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Vacation Behaviour:

Frequency, Destination Choice and Expenditure Level

Abstract

For many countries, tourism has a large impact on GDP, and the number of people employed in the tourist or related industries is large. We explain the decision whether to go on vacation or not and how often, the choice of destination and the decision on the level of expenditure, using different micro-econometric models. From these estimations we calculate for example the income elasticity. We use the CVO (2008) cross-section dataset of Dutch households. On average a Dutch holidaymaker spends € 24.68 a day for a domestic vacation and € 60.62 per day for a foreign vacation. Further, we discuss relevant characteristics of the vacations like type and duration of the vacation, the valuation of the vacation and destination. And we will discuss the characteristics of the households such as its composition and location.

1.0 Introduction

Tourism is one of the major international trade categories. The overall export income generated by international tourism including passengers transport reached US\$ 1.1 trillion (748 billion euro's) in 2008, or US\$ 3 billion a day. International tourism receipts rose to US\$ 944 billion (642 billion euro's) by 2008. Tourism exports account for as much as 30% of the world's exports of commercial services and 6% of overall exports of goods and services. Tourism ranks fourth globally, as an export category, after fuels, chemicals and automotive products. For many developing countries it is one of the main sources of income and the number one export category, creating employment and opportunities for development. The worldwide contribution of tourism to GDP is estimated at 5%. Direct and indirect contribution of tourism to employment is estimated at 6-7% of the overall number of jobs, and up to over 10% in countries where tourism is a major part of the economy (UNWTO, Tourism Highlights 2009).

Studies in the field of tourism economics are mainly focussed on international tourism demand and its determinants. The general focus in international tourism demand models is typically on demand for international travel services, tourist expenditures, travel exports/imports or tourist length of stay in relation to income, transportation costs, relative prices at origin and destination (Lim 1999). The purpose of this paper is to explain tourist behaviour, by analysing individual data on vacation behaviour and expenditure levels. We explain the decision whether to go on vacation or not and how often, the choice of destination and the decision on the level of expenditure, using different micro-econometric models. We

use the CVO (2008) cross-section dataset of Dutch households to estimate the models. Vacation activities are products that require inputs like the time of the consumer, recreational services, food, gasoline etc. (Morey 1984, 1985). Soest and Kooreman (1987) already stated that in this household production approach it is assumed that households strive to maximize a utility function defined over vacation and other activities, subject to the production technology, the time and the income constraints. For policymakers it is interesting to know which factors are of influence on spending a vacation at a destination abroad or at a domestic destination. For example, makers of policies aimed at increasing the number of domestic vacations can take learning from the results obtained from our research.

We will start in section 2 by describing the Dutch national and international tourism market. First the Dutch tourism market will be described by showing some core figures and some historic figures of earlier research done in 1987 using data from a consumer expenditure survey from 1981, after which we focus on the sample statistics of the most current consumer survey available for us (CVO 2008). We compare the core figures today with that of almost 30 years ago. In section 3 we discuss the micro-econometric model(s) and the estimation method used to analyse the data on individual vacation behaviour. Melenberg and van Soest (1996) studied some possibilities for the modelling of vacation expenditures. For their analysis they use the 1981 CVO dataset. In their study they use a two-step model, a binary choice equation to model participation, and, for the non-zero observations, they use a regression equation to explain the expenditure level. Where Melenberg and van Soest only consider vacations expenditures in total, domestic vacations and vacations abroad totalled, we will look at both domestic vacation expenditures and expenditures for vacations abroad. We will embroder on their model specifications and extend them with the distinction between domestic vacations and vacations abroad. In section 3 we will also look at the income elasticity's of both domestic and vacations abroad and if these goods are normal goods (income elasticity between 0-1) or luxury goods (income elasticity >1). In Section 4 the estimation results will be commented on. Finally, section 5 concludes.

2.0 Data background

2.1 Core figures of the Dutch tourism market.

The dataset we use to estimate the models is the result of a survey held by TNS-NIPO in cooperation with Central Bureau of Statistics and the Dutch Bureau of Tourism and Congresses of the Netherlands. The definition for a vacation that is used: A stay out of a respondents' own home or living area for the purpose of leisure, with the duration of at least one night. Also a stay with friends or family in a foreign destination is considered a vacation.

A stay with friends or family in a domestic location is only considered a vacation if the owners were not present.

First we describe the population figures. With the use of weights for each category of respondents, the sample data can be used to provide estimates for the whole Dutch population. In table 1 an overview is given of the development of figures about the Dutch tourism market since 2004.

Table 1: Core figures Dutch tourism market (NBTC – NIPO)

	2004	2005	2006	2007	2008
Total number of vacations (in millions)	35.2	34.4	34.5	35.2	35.9 (100%)
Domestic vacations (in millions)	18.0	17.3	17.8	17.6	17.5 (48.6%)
Vacations abroad (in millions)	17.2	17.1	16.8	17.6	18.5 (51.4%)
Short vacations (2 -7 days)(in millions)	19.0	18.3	18.5	19.0	18.8 (52.4%)
Long vacations (8+ days)(in millions)	16.2	16.1	16.0	16.2	17.1 (47.6%)
Vacation participation of Dutch citizens (at least 1 vacation)	81.2%	80.8%	80.5%	80.7%	81.6%
Number of holidaymakers (in millions)	12.5	12.4	12.4	12.5	12.7
Number of overnight stays (in million nights)	274	268	265	270	280
Frequency (vacations per year)	2.82	2.77	2.78	2.81	2.84
GDP Netherlands (in billion)	€491.184	€513.407	€540.216	€568.664	€595.883
Total expenditures on vacations (in billons)	€12.69	€12.74	€12.98	€13.81	€15.25 (100%)
In percentage of GDP	2.58%	2.48%	2.40%	2.42%	2.56%
Domestic vacations (in billions)	€2.57	€2.48	€2.57	€2.70	€2.70 (17.7%)
In percentage of GDP	0.52%	0.48%	0.48%	0.47%	0.45%
Average expenditures per person	€143	€143	€144	€154	€155
Average expenditures per person per day	€21.46	€21.92	€22.08	€23.83	€24.68
Vacations abroad (in billions)	€10.12	€10.26	€10.41	€11.11	€12.56 (82.3%)
Average expenditures per person	€589	€600	€622	€633	€680
Average expenditures per person per day	€53.37	€54.18	€56.75	€57.80	€60.62

The total number of vacations since 2004 stayed nearly the same, with the remark that the number of domestic vacations decreased and the number of vacations abroad increased. Also the distribution of short and long vacations stayed almost the same in 2008 compared with 2004, with long vacations winning more than 1 percentage point. The vacation participation slightly decreased from 2004 (81.2%) to 2007 (80.7%) to be higher in 2008 (81.6%). The total expenditures increased every year from €12.69 billion in 2004 up to €15.25 billion in 2008. The expenditures on domestic vacations did not increase as much as expenditures on vacations abroad. The share of expenditures on domestic vacations decreased from 20.25% in 2004 down to 17.7% in 2008. The expenditures per person and per person per day both increased in 2008 compared to the previous years. But looking at the GDP figures of the years 2004-2008 tourism expenditures dropped from 2.58% in 2004 to 2.40% in 2006 and finally

rising to 2.56% in 2008, which is also lower compared with 2004. The tourism expenditures did not increase at the same rate as GDP. For domestic vacation expenditures the difference is even larger, with a fall from 0.52% in 2004 down to 0.45% in 2008. In the growth in income (GDP) is thus larger than the growth in the vacation expenditures.

2.2 Sample statistics

We start with describing some figures of the consumer expenditure surveys held in the Netherlands from 1981 and the current figures from 2008. The survey from 1981 is an early form of the current consumer survey (CVO 2008), that we use to make our analysis. Soest and Kooreman (1987) have used the 1981 dataset in earlier research about vacation behaviour. In the second part of this paragraph the figures of the CVO 2008 are described more extensively. At the end of this section comparison between the two datasets is given and helps to illustrate how vacation expenditures have developed since 1981.

1981 survey

The cross-section data that was obtained from conducting a survey under 1822 Dutch households contained information on vacation destination (domestic/abroad), expenditure level and household characteristics. In 1981 most of the households either choose only one of the two destinations (domestic 21.7% / abroad 33.5%) or did not spend anything on a vacation at all (37.0%). Around a tenth of the households spend money on both a domestic and a vacation abroad (11.3%). Per household expenditures on domestic vacations on participation have a sample mean value of fl.1078 (€874 purchasing power in 2008) and expenditures on participation for vacations abroad have a sample mean value of fl.2657 (€2155 purchasing power in 2008). The total household expenditures have a sample mean value of fl.34,150 (€27,709 in 2008). Vacation participation and expenditure levels have increased since 1981 very much. In table 2 an overview is given of the total and average expenditure levels of Dutch holidaymakers and participation rates are displayed. Since 1990 participation has steadily increased and also total and average expenditures on both domestic and vacations abroad have increased. Keeping purchasing power in consideration, the average expenditure in 2008 has stayed almost equally to the expenditure level of 1990 on vacations abroad.

Table 2: Overview of expenditure and participation level since 1990¹.

	population size	Number of holiday makers	% of population vacation participation	Total expenditures domestic vacations	Average pp expenditures domestic vacations	Total expenditures vacations abroad	Average pp expenditures vacations abroad
				x billion euro	Euro's	x billion euro	Euro's
Periods	x1000	x1000	%				
1990	13971	10426	74.6	1.4	96	4.8	453
1991	14038	10711	76.3	1.5	99	5.2	457
1992	14116	10670	75.6	1.6	106	5.6	494
1993	14230	11006	77.3	1.7	108	6	500
1994	14310	11163	78	1.7	105	6.6	509
1995	14400	11105	77.1	1.8	112	6.5	529
1996	14521	11250	77.5	1.9	109	6.6	514
1997	14640	11400	77.9	1.8	112	7.1	550
1998	14742	11743	79.7	1.9	120	7.8	572
1999	14861	11906	80.1	2	121	8.1	572
2000	14982	11894	79.4	2.1	127	8.3	595
2001	15095	11955	79.2	2.3	128	8.6	602
2002	15204	12288	80.8	2.9	155	9.7	581
2003	15283	12495	81.8	2.6	145	9.8	593
2004	15347	12456	81.2	2.6	143	10.1	589
2005	15393	12436	80.8	2.5	143	10.3	600
2006	15434	12421	80.5	2.6	144	10.4	622
2007	15469	12484	80.7	2.7	154	11.1	633
2008	15510	12661	81.6	2.7	155	12.6	680

2008 Survey

On the next page we describe the sample data of the 2008 CVO². We focus on the variables of importance for our estimations. In section 3 we estimate our model and the dependent variable we select is tourist expenditures as a fraction of gross income. This is in line with earlier research. Lim (1997, 1999) already pointed out in a review study of international tourism demand models, that tourist arrivals and/or departures and tourist expenditures and/or receipts are the most often used and most suitable dependent variables. Explanatory variables like income, relative prices, transportation costs, exchange rates, trend, dynamics, competing destinations/goods, seasonal factors, marketing expenditures, migration, business travel/trade, economic activity indicators and qualitative factors are most widely used in previous research. We focus in our descriptive statistics on income, qualitative and other factors like travel group size, travel frequency, age, degree of urbanization, occupation of respondent, length of stay and destination (domestic/abroad), etc. Table 3 presents the sample statistics of the CVO.

¹ Population figures based on the yearly collected CVO surveys.

² CVO, continued vacation research, an annual (October – October) survey performed by TNS-NIPO in cooperation with the Dutch Central Bureau of Statistics (CBS) and the Dutch Bureau of Tourism and Congresses (NBTC).

Table 3: Sample statistics (CVO 2008)

Variable	N	Mean	Standard deviation
Expenditures on vacations abroad (per vacation, per household)	5855 (trips)	€ 1665.32	€ 1673.39
Expenditures on vacations abroad (year total per household)	4562	€ 2545.80	€ 2984.35
Expenditures on vacations abroad (non-zero)	2957 (participants)	€ 3317.21	€ 3007.69
Expenditures on domestic vacations (per vacation, per household)	5540 (trips)	€ 458.15	€ 533.29
Expenditures on domestic vacations (year total per household)	4562	€ 658.74	€ 925.66
Expenditures on domestic vacations (non-zero)	2498 (participants)	€ 1016.06	€ 979.9
Length of stay in nights	11395 (trips)	7.90	7.52
Total length of stay in nights (vacations abroad)	2957 (participants)	20.62	15.96
Total length of stay in nights (domestic vacations)	2498 (participants)	11.64	14.65
Number of persons in travel group	11395 (trips)	3.29	2.01
Number of persons in household	4562	2.59	1.18
Age of respondent	4562	49.24	16.73
Social class (VMO) ^a	4562	2.64	1.09
Degree of urbanization ^b	4562	3.19	1.29
Income ^c	4562	€ 42,931.77	€ 28,035.53
Travel frequency	4562	2.50	2.49
Travel frequency domestic vacations.	4562	1.01	2.08
Travel frequency vacations abroad.	4562	1.52	1.46
Respondent is self-employed ^d	4562	0.034	0.18
Respondent is a civil servant ^d	4562	0.080	0.27
Respondent is an employee ^d	4562	0.479	0.49
Respondent is unemployed ^d	4562	0.400	0.49
Educational level ^f	4562	3.24	0.86
Tent/camper/mobile home/cabin boat at permanent location	4562	0.062	0.24
Tent/camper/mobile home/cabin boat	4562	0.266	0.44
Second home	4562	0.020	0.14

^a A characteristic of a classification to what kind of household a respondent belongs in light of education and occupational group of family head ranging from 1:high to 4:low

^b Ranging from 1 (country village) to 5 (big city).

^c Gross income of respondents' household.

^d Dummies pertaining to the respondents occupation. If all three dummy values are equal to 0, then the respondent does not want to state his occupation.

^f Ranging from 1 (no education) to 5 (scientific education)

When we look at the expenditures on vacations abroad and domestic vacations and compare the sample statistics of table 2 with the population in table 1, we can see that in expenditures for vacations abroad are roughly 3 to 4 time as high as expenditures on domestic vacation. In table 1 this is per person and in table 2 it is per household. The figures are in line with each other when we include the number of people in the travel group. Domestic vacations and vacations abroad are in both tables 1 and 2 divided around 50-50%.

In table 4 and 5 below the distribution of expenditures and distribution of frequencies for domestic and vacations abroad is displayed. The decisions to go on a vacation or not and the decision which destination to choose are of a discrete nature, as opposed to the decision on the level of expenditures, which is continuous (Soest & Kooreman, 1987). Most of the households go on a vacation, 84.46%, furthermore an estimated 19.65% of the households

only choose to go on a domestic vacation and 29.7% only spend a vacation abroad. Around a third (35.11%) of the households spend money on both domestic vacations and vacations abroad. Looking at the levels of expenditures it is noticeable that for domestic vacations the largest group of households spends between 0 and 800 euro's (28.10%) and for vacations abroad the largest group of households (17.93%) spends more than 4000 euro's in total.

Table 4: Distribution of expenditures on domestic and vacations abroad

Vacations abroad (euro's)	Domestic vacations (euro's)					Total
	0	0 – 800	800 – 1600	1600 – 2400	> 2400	
0	15.54	8.75	6.38	2.63	1.89	35.18
0 – 800	3.24	2.83	1.14	0.50	0.26	7.98
800 – 1600	4.78	3.33	2.02	0.39	0.55	11.07
1600 – 2400	5.46	3.09	2.04	0.68	0.35	11.62
2400 – 3200	4.65	3.20	1.34	0.46	0.28	9.93
3200 – 4000	2.96	1.80	0.96	0.33	0.24	6.29
> 4000	8.61	5.11	2.72	0.77	0.72	17.93
Total	45.24	28.10	16.59	5.77	4.30	100 %

Based on 4562 household observations (respondents) of the 2008 CVO

Table 5 and image 1 and 2 below show the frequency distribution of both domestic vacations and vacations abroad. Of the 4562 households 2498 respondents participate in a domestic vacation and 2957 in a vacation abroad. Noticeable from the frequency figures is that 22% of the households have only one vacation and 62% of the households have at least two vacations per year.

Table 5: Frequency distribution of vacations

Vacations abroad (freq)	Domestic vacations (freq)							Total	Total (respondents)
	0	1	2	3	4	5	6-22		
0	15.5%	9.7%	4.7%	2.3%	1.3%	0.4%	1.3%	35.18%	1605
1	12.6%	7.9%	5.3%	1.9%	0.9%	0.5%	0.5%	29.76%	1358
2	9.2%	5.4%	2.7%	0.9%	0.5%	0.3%	0.4%	19.44%	887
3	4.2%	2.7%	1.2%	0.5%	0.2%	0.1%	0.0%	8.86%	404
4	2.2%	0.9%	0.4%	0.2%	0.1%	0.0%	0.1%	4.06%	185
5	0.9%	0.4%	0.1%	0.1%	0.0%	0.0%	0.1%	1.51%	69
6-20	0.6%	0.2%	0.2%	0.1%	0.1%	0.1%	0.5%	1.18%	54
Total	45.24%	27.16%	14.6%	6.05%	2.94%	1.35%	2.61%	100%	
Total (respondents)	2064	1239	668	276	134	62	119		4562

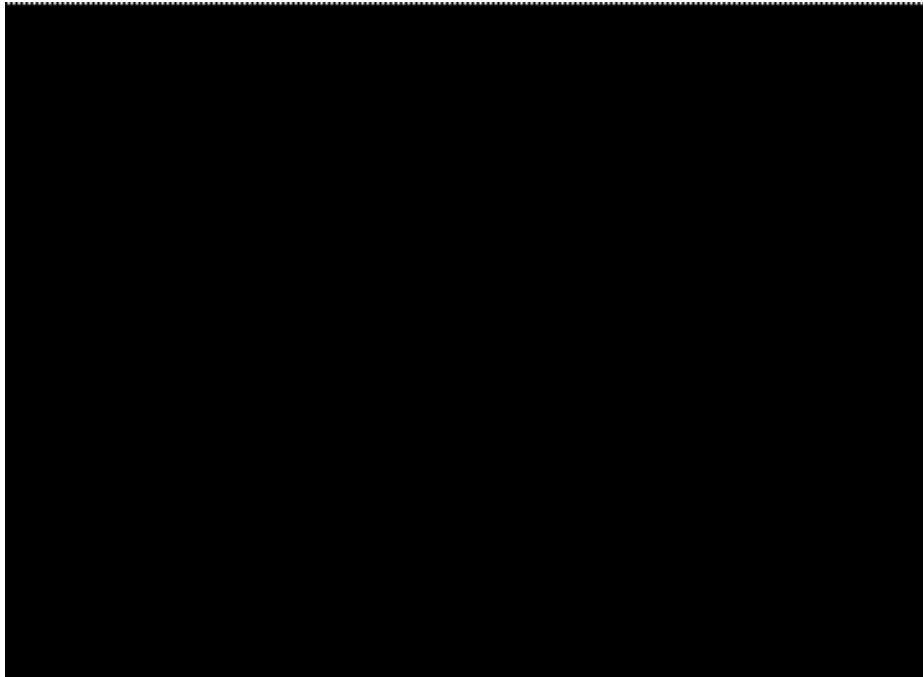


Image 1: Domestic vacation frequency

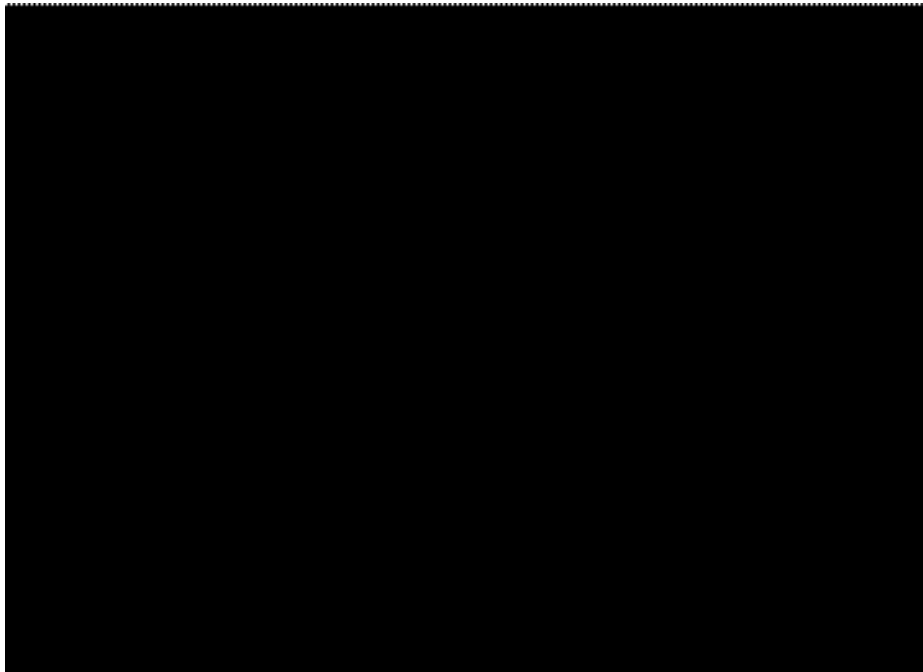


Image 2: Vacations abroad frequency

Comparing 1981 with 2008 CVO

Comparing the statistics of table 3 with the data of the 1981 CVO data and the data in table 2, we see that expenditures on domestic vacations and vacations abroad both have a higher mean value, for domestic vacations it was €874 in 1981 and €1016 in 2008, and for vacations abroad it was €2155 in 1981 and €3317 in 2008. We compared this figures by calculating the 2008 purchasing power of the amount of guilders the mean expenditure level was in 1981,

using an index with data from the Dutch Central Bureau of Statistics³ (1 guilder in 1981 has 0.81 euro purchasing power in 2008). In 1981 many of the households either choose only one of the two destinations (domestic 21.7% / abroad 33.5%) or did not spend anything on a vacation at all (37.0%). Only a few households spend money on both a domestic and a vacation abroad (11.3%). In 2008 only 15.54% did not participate in either a domestic or a vacation abroad. 19.65% of the households only participated in a domestic vacation and 29.7% only in a vacation abroad, 35.1% of the households participated in both. This figure is more than three times as large as it was in 1981. The figures confirm the presumption that since 1981 Dutch households consider spending a vacation more and more as a necessity than as a luxury.

3 The model

In this section we introduce the two separate model specifications that serve as a background for the empirical work that will be reported in the next section. We start with the participation model and then describe the model concerning vacation expenditures.

In the empirical work of this paper we use the expenditure share equations that will be specified below, and explain participation as a bivariate probit model. Here two dependent variables can be included, participation for both domestic vacations and vacations abroad have value 1 if the household respondent participates, and 0 otherwise. In this model households have the choice between going on a vacation or not, and this can be a domestic vacation, a vacation abroad or both.

$$\begin{aligned} \text{Domestic vacations: } W_{1j}^* &= \hat{\beta}_1 X_{1j} + \varepsilon_{1j} \\ W_{1j} &= 1 \quad \text{if } W_{1j}^* > 0 \\ W_{1j} &= 0 \quad \text{otherwise} \end{aligned}$$

$$\begin{aligned} \text{Vacations abroad: } W_{2j}^* &= \hat{\beta}_2 X_{2j} + \varepsilon_{2j} \\ W_{2j} &= 1 \quad \text{if } W_{2j}^* > 0 \\ W_{2j} &= 0 \quad \text{otherwise} \\ j &= \text{households} \end{aligned}$$

X_j = Constant, Log income, Household size, Age, Degree of Urbanisation, Level of education, Civil servant, Employee, Not employed, Tent/camper/mobile home/cabin boat at permanent location, Tent/camper/mobile home/cabin boat, Second home, Total days on vacation.

³ Between 1913 and 1998 the data are taken from research done by Jan Luiten van Zanden, who has created the index from CBS-indices. From 1998 on these data are supplemented from the CBS index.

The predicted probabilities for the four possible outcomes are:

$$\Pr(W_{1i} = 1, W_{2i} = 1) = \Phi_2(X_{1i} \hat{\beta}_1, X_{2i} \hat{\beta}_2, \hat{\rho})$$

$$\Pr(W_{1i} = 1, W_{2i} = 0) = \Phi(X_{1i} \hat{\beta}_1) - \Phi_2(X_{1i} \hat{\beta}_1, X_{2i} \hat{\beta}_2, \hat{\rho})$$

$$\Pr(W_{1j} = 0, W_{2j} = 1) = \Phi(X_{2j} \hat{\beta}_2) - \Phi_2(X_{1j} \hat{\beta}_1, X_{2j} \hat{\beta}_2, \hat{\rho})$$

$$\Pr(W_{1j} = 0, W_{2j} = 0) = 1 - \Phi(X_{1j} \hat{\beta}_1) - \Phi(X_{2j} \hat{\beta}_2) - \Phi_2(X_{1j} \hat{\beta}_1, X_{2j} \hat{\beta}_2, \hat{\rho})$$

Where Φ_2 denotes the bivariate normal cumulative distribution function, with correlation coefficient ρ and Φ without subscripts denotes the standard normal cumulative distribution function.

The second stage model we use is based on the Working-Leser Engel curve (Deaton & Muellbarer, 1980) and extensions to the model are inspired by the research done by Soest and Kooreman (1987), Melenberg and van Soest (1996), Lim (1997, 1999) and an extension of the almost ideal demand system by Banks et al. (1997). The model relates budget shares to different explanatory variables:⁴

$$w_i = \alpha_i + \beta_{1i} \log y + \beta_{2i} (\log y)^2 \quad i = 1, 2 \text{ (domestic, abroad),}$$

y denotes household gross income; w_1 and w_2 denote expenditures on domestic vacations and vacations abroad as a fraction of y . α_i , β_{1i} and β_{2i} ($i = 1, 2$) are parameters. If w_i is positive the corresponding elasticity of expenditures on vacations in destination i with respect to income is given by (Atkinson et al., 1990):

$$\eta_y^i = 1 + \frac{\beta_{1i} + 2\beta_{2i} \log y}{w_i}.$$

For example a vacation abroad is a luxury when $\beta_{1i} + 2\beta_{2i} \log y > 0$.

We use a quadratic logarithmic model because that permits goods to be luxuries at some income levels and necessities at others (Banks et al., 1997). Conditional on the first stage equation (participation), the decision to participate, the decision on how much to spend on domestic vacations and vacations abroad is modelled by a regression equation using standard OLS. When modelling consumer expenditures on commodities and services we have to consider zero-expenditures. Various models that deal with data in which expenditures can be zero for some commodities have been developed in the literature, see Hasegawa et al. (2008), Deaton and Irish (1984), Kay, Keen and Morris (1984), Keen (1986), Blundel and Meghir

⁴ See, for example, Working (1943), Leser (1963) and Deaton and Muellbauer (1980).

(1987), Pudney (1989, 1990), Griffiths and Valenzuela (1998), etc. Most of these models deal with infrequency of purchase as the cause of such observations. Household expenditure data collected via surveys is often recorded only for a relatively short period, say two weeks (Keen, 1986). It is therefore quite possible that there is a discrepancy between observed purchases and consumption of the good, which is the relevant variable. In the case of vacation behaviour, the infrequency of purchase approach is less convincing, at least for the data that we use. Our survey data refer to a period of one year, and if no vacations are observed in this time period, there is also no consumption, unless there are reporting errors.

The second main explanation for zero expenditure is taste differences. Alcohol and tobacco are examples of commodities that are not consumed by some people because of taste differences. This explanation seems more relevant for vacation behaviour. For instance, some people don't go on vacation because they prefer to make daytrips when they are free from work, but do not like to stay elsewhere for one or more nights. However, such taste differences are probably not the only relevant reason for the zero-expenditures we observe in our data. For instance, a household may plan an expensive trip next year and decide to save for it by not going on vacation this year, or to take only a short domestic vacation. In what follows we further develop the model described above and form a model that is based on taste differences, but we also allow for other factors that have an impact on zero expenditures.

We consider a utility maximizing household who spends a given budget y on three commodities: domestic vacations q_1 , vacations abroad q_2 and other goods q_0 . The utility function is:

$$u = u(q_0, q_1, q_2). \quad (1)$$

We assume that the other goods are essential, while the consumer may decide not to go on vacation during a particular year. The budget constraint is:

$$q_0 + p_1 q_1 + p_2 q_2 = y, \quad (2)$$

and we have to take into account two possibly binding non-negativity constraints:

$$q_1 \geq 0, \quad (3)$$

$$q_2 \geq 0. \quad (4)$$

The Kuhn-Tucker conditions imply four possible regimes:

- No vacation. In this case the whole budget is spent on other goods: $q_0 = y, q_1 = 0, q_2 = 0$.

- Two vacations, none of the non-negativity constraints is binding. We have an interior solution and the demand functions for domestic and foreign vacations can be written as:

$$q_1 = q_1^{11}(p_1, p_2, y), \quad (5)$$

$$q_2 = q_2^{11}(p_1, p_2, y). \quad (6)$$

-No vacation abroad. In this case we have:

$$q_1 = q_1^{10}(p_1, y) \quad (7)$$

$$q_2 = 0. \quad (8)$$

-No domestic vacation. The demand equations are now:

$$q_1 = 0 \quad (9)$$

$$q_2 = q_2^{01}(p_2, y) \quad (10)$$

The four regimes are distinguished by participation decisions: the consumer does not undertake a vacation type and therefore spends nothing on it, or undertakes that vacation type and in that case the demand equation tells us how much will be spent. The theory implies that the specifications of the demand function for each vacation type depends on the consumer's participation decision with respect to the other vacation type. We have used superfixes to distinguish the demand equations in the various regimes. The model thus gives rise to four different demand equations for vacations, two for each type.

In our empirical work we use the quadratic extension of the almost ideal demand system of Banks et al. (1997). The budget shares w for domestic and foreign vacations in the first regime can therefore be written as:

$$w_1^{11} = \alpha_{01} + \alpha_{11}p_1 + \alpha_{21}p_2 + \beta_{11} \ln y + \beta_{21} \ln y^2 \quad (11)$$

$$w_2^{11} = \alpha_{02} + \alpha_{12}p_1 + \alpha_{22}p_2 + \beta_{12} \ln y + \beta_{22} \ln y^2 \quad (12)$$

If the budget share of domestic vacations is restricted to be equal to 0 by the participation decision, the implied shadow price p_1^{01} for this vacation type can be found by setting w_1^{11} in (11) equal to 0 and solving for the price p_1 :

$$p_1^{01} = -\frac{1}{\alpha_{11}}(\alpha_{01} + \alpha_{21}p_2 + \beta_{11} \ln y + \beta_{21} \ln y^2).$$

If we substitute this expression for p_1 in (12), we find the budget share equation for foreign vacations in this regime (see Neary and Roberts, 1980):

$$w_2^{01} = \left(\alpha_{02} - \frac{\alpha_{12}}{\alpha_{11}}\alpha_{01}\right) + \left(\alpha_{22} - \frac{\alpha_{12}}{\alpha_{11}}\alpha_{21}\right)p_2 + \left(\beta_{12} - \frac{\alpha_{12}}{\alpha_{11}}\beta_{11}\right) \ln y + \left(\beta_{22} - \frac{\alpha_{12}}{\alpha_{11}}\beta_{21}\right) \ln y^2 \quad (13)$$

The demand function for domestic vacations in the regime where only a domestic vacation is undertaken can be derived similarly:

$$w_1^{10} = \left(\alpha_{01} - \frac{\alpha_{21}}{\alpha_{22}}\alpha_{02}\right) + \left(\alpha_{11} - \frac{\alpha_{21}}{\alpha_{22}}\alpha_{12}\right)p_1 + \left(\beta_{11} - \frac{\alpha_{21}}{\alpha_{22}}\beta_{12}\right) \ln y + \left(\beta_{21} - \frac{\alpha_{21}}{\alpha_{22}}\beta_{22}\right) \ln y^2 \quad (14)$$

The demand equation for each vacation type thus depends on the regime that is relevant, and we have to deal with two different demand equations for both vacation types.

Taste variation can now be introduced by allowing the coefficients α_{0i} , $i=1,2$ to be random variables:

$$\alpha_{0i} = \hat{\alpha}_{0i} + \varepsilon_i, \quad i = 1, 2.$$

The probability of observing zero expenditure because of a less intensive taste for vacations is then the probability that one or both ε 's take on such a small value that the implied budget share would be negative, in which case the observed budget share will be equal to 0. This would imply a Tobit-like model. However, we will also allow for other reasons that a particular type of vacation is not undertaken, or no vacation at all, in a particular year. For this reason we specify the participation equations independent of the budget share equations.

Results

A simple bivariate frequency count for domestic vacations and vacations abroad is:

Table 6: Frequency count

Vacations abroad	Domestic vacations		Total
	0	1	
0	709	896	1,605
1	1,355	1,602	2,957
Total	2,064	2,498	4,562

Table 6 illustrates the composition of the sample data. With the data on the participation for domestic and vacations abroad, we can estimate the probability of participation. The results are displayed in table 7.

Table 7: Bivariate probit estimates

Parameter	Estimates	
	W1 (domestic)	W2 (abroad)
Constant term	- 0.059 (0.435)	- 3.996 (0.499)**
Log income	- 0.077 (0.037)**	0.387 (0.043)**
Household size	0.047 (0.019)**	- 0.072 (0.022)**
Age	- 0.002 (0.002)	- 0.004 (0.002)**
Degree of Urbanisation	- 0.028 (0.015)*	0.010 (0.017)
Level of education	- 0.038 (0.024)	0.183 (0.028)**
Self-employed	0.794 (0.264)**	- 0.725 (0.290)**
Civil servant	0.752 (0.252)**	- 0.480 (0.279)*
Employee	0.790 (0.244)**	- 0.524 (0.267)*
Not employed	0.707 (0.246)**	- 0.808 (0.270)**
Tent/camper/mobile home/cabin boat at permanent location	0.313 (0.088)**	- 1.195 (0.096)**
Tent/camper/mobile home/cabin boat movable	0.173 (0.046)**	0.068 (0.054)
Second home	- 0.499 (0.146)**	- 0.686 (0.172)**
Total days on vacation	0.021 (0.001)**	0.051 (0.002)**
Rho	- 0.545 (0.031)	
Likelihood-ratio test of rho = 0	Chi2(1) = 268.061	Prob > chi2 = 0.000

*Coefficient is significant at the 0.1 level (2-tailed).

**Coefficient is significant at the 0.05 level (2-tailed).

Table 7 thus contains the estimates of the parameters of the bivariate probit model. The test of the null hypothesis of zero correlation strongly rejects the hypothesis that ρ equals zero at the five per cent level (Greene, 2008). The estimates for log (income) indicate that for domestic vacations (W1) the probability of participation decreases with a rise in income and for vacations abroad (W2) increases with a rise in income. For household size, probability for participating in a domestic vacation is influenced positively, and negatively for vacations abroad. This is probably because a vacation abroad is not only more expensive with more members in household, but also more hassle while making longer journeys. The estimates for degree of urbanisation tell us that the more urbanised a household place of residence is, the higher the probability of participation is for a vacation abroad and lower for a domestic vacation. An interesting result is the relation of the level of education: the higher the level of education, the larger the probability for participating in a vacation abroad and the lower (not significant) the probability for participation in a domestic vacation. The effect of education on vacation abroad is larger than on domestic vacation participation probability. Concerning the profession of the head of the household (the respondent in our case). Little is to say for domestic vacations. For vacations abroad we can say that people that are self-employed, or not employed at all, participation is more strongly negatively related than for civil servants.

When households own a tent, camper, mobile home or cabin boat at permanent location they the probability that they participate in a vacation abroad is related negatively and for a vacation abroad positively. This is probably because these durable goods are on a permanent location in the Netherlands. And once these goods are moveable the probability for participation in a vacation abroad is related positively, although not significantly. Owning a second home has a negative influence on participation for domestic vacations and participation in vacations abroad. The total number of days a household spend yearly on vacation is positively correlated with participation probability for domestic vacations as well as for vacations abroad. These households are assumed to be more 'vacation minded'.

Figure 3 below shows the participation probability for the mean household as a function of family income. The other variables are thus set to their sample means. Vacations abroad seem to be more sensitive to changes in income, the higher the income, the higher the participation probability for vacations abroad.



Image 3: Participation probability (P) for the mean household as a function of family income (y)

Next we elaborate on the budget share regression estimates given in table 8. Here w_1 and w_2 correspond to the budget shares for expenditures on vacations (w_1 =domestic, w_2 =abroad).

For all the budget equations, the coefficients on $\log(\text{income})$ and $\log(\text{income})^2$ indicate that the share of spending money on vacations first falls with total income and then rises.

Table 8: Regression estimates

<i>Parameter</i>	w_1 (if $w_1=1$ and $w_2=0$)	w_1 (if $w_1=1$ and $w_2=1$)	w_2 (if $w_1=0$ and $w_2=1$)	w_2 (if $w_1=1$ and $w_2=1$)
Constant term	208.55 (22.45)**	83.22 (12.32)**	193.95 (29.39)**	119.93 (30.94)**
Log income	- 37.18 (4.39)**	- 13.51 (2.31)**	- 31.21 (5.58)**	- 17.55 (5.81)**
(Log income) ²	1.65 (0.22)**	0.55 (0.11)**	1.18 (0.26)**	0.59 (0.27)**
Household size	0.39 (0.12)**	0.06 (0.06)	0.78 (0.15)**	0.21 (0.15)
Age	0.03 (0.01)**	0.01 (0.01)	0.02 (0.01)*	0.02 (0.01)
Degree of Urbanisation	- 0.07 (0.10)	- 0.01 (0.05)	0.07 (0.13)	0.19 (0.12)
Level of education	0.12 (0.16)	- 0.00 (0.08)	0.35 (0.20)*	0.17 (0.20)
Selfemployed	- 0.94 (2.14)	- 0.52 (1.12)	4.38 (1.67)**	0.31 (2.82)
Civil servant	- 0.04 (2.10)	- 0.71 (1.09)	1.89 (1.55)	- 1.26 (2.75)
Employee	- 0.002 (0.020)	- 0.52 (1.08)	2.53 (1.47)*	- 0.56 (2.71)
Not employed	- 0.83 (2.05)	- 0.73 (1.09)	2.11 (1.49)	- 1.16 (2.73)
Tent/camper/mobile home/cabin boat at permanent location	- 2.47 (0.45)**	- 1.11 (0.26)**	0.17 (0.84)	- 0.88 (0.65)
Tent/camper/mobile home/cabin boat movable	- 0.44 (0.29)	- 0.36 (0.13)**	- 2.13 (0.38)**	- 1.40 (0.32)**
Second home	- 0.93 (1.01)	0.15 (0.43)	- 6.36 (1.07)**	- 3.98 (1.07)**
Total days on vacation	0.09 (0.01)**	0.02 (0.00)**	0.20 (0.01)**	0.13 (0.01)**
Total no of domestic vacations	0.09 (0.06)	0.40 (0.03)**	-	- 0.48 (0.09)**
Total no of vacations abroad	-	- 0.22 (0.06)**	0.70 (0.13)**	1.79 (0.14)**

*Coefficient is significant at the 0.1 level (2-tailed).

**Coefficient is significant at the 0.05 level (2-tailed).

For all other parameter estimates we consider that the results lead to a simple shift in the constant term, α , in equation..... Larger households allocate a larger fraction of their budget to vacation expenditures, significant results are for only domestic destination participation and for only abroad participation. Age has little estimated effect on budget shares for vacation. For degree of urbanisation no significant estimates are obtained. Neither are there significant results for the role of profession. Owning a tent, a camper, a mobile home or a cabin boat at a permanent location, significantly negatively influences budget share for domestic vacations. And looking back at the results obtained from the bivariate model before, participation in a vacation abroad was strongly negatively influenced by owning a tent, a camper, a mobile home or a cabin boat at a permanent location. Owning a movable tent, a camper, a mobile home or a cabin boat also negatively influences the vacation budget shares. This is probably due to the lesser costs for accommodation that these households encounter when going on vacation. Owning a second home has a significant negative relation on budget shares for vacations abroad. The same argument as for owning a tent (etc.) is probably the reason for this result. The result for duration and frequency of vacation participation are intuitive. The total number of days on vacation positively relates to budget shares, and budget shares for households that participate both in domestic and vacations abroad, are negatively influenced when either the number of vacation days abroad or days on a domestic vacation increase.

Figure 4 – 7 below display scatter diagrams of budget shares as a function of household income. The budget shares all decrease with a rise in income, but with a diminishing effect.

Image 4: Domestic (domestic participation)

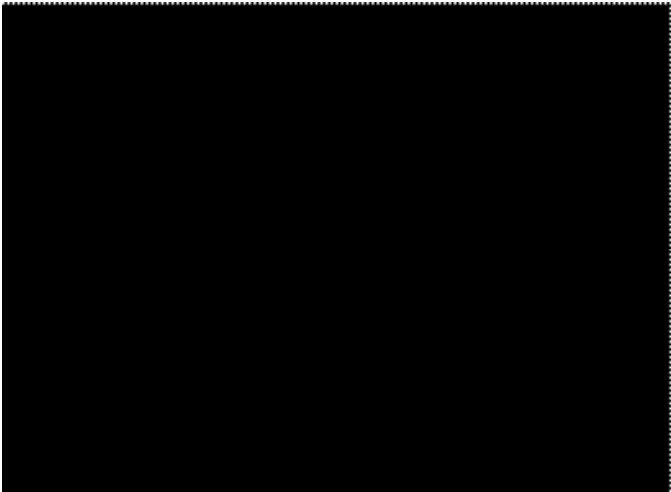


Image 4: Domestic (domestic/abroad participation)

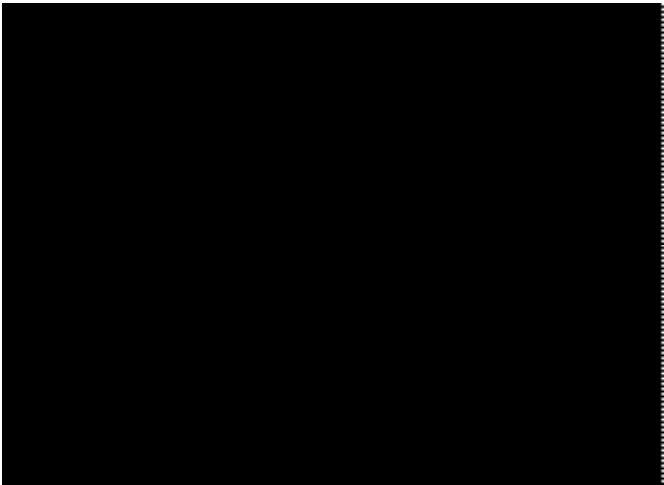


Image 6: Abroad (abroad participation)

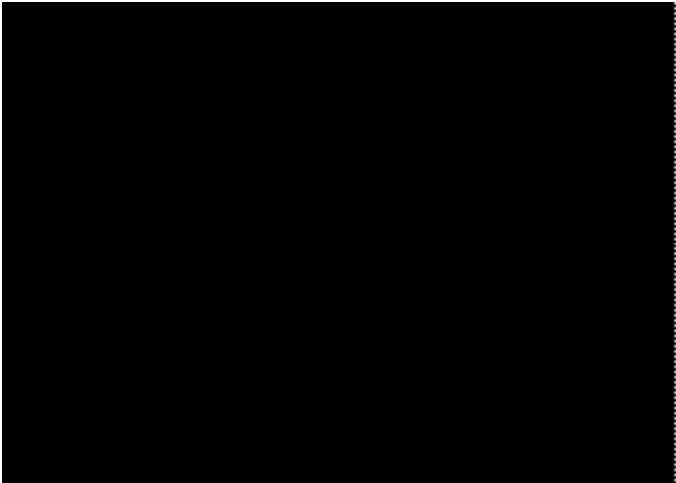
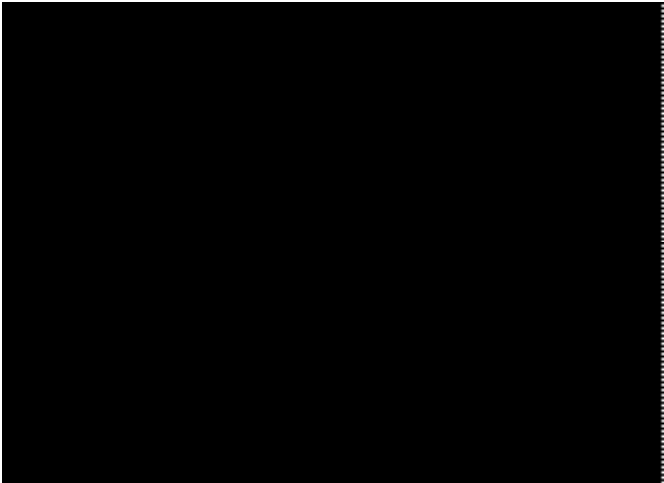


Image 5: Abroad (domestic/abroad participation)



Conclusions

In this paper we have estimated in two steps the vacation behaviour of Dutch tourists. In the first model we explained the decision whether to go on vacation or not and to go to a domestic destination or a destination abroad. And in the second step we modelled the decision on the level of vacation expenditures for domestic vacations and vacations abroad.

Most of the households participate in a vacation, 84.5 per cent, 19.7 per cent only choose to go on a domestic vacation, 29.7 per cent only spend a vacation abroad and around one third, 35.1 per cent participate both in a domestic vacation and a vacation abroad. With an increase in income, the participation probability for domestic vacations declines and the probability in participation for vacations abroad increases. The more days a household spends on vacation, the higher the probability of participation is for both domestic vacations and vacations abroad.

In the second step the budget share estimates explained the decision on the level of expenditures. Here we distinguished for regimes: budget share for domestic vacations, with only domestic participation; budget share for domestic vacations, with both domestic and abroad participation; budget share for vacations abroad, with only abroad participation; and budget share for vacations abroad, with both domestic and abroad participation. For all budget share combinations the estimates show that with a rise in income the budget shares decrease, with a diminishing effect.

Where we in this study modelled the decision to participate, where to go and how much to spend separately, an extension for further research in the field of vacation behaviour would be to estimate the decision whether to go on vacation or not, the choice of destination and the decision on the level of expenditures simultaneously in one model.

References

- Banks, J., Blundell, R., and Lewbel, A. (1997). 'Quadratic Engel Curves and Consumer Demand', *The Review of Economics and Statistics*, Vol. 79, pp. 527-539.
- Blundell, R. and Meghir, C. (1987). 'Bivariate alternatives to the Tobit model', *Journal of Econometrics*, Vol. 34, pp. 179-200.
- Deaton, A., and J. Muellbauer (1980), "An Almost Ideal Demand System". *American Economic Review*, Vol. 70:312-326.
- Deaton, A., and J. Muellbauer (1980), "Economics and Consumer Behaviour", Cambridge: Cambridge University Press.
- Deaton, A. and Irish, M. (1984). 'Statistical models for zero expenditures in household budgets', *Journal of Public Economics*, Vol. 23, pp. 59-80.
- Greene, W. (2008). *Econometric Analysis*. New York: Pearson Education.
- Griffiths, W. and Valenzuela, M. R. (1998). 'Missing data from infrequency of purchase: Bayesian estimation of a linear expenditure system', in Fomby T. B. and Hill R. C. (eds), *Advances in Econometrics: Messy Data – Missing Observations, Outliers, and Mixed-Frequency Data*, Vol. 13, JAI Press, Greenwich, pp. 75-102.
- Keen, M. (1986). 'Zero expenditures and the estimation of Engel curves', *Journal of Applied Econometrics*, Vol. 1, pp. 277-286.
- Kay, J. A., Keen, M. J. and Morris, C. N. (1984). 'Estimating consumption from expenditure data', *Journal of Public Economics*, Vol. 23, pp. 169-181.
- Leser, C.E.V., (1963), "Forms of Engel Functions", *Econometrica*, Vol. 31, No. 4, pp. 694-703.
- Lim, C (1997), "Review of International Tourism Demand Models". *Annals of Tourism*, Vol. 24:835-849.
- Lim, C. (1999), "A Meta-Analytic Review of International Tourism Demand". *Journal of Travel Research*, 37:273.
- Melenberg, B., & van Soest, A. (1996). "Parametric and Semi-parametric Modelling of Vacation Expenditures". *Journal of Applied Econometrics*, 11, pp. 59-76.
- Morey, E.R. (1984), "The choice of ski areas: estimation of a generalized CES preference ordering with characteristics". *Review of Economics and Statistics*, 66: 584-590.
- Morey, E.R. (1985), "Characteristics, consumer surplus and new activities". *Journal of Public Economics*, 26: 221-236.
- Pudney, S. (1989). *Modelling Individual Choice: The Econometrics of Corners, Kinks and Holes*, Basil Blackwell, Oxford.
- Pudney, S. (1990). 'The estimation of Engel curves'(with discussion), in Myles G. D. (ed.), *Measurement and Modelling in Economics*, North-Holland, Amsterdam, pp. 267-323.

Soest, A. van, and P. Kooreman, (1986), "A Micro-Econometric Analysis of Vacation Behaviour". *Journal of Applied Econometrics*, Vol. 2: 215-226.

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Working, H., (1943). "Statistical Laws of Family Expenditure". *Journal of the American Statistical Association*, Vol. 38. No 221

Appendix A

Table A.1	Means and standard deviations of variables			
	Mean	S.D.	Minimum	Maximum
<i>Vacation budget</i>				
Budget share domestic vacations (all households)	0.0161	0.0294	0	0.0477
Budget share domestic vacations (if participating)	0.0294	0.0344	0.0002	0.0477
Budget share vacations abroad (all households)	0.0521	0.0707	0	0.6866
Budget share vacations abroad (if participating)	0.0804	0.0738	0.0005	0.6866
<i>Vacation frequency</i>				
Total days on vacation per year (all households)	19.74	19.35	0	182
Total days on vacation per year (if participating)	23.37	18.94	1	182
Total days on domestic vacation	11.64	14.65	1	165
Total number of domestic vacations	2.21	2.42	1	22
Total days on vacation abroad	20.62	15.96	1	180
Total number of vacations abroad	1.98	1.37	1	20
<i>Income^b</i>				
Income (euro's)	42,931.77	28,035.53	3000	300000
Log (income)	10.50	0.58	8.00	12.61
(log(income)) ²	110.68	12.07	64.10	159.05
<i>Characteristics</i>				
Degree of urbanization ^a	3.19	1.29		
Household size	2.59	1.18	1	9
Age	49.24	16.73	16	92
Education ^d	3.24	0.86		
Self-employed ^c	0.034	0.18		
Civil servant ^c	0.080	0.27		
Employee ^c	0.479	0.49		
Not unemployed ^c	0.400	0.49		
Tent/camper/mobile home/cabin boat at permanent location	0.062	0.24		
Tent/camper/mobile home/cabin boat	0.266	0.44		
Second home	0.020	0.14		