Analysis of the Motivation Factors that Affect the Divers' Diving Place Preferences by the Ordinal Logistic Regression

AHMET KUBAŞ[1], DILEK ALTAŞ† AND BURÇIN ŞAPÇI
Trakya University, Tekirdağ Faculty of Agriculture, Department of Agricultural Economics, 59100, D.Altı/Tekirdağ/Turkiye
†Marmara University, Faculty of Economics and Administrative Sciences, Department of Econometrics, Statistics, 34570, Bahçelievler/ İstanbul/Turkiye
[1]Corresponding author's e-mail: akubas@tu.tzf.edu.tr; ahmetkubas@yahoo.com

ABSTRACT

In this research, a questionnaire study has been applied to visitors who visit İbrice Harbor at the north of Saroz Gulf in the Marmara Region, in Turkey. With the help of the findings that have been obtained from the questionnaires, the relationship between the number of visits of divers and the motivation factors that affect the travel has been analyzed by the ordinal logistic regression model. According to the research findings there are some factors that affect the frequency of divers' visits. The main factors that affect the number of visits are the forest, the quality of the landscape, distance and the reasonable general cost level for accommodation and food. Besides these the number of the stars that show the experience and the level of the divers also affect the number of visits. Because the income level of the visitors who come to Saroz Gulf for diving is generally high, an important relation has not been observed between the income level and number of visits. At the activities related to ecotourism, protection-usage balance and the carrying capacity of the area must be cared certainly. Constant protection of environment and education of individuals are the necessary measures to keep the environment maintained, which is the key for a continuous ecotourism.

Key Words: Ecotourism; The ordinal logistic regression; Scuba; Saroz gulf; Number of visits

INTRODUCTION

In all developing and developed countries the tourism sector plays an important role in the general economy. The sector shows differences according to the level of the development of the countries, with many different areas. However, the sea tourism that is alive during the summer is the most popular one in Turkey. In recent years the traditional understanding of tourism has been abandoned and new approaches like ecotourism, agro tourism etc. have been accepted. These developments have helped the growth of the sector in different areas for different seasons apart from the seasides. (Şapcı, 2005)

The United Nations declared 2002 the year of ecotourism. (www.turizm.gov.tr, 2005). Ecotourism, which has been talked about increasingly in the last ten years, is described as a responsible journey to natural areas that protects the environment, and aims to learn about the inhabitants who created an indigenous culture by living effectively in a harmony (Özhan, 1997). The International Ecotourism Society (TIES) defines ecotourism as responsible travel to the natural areas that conserves the environment and improves the well being of locals. (www.ecotourism.org, 2005).

In Turkey, especially in recent years, there has been increasing development of tourism varieties like tracking, rafting, ecotourism and agro-tourism. These developments have contributed to the tourism activities in and out of the country in different periods. The concept of tourism is no longer limited to travel to the sea, but now also involves different activities. Sports activities are one of the important sources for tourism. Lately, scuba has developed so fast and helped the tourism activities become faster in the area of diving.

İbrice Harbor, located in the Saroz Gulf in the south of Keşan, county of Edirne City in Turkey has appropriate conditions for diving. Starting from May through October, professional training is available by many diving clubs around the harbor. There are many convenient transportation routes from Istanbul and Keşan, as well as sea transportation by private yacht.

Saroz Gulf on the Aegean Coast is rich in aquatic flora and fauna, and has spectacular views for visitor. İbrice Harbor in Saroz Gulf and Uzun Kum area, at the west of the harbor, has the suitable depth and other conditions for diving. For this reason İbrice Harbour is visited by lots of diving clubs for training, during the summer. If its close distance to İstanbul is taken into consideration, the area definitely becomes an attractive diving centre.

In the research, the potential relation between the divers' frequency of visits and the motivation factors has been analyzed. Because these kinds of recreation areas are in the product list of the tourism firms, the findings of the research can be used for marketing of these products. Especially by highlighting the factors that affect the visit motivation, this research can help increase demand on these subjects. Therefore, it may lead to a development in rural areas that have potential but not the opportunity.

METHODOLOGY

Sampling method. The samples were chosen from the

visitors who came to the area for diving as they could represent the population. For sampling, the infinite sampling method is used and the divers that were sampled were chosen at random (Malhotra, 1993). The questionnaires were applied by the researchers themselves as an interview in July and August of 2004 and the total number of the divers was 157. The data obtained from the questionnaires were analyzed by ordinal logistic regression. Reliability analysis was applied to the likert questions used in the analysis and Cronbach's Alpha (0.852) was found meaningful.

Ordinal logistic regression. Ordinal logistic regression is frequently used in social sciences. Snipes *et al.* (1998) introduced the use of an ordinal logit framework, which improves upon previous research by exploiting the simultaneous and ordered nature of a Likert scale. Carbonaro (2001) examined cross-national differences in the skills-earnings relationship.

Fielding *et al.* (2002) used multilevel ordinal models for examination grades. Klaeboe *et al.* (2002), examined vibration in dwellings from road and rail traffic with data of Norwegian Socio-vibration survey. Fujtomo (2003) applied ordinal regression analysis to Japanese Female Labor Market data by separating the firms into 4 groups as small-medium (< 1000), large (1000 - 4999), very large (5000 - 9999) and huge ($\geq$ 10.000).

By arranging as never, less than once a month, more than once a month, Vermunt and Hagenaars (2004) used National Youth Survey's data of five years about using drugs and sexuality. Cooke and Speirs (2005) observed the effect of being a tied migrant on the economic status of the civilian husbands and wives of military personnel in order to confirm whether observed trailing-wife effects are consistent with being a tied migrant.

Logit models in which the dependent variable has two or more categories are widespread.

If the probability of an event to happen is π, logit (π) as event is described as "log odd" is explained as:

$$\text{logit } (\pi) = \log(\frac{\pi}{1-\pi}) \qquad (1)$$

When the variable k is used the logistic model is found as:

$$\text{logit}(\pi) = \beta_0 + \sum_{j=1}^{k} \beta_j x_{ji} \qquad (2)$$

When the dependent variable is measured on an ordinal scale, to find the reason-result relations between the dependent variables and independent variables, ordinal regression analysis is used. Ordinal scaled dependent variable must have values seen at least 3 categories (Özdamar, 1999) such as low, medium, high, highest. One of the reasons for preferring the model that takes ordinal values is that the interpretation is easier; the other is that the hypothesis tests are stronger. The disadvantage of ordered models is that they impose restrictions on the data that may

be inappropriate. So whenever you use an ordered model, it is important to test whether its restrictions are valid (Allison, 1999). The options available include (Menard, 2002)

-Ignoring the ordering of the categories of the dependent variable and treating it as nominal

-Treating the variable as though it were measured on a true ordinal scale

-Treating the variable as though it were measured on an ordinal scale, but the ordinal scale represented crude measurement of an underlying interval/ ratio scale

-Treating the variable as though it were measured on an interval scale.

There are three different methods for forming the logit models that take ordered categorical values: cumulative logit model, adjacent category model and continuation ratio model. Cumulative logit model is known as ordinal logit model and its hypothesis tests give stronger results (Allison, 1999).

If the dependent variable has category k that takes π_1, π_2, π_k polynomial probabilities and if $\sum_{i=1}^{k} \pi_i = 1$, cumulative logits are defined as:

$$F_i = \frac{\sum_{j=1}^{i} \pi_j}{\sum_{j=i+1}^{k} \pi_j} \qquad (3)$$

Ordinal logistic regression determines the relations between ordinal response and independent variables. Proportional odds model is defined as (Le, 1998).

$$\text{Log }(F_i) = \beta_{0i} + \sum_{j=1}^{m} \beta_j x_j \qquad (4)$$

Model IV bases on the cumulative probability of dependent variable categories suppose that regression functions are parallel to logit scales for different Y categories. In ordinal logit models, the categories are parallel to each other hypothesis is used. This hypothesis is tested by Wald and Likelihood Ratio (LR) (http://etd.library.pitt.edu/). Parallel regression lines are assumed, and therefore, a single slope is calculated for each covariate. In situations where this assumption is not valid, nominal logistic regression, which generates separate logit functions, is more appropriate.

There are different methods to interpret coefficients. One of them is the interpretation of odds ratios (http:// idari.cu.edu.tr/sempozyum/bil13.htm). The odds of a reference event is the ratio of P (event) to P (not event). The estimated coefficient of a predictor (factor or covariate) is the estimated change in the log of P (event)/P (not event) for each unit change in the predictor, assuming the other predictors remain constant. At continuous variables, percentage of the variation is calculated by operation (odds ratio - 1)*100

RESULTS

In the research visit the divers who came to Saroz Region are grouped into the following categories: never, less than 2, 2 - 4 times, 4 - 10 times and more than 10 times and ordered as 1, 2, 3, 4, 5. By applying the ordinal logistic regression analysis to whole variables that affect the visit frequencies, most meaningful models have been obtained.

When the odds ratio in the table are examined; one unit increase in star numbers decreases the probabilities of the visits to the area never (1), less than 2 (2), 2 - 4 times (3), 4 - 10 times (4) 52% comparing to probability of visits more than 10 times. This means that increase in star numbers increases the frequency of the visits.

One unit increase in distance (hour) increases the probability of visits never (1), less than 2 (2), 2 - 4 times (3), 4 - 10 times (4) 63%. This means that distance is a factor that decreases the frequency of the visits.

The effect of the diving clubs' taking their students to the area for practical training after the basic training is significant. After completing the training to get the one-star diver certificate students have to dive 18 m deep.

In recent years, because diving has begun to be better known, this sport has become increasingly popular and every season hundreds of diver candidates apply to diving clubs to get diving training. These new divers come to the area through diving clubs or on their own. But lots of divers

Model I. Independent variable: distance (hour), number of stars

						95% CI	
Logistic Regression Table							
Predictor	Coef.	SE Coef	Z	P	Odd Ratio	Lower	Upper
Const(1)	-2,34267	0,682729	-3,43	0,001			
Const(2)	-0,994848	0,682729	-1,62	0,105			
Const(3)	0,192358	0,612946	0,31	0,754			
Const(4)	2,33565	0,753996	3,10	0,002			
Number of stars	-0,728296	0,165041	-4,41	0,000	0,48	0,35	0,67
Distance (hour)	0,487441	0,140580	3,47	0,001	1,63	1,24	2,14
Log-Likelihood= -109,712							
Test that all slopes are zero: G = 31,867, DF = 2, P-Value = 0,000							
Goodness-of-Fit Tests							
Method	Chi-Square	DF	P				
Pearson	188,182	118	0,00				
Deviance	97,789	118	0,912				

Model II. Independent variable: distance (km), place rent

						95% CI	
Logistic Regression Table							
Predictor	Coef.	SE Coef	Z	P	Odd Ratio	Lower	Upper
Const(1)	-7,04562	1,65776	-4,25	0,000			
Const(2)	-4,85985	1,43681	-3,38	0,001			
Const(3)	-3,85838	1,37938	-2,80	0,005			
Const(4)	-1,91723	1,30095	-1,47	0,141			
Distance(km)	0,013182	0,0053	2,46	0,014	1,01	1,00	1,02
Place rent	0,048510	0,0251	1,93	0,054	1,05	1,00	1,10
Log-Likelihood= -49,005							
Test that all slopes are zero: G = 24,104 DF = 2, P-Value = 0,000							
Goodness-of-Fit Tests							
Method	Chi-Square	DF	P				
Pearson	96,95	114	0,874				
Deviance	77,55	114	0,996				

who gain experience in time are also pleased by the area and prefer the area personally.

Inexperienced divers feel comfortable in the area since they have done their training diving in there, and for this reason they also prefer the area. The number of divers in Saroz, who consist of trainers and diving club owners, are relatively high. These people have dived in the area in recent years for many times. However, naturally, the number of dives carried out by the trainers is higher than that of the other divers.

In Model II, one unit increase in distance (km.) and rental of accommodation, increases the probabilities of visits never (1), less than 2 (2), 2 - 4 times (3), 4 - 10 times (4) 1% and 5% comparing to probability of visits; more than 10 times. In other words increase in distance and rental costs is the main factor that decreases the frequency of visits to the area.

As seen in Model III one unit increase in salary does not affect the frequency of the visits so much (odds ratio = 1). The reason that salary does not affect the frequency of the visits is that the divers are generally high salary earners. The increase in the number of dives decreases probabilities of visits; never (1), less than 2 (2), 2 - 4 times (3), 4 - 10 times (4) 1% comparing to probability of visits more than 10 times. The increase in the number of dives is a factor that increases the frequency of visits to the area.

In Model IV, t 4 and t 12 variables have been found meaningful. These variables are an abundance of forest and green areas (t 4) and affordability (t 12). According to the obtained results if the "abundance of forest and green areas" variable increase, probabilities of visits; never (1), less than 2 (2), 2 - 4 times (3), 4 - 10 times (4) decrease 38% comparing to probability of visits more than 10 times, inexpensive costs also decrease the probabilities of visits; never (1), less than 2 (2), 2 - 4 times (3), 4 - 10 times (4) 32% comparing to probability of visits more than 10 times. According to this "abundance of forest and green areas" and "the costs are inexpensive" variables are the factors that increase the frequency of the visits. It is seen that the variables; the area is suitable for diving (t 1), diving clubs prefer the area (t 2), clean sea (t 3), clean air (t 5), quiet environment (t 6), no traffic (t 7) quality and length of the beach (t 8), safe area (t 9), rich flora and fauna (t 10), easy transportation (t 11) do not affect the frequency of the visits.

DISCUSSION

Saroz Gulf in the southwest of the Trakya Region is an important area from the point of natural resource potential with its rich aquatic flora and fauna. Moreover, the Gulf shows a clean and clear structure because of the property of cleaning itself by flow. İbrica Harbor and its surroundings, which are suitable for diving in terms of depth and visuals, are used as a practice area by scuba divers.

According to the research findings there are some factors that affect the frequency of divers' visits. In particular, the distances between the departure points of the

Model III. Independent variable: salary, number of dives

Logistic Regression Table

Predictor	Coef.	SE Coef	Z	P	Odd Ratio	95% CI Lower	Upper
Const(1)	-0,511935	0,448917	-1,14	0,254			
Const(2)	0,692743	0,439185	1,58	0,115			
Const(3)	1,46600	0,489857	2,99	0,003			
Const(4)	4,70749	1,26060	3,73	0,000			
Salary	-0,0001279	0,0000947	-1,35	0,177	1,00	1,00	1,00
Number of dives	-0,0059980	0,0037247	-1,61	0,107	0,99	0,99	1,00

Log-Likelihood= -52,403

Test that all slopes are zero: G = 5,292 DF = 2, P-Value = 0,071

Goodness-of-Fit Tests

Method	Chi-Square	DF	P
Pearson	185,564	134	0,002
Deviance	98,215	134	0,991

Model IV. Independent variables: t1,t2,t3,t4,t5,t6,t7,t8,t9,t10,t11,t12

Logistic Regression Table

Predictor	Coef.	SE Coef	Z	P	Odd Ratio	95% CI Lower	Upper
Const(1)	0,612957	1,24492	0,49	0,622			
Const(2)	1,25386	1,24817	1,00	0,315			
Const(3)	1,78609	1,25256	1,43	1,154			
Const(4)	3,34118	1,28539	2,60	0,009			
t1	0,0412393	0,263473	0,16	0,876	1,04	0,62	1,75
t2	0,101967	0,176810	0,58	0,564	1,11	0,78	1,57
t3	0,0453421	0,254936	0,18	0,859	1,05	0,63	1,72
t4	-0,473673	0,206217	-2,30	0,022	0,62	0,42	0,93
t5	-0,0685716	0,244816	-0,28	0,779	0,93	0,58	1,51
t6	0,0309620	0,209541	0,15	0,883	1,03	0,68	1,56
t7	0,143840	0,169592	0,85	0,396	1,15	0,83	1,61
t8	-0,0733157	0,190319	-0,39	0,70	0,93	0,64	1,35
t9	0,313899	0,203790	1,54	0,123	1,37	0,92	2,04
t10	0,0703768	0,189405	0,37	0,710	1,07	0,74	1,56
t11	0,0552689	0,179044	0,31	0,758	1,06	0,74	1,50
t12	-0,390951	0,190128	-2,06	0,040	0,68	0,47	0,98

Log-Likelihood= -192,901

Test that all slopes are zero: G = 15,448 DF =12, P-Value = 0,218

Goodness-of-Fit Tests

Method	Chi-Square	DF	P
Pearson	562,915	564	0,505
Deviance	362,574	564	1,000

visitors and area in km. or hour, affect the frequency of visits. In addition, accommodation costs and divers' experience level affect the frequency of the visits.

The relations between the frequency of visits and "abundance of forest and green areas" and "the costs are inexpensive" variables have been found meaningful. One of the other important reasons of the divers' preferring the area is its close distance to İstanbul, and this may show that the expenditure per diver is low. Moreover, from the point of view of natural beauty, the North Saroz area is still untouched and this helps the area to be an attractive for divers.

By the research it is seen that sportive tourism activities are important tools that can be used in the subject of rural development. Especially in the research area Mecidiye and its surroundings benefit from the expenditures of the divers whose income level is high, spend for feeding and lodging in the area. By this research it is possible for the

firms that have activities in tourism subject, to increase the numbers of visitors and visits by highlighting the activities like scuba. Especially while marketing their products, the firms that have activities in this subject may use the motivation factors in their promotion activities (Şapçı, 2005).

At the activities related to ecotourism, protection-usage balance and the carrying capacity of the area must be cared certainly. Damages of the visitors to the natural source while using it must be prevented. For this the most important activity is education to increase the sensibility of visitors by informing them. For this reason visitors' profiting from the natural source must be sustainable.

Environment is the key factor for tourism activities. Therefore fragile natural structures must be protected in order to expect more visitors continuously. These measures will not only help the environment and its sustainability, but it will also help development of the local rural areas.

REFERENCES

Allison, P.D., 1999. Logistic Regression Using the SAS System: *Theory and Applications*. pp. 133: 134–6. USA

Anonymous, 2005. www.turizm.gov.tr Ministry of Culture and Tourism, Republic of Turkey

Anonymous, 2005a. www.ecotourism.org The International Ecotourism Society

Anonymous, 2005b. http://idari.cu.edu.tr/sempozyum/bil13.htm Cukurova University

Carbonaro, W., 2001. *Explaining Cross-National Differences in the Skills-Earnings Relationship: Contextual Effects of Occupations*. University of Notre Dame. Working Paper and Technical Report Series

Cooke, T. and K. Speirs, 2005. Migration and Employment Among the Civilian Spouses of Military Personnel. *Social Sci. Quarterly,* Vol. 86, No. 2, pp. 343–55

Fielding, A., M. Yang and H. Goldstein, 2002. *Multilevel Ordinal Models for Examination Grades*. Statistical Modelling, London, pp. 1–42

Fujimoto, K, 2003. *Application of Multinomial and Ordinal Regressions to Data of the Japanese Female Labor Market*. pp. 1–55. University of Pittsburgh

Klaeboe, R., I.H. Rise, L. Harvik and C. Madshus, 2002. Vibration in Dwellings From Road And Rail-Traffic- Part II: Exposure-effect Relationship Based On Ordinal Logit and Logistic Regression Models. *Elsevier Science Ltd*., pp. 89–109

Le, C.T., 1998. *Applied Categorical Data Analysis,* pp. 146–8. John Wiley & Sons, Inc. Newyork

Malhotra, K.N., 1993. *Marketing Research an Applied Orientation,* pp.39. Prentice Hall International Inc.USA

Menard, S., 2002. *Applied Logistic Regression Analysis*. Second Edition. pp. 97. Sage Publication London

Özdamar, K., 1999. Statistical Data Analysis with Packet Programs-I. Kaan Bookstore. *Eskişehir*, pp. 500–5

Özhan, E., 1997. Türkiye Kıyıları 97; "Kıyılarımızda Ekoturizmin Geliştirilmesinde Kentsel Tasarımın Rolü. Türkiye'nin Kıyı ve Deniz Alanları I. Ulusal Konferansı. *ODTÜ*, Ankara

Snipers, R.L. S.L. Oswald and S.B. Caudill, 1998. Sex-Role Stereotyping, Gender Biases and Job Selection: The Use of Ordinal Logit in Analyzing Likert Scale Data. *Employee Responsibilities and Rights J.*, 11: 81–97

Şapçı, B., 2005. *Edirne İli Keşan İlçesi Kuzey-Orta Saroz Bölgesinde Ekoturizm ve Agroturizm*, pp. 1–27. Trakya Üniversitesi Fen Bilimleri Enstitüsü Yayınlanmamış Yüksek Lisans Tezi, Edirne

Vermunt, J.K. and J.A. Hagenaars, 2004. *Ordinal Longitudinal Data Analysis*, pp. 374–93. Tilburg University , Tilburg, Netherlands