

# Determinants of spending by Danish travellers

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## Abstract

Based on a survey of about 6500 business and leisure travellers, multiple regression analysis is used to estimate the magnitude of the factors that determine spending by Danes travelling within Denmark and outbound from Denmark. Explanatory variables such as trip purpose (leisure or business), travel distance and destination, length of stay, travel party size, package vs. self-organised trip, mode of transport (airline vs. other types of transport), type of accommodation (hotel vs. other types of accommodation), age group (a proxy for income) and season are included to determine their possible importance. The mentioned factors were generally found to be significant determinants in four different spending models, whereas gender was not.

Key words: Spending, multiple regression analysis.

## 1. Introduction

The majority of tourist spending studies focus on inbound tourism. This study, however, focuses on domestic and outbound tourism. Initially, factors which determine individuals' or travel groups' spending are identified based on the literature. It then goes on to test which determinants are significant in an empirical study and what specific value each of the determinants has. Different types of customers in a travel market have different spending patterns. Criteria which distinguish effectively between high and low spenders may be a relevant as basis for segmenting travel markets. There are several ways of measuring travel spending such as per person or per travel group, and per night or per stay. Thus, there are four ways of measuring tourist spending at the micro level. Furthermore, there may be different spending categories, including transport, accommodation, and others.

The purpose of this study is to identify the socio-demographic and trip-related determinants of traveller spending, to quantify these in an empirical study, and to discuss the results in relation to segmentation.

The basis of the empirical analysis is data from a survey undertaken in 2007 among 6500 Danish business and leisure travellers, staying at least one night at mostly commercial accommodations in Denmark or abroad. The main method used to analyse the data was linear multiple regression analysis. The regression coefficients will express directly how much - in EUR - an extra unit of or the presence (vs. absence) of given determinants will add to or detract from expected spending, keeping other factors included in the study constant. The analysis is also expected to show which of the determinants are significant for travel spending on the individual or travel group level. After scaling the survey results up to the Danish population (or rather the Danish travel market), travel

spending by different segments can be estimated. Such information may be of interest not just to academics and researchers but also to those in foreign destinations who may want to understand the revenue and profit potential of different segments. Travel agents, tour operators, airlines and hotels may also take an interest in the methods and findings of this study.

## 2. Background

In this study, the data used is from a survey from a single year, but it covers both leisure and business travellers and both short and long holidays. In the first section below, a comparison of time-series and cross sections studies are undertaken. A brief literature review is undertaken with a special focus on cross-section spending studies to identify possible determinants of travel spending. On this basis, a conceptual model of travel spending is then proposed. Finally, it is explained how outliers and contaminants are handled in the empirical study.

### 2.1. Cross-section studies of spending vs. time series studies of demand

Time-series studies and cross-section studies seem to represent two rather distinct fields with relatively few references connecting them. In Table 1, the two approaches are compared.

TABLE 1

Crouch (1994), Lim (1999), and Li, Song & Witt (2005) have done comprehensive reviews (meta-analyses) of studies of tourism demand published in academic journals. Li, Song & Witt (2005) reviewed 84 studies (mostly) published between 1990 and 2004: i.e., during a period of 15 years. The most commonly used dependent variable was found to be tourist arrivals, followed by tourism receipts/expenditures, and all studies were time-series studies. Every one of the 9 studies with tourism expenditures as the only dependent variable used log-linear regression.

The literature suggests that a great number of variables may influence spending by tourists/travellers. In a meta-analysis of international tourism demand, Lim (1999) mentions income, transportation costs and tourism prices as three basic determinants. In a later meta-analysis Li, Song & Witt (2005) mention purpose of travel, charter tours, accommodations types, number of nights, and more.

In a meta-analysis of the determinants mentioned in over 50 cross-section tourist spending studies published during the 15-year period 1995-2009, this writer (2011) reports that the 18 most frequently included or tested determinants of spending in cross-section studies were seven socio-demographic characteristics and 11 trip related characteristics. The seven most frequently tested socio-demographic characteristics in the reviewed studies were: age (73%), income (65%), gender (40%), education (35%), marital status (33%), profession/occupation (31%), and nationality/origin (29%). The 11 most frequently tested trip-related characteristics were: duration of stay (76%), party size (60%), accommodation type (45%), activities undertaken at the destination (40%), purpose of travel (35%), motives (33%), frequency of visits (31%), package or non-package (27%), first time or repeat visit (24%), children in the party (24%), and transportation mode (20%).

Furthermore, in an empirical study of incoming and domestic tourism in Denmark, this writer (2011) also found that 18 tested sets of determinants were significant in at least one of four spending measuring models. In decreasing order by numeric t-values, these were: length of stay, accommodation type, size of travel party, destination, packaging, mode of transport, household income, travel distance, activities, purpose of travel, age groups, origin market, information sources, gender, first-time or repeat visitor, booking channel, season and motives for visiting. For the sake of comparison, across four spending models, the 10 most significant out 23 sets of determinants in Kozak et al. (2008) can be calculated. The top 10 are the following, in decreasing

order by average numeric t-value: size of travel party, occupation, length of stay, packaging, income, type of service (meals, etc.), nationality, standard of nightlife/entertainment, value for money, and number of past visits.

## 2.2. Conceptual model

Most of the possible determinants of spending identified in the literature studies referred to in the previous section are summarised in Figure 1. Trip-related characteristics include factors such as household income, number of adults and children in the household, age of household members, and these individuals' gender, job level and education level. The trip-related characteristics include mode of transport, accommodation type, purpose of travel, length of stay, destination, size of travel party, travel package, activities, motives for travelling, etc. Air transport is thought to be more expensive than other means of transport, leading to higher spending, and the same is the case with hotel accommodation as opposed to other types of accommodation. Spending is thought to be higher if the employer pays as opposed to the household members themselves. Short stays are thought to be more expensive per night than long stays. The more people who can share the accommodation costs, the lower the cost per person is thought to be. Domestic holidays are thought to be cheaper than international ones. Destinations outside of Europe are thought to be associated with higher spending, even after controlling for distance. Holiday travel demand is highest in the middle of the summer, and therefore, spending per night per leisure traveller is thought to be highest in the summer months. However, business travellers do not travel as much in the summer months, so the net effect remains to be seen. The middle age group with the highest income must be assumed to spend more per person, all other things including party size being equal.

### FIGURE 1

In tourist spending studies and related studies, determinants have traditionally been sorted into socio-demographic and trip-related characteristics (Roehl & Fesenmaier, 1995; Hsieh et al., 1996; Cannon & Ford, 2002 among others). This distinction is also reflected in the conceptual model shown in Figure 1.

In a recent study, Kozak et al. (2008) suggest that four different dependent variables should be used in studies of the determinants of tourist spending. They will also be applied in this study, and they are as follows:

1. Spending per person per night
2. Spending per travel party per night
3. Spending per person per trip
4. Spending per travel party per trip

### TABLE 2

In this study, a strictly linear approach to multiple regression analysis will be used. This means that the regression coefficients will have a direct meaning in absolute monetary terms (EUR). However, there may be non-linearity between the two important determinants of travel spending, namely length of stay and size of the travel party (Thrane & Farstad, 2009). The way the mentioned issue is handled here is to include dummy variables on top of or in addition to the continuous variables length of stay and size of the travel party.

### 2.3. Handling of outliers and contaminants

Huan et al. (2008) and Pol et al. (2006) deal with the problems of outliers and contaminants. Also, Stynes & White (2006) mention the importance of carefully examining outliers and contaminants before analysing spending data. Outliers may be reported spending amounts, which are a certain number of standard deviations above or below regression estimates based on the full survey. Contaminants might include clearly misplaced decimal points that, for example, make a number 1000 times the expected. In this study, outliers are defined as zero spenders at the low end of the scale, and those spending more than seven SDs above the regression estimate, for any of the four spending measures. The zero spenders corresponded to the level three SDs below the regression estimate, and seven SDs above the mean corresponds to over 10000 DKK (or over 1341 EUR) per person per night. Contaminants were deleted or corrected before initiating the analysis. There were only a few contaminants.

### 3. Results

Table 3 shows basic information – averages – for key dependent and independent variables in the survey (n=6458). Spending was 114 EUR per person per night, 455 EUR per person per stay, 152 EUR per travel party per stay and 724 EUR per travel party per stay. 16% of the respondents were business travellers. 37% travelled alone, and an equal number travelled as couples. 44% stayed at hotels. 32% flew. 53% went abroad, mostly within Europe, whereas 47% stayed in Denmark. Pairwise correlations (r) are also shown in Table 3. Across the four spending models, purpose of travel had the highest  $r^2$ .

TABLE 3

The results of a series of four regression analyses, without outliers, will now be presented. Dummy variables are used to distinguish between different levels of several independent variables. Fourteen variables cover nine sets of determinants: 1. business vs. leisure (with leisure as the basis); 2. party size (with the absolute number as one variable, and a dummy variable for individual travellers); 3. travel distance and destination (with the absolute one-way distance as one variable and a dummy variable for domestic travel); 4. length of stay (with one variable for the absolute number of nights and two additional dummy variables for one night only and for two nights only); 5. flying vs. other means of transport (with the latter as the basis); 6. age group (15-29, 30-59, 60+, with middle group as basis); 7. accommodation type (hotels vs. other types, with the latter as basis); 8. packaging vs. non-packaging (with the latter as the basis); 9. season (July vs. the rest of the year). A tenth determinant, gender, was also tested, see below. One variable, families with children vs. travel groups without children, was excluded because of the multicollinearity between *child\_family* and *party\_3\_more*. Thus, almost all travel parties with three persons or more also fall into the *child\_family* category. Information about household income levels was not available in the data set. Age group will therefore have to be regarded as a proxy for income.

In the two models with spending per night as the dependent variable (spending per person per night and spending per travel group per night), the *business vs. leisure* distinction emerges as the most significant determinant. In both of the last two models, spending per person per trip and spending per travel group per trip, the determinant *distance* (KM\_1000) has the highest t-value and is thus the most significant determinant. This is the case both with and without outliers. Across the four models, adjusted  $R^2$  increased by 9.3 percentage points when outliers were excluded. Across the four spending models, the ranking of the explanatory variables by average numeric t-value was as follows: 1) purpose of travel (business vs. leisure), 2) distance, 3) length of stay, 4) size of the travel party, 5) packaging, 6) mode of transport, 7) type of accommodation, 8) age group, and 9) season. A tenth determinant, gender, was not significant in any of the four models and is therefore left out. In the regression analyses without outliers all nine sets of determinants were significant in all four models.

TABLE 4

## 4. Discussion

In this section the results are discussed in relation to segmentation, i.e., how some of the most significant spending determinants can be used to segment a travel market.

### 4.1. Segmentation

For the purpose of facilitating segmentation, the regression analyses were supplemented with a number of analyses of variance, inspired by Legohérel & Wong (2006), who use a tree-based classification procedure. The segmentation criteria business vs. leisure and domestic vs. international are two of the most relevant segmentation criteria, helping to distinguish between high spenders and low spenders. Additional candidates for relevant segmentation criteria found in the analyses of variance (and mentioned in Figure 2) are ranked in the same way as in the regression analyses results shown in Table 4. They are: length of stay, party size, and packaging. Finally, mode of transport (air vs. non-air) could be a relevant criterion for segmenting travellers seen from the point of view of travel agents or airlines, for example. For accommodation providers and destinations, accommodation type is a relevant segmentation criterion.

FIGURE 2

### 4.2. Sizing the segments

All in all, Danes made 12.3 million trips with overnight stays in 2007, not including VFR. Total spending was 5.7 billion EUR, of which 64% was spent in Denmark initially. Domestic leisure travel accounted for 9% of travel spending, international leisure 58%, and business travel 33%. These can be considered the three main segments of the travel market.

TABLE 5

From some perspectives - for example, from the perspective of a travel agent, an airline or a tour operator - it is relevant to consider the spending in the origin market: in this case, Denmark. Other types of actors such as foreign accommodation providers may be interested in the part spent abroad. From other perspectives, the full value of the travel market in question is relevant.

The three main segments can be broken down into  $2 \times 2 \times 2 = 16$  segments that can be aggregated in a number of different ways (if relevant) or dealt with separately. For example, the Danish air-inclusive international charter flight-based market, i.e., the market for package tours, amassed 1.34 million in 2007, its highest amount ever, and over 1 million in each of the three earlier years, according to statistics from Statistics Denmark (2009). This information fits perfectly with the results of this survey, which indicate 1.1 million in pure international, air-based, leisure package tours plus 0.2 million in business/mixed-purpose package tours for 2007. For package tours, 69% of spending was initially spent in Denmark, part of which was for the accommodations, but these expenditures were generally reimbursed to the foreign destinations by the tour operators. Leisure package tours account for 9% of all trips made by Danes, but they account for 18% of travel spending and they account for 20% of the amount initially spent in Denmark. Another major segment of the Danish travel market is domestic non-air leisure trips. Many of these trips are for stays in holiday cottages, which account for 14% of the amount spent in Denmark. Non-package international leisure air trips account for 17% of the amount spent in Denmark, and the corresponding business travel segment accounts for 18%.

A comparison of the current Danish survey with the Danish population (according to Statistics Denmark, 2009) shows that leisure travellers apparently try hard not to travel alone. Even if they are from a single-person household, they will normally try to travel with one other person.

## 5. Summary and conclusion

Econometric time-series studies of demand, which normally try to explain and sometimes forecast numbers of international arrivals, are more common in tourism-related journal articles than cross-section studies. However, cross-section studies make it possible to take into account a relatively high number of socio-demographic and trip-related characteristics and test their influence on spending, typically in a given year.

The study reported in this paper was of the cross-section category. Here, multiple regression analysis was used to estimate the magnitude of the factors determining the spending by Danes travelling within Denmark and outbound from Denmark. There were four different dependent variables in this study: (1) spending per traveller per night (2) spending per travel party per night (3) spending per traveller per trip, and (4) spending per travel party per trip. The results for all four dependent variables were expressed in Euros. Only trips with at least one overnight stay undertaken by persons residing in Denmark were included. Ten sets of explanatory variables were tested. In descending order of average numeric t-values across the four spending models, these were: purpose of trip (leisure or business), distance, length of stay, travel party size, package vs. self-organised trips, mode of transport (airline vs. other types of transport), accommodation type (hotel vs. other types of accommodations), age group, and season. The tenth tested determinant was gender. The first nine factors were found to be significant in all four models, when excluding outliers. Gender was not significant in any of the four models, and was therefore excluded. In the regression analyses without outliers, all nine sets of determinants were significant in all four models.

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**Table 1 Contrasting time-series and cross-section studies in tourism demand and spending studies**

	<b>Time-series studies</b>	<b>Cross-section studies</b>
Years, time periods	Many	One
Dependent variable	Primarily: arrivals. - Secondly: aggregated expenditures/receipts	Spending per person (or per party) per night (or per stay)
No. of explanatory variables	Relatively few: ~5	Relatively many: ~10
Explanatory variables	Income, transportation costs, prices. - And others.	Socio-demographic and trip-related characteristics, psychographics
No. of origin (and/) or destination countries	One or few	Many (destinations <u>or</u> origins)
Scale(s) – on dependent variable	Log	Linear – or log
Output – meaning of regression coefficients	Elasticities	Spending (or alternatives such as length of stay)
Frequently used for	Forecasting demand	Market value sizing Understanding consumers
Disciplinary fields	Econometrics, economics	Marketing, social sciences
Statistical problem(s)	Autocorrelation – and more	Multicollinearity – and more
Input data	Often aggregated (macro) data	Survey (micro) data
Journal articles in ~15 years	84 (1990-2004), i.e. ~100	51 (1995-2009), i.e. ~50

**Table 2 Four ways of measuring travel spending: Four models – and examples of for whom each is relevant**

	<b>Per night</b>	<b>Per trip</b>
Per person	1. Spending per person per night	3. Spending per person per trip
Per travel party	2. Spending per travel party per night	4. Spending per travel party per trip

	<b>Per time unit</b>	<b>Per trip</b>
Per person	1. Destinations	3. Airlines
Per travel party	2. Accommodations	4. Travel agents

**Table 3 Means and correlations (r) for four dependent and key independent variables (n=6458)**

		Mean	EUR_pp p_night	EUR_pp	EUR_p_ party_night	EUR_p_ _party	Business	Interna- tional	Domestic
	EUR_ppp_night	113,96	1	,544**	,951**	,336**	,615**	,225**	-,225**
	EUR_pp	455,23	,544**	1	,555**	,831**	,288**	,385**	-,385**
	EUR_p_party_night	152,47	,951**	,555**	1	,478**	,520**	,295**	-,295**
	EUR_p_party	724,02	,336**	,831**	,478**	1	,092**	,443**	-,443**
1	Business	16%	,615**	,288**	,520**	,092**	1	,039**	-,039**
2	Flying	32%	,315**	,430**	,367**	,455**	,171**	,599**	-,599**
3	International	53%	,225**	,385**	,295**	,443**	,039**	1	-1,000**
	Domestic	47%	-,225**	-,385**	-,295**	-,443**	-,039**	-1,000**	1
	Europe	47%	,182**	,169**	,232**	,203**	,029**	,900**	-,900**
>	Rest_of_World	5%	,096**	,484**	,141**	,536**	,023**	,224**	-,224**
4	Hotels	44%	,368**	,298**	,408**	,282**	,382**	,364**	-,364**
	Other_accom	47%	-,294**	-,231**	-,321**	-,215**	-,310**	-,289**	,289**
	VFR_cottages	9%	-,128**	-,117**	-,152**	-,117**	-,124**	-,130**	,130**
5	Party_1	37%	,473**	,324**	,319**	,033**	,568**	,029**	-,029**
	Party_2	38%	-,247**	-,151**	-,195**	-,074**	-,342**	-,004**	,004**
	Party_3_more	25%	-,251**	-,192**	-,137**	,046**	-,251**	-,029**	,029**
6	Nights	5,62	-,148**	,345**	-,104**	,495**	-,198**	,310**	-,310**
7	Package	15%	,097**	,252**	,178**	,336**	-,006**	,326**	-,326**
8	Age_15_29	17%	-,066**	-,010**	-,095**	-,044**	-,084**	,003**	-,003**
>	Age_30_59	61%	,131**	,040**	,165**	,075**	,193**	,016**	-,016**
	Age_60_93	21%	-,095**	-,038**	-,109**	-,048**	-,152**	-,022**	,022**
9	Male_share	52%	,144**	,089**	,129**	,038**	,205**	,084**	-,084**
10	Month_6_8	38%	-,124**	-,046**	-,100**	,029**	-,147**	-,015**	,015**

Note: The 10 sets of determinants have been ranked by average R<sup>2</sup> for the four spending determinants. All pairwise Pearson's correlations between the four spending measures and its spending determinants are significant at the 99%-level (\*\*), except in one instance (season, broadly defined: month\_6\_8) which is significant at the 95% level.



**Table 4 Regression analysis results – 4 models, without outliers**

		Without outliers		Without outliers		Without outliers		Without outliers		Collinearity Stats		Average
	Y	EUR_ppp_night	t	EUR_p_party_night	t	EUR_pp	t	EUR_p_party	t	Tolerance	VIF	t
	(Constant)	63,13	10,40	85,40	12,89	133,26	5,83	-42,15	-1,33			7,6
1	Business	206,72	39,54	187,98	32,95	317,67	16,15	299,14	10,94	,516	1,937	24,9
2	KM_1000	2,34	2,08	7,11	5,79	144,12	34,06	235,79	40,11	,502	1,991	20,5
	Domestic	-54,79	-14,70	-65,69	-16,15	-40,50	-2,89	-61,88	-3,18	,529	1,891	9,2
3	Nights	-2,29	-8,12	-3,18	-10,31	17,20	16,17	37,90	25,65	,618	1,619	15,1
	Nights_1	91,88	18,64	102,28	19,01	-230,09	-12,40	-150,90	-5,85	,719	1,390	14,0
	Nights_2	21,32	5,46	20,97	4,92	-89,91	-6,12	-75,25	-3,69	,765	1,307	5,1
	Party_size	-5,21	-3,67	5,63	3,63	-54,03	-10,10	36,75	4,95	,501	1,994	5,6
4	Party_1	65,20	14,98	24,82	5,22	301,09	18,38	80,49	3,54	,419	2,387	10,5
5	Package	10,38	2,49	36,43	8,02	146,76	9,37	367,15	16,87	,806	1,241	9,2
6	Flying	52,28	12,78	59,60	13,35	55,48	3,60	100,80	4,71	,504	1,983	8,6
7	Hotels	18,79	5,55	38,57	10,44	63,42	4,98	166,05	9,38	,647	1,545	7,6
8	Age_15_29	-24,14	-6,22	-30,50	-7,20	-52,07	-3,56	-85,52	-4,21	,868	1,153	5,3
	Age_60_93	-7,07	-1,95	-14,89	-3,76	-45,16	-3,30	-74,34	-3,91	,823	1,215	3,2
9	July	11,51	3,11	15,52	3,85	30,08	2,16	105,92	5,48	,894	1,119	3,7
	R2 adjust.	0,606		0,536		0,568		0,607				
	F	690,0		517,9		589,2		694,2				
	Mean	109,24		147,48		432,32		695,62				
	N	6274		6274		6274		6274				

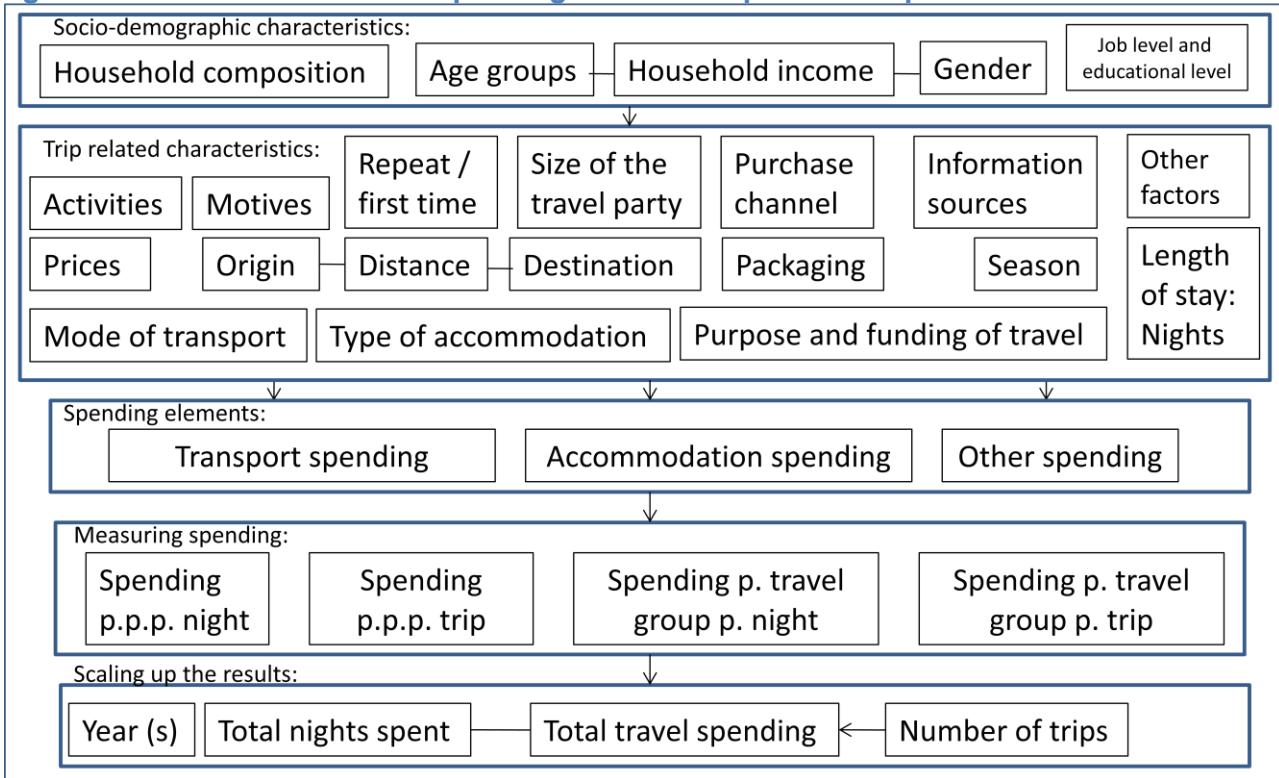
Note: Collinearity statistics: Maximum VIF was 2.4, and minimum tolerance 0.42 (for Party\_1), i.e. well over 0.3.

**Table 5 Scaling the survey data up to the total Danish travel market**

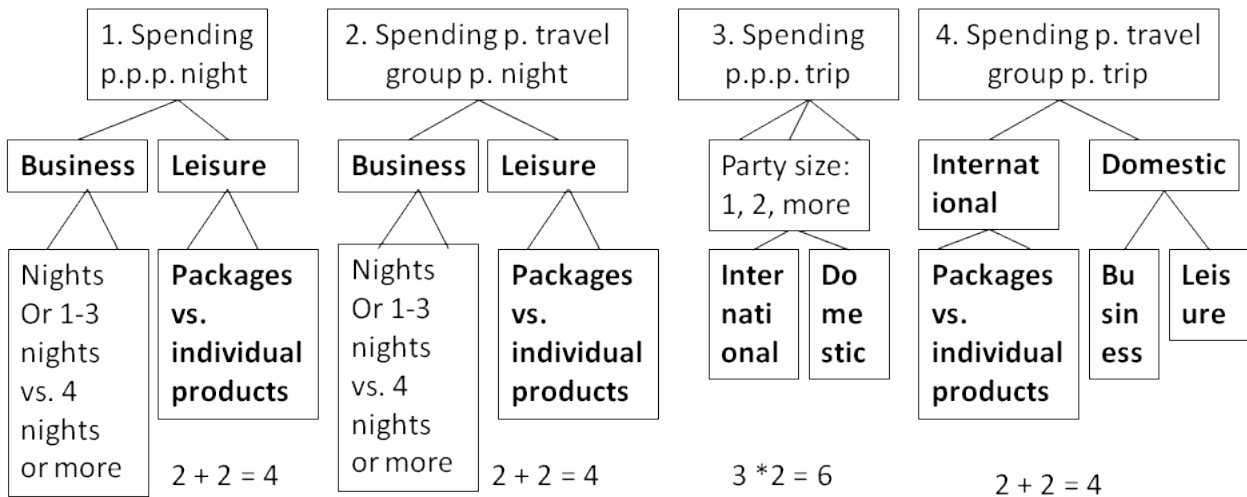
		Weight	N	Million trips	Trips %	Spending mill. EUR	Spending %	DK share	Million EUR in DK	EUR in DK%
Leisure, domestic		1864	2630	4,9	40%	516	9%	100%	516	14%
Leisure, international		1928	2799	5,4	44%	3280	58%	54%	1759	49%
Business		1912	1029	2,0	16%	1864	33%	72%	1342	37%
Total		1899	6458	12,3	100%	5660	100%	64%	3617	100%

Business	International	Flying	Package	Weight	N	Million trips	Trips %	Spending mill. EUR	Spending %	DK share	Million EUR in DK	EUR in DK%
Leisure	Domestic	Non air	Not package	1863	2557	4,8	39%	489	9%	100%	489	14%
			Package tour	1743	41	0,1	1%	19	0%	100%	19	1%
		Air	Not package	2088	32	0,1	1%	9	0%	100%	9	0%
	International	Non air	Not package	1858	1075	2,0	16%	635	11%	37%	237	7%
			Package tour	1808	221	0,4	3%	270	5%	69%	186	5%
		Air	Not package	2057	923	1,9	15%	1340	24%	46%	620	17%
		<b>Package tour</b>	<b>1899</b>	<b>580</b>	<b>1,1</b>	<b>9%</b>	<b>1034</b>	<b>18%</b>	<b>69%</b>	<b>716</b>	<b>20%</b>	
Business	Domestic	Non air	Not package	1936	354	0,7	6%	293	5%	100%	293	8%
			Package tour	1947	45	0,1	1%	39	1%	100%	39	1%
		Air	Not package	1639	37	0,1	0%	34	1%	100%	34	1%
			Package tour	1894	8	0,0	0%	9	0%	100%	9	0%
	International	Non air	Not package	1885	104	0,2	2%	174	3%	51%	88	2%
			Package tour	2163	11	0,0	0%	33	1%	74%	24	1%
		Air	Not package	1922	381	0,7	6%	1010	18%	63%	635	18%
			Package tour	1873	89	0,2	1%	273	5%	81%	220	6%
		<b>Total</b>	<b>1899</b>	<b>6458</b>	<b>12,3</b>	<b>100%</b>	<b>5660</b>	<b>100%</b>	<b>64%</b>	<b>3617</b>	<b>100%</b>	

**Figure 1 Determinants of travel spending - Factors of possible importance**



**Figure 2 Candidates for primary and secondary segmentation criteria in the four spending models**



Note: Based on ANOVA at step one, followed by ANOVA of each of the resulting segments separately in step 2.