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Modelling Repeat Visitation

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Abstract:

Repeat visitation seems to be important for a tourism destination, especially for a peripheral destination. This paper uses Bornholm as a case to show the factors that influence tourists to choose the same holiday destination. The study concentrates on the factors within geographical and demographic fields. A logit model is used in the analysis of estimating the probability of "yes" answer to the question concerning "repeat" or not. The results show that age of visitors, family income of visitors, the length of stay in the destination, the distance between the visitors' home area and the destination, and the visitors' evaluation on the destination (image) are important factors that influence their repeat visit decisions.

1. Introduction

Researches on first-time or repeat visitors to a destination have been undertaken for different purposes. It is widely known that it is important for any destinations to attract more repeat visitors, in particular, for the destination in a peripheral area. The benefits of destination from repeat visitation have been concluded that, firstly, more repeat visitors make it possible to reduce marketing costs (Oppermann, 1998). Secondly, the destinations can build up a positive image by their satisfied customers and the image will spread to the potential markets and gain a further marketing incentive (Oppermann, 1998; Reid and Reid, 1993). Thirdly, repeat visitation is especially important for a peripheral destination, as it needs the customers' brand loyalty to its products.

The studies on first-time and repeat visitors so far, have explored some evidences on the motivation of visitors (Fakeye and Crompton, 1992; Prentice, Witt and Hamer, 1998), the destination choice behaviour (Mazursky, 1989), the patterns of repeat visitation (Oppermann, 1997; Gitelson and Crompton, 1984), and importance of repeat visitors to tourism service suppliers (Reid and Reid, 1993). However, a modelling of repeat visitation is still rare in research publications.

A major question raised here is what are the main factors influencing tourists to choose the same holiday destination every year? There are many factors that dominate the destination choice behaviour, such as factors from demographic psychological, economical and cultural aspects. Apart from these factors, there are also factors from individual behaviour, for example some tourists are faithful to a destination, while for others, it may happen that the decisions for a certain destination in one year is at the same time a decision against that destination in the following year (Schmidhauser, 1976-1977, re-quoted from Oppermann, 1998).

The purpose of this paper is to explain tourist repeat behaviour by studying it with geographical and demographic characteristics. The Baltic island of Bornholm in Denmark (being considered as a destination in a peripheral area) is used as a case study in this paper. Some facts about tourism on Bornholm, especially concerning first time and repeat visits, are presented in the second section. In the third section model formulation is given, where a logit model based on the cumulative logistic probability function is introduced. Results of estimations and discussion are given in the fourth section and the last section is the conclusion.

2. Tourism on Bornholm

Bornholm is an island in the Baltic Sea inhabited by 45 000 people. It is one of the important tourism destinations in Denmark. An estimation of approximate 500 000 visitors come to the island each year mainly for its beaches, rocks, nature and picturesque fishing villages and farms that dot the island. Tourism on Bornholm shows a strongly seasonal trend, as leisure holidaymakers mainly enjoy their summer holidays on Bornholm. Denmark – where Bornholm is situated - and two neighbouring countries (Germany and Sweden) dominate the tourism market of Bornholm. Table 1 shows visitors on Bornholm by original country. Danish visitors dominate the market in a whole year period as many Danes visited families and relatives (VFR) during the winter period, such as during the Christmas holidays. However, in the third quarter of the year the number of the German tourists is equal to (or overtake) the Danish tourists.

Repeat visitation is very important for Bornholm. It is shown in Table 2 that repeat visit accounted for about 70 percent of all visitors in the whole year period and it accounted for 62 percent in the third quarter of the years 1996-1998. The figures for the third quarter should be considered as rather high shares, as holidaymakers accounted for 80 percent in this period, while holiday/VFR combined visitors accounted for 11 percent in all visitors.

Table 3 shows main features of first-time and repeat visitors by original country, age group, education, family income, purpose of visit, length of visit and the distance from visitors' home area to Bornholm by driving hours. The data for Table 3, except for the variable "distance", were from the visitor survey database at Research Centre of Bornholm. The database includes only the surveys of visitors on departure by ferries. It is assumed that the travel by car is a transport mode as a proxy for all transport modes. The variable "distance" is measured by the number of driving hours by car from visitors'

home areas (provinces or amter) to Bornholm, including the time when the car is taken on board the ferry. Therefore, three hours is the minimum time for coming to Bornholm. The data of driving hours by car were collected from *Internet* information (i.e. www.routeplanner.dk or www.shell.dk) and a survey of the visitors on Bornholm.

The visitors from three main original countries and from "others" (Denmark, Sweden, Germany and others) are listed in the table. The Danish, German and Swedish visitors together accounted for 88 percent of first-time visitors and 97 percent of repeat visitors on Bornholm. Visitors' age was grouped into six categories and visitors' education was grouped into four categories, as shown in the table. The family income was grouped into four categories, i.e. low, middle, middle-high and high. The main purposes of visit shown in the table were business, holiday, holiday combined with VFR and VFR solely. The length of visit, as listed in the table, is simply the numbers of days which visitor stayed on the island. The number of days is divided into five groups. Finally the distance is divided into four groups.

Two periods of observations are listed in Table 3: a whole year and the third quarter of a year for a period of three years. A quite different pattern is shown by first-time and repeat visits in term of original country. German tourists accounted for 57% on first-time visits, while they accounted for only 21% (or 27% in the third quarter) on repeat visits. Danish repeat visitors in both whole year and the third quarter were higher than the German, Swedish and other visitors. The three other variables: age, education and family income showed a slight difference in term of both the first/repeat visits in the whole-year period. It showed that age of respondents at 35-49 years accounted for the highest share in the observations, it was followed by the visitors at an age between 50-59 years. It showed that the respondents with higher education accounted for a large share

of first-time visitors, but the visitors with 12 years plus three years of vocational education accounted for a large share on repeat visits. It also showed that visitors with a middle-level family income accounted for a large share on both first-time and repeat visits, but the visitors with a middle-high family income accounted for quite a high share on repeat visits. The first-time and repeat visitors showed a different pattern in the distance variable. On first-time visits, visitors from areas within a distance to Bornholm of 6-9 driving hours have the highest share, they were followed by visitors from areas within a distance of 9-12 driving hours and from areas with more than 12 hours. However, the short distance, i.e. the distance of 3-6 driving hours accounted for the highest share on repeat visits, followed by the distance of 6-9 hours and 9-12 hours. This indicates that the shorter the distance between the origin and the destination, the more frequently the visitors made trips to Bornholm.

Information was also collected for image of visitors on the destination, such as "Bornholm as a destination for holidays", and "value for money" during their visits on Bornholm. Responses are recorded along a five-point scale where five represents "excellent" and one means "poor". Table 4 shows the image of visitors on Bornholm by first-time and repeat visits. It can be seen from the table that on average the visitors gave a quite high mark regarding the first question, but they offered a more realistic answer towards the second question. For the first question 63.9 percent of first-time visitors marked "excellent", while 69.2 percent of repeat visitors marked "excellent" by a whole year observation. The percentages were slightly increased when the observation period was changed from a whole year to the third quarter of the year. 26 percent of first-time visitors evaluated Bornholm as a good destination for holidays, while 18 percent of repeat visitors marked "good" on the same question.

Evaluation on “value for money on Bornholm” was not as optimistic as the first evaluation question. It showed that only 15 percent of first-time visitors and 29 percent of repeat visitors gave “excellent” answers, while the majority (about 75 percent of first-time visitors and 61 percent of repeat visitors) of the visitors marked either “good” or “average” to the question.

3. Model Formulation

A visitor survey has been conducted at the Research Centre of Bornholm for more than four years now. Around 2 – 3 000 interviews were made every year in the past four years. The question, such as “is it your first time on Bornholm?” in the questionnaire, results in a binary variable, as indicated by “first-time=0”, or “repeat=1”. Intuition would suggest that factors such as age, education, family income, length of stay on Bornholm and the “distance from visitors’ home areas to the destination” would be relevant in explaining why visitors choose to make their repeat visits. In this case, “a binary choice model” should be applied in the analysis.

The discrete choice analytical method, such as a logit model, is normally used to estimate the probability of a “yes” or “no” answer. This is a kind of binary choice models in the context of a formal regression model in which the nature of data observed dictates the special treatment for a binary dependent variable.

The logit model is based on the cumulative logistic probability function and is specified as

$$P_i = F(Z_i) = F(a + bX_i) = \frac{1}{1+e^{-Z_i}} = \frac{1}{1+e^{-(a+bX_i)}} \qquad (1)$$

where P_i is probability of "yes" to repeat visits, and $Z_i = \alpha + \beta X_i$.

From (1), the formula can be transformed to

$$(1+e^{-Z_i})P_i = 1 \; ; \quad \text{or} \quad e^{-Z_i} = \frac{1}{P_i} - 1 = \frac{1-P_i}{P_i} \tag{2}$$

so

$$e^{Z_i} = \frac{P_i}{1-P_i}; \quad \text{or} \quad \ln(\frac{P_i}{1-P_i}) = Z_i = a + bX_i + e \tag{3}$$

If Z_i value is obtained, the results from equation (3) can be used to estimate the P_i value by equation (1).

As discussed above on the factors influencing visitors' repeat behaviour, we can consider including the following variables: age groups (age), education level (education), family income (fminc), purpose of visit (purpose), number of days on Bornholm (nodaybh), travelling hours from visitors' home areas to Bornholm (travelhr), the opinions on "Bornholm as a destination for holiday" (destination) and "value for money on Bornholm" (bhvfm) as independent variables to explain *Z*. The Z_i vector are binary choice data, in this case, i.e. repeat (Z=1) and non-repeat (Z=0).

The preliminary regression shows that the variables, such as "education" and "destination" do not contribute significantly to the estimation. The purpose of the visit is used here only for selecting the data by the purpose, so that we can make a regression only based on the holidaymakers or holidaymakers combined with VFR. Therefore, the model of repeat visit (Z_i) is described as follows:

$$Z_i = c + \text{age (category)} + \text{fminc} + \text{nodaybh} + \text{travelhr} + \text{bhvfm} \tag{4}$$

where

age - respondents' age;

fminc – visitors' family income;

nodaybh - number of days the visitors stayed on Bornholm;

travelhr - travelling hours from visitors' home areas to Bornholm;

bhvfm - evaluation on value for money on Bornholm;

c - a constant.

The variable "age" is used in the form of categorical regression in order to show the reflection by each age group of the visitors, by the default of indicator contrast. Indicator contrasts indicate the presence or absence of category membership when it regresses. The variable for the "family income" is also multiple dummy data, here it is taken as to measure the reflection on the level of income. The variable "length" is numeric data, showing the real number of days the visitors stayed on Bornholm. The variable "distance" is also numeric data measuring the number of hours for tourists driving in their own cars from their permanent living areas to Bornholm. For the image of destination, the second measure for the evaluation, i.e. "value for money on Bornholm" gave a better fit in the regression.

4. Results and Discussion

Table 5 offers the description of data by giving mean, standard deviation, minimum and maximum value, and number of valid observations of each independent variable in the database. The data are based on the survey of visitors on departure by

ferry in the period of July 1995 to June 1998. The total number of observations is 7381. The results of regressions are shown in Table 6, 7 and 8. Table 6 shows the regression results based on all the available data by using “an indicator-variable coding” for “age”, where the first age group has been used as the reference group. While Table 7 shows the regression results based on the same database and using the same indicator-variable coding for “age”, but the difference is that the last age group has been used as the reference group. Table 8 show the results based only on the holidaymakers.

To assess the goodness of fit of a logit model, several tests are provided to determine how well the model performs. The *model Chi-square* test is a likelihood-ratio test, which shows the goodness-of-fit statistics for the model with all of the independent variables, by looking at the difference between the *-2LL* for the model with only a constant and *-2LL* for the current model. The *Chi-square* tests in the three regressions are highly significant.

For a large sample size like this, *Wald statistic* is a good test for a coefficient if it is zero or not. When a variable has a single degree of freedom, the *Wald statistic* is just the square of the ratio of the coefficient to its standard error. For the categorical variables, the *Wald statistic* has a degree of freedom equal to one less than the number of categories. The significant level for the coefficient on the *Wald statistic* is shown in the column labelled *Sig*. In Table 6, all the variables are significant at a level below 0.05. Another test in the estimation table is *R*, which is a statistic used to look at the partial correlation between the dependent variable and each of the independent variables. A positive value in *R* indicates that as a variable increases in value, so does the likelihood of the event occurring. If *R* is negative, the opposite is true. A small value for *R* indicates that the variable has a small partial contribution to the model. The variable “travelling

hours from home area to Bornholm" (travelhr) in all three regressions has a large partial contribution to the model.

A logit model also offers a classification table for the regression. Table 9 shows the classification table for repeat visits from the regression listed in Table 6. It can be seen that 24.8 percent of the first-time visits and 92.1 percent of repeat visits have been correctly predicted. Overall 72.5 percent of the valid observations have been correctly predicted.

Comparing the result in Table 6 with that in Table 7, it is found that the variable "age" by category with the first age group (i.e. 16-24 years) as reference group gives a better fit. As compared with the figures in *R* in Table 7, some age groups have made no (or less) contribution to the model. The estimation in Table 6 has obtained the better fit.

Table 8 shows the estimation result only based on the data of holidaymakers. Apart from the age group (5) (i.e. the age over 69 years) not being significant, all the other variables are significant at a level below 0.05. *R* test for "number of days on Bornholm" (nodaybh) is 0.1116, more than that (0.0618) in Table 6. This shows that number of days on the destination is more relevant to the holidaymakers than other visitors. The coefficients of the variables have the same signs and the values are close to the values in Table 6.

The regressions based on the different original countries of the visitors have also been made, however, only the regression based on the German visitors is significant in most of the variables.

From Table 6 the signs of the coefficients show that "age" and "travelling hours" have the negative effect on repeat visitation behaviour, on the other hand, "family

income", "number of days on Bornholm" and "value for money" have the positive effect. The coefficient of "nodaybh" is rather small.

The probability for "an average visitor" (i.e. all the independent variables equal to its mean) to Bornholm is given at the bottom of each regression table. $\sum\beta$ is a sum of the mean of each independent variable multiplied with its coefficient. Then the probability is calculated by formula (1), i.e. $P=f(\sum\beta)$. The forecasting results show that the probability for "an average visitor" to come back to Bornholm is 0.32, 0.55 and 0.28 respectively in Table 6, 7 and 8. The difference between the results from Table 6 and Table 7 is that the coefficients for AGE groups are quite different to each other. The average coefficient from the AGE categories was used for forecasting the probability.

The simulations have been made based on the different assumptions. Figure 1 shows the simulation on "an average visitor" to Bornholm, which is the probability for a visitor who has an average age and family income, and an average number of days and an average image on Bornholm, just allowing the variable "travelling hours by car" to vary. Figure 2 is made based on the assumption 1, that is age = 3 (i.e. age between 35-49 years), family income is at the highest level, number of days on Bornholm is 7 and image on Bornholm is good. Figure 3 is the simulation based on the assumption 2, which is same as in Figure 2 except for age=1.

The three figures show different patterns for the probability of repeat visitation. Figure 1 and Figure 2 are nearly in the same trend, but the probability of repeat is larger for the visitors from the same area while the family income is at a higher level. For example, two visitors from the area of "distance"(travelhr=13), the visitor with an average family income (fminc=2.17) has 8 percent of probability to make a repeat visit,

while the visitor with a highest level of income will have 15 percent of probability to come back. Figure 3 shows another pattern of probability of repeat by assuming visitors are young and at a higher level of income. In this case the visitor from the area of the same distance (travelhr=13) will have 48 percent of probability to make a repeat visit. Therefore even if the visitors live far away from the destination, they will make repeat visits if they are young and rich.

Table 10 shows the probability of repeat visitation based on travelling hour in four scenarios, i.e. at the different family income level. It can be seen from the shadow areas that the repeat visits are influenced both by their income and "distance". When the family income is at "level 4", the visitors from the areas of 12 hours-driving to Bornholm have a probability higher than 0.5 for repeat visits. Comparatively, when the family income is at "level 1", the visitors in the areas of 9 hours-driving to Bornholm have a probability higher than 0.5 for repeat visits.

5. Conclusion

This paper analyses repeat visitation behaviour by using Bornholm as a case study for a tourism destination choice. Factor analysis showed that some factors in geographic, demographic and psychological dimensions are relevant to repeat visitation. The study concentrates on the application of a logit model to the binary dependent variable. When a cumulative logistic probability function is used in the estimation, the probability of repeat visitation can be calculated based on the estimations of variables from the regression.

The results in this analysis show that visitors' age and "travelling hours from their home area to the destination" have a negative effect on the behaviour of repeat visitation. On the other hand, the visitors' family income, "number of days stayed on Bornholm"

and “the visitors’ evaluation on value for money” have the positive effect on repeat visitation. However, the influence by the length of their stay is quite small. The conclusion from this study is that the family income of visitors and the “distance” from visitors permanent living place to the destination are important factors for the repeat visit behaviour.

The repeat visitation analysis is helpful to the studies of tourism marketing and tourist destination choice behaviour. Any destination may have repeat visitors. Study on repeat visitation is crucial for tourism businesses and tourism planners to define why visitors choose to repeat visits and what factors influence visitors to make the same destination choice decisions.

Table 1 Visitors by original country on Bornholm

(%, total=100)

Original country	All year 1996	3rd quarter 1996	All year 1997	3rd quarter 1997	All year 1998	3rd quarter 1998
Denmark	49	38	42	39	49	43
Sweden	11	10	17	11	16	10
Germany	35	46	34	40	30	38
Others	5	6	7	9	6	9
Number of observations	2421	1155	2340	1453	1714	917

Source: Rassing C. R. *Survey of Visitors to Bornholm*, 1996, 1997 and 1998. Research Centre of Bornholm.

Table 2 Visitors by first time and repeat visit on Bornholm

(%, total=100)

Visit by	All year 1996	3rd quarter 1996	All year 1997	3rd quarter 1997	All year 1998	3rd quarter 1998
First	29	39	32	39	29	37
Repeat	71	61	68	61	71	63
Number of observations	2420	1154	2326	1448	1669	913

Source: Rassing C. R. *Survey of Visitors to Bornholm*, 1996, 1997 and 1998. Research Centre of Bornholm.

Table 3 Main features of first time and repeat visitors on Bornholm

(%, total=100)

Name of category		**First-time visitors**		**Repeat visitors**	
Sample period: July 1995 – June 1998		whole Y	3rd QT	whole Y	3rd QT
(number of valid observations:)		(1972)	(1365)	(4880)	(2491)
Original	Denmark	18.0	17.5	61.3	56.0
Country	Sweden	13.5	12.5	14.7	13.3
	Germany	57.2	57.0	21.3	27.4
	Others	11.3	13.0	2.7	3.3
Age groups	16-24 years	5.1	5.4	8.1	6.5
	25-34 years	18.4	18.5	16.6	16.0
	35-49 years	34.7	38.0	35.1	38.2
	50-59 years	22.9	21.0	21.6	21.0
	60-69 years	13.9	12.6	12.8	11.8
	over 69 years	5.0	4.4	5.9	6.4
Education	Up to 9 years	23.4	22.4	18.3	18.3
	9-12 years	20.6	20.2	24.5	24.3
	12 + vocational edu.	20.1	20.5	31.7	30.4
	12 + academic edu.	35.9	36.9	25.6	27.0
Family income	Low (less than 200)	23.9	22.9	21.1	18.3
(in 000 DKK)	Middle (200 – 400)	49.2	48.1	43.5	44.8
	Middle-high (400 – 700)	21.7	23.2	29.1	30.4
	High (above 700)	5.2	5.8	6.4	6.5

Purpose of visit	Business	2.8	2.0	8.9	5.0
	Holiday	88.3	90.3	48.3	62.3
	Holiday and VFR	4.7	4.5	20.3	18.7
	VFR, solely	0.5	0.3	13.9	5.8
	Other	3.7	2.9	8.6	8.2
Length of visit	1 - 6 days	33.2	26.1	42.0	34.7
	7 - 8 days	32.0	33.2	22.0	26.5
	9 - 13 days	9.0	9.0	9.9	11.7
	14 - 15 days	18.2	21.8	8.5	12.6
	Others	7.6	9.9	17.6	14.5
Distance:	3.00 - 6.00 hours	10.0	8.7	45.5	38.1
	6.01 - 9.00 hours	36.1	42.1	33.9	34.8
	9.01 - 12.00 hours	32.6	25.5	14.1	17.8
	12.01 or more	21.3	23.7	6.5	9.3

Source: The visitors survey data base at Research Centre of Bornholm.

Table 4 Evaluation of destination by first time and repeat visitors on Bornholm

(%, total=100)

Name of category		**First-time visitors**		**Repeat visitors**	
Sample period:		whole Y	3rd QT	whole Y	3rd QT
(number of valid observations)		(1981)	(1383)	(4580)	(2392)
	Poor	4.6	0.4	8.4	0.1
Bornholm as a	Not good enough	2.3	0.1	2.2	0.1
destination for	Average	3.2	3.3	3.0	3.0
holidays:	Good	26.1	26.8	17.2	18.0
	Excellent	63.9	69.4	69.2	78.8
	Poor	2.1	1.0	5.2	0.6
Value for money	Not good enough	8.9	6.7	7.3	4.9
on Bornholm:	Average	33.1	33.3	27.9	28.7
	Good	41.1	43.6	30.7	35.1
	Excellent	14.8	15.5	28.9	30.7

Source: The visitors survey database at Research Centre of Bornholm.

Table 5 Description of data

	Mean	Standard Deviation	Minimum	Maximum	Number of valid observation
AGE	3.34	1.26	1	6	6748
FMINC	2.17	0.84	1	4	5775
NODAYBH	8.33	8.78	0	300	7251
TRAVELH	7.55	2.84	3.32	26.5	6792
BHVFM	3.67	1.06	1	5	5886

Table 6 Estimation result (1) based on equation (5): all available observation

Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
AGE*			27,5738	5	,0000	,0568	
AGE(1)	-,8927	,1793	24,7735	1	,0000	-,0647	,4096
AGE(2)	-,7859	,1734	20,5513	1	,0000	-,0584	,4557
AGE(3)	-,7900	,1787	19,5446	1	,0000	-,0568	,4538
AGE(4)	-,8223	,1871	19,3255	1	,0000	-,0564	,4394
AGE(5)	-,5068	,2419	4,3888	1	,0362	-,0210	,6024
FMINC	,3464	,0469	54,5064	1	,0000	,0982	1,4139
NODAYBH	,0294	,0061	22,7971	1	,0000	,0618	1,0298
TRAVELHR	-,3103	,0147	442,8560	1	,0000	-,2846	,7332
BHVFM	,1525	,0349	19,1098	1	,0000	,0561	1,1647
Constant	2,5652	,2365	117,6016	1	,0000		

Chi-square=647.146; df=9; significant=0.0000; observation=4511

□β=-0.75804; P=f(□β)=0.3191; average coefficient of AGE is -0.7595

Note: * Variable “age” is categorical by using indicator variable coding. The first age group (i.e. 16-24 years) has been used as reference category. (Observation classified by age group is: 16-24 years = 308; 25-34 years = 833; 35-49 years = 1673; 50-59 years = 977; 60-69 years = 538; over 69 years = 182.)

Table 7 Estimation result (2) based on equation (5): all available observation

Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
AGE			27,5738	5	,0000	,0568	
AGE(1)	,5068	,2419	4,3888	1	,0362	,0210	1,6600
AGE(2)	-,3859	,2017	3,6605	1	,0557	-,0175	,6799
AGE(3)	-,2791	,1957	2,0343	1	,1538	-,0025	,7565
AGE(4)	-,2832	,2004	1,9960	1	,1577	,0000	,7534
AGE(5)	-,3155	,2088	2,2846	1	,1307	-,0072	,7294
FMINC	,3464	,0469	54,5064	1	,0000	,0982	1,4139
NODAYBH	,0294	,0061	22,7971	1	,0000	,0618	1,0298
TRAVELHR	-,3103	,0147	442,8560	1	,0000	-,2846	,7332
BHVFM	,1525	,0349	19,1098	1	,0000	,0561	1,1647
Constant	2,0584	,2625	61,4740	1	,0000		

Chi-square=647.146; df=9; significant=0.0000; observation=4511

□β=0.13288; P=f(□β)=0.5332; average coefficient of AGE is –0.34102

Note: * Variable “age” is categorical by using indicator variable coding. The last age group (i.e. age over 69 years) has been used as reference category. (Observation classified by age group is: 16-24 years = 308; 25-34 years = 833; 35-49 years = 1673; 50-59 years = 977; 60-69 years = 538; over 69 years = 182.)

Table 8 Estimation result (3) based on equation (5): on holidaymakers

Variable	B	S.E.	Wald	df	Sig	R	Exp(B)
AGE			20,8458	5	,0009	,0528	
AGE(1)	-,8184	,2332	12,3185	1	,0004	-,0515	,4411
AGE(2)	-,5450	,2232	5,9620	1	,0146	-,0319	,5798
AGE(3)	-,5331	,2275	5,4924	1	,0191	-,0300	,5868
AGE(4)	-,4753	,2353	4,0823	1	,0433	-,0231	,6217
AGE(5)	-,0070	,2923	,0006	1	,9809	,0000	,9930
FMINC	,3091	,0537	33,1978	1	,0000	,0895	1,3623
NODAYBH	,0569	,0080	50,5012	1	,0000	,1116	1,0586
TRAVELHR	-,2606	,0171	231,7492	1	,0000	-,2429	,7706
BHVFM	,1365	,0416	10,7410	1	,0010	,0474	1,1462
Constant	1,3591	,2955	21,1549	1	,0000		

Chi-square=335.571; df=9; significant=0.0000; observation=2875

□β=-0.94319; P=f(□β)=0.2803; average coefficient of AGE is -0.59295

Note: * Variable “age” is categorical by using indicator variable coding. The first age group (i.e. 16-24 years) has been used as reference category. (Observation classified by age group is: 16-24 years = 113; 25-34 years = 449; 35-49 years = 1105; 50-59 years = 693; 60-69 years = 393; over 69 years = 122.)

Table 9 Classification Table for Repeat Visits

The cut value is 0.50

		Predicted	
Correct	First-time visit	Repeat	Percent
Observed			
First-time visit	326	987	24.83%
Repeat	254	2944	92.06%
		Overall:	72.49%

Simulation on “an average visitor” to Bornholm

Condition: Z = 2.5652 - 0.7579*3.34 + 0.3464*2.17 + 0.0294*8.33 -0.3103*X+0.1525*3.67

where X is travel hours by car.

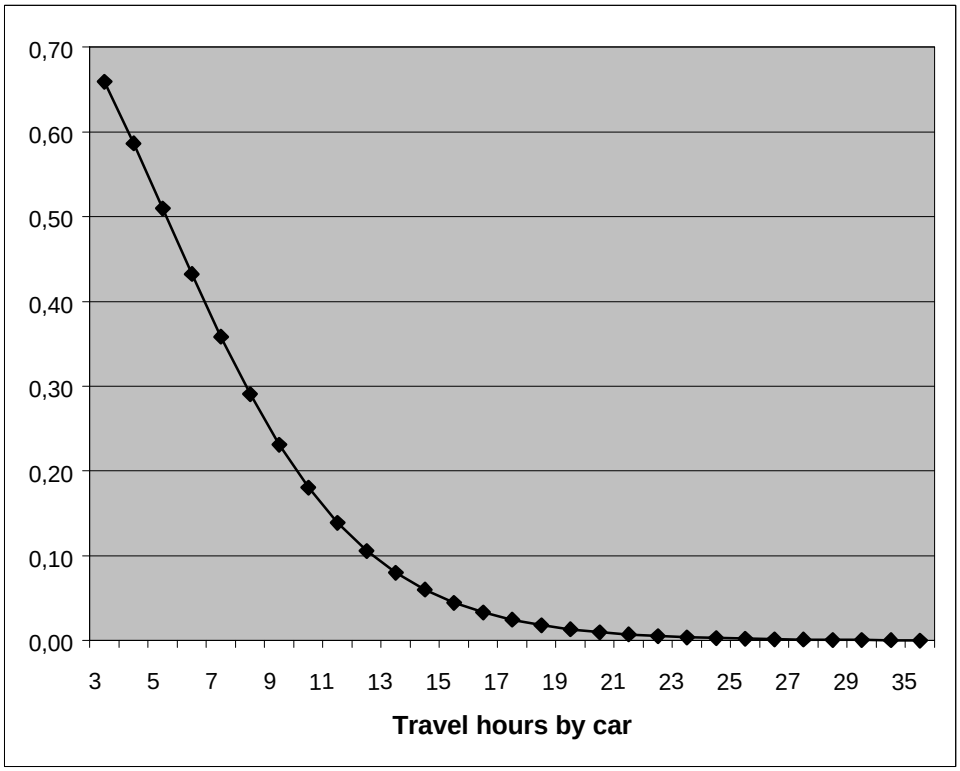

Figure 1. Probability of repeat visitation for an average visitor to Bornholm

(The figure is produced by the above simulation condition, when the means of age, family income, number of days on Bornholm and image on Bornholm are applied.)

Simulation by assumption 1:

Condition: Z = 2.5652 - 0.8227*3 + 0.3464*4 + 0.0294*7 -0.3103*X + 0.1525*4

where X is travel hours by car.

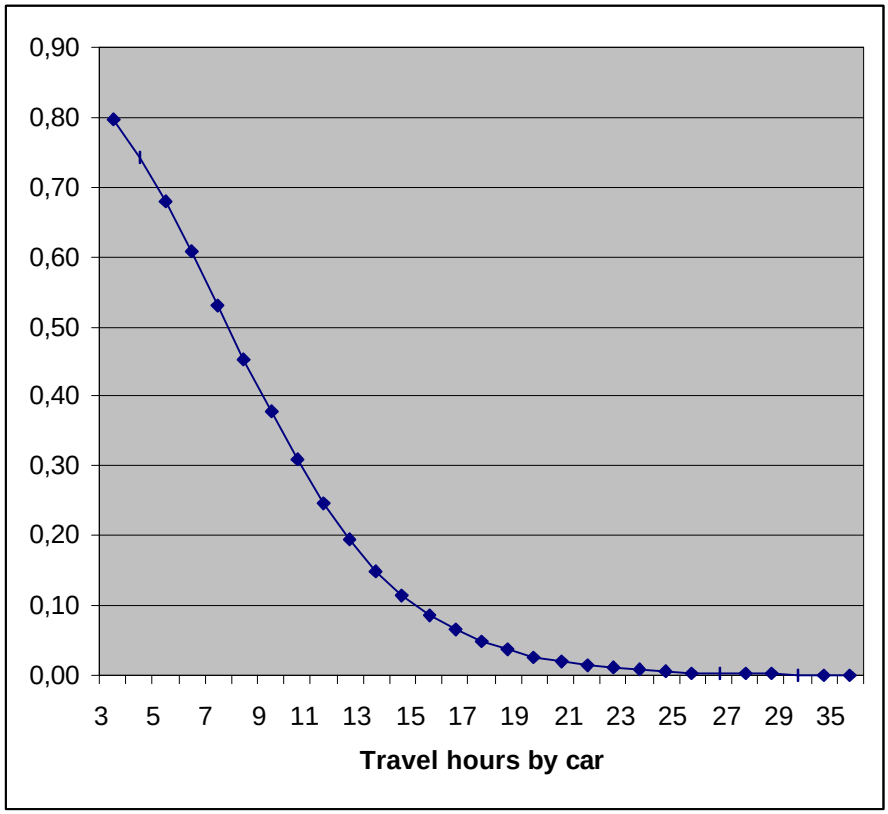

Figure 2. Probability of repeat visitation on Bornholm

(The figure is produced by the above simulation condition, when we assume age=3, fminc = 4, nodaybh=7; bhvfm=4).

Simulation by assumption 2:

Condition: Z = 2.5652 - 0.8227*1 + 0.3464*4 + 0.0294*7 - 0.3103*X + 0.1525*4

where X is travel hours by car.

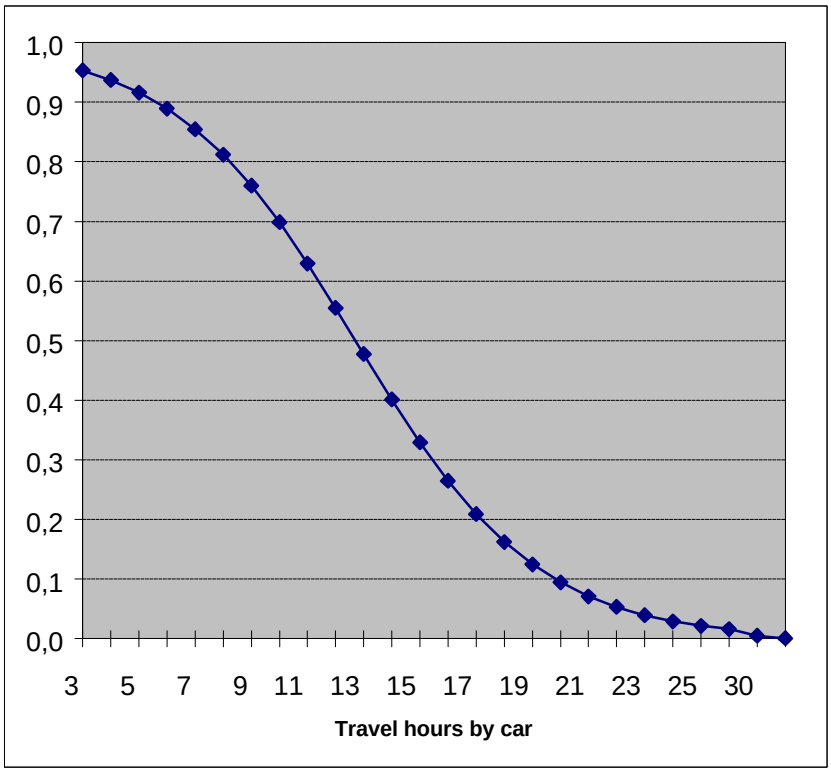

Figure 3. Probability of repeat visitation to Bornholm

(The figure is produced by the above simulation condition, when we assume age=1, fminc=4, nodaybh=7, bhvfm=4).

Table 10 Probability of repeat visitation based on travelling hours by car

Travel hours	Fminc = 4	Fminc = 3	fminc = 2	fminc = 1
3	0,9532	0,9350	0,9105	0,8780
5	0,9162	0,8855	0,8455	0,7947
6	0,8892	0,8501	0,8005	0,7394
7	0,8547	0,8062	0,7463	0,6754
8	0,8118	0,7531	0,6832	0,6040
9	0,7597	0,6910	0,6126	0,5280
10	0,6987	0,6212	0,5370	0,4506
11	0,6296	0,5459	0,4595	0,3755
12	0,5549	0,4685	0,3840	0,3060
14	0,4012	0,3215	0,2510	0,1916
16	0,2649	0,2031	0,1527	0,1130
18	0,1623	0,1205	0,0883	0,0641
20	0,0943	0,0686	0,0495	0,0355
22	0,0530	0,0381	0,0272	0,0194
24	0,0292	0,0208	0,0148	0,0105
26	0,0159	0,0113	0,0080	0,0057
30	0,0047	0,0033	0,0023	0,0017
36	0,0007	0,0005	0,0004	0,0003

Note:

fminc = 4 means that visitors' family income is above DKK 700 000;

fminc = 3 means that visitors' family income is between DKK 400 000 - 700 000;

fminc = 2 means that visitors' family income is between DKK 200 000 - 400 000;

fminc = 1 means that visitors' family income is below 200 000.

References

Fakeye, P. C. and J. L.Crompton (1992). "Importance of socialization to repeat visitation", *Annals of Tourism Research*, **19** (2), 364-367.

Gitelson, R. J. and J. L.Crompton (1984). "Insights into the repeat vacation phenomenon", *Annals of Tourism Research*, **11**(1), 199-217.

Greene, W. H. (1993). *Econometric Analysis*, 2nd edition, Prentice Hall International Editions.

Laarman, J. G. and R. R Perdue (1989). "Science tourism in Costa Rica", *Annals of Tourism Research*, **16**, 205-215.

Lingberg, K. and R. L. Johnson (1997). "The economic value of tourism social impacts", *Annals of Tourism Research*, 24 (1), 90-116.

Mazursky, D. (1989). "Past experience and future tourism decisions", *Annals of Tourism Research*, **16**, 333-344.

Oppermann, M. (1997). "First-time and repeat visitors to New Zealand", *Tourism Management*, **18** (3), 177-181.

Oppermann, M. (1998). "Destination threshold potential and the law of repeat visitation", *Journal of Travel Research*, **37**, 131-137.

Prentice, R. C., S. F. Witt, and C. Hamer (1998). "Tourism as experience - The case of heritage parks", *Annals of Tourism Research*, 25 (1), 1-24.

Rassing, C. R. (1996, 1997, 1998). *Survey of Visitors to Bornholm*. Research Centre of Bornholm, Denmark.

Reid, L. J., and S. D. Reid (1993). "Communicating tourism supplier services: Building repeat visitor relationships", *Journal of Travel & Tourism Marketing*, **2**(2/3), 3-20.

SPSS for Windows, Advanced Statistics, Release 6.0 (1993).