; definitely influential	0.363 <sup>a</sup>	1.44	0.180	1.17 – 1.77
Constant term	-3.838 <sup>a</sup>	--	1.326	--
<b>Summary statistics</b>				
Number of observations: 408	--	--	--	--
Log-likelihood at zero: -284.000	--	--	--	--
Log-likelihood at convergence: -222.041	--	--	--	--
McFadden R <sup>2</sup> : 0.26	--	--	--	--
Adjusted McFadden R <sup>2</sup> : 0.20	--	--	--	--
Goodness of fit value: 0.48	--	--	--	--

Source: Authors' own research. Notes: <sup>a</sup> significant at 99%; <sup>b</sup> significant at 95%; <sup>c</sup> significant at 90%.

**Table 3.** Marginal effects of independent variables

Independent variable	Marginal effect	Std Err
Gender; male	24.8% <sup>a</sup>	0.063
Age group; 30 ≤ Age ≤ 39	-18.4% <sup>b</sup>	0.092
Age group; 40 ≤ Age ≤ 49	-16.1% <sup>c</sup>	0.084
Monthly individual income; 1000 TL ≤ Income < 2000 TL	21.6% <sup>c</sup>	0.128
Monthly individual income; 2000 TL ≤ Income ≤ 3000 TL	24.1% <sup>c</sup>	0.133
Monthly individual income; Income > 3000 TL	27.7% <sup>c</sup>	0.159
Household size; 3 – 4 individuals	20.7% <sup>c</sup>	0.107
Household size; more than four individuals	32.8% <sup>a</sup>	0.103
Driving license; class E	26.7% <sup>b</sup>	0.126
Type of fuel; oil	-17.4% <sup>b</sup>	0.071
Type of fuel; LPG	-18.9% <sup>a</sup>	0.068
Cost of SRC and K licenses; definitely influential	-4.4% <sup>c</sup>	0.023
Significant increase on monthly income; definitely influential	8.1% <sup>a</sup>	0.028

Source: Authors' own research. Notes: <sup>a</sup> significant at 99%; <sup>b</sup> significant at 95%; <sup>c</sup> significant at 90%.

Household size was found as another significant key factor of consumers' future LCV demand. On one hand, when household size was between three and four individuals, respondents were almost 2.5 times (OR = 2.52,  $p < .10$ , 90% CI = 1.13 – 5.63) more likely to have an LCV ownership intention. On the other hand,

this probability increases by 20.7%. Respondents who have more than four individuals in their family were almost 4.4 times (OR = 4.38,  $p < .01$ , 90% CI = 1.96 – 9.80) more likely to have an LCV in the near future than respondents who have less than three individuals in their family. According to marginal effects, the corresponding probability increases by 32.8%. Driving license had an increasing impact on consumers' future LCV purchase decisions. Specifically, respondents who had class E driving license were almost three times (OR = 3.08,  $p < .05$ , 90% CI = 1.29 – 7.33) more likely to buy an LCV. The probability of an LCV purchase intention increases by 26.7% for respondents holding a class E driving license. This statistically significant contribution of several demographic results is consistent with many earlier studies (Choo and Mokhtarian, 2004; Cao et al., 2006; Potoglou, 2008; Potoglou and Kanaroglou, 2008a; Nayum and Klöckner, 2014).

The results of the statistical estimations indicated that the type of fuel would be a significant contributor of respondents' future LCV purchase intentions. This result shows consistency with many prior work (Potoglou, 2008; Bhat et al., 2009; Dagsvik and Liu, 2009; Qian and Soopramanien, 2011; Hackbarth and Madlener, 2013; Mabit, 2014; Liu et al., 2014; Nayum and Klöckner, 2014; Tanaka et al., 2014; Xu et al., 2015). Accordingly, when type of fuel was oil, respondents were 0.42 times (OR = 0.42,  $p < .05$ , 90% CI = 0.21 – 0.82) less likely to have an intention to purchase an LCV than in the case of other types of fuel. The probability of having such an intention decreases by 17.4% with respect to marginal effects. Oil prices were relatively high in Turkey, so this was an expected result. Interestingly, respondents were almost 0.4 times (OR = 0.39,  $p < .05$ , 90% CI = 0.20 – 0.74) less likely to have an LCV purchase intention when the type of fuel was LPG. As LPG is the relatively cheapest fuel in Turkey, it is highly preferred by most of the drivers. The cost of having an LPG tank in a motor vehicle and the potential security issues of this fuel for the road traffic might have been some reasons of respondents' reduced preference for this type of fuel. The costs of SRC and K licenses were a significant influencer of consumers' LCV purchase intention. Respondents were 0.82 times (OR = 0.82,  $p < .10$ , 90% CI = 0.69 – 0.97) less likely to have an LCV purchase intention when the costs of SRC and K licenses were under consideration. This probability decreases by 4.4% for these responses. SRC and K licenses were strictly obliged to use a motor vehicle for commercial purposes and respondents might have been intending to own an LCV for a passenger car purpose. Although, it was not statistically significant in the final fitted logistic regression model, most of the respondents think that the use of an LCV as a passenger car was influential or definitely influential on their intentions. Further particular research is definitely needed to explain respondents' similar decisions. Finally, a significant increase of monthly income was found to have impact on LCV purchase intentions. In this circumstance, respondents were 1.44 times (OR = 1.44,  $p < .01$ , 90% CI = 1.17 – 1.77) more likely to intend to buy an LCV.

## Conclusions

The automotive industry is one of the most rapidly increasing sectors of the emerging countries, along with recent technological advances. When the crucial contribution of this industry to emerging economies is considered, sustainable development in the automotive industry has to be accomplished. Consumers'

decisions on automotive products are one of the factors influencing for the sustainable growth of the industry and their future behaviours should be periodically examined to compensate their expectations. The main objective of this paper is to determine the factors affecting consumers' future purchase intentions of automotive products with a particular focus on consumer LCV demand. Although automotive products demand was extensively studied in the existing literature, little attention was paid to LCV demand compared to its relatively high sales in emerging economies like Turkey. The results of a survey conducted in one of the municipalities of Turkey may be insightful for future LCV demand research and may fill the significant gap for both consumer behaviour and automotive market literature. As the dependent variable of the data obtained from the survey has a discrete and binary nature, a logistic regression analysis was employed.

The results of the statistical estimations reveal that consumers' demographic attributes as well as the type of fuel and some obligations to have an LCV, have a significant effect on their LCV purchase intentions. Automotive distributors and other authorized policy makers in Turkey will continue to keep focusing on the male consumers in the automotive market. However, future marketing policies may fulfil female drivers' expectations such as introducing the usefulness of LCVs for female consumers especially as a passenger car. Results also indicate that consumers aged younger than 49 years did not intend to own an LCV in the near future. More sportive LCV models that can be intensively used for passenger transport purposes may influence the future decisions of both female and younger consumers. The current LCV market policies can be considered as successful for middle income consumers since an LCV purchase seems to be included in their future plans. Recent technological advances allow automotive distributors to produce more comfortable and sophisticated LCVs, and that may contribute to a positive change on high income consumers' future purchases. This suggestion is also highlighted in a prior research as a significant factor of car purchase (Sedzro et al., 2014). Low-cost LCVs with less comfort may also change low income consumers' decisions along with a possible significant income increase. High SCTs have been extensively reported as one of the most important barriers on the development of the Turkish automotive industry (Kircova et al., 2012; Kitapçı et al., 2014; KPMG Turkey, 2014; Automotive Distributors' Association, 2015). A possible re-adjustment on this issue may also accelerate current Turkish LCV market sales that were on a decreasing trend in 2014.

As the results of the present study indicate, more crowded households are more likely to own an LCV. The presentation of LCVs as a convenient family vehicle may persuade consumers with bigger households to buy more LCVs. The degree of influence of this suggestion is confirmed by another result of this study. Consumers holding a class E driving license are more likely to have an intention to own an LCV in the near future, although LCVs can be driven with a class B passenger car driving license. It seems that consumers still assess LCVs as a commercial purpose vehicle. The possible enlargement of this image with successful future marketing policies may be useful for higher LCV sales. As results suggest, LCVs with oil and LPG are not generally preferred by consumers. Oil prices in Turkey are very high, but recent political developments led to the decline of these prices. This may contribute to the increase of automotive products sales including LCVs. Future research is actually needed to decide a clear explanation of the consumers' type of

fuel preference. Additionally, the use of hybrid vehicles can be encouraged by relevant marketing policies which are not popular in Turkey, yet. Fortunately, the intensive use of hybrid vehicles is expected in the near future. On the other hand, a possible decline of the costs of SRC and K licenses may increase the intention of consumers' LCV purchase for commercial purposes. This result is in line with an early work (Lam et al., 2000).

This study has various limitations. The survey was limited to a selected region in a limited time period. Similar surveys can be periodically conducted to capture both city centre and other districts of Erzurum. As one of the largest cities in its region, the full coverage of the city with an increased sample size may give valuable information about the North-East of Turkey including some other variables such as the presence of children in the family, number of working adults and country of origin. More attention should be paid to future LCV researches in the country if the sales and contribution of LCVs on Turkish economy are considered. A cross-city or a cross-country comparison of consumers' future LCV purchase intentions may be encouraged in order to evaluate current marketing policies and to decide on future attempts. In this sense, a comparison of similar emerging markets may provide a valuable tool for the growth of these markets. Apart from binary models, other different ordered response models such as ordered logit model, generalized ordered logit model, partial constrained ordered logit model and/or heterogeneous choice model can be employed by considering some categorical variables as a dependent variable with an ordered nature.

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