

# Investigating the Factors Affecting Consumers' Comprehensive Car Insurance Demand in Turkey: A Behavioral Perspective

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**Abstract:** Car insurance is a crucial line in the individual insurance industry, and although it is mandatory for drivers to have car liability insurance in many countries, there is a coverage gap in comprehensive insurance, especially in emerging countries such as Turkey. This study aims to investigate the determinants of comprehensive car insurance demand in Turkey, with a focus on the effects of perceived insurance benefit and insurance literacy, as well as socioeconomic indicators. The survey method was used for data collection, with 261 usable responses obtained through a digital survey distributed to car owners in Turkey using a simple random method. Binary logistic regression was applied to determine the effect of the aforementioned factors on comprehensive car insurance demand. The results revealed a significant and strong relationship between comprehensive car insurance demand and having a traffic ticket, driving experience, driver's age, and vehicle age indicators. Perceived insurance benefit and insurance literacy were also identified as important determinants, while driving frequency and experiencing a traffic accident did not show a significant relationship with insurance demand. The study has important implications for the insurance industry in terms of marketing, product development, and the underwriting process. Insurance companies should consider the factors affecting consumers' insurance demand while designing products and services and collaborate with regulatory authorities to organize awareness campaigns and financial literacy courses to explain the benefits of insurance products and services better.

**Keywords:** comprehensive car insurance, insurance demand, insurance literacy, perceived insurance benefit, socio-economic factors, Turkey.

## INTRODUCTION

The factors affecting consumers' decision to demand insurance have been the subject of numerous academic research in the field of insurance. Researchers aimed to measure the socio-demographic and behavioral factors that may be effective in making the purchasing decision of consumers with hypothetical and experimental methods (Jaspersen, 2016).

As of 2020, car insurance has reached a premium size of \$560 billion and stands out as the most important insurance line in individual insurance, with a market share of 62,1% (Swiss Re, 2022). Car insurance provides financial protection against several risks, such as natural disasters, theft, and fire, in addition to the damage caused by traffic accidents. In many countries, it is a legal obligation for drivers to have car liability insurance against bodily injury and property damage that they may cause to third parties while driving (Hsu et al., 2016). However, there is a coverage gap in comprehensive insurance, which is offered optionally, especially in developing countries where insurance penetration rates are low.

Turkey is one of the countries with the lowest insurance penetration rate of 1.5% among OECD countries (OECD, 2021). Although the comprehensive car insurance coverage rate in the country has increased slightly

*Investigating the Factors Affecting Consumers' Comprehensive Car Insurance Demand in Turkey: A Behavioral Perspective* in the last five years, it is still at the level of 28.2% (TSB 2021; TURKSTAT 2021). The comprehensive car insurance premium size in the country is growing thanks to economic growth and the increasing number of cars; however, since penetration rates are not increasing significantly, it cannot help the market to deepen. At this point, in order to increase insurance penetration rates in the country, it becomes more important to investigate the factors that affect car owners' decision to demand comprehensive car insurance. Empirical studies on the factors affecting comprehensive car insurance demand in the literature generally attempted to develop a model using socio-demographic indicators (Sherden, 1984; Awunyo-Vitor, 2012; Hsu et al., 2016; Jaspersen, 2016). These studies did not consider behavioral factors in consumers' insurance preferences. However, there are many studies in the literature showing that behavioral and emotional factors have an impact on insurance demand (Browne et al., 2015; Awel et al., 2015; Corcos et al., 2020; Pitthan and Witte, 2021). It is important to conduct empirical studies that focus on the factors determining the demand for comprehensive car insurance from a broader perspective. In this context, the aim of the study is to investigate the factors affecting consumers' comprehensive insurance demand in Turkey. This study differs from its predecessor as it uses perceived benefit and insurance literacy in addition to socio-demographic indicators for developing a model of comprehensive car insurance demand.

## **2. LITERATURE REVIEW**

According to the theory of insurance demand in classical economics, individuals would like to maximize their benefits and avoid risk demand insurance in exchange for a reasonable premium over the expected risk. This assumption is based on the Expected Utility Theory. Individuals are protected from future financial difficulties by giving up a small portion of the savings they have today; thus, they maximize their benefits in every situation (Schlesinger, 2013).

Although this approach is successful in providing a general perspective on insurance demand, it is not sufficient to explain consumer behavior for a complex product such as insurance. For example, some individuals prefer to buy insurance against the same risks, while others do not. Moreover, sometimes insurance products with high risk are not demanded by consumers, while insurance products with much lower risk are in demand (Kunreuther et al., 2013).

One of the main reasons why the Expected Utility Theory is unable to provide a precise view of consumers' insurance demand is that individuals cannot always make rational decisions under uncertainty (Jurkovicova, 2016). According to the Prospect Theory developed by Kahneman and Tversky (1979), individuals have different risk appetites when it comes to gains and losses. Individuals make decisions under the influence of a series of cognitive biases when evaluating the probability of an event occurring (Kahneman and Tversky, 1974; Rabin and Thaler, 2001). This brings us to the conclusion that individuals do not always show consistent behaviors regarding their insurance demands. In this respect, it is important to investigate the socio-demographic and behavioral factors that affect the insurance demand of individuals.

### **2.1. Socio-Demographic Factors**

When individuals tend to be risk-averse, they will be more likely to demand insurance that provides financial protection against the risks they are faced with. However, the tendency to avoid risk is a subjective phenomenon that varies according to individuals and conditions. There are several empirical studies showing that socio-demographic factors, such as income status, age, gender, and education level, influence the tendency of risk aversion and insurance demand. In different studies, it was observed that when the basic parameters determined as indicators of socio-economic development increased, the demand for insurance was generally higher (Browne and Kim, 1993; Halek and Eisenhauer, 2001; Beck and Webb, 2003; Zweifel and Eisen, 2012; Outreville, 2014).

On the other hand, the effect of indicators on insurance demand is not independent of the socio-economic structure of societies. The results vary according to the data and methods used. For example, in some studies, it was concluded that the age of the consumer was associated with the demand for life insurance. Yet, while some of these indicated the direction of the relationship positively, others indicated it negatively (Zietz, 2003). It is essential to measure the effect of the sociodemographic characteristics of individuals on comprehensive insurance demand, but results may contain biases specific to the data and research method used.

People with a higher risk appetite are expected to tend to demand less insurance (Zweifel and Eisen, 2012). Joseph et al. (2016) showed that individuals' risk appetites, despite certain stability throughout life, varied according to their character traits and domain. Besides, several related studies in the literature found that a number of descriptive variables, such as driving experience and vehicle age, had some effects on risk appetite and insurance demand (Awunyo-Vitor, 2012; Hsu et al., 2016; Shi et al., 2016).

## **2.2. Perceived Insurance Benefit**

One of the most valuable contributions of the Prospect Theory to the explanation of individuals' decisions under uncertainty was to reveal that risk preferences changed according to how people classify risk. According to this phenomenon, which is called the framing effect, individuals act more conservatively when it comes to gains and pursue more risks when it comes to losses (Tversky and Kahneman, 1986). Accordingly, individuals' decision to demand insurance would vary depending on whether they qualify for insurance as a gain or a loss. Weedige et al. (2019) determined that there was a significant relationship between the perceived benefit of insurance products and trust in insurance companies and insurance demand.

Whether individuals qualify insurance as a loss or gain is related to the probability of the risk occurring and the extent of the damage. However, individuals make use of their personal experiences, not actuarial tables, when evaluating loss probabilities (Kunreuther et al., 2013). Individuals would only tend to buy insurance if they think that the probability of a loss is high enough. Hertwig et al. (2004) showed that individuals underestimated the probability of rare events when they made decisions based on their experience and that if a relevant event occurred recently, it would make individuals come up with more accurate predictions. It can be expected that individuals, who have recently been involved in a traffic accident, would be more likely to demand comprehensive insurance.

## **2.3. Insurance Literacy**

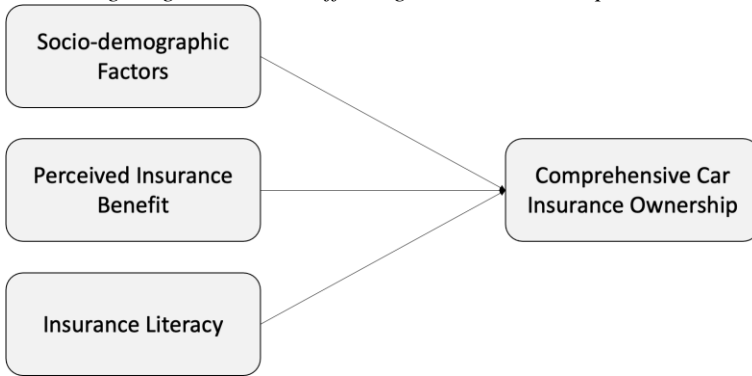
Whether financial literacy has a significant impact on individuals' financial decisions has been the subject of many studies so far (Pitthan and Witte, 2021). Lusardi and Mitchell (2014) found that low financial literacy was associated with poor financial investment decisions and retirement planning. It is a common expectation that financial literacy will have a similar effect on insurance demand. There are many studies showing that the demand for insurance increases as financial literacy increases (Cole et al., 2013; Awel and Azomahou, 2015; Uddin, 2017; Bryan, 2019). However, only a few of those studies specifically attempted to measure the impact of insurance literacy.

According to Tennyson's insurance literacy research, the average consumer did not have enough knowledge about insurance. In addition, the level of knowledge of car and home insurance was lower than in health and life insurance (Tennyson, 2011). Individuals who do not have enough knowledge about insurance products and services may have low awareness of the risks they face, which may reduce their risk aversion level. In addition, it can be expected that the perceived benefit of insurance products for these individuals will be relatively low. In this context, insurance literacy is expected to have a positive impact on individuals' insurance demand.

## **3. METHODOLOGY**

We developed the conceptual framework of the study by conducting empirical research in the literature. The dependent variable in the study is comprehensive car insurance ownership, which represents insurance demand. Figure 1 demonstrates the research model of the study used to explain the relationship between the dependent and independent variables.

**Figure 1: Conceptual Framework of the Research**



The study was designed as relational-causal due to cost and time constraints. The research was a cross-sectional study because the data were collected at a specific point in time. We used the survey method for data collection. The survey was prepared digitally and distributed to car owners in Turkey via a social media platform using a simple random method. The total number of usable responses obtained was 261. The survey form contained the perceived insurance benefit scale and the insurance literacy test, in addition to 14 socio-demographic descriptive questions. The survey items were adopted from previous studies in the literature. Specifically, we adopted the perceived insurance benefit scale from Weedige et al. (2019) and the insurance literacy test from Tennyson (2011). The perceived insurance benefit items were measured with a seven-point Likert scale, anchored from strongly disagree to strongly agree. All items were translated into Turkish and adjusted to match the context and the target audience.

In this research, statistical analysis was carried out by using SPSS 17.0 (Statistical Package for Social Sciences). First, we applied descriptive analysis to understand the data set and its characteristics. Then we used Coefficient Alpha to test the reliability of the Likert-type scales in the questionnaire. The test shows the consistency of the statements on the scale with each other. The Coefficient Alpha value is between 0 and 1, and results above 0,7 for social sciences assume that the scale is reliable (Cronbach, 1958). Next, we applied multiple regression analysis to survey data to determine factors related to the comprehensive car insurance demand. The logistic regression analysis was used to assess the effectiveness of the independent variables since the dependent variable comprehensive car insurance demand, is a binary (King, 2008). Moreover, The Hosmer and Lemeshow test was applied to assess the goodness of model fit. Finally, we used the classification report, confusion matrix, and ROC curve tests to evaluate the performance of the model (Drost, 2011):

- The classification report shows the percentages of correct predictions by accuracy, recall, precision, and F1-score metrics. True Positives, False Positives, True Negatives and False Negatives are used to predict the metrics of a classification report.
- The confusion matrix shows how distributed “actual and predicted” and “false and true” values are in model outputs. In this way, the distribution of predicted values could be determined by observing true and false ones with the matrix indicating density.
- ROC (Receiver Operating Characteristic) curve analysis is a valuable tool for evaluating the accuracy of logistic regression. It’s a plot of the sensitivity (true positive) on the vertical axis and the specificity (false positive) on the horizontal axis or several different candidate threshold values between 0 and 1.

### **3.1. The Model Applied**

The descriptive statistics used in the study are shown in Table 1. Approximately 71% of the sample had comprehensive car insurance. A typical driver had 13,7 years of driving experience, and 56% of them had a traffic accident recently. The average age of the vehicle was 7,8 years old.

**Table 1: Socio-Demographic Descriptive Statistics  
Comprehensive Car Insurance**

**Ownership**

Variable		n	%	Yes	No
Age	Below 29	49	18.77	61.22	38.78
	30 - 44	16	64.75	74.56	25.44
		9			
	Above 45	43	16.48	69.77	30.23
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				<b>Category n</b>	<b>Yes</b>
		<b>No</b>	<b>%</b>		
Gender	Male	20	79.31	71.01	28.99
	Female	54	20.69	72.22	27.78
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Education	High school or below	15	5.75	26.67	73.33
	Bachelor's degree	16	64.75	68.64	31.36
		9			
	Master's degree or PhD	77	29.50	85.71	14.29
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House Ownership	Yes	16	61.69	77.02	22.98
	No	10	38.31	62.00	38.00
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Marital Status	Single	66	25.29	66.67	33.33
	Married	19	74.71	72.82	27.18
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Having Children	Yes	16	61.69	70.19	29.81
	No	10	38.31	73.00	27.00
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Family Income	Below 7.500 TL	23	8.81	39.13	60.87
	7.501 TL - 15.000 TL	81	31.03	61.73	27.94
	15.001 TL - 22.500 TL	68	26.05	72.06	
	22.501 TL - 30.000 TL	36	13.79	86.11	13.89
	Above 30.001 TL	53	20.31	88.68	11.32
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Vehicle Age	0 - 2	77	29.50	21.46	38.96
	3 - 6	56	32.57	71.43	10.59
	7 - 10	85		89.41	
	Above 11	43	16.48	93.02	6.98

Driving Experience (years)	0 - 5	68	26.05	22.99	69.12	71.67	30.88
	6 - 12	60	28.74		70.67		28.33
	13 - 20	75					29.33
	Above 21	58	22.22		74.14		25.86

Having Traffic Ticket	Yes	5	47,89		66,40		33,60
	No	12	52,11		75,74		24,26
Frequency of Driving		6					
	Rarely	41	15.71	23.75	70.73	77.42	29.27
	Usually	62	60.54		68.99		22.58
	Always	15					31.01

Having Pension Contract	Yes	9	53.26		83.45		16.55
	No	12	46.74		57.38		42.62

Having Car Accident	Yes	6	55.94		72.60		27.40
	No	11	44.06		69.57		30.43

Having Healthcare Insurance	Yes	2	62.07		85.19		14.81
	No	99	37.93		48.48		51.52

The result of the Coefficient Alpha test was used to determine the reliability of the perceived insurance benefit scale. The reliability analysis revealed a coefficient alpha of 0.772, which indicates that the scale is reliable (Cronbach, 1958). Since the dependent variable was binary, we applied binary logistic regression to determine the effect of the independent variable on the dependent variable (King, 2008).

**3.2. Empirical Results**

The results of the logistic regression analysis are shown in Table 2. The Nagelkerke R<sup>2</sup> value demonstrates that 70,9% of the variation was explained by the predictive model, which indicates a significantly strong relationship between the independent and dependent variables (Lewis-Beck et al., 2003).

**Table 2: Binary Logistic Regression Model Results Model Fit Statistics and Lemeshow Test**

**Hosmer**

-2 Log likelihood	126.796	Chi-Square	41.616
Cox & Snell R <sup>2</sup>	0.488	Sig. (P)	0.544
Nagelkerke R <sup>2</sup>	0.709		

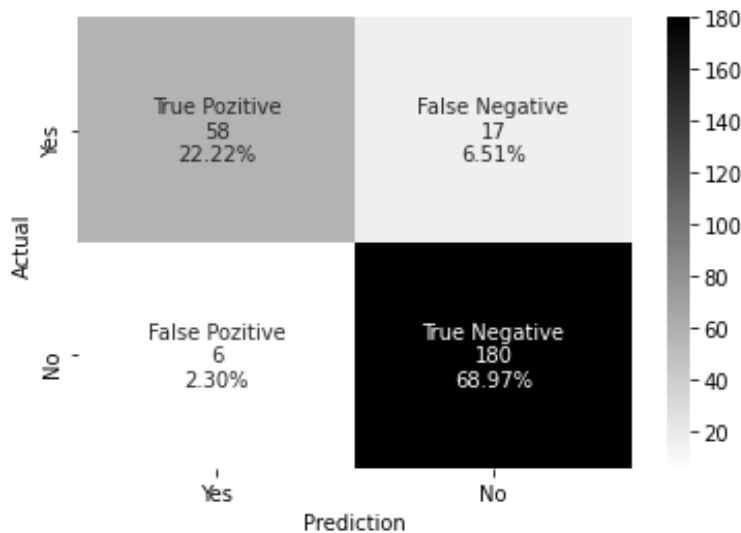
Variables	B	S.E.	Wald	df	Sig.	Exp(B)
Age	-0.090	0.044	4.260	1	0.039*	0.914
Education Level	-1.821	0.548	11.031	1	0.000***	0.162
House Ownership	-1.878	0.527	12.704	1	0.000***	0.153
Vehicle Age	-0.371	0.066	31.154	1	0.000***	0.690
Driving Experience	0.132	0.042	9.814	1	0.001**	1.141
Having A Traffic Ticket	1.062	0.486	4.776	1	0.028*	2.893
Having Healthcare Insurance	-2.878	0.581	24.552	1	0.000***	0.056
Having Pension Contract	-1.471	0.493	8.896	1	0.002**	0.230
Income Level	-2.316	1.179	3.860	1	0.049*	0.099
Perceived Insurance Benefit	-1.448	0.391	13.691	1	0.000***	0.235
Insurance Literacy	-0.760	0.334	5.174	1	0.022*	0.468
Constant	762.394	135.153	31.821	1	0.000***	

\*\*\*: p<0.001, \*\*: p<0.005, \*: p<0.05

The classification results of the model are presented in Table 3, showing the accuracy of the model. The average classification accuracy score of the model was 91%, and the recall rate and the F-1 Score were obtained as 91%. Out of the sample that the model predicted would have comprehensive car insurance, %91 have it. The model correctly predicted %91 of all comprehensive car insurance owners. The results indicated that the model had high predictive power. **Table 3: Classification Results of the Model**

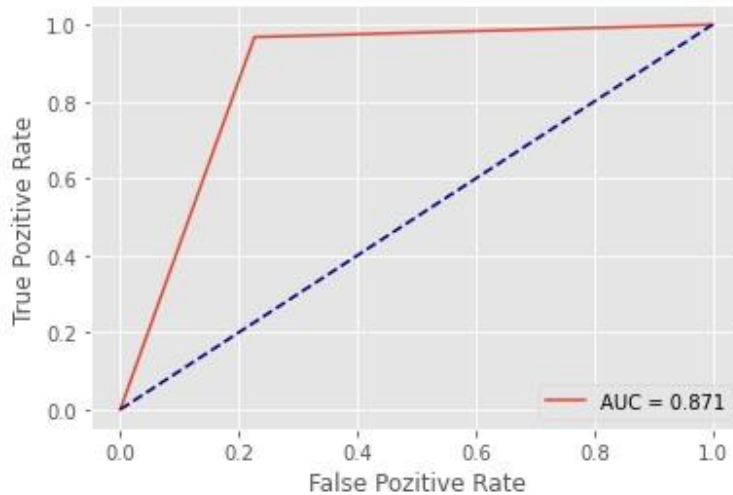
Comprehensive Car Insurance Ownership	N	Precision	Recall	F1-score	Accuracy
Yes	94	97%	91%	94%	91%
No	197	77%	91%	83%	91%
Avg.	261	92%	91%	91%	91%

**Figure 2: Confusion Matrix**



The actual and predicted data of the comprehensive car insurance demand were compared in the confusion matrix (Figure 2). According to the matrix, the correct classification success rate for the True Negative was significantly higher than the others. The True negative in this scheme aligned with the statistical power definition in the statistics literature. The statistical power was 0.68, which is an acceptable level. With a 68% probability, we could detect those individuals who did not have comprehensive car insurance appropriately.

**Figure 3: ROC Curve Graph of the Model**



As seen in Table 3, the ROC curve was positive and the AUC score was 0.979, indicating that the model has high explanatory power. From the ROC curve, it could be easily argued that the model classifies into categories appropriately. There are two indices to consider here: sensitivity and specificity. Sensitivity could be defined as the probability that predicts a positive outcome when an outcome is actually positive. The same could be defined for specificity when observation is predicted as negative when it is actually negative. AUC shows how well our model predicts these two indices, and it is better as it gets closer to 1. Our model is very good in terms of the indices defined above.

#### **4. CONCLUSION**

The factors affecting the insurance demand of consumers have been the subject of research in many developed and developing countries. This research indicates that socio-demographic indicators, such as age, gender, income, and education level, have significant effects on insurance demand. However, the results obtained differ according to variables such as the data sets used, research method, and insurance type. At this point, it becomes important to re-apply existing research with different data sets, indicators, and insurance types. The results obtained will help make practical contributions to the development of the insurance sector, especially in developing countries where the insurance penetration rate is low.

In the study, we investigated the effects of perceived insurance benefit and insurance literacy variables, in addition to socioeconomic indicators, as the determinants of comprehensive car insurance demand in Turkey. The results showed that, besides socio-demographic indicators, perceived insurance benefit and insurance literacy level had an impact on comprehensive car insurance demand. The driver age and vehicle age stood out as the leading descriptive statistics associated with comprehensive insurance demand in the model. In addition, the total years of driving experience had a strong relationship with insurance demand. Having health insurance or private pension contracts also increased consumers' tendency to demand comprehensive car insurance.

One of the most remarkable findings of the study was that consumers, who had a traffic ticket in the last three years, had a significantly higher demand than others. This result appears to be evidence of adverse selection and moral hazard in comprehensive car insurance. Those, who have recently received traffic tickets, may demand comprehensive car insurance because they drive riskily or may drive riskier since they have insurance. We did not find a relationship between insurance demand and driving frequency or experiencing a traffic accident. Although these two factors increase the consumer's risk of having an accident, there is no meaningful relationship between that and insurance demand.

Perceived insurance benefit and insurance literacy factors also affected consumers' comprehensive insurance demand. However, when compared with the existing literature, the explanatory power of these variables was relatively low. We understand that comprehensive car insurance demand in Turkey is related to tangible indicators, such as vehicle age, rather than intangible indicators, such as perceived insurance benefit.

The findings contain several practical applications for the insurance industry in terms of marketing, product development, and the underwriting process. Since the tendency to demand insurance is higher among consumers, especially those having more driving experience and a newer car, tailor-made insurance products can be developed for these segments. In addition, insurance companies should offer bundled product campaigns to consumers who have a health insurance policy or a private pension contract. On the other hand, it is an important point to consider those risky drivers may attempt to demand more comprehensive car insurance. The tendency to buy insurance would be higher in this consumer segment, but they would also have a higher loss-premium ratio since the propensity of having a traffic accident is more than others.

Finally, the findings have implications for regulatory authorities and insurance industry associations. If insurance literacy and perceived insurance benefit in society can be increased, the demand for car insurance and, thus, insurance penetration rates will increase. We recommend insurance industry associations act together with regulatory authorities to organize awareness campaigns and financial literacy courses to better explain the individual and social benefits of insurance products and services.

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