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## **Seaside recreation in the Stockholm archipelago: travel patterns and costs**

by

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## **Abstract**

The Stockholm Archipelago is Sweden's perhaps most important recreational area. This is due both to its many attractive features and to the fact that it is situated in the country's most densely populated area. Based on a mail survey of citizens of the two counties adjacent to the archipelago, Uppsala County and Stockholm County, we estimate the total number of visits to during the summer of 1998. We also analyze the socioeconomic factors that determine whether or not an individual will make such a visit, and of how many visits he will make. We also describe some characteristics of the visits, and present estimates of the amount of money spent by recreational visitors to the archipelago.

According to our estimates, around 610 000 persons, or 43 percent of the adult population, from the two counties made 3 100 000 trips to the archipelago.

Altogether they spent around SEK 1.6 billion ( $\approx$ 190 million EURO), which corresponds to about 0.4 percent of the gross regional product of the two counties.

Using a complementing data set, we estimate that an additional 60 000 visitors arrive from other parts of the country. It is thus beyond any doubt that the Stockholm archipelago is of great significance as a recreational area.

## **Acknowledgements**

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# 1 Introduction

The Stockholm archipelago is one of the most important recreation areas in Sweden not only due to its many attractive features, but also because it is easily accessible from the country's most densely populated area. In fact, the capital city itself, Stockholm, is situated on the fringe of the archipelago. The purpose of this report is to attempt to quantify the importance of tourism to the Stockholm archipelago, and to attempt to describe the relationship between travel behavior and some socio-economic variables.

The report is structured as follows. In the next section, we discuss the data used. We then obtain estimates of the total number of trips to the area (Section 3), and discuss some characteristics of these trips (Section 4). In Section 5, we present the results from two econometric models that measure the connection between travel behavior and some socio-economic variables, and in Section 6, we make an estimate of the amount of money spent on this form of tourism. The last section offers some concluding remarks.

## 2 Data

The analysis is primarily based on a data set that was obtained by a survey carried out in 1998. This survey had the double purpose of collecting data both about people's recreational behavior in the archipelago and their willingness to pay for a reduced eutrophication of the archipelago. See Söderqvist and Scharin (2000) for willingness to pay estimates. The relatively large amount of data that had to be

collected and budgetary considerations called for the use of a mail questionnaire as the survey instrument. Questionnaire draft were tested in focus group settings and among boat passengers in June, July and August 1998. The design of the questionnaire followed Dillman's (1978) Total Design Method in all essentials.

The population for the survey was defined as the inhabitants in the county where the Stockholm archipelago is situated (Stockholm County) and the inhabitants in one adjacent county (Uppsala County). (See Figure 1). The survey sample consisted of 4,000 inhabitants in 18-75 years of age. The response rate after three reminders was 47.2%. (See Söderqvist and Scharin (2000) for details.)

The data set obtained by the survey thus covers travel by residents of the two counties adjacent to the archipelago. To complement these data, we use the Tourism and Travel Data base (TDB). The TDB is based on interviews with 2 000 – 4 000 randomly selected Swedes every month, and has been collected since 1989. For the present study, we have access to data for the months June, July and August for the years 1990-1994. The TDB only covers trips with over-night stays and day trips to destinations further from home than 100 kilometers. Thus, this database is not appropriate for describing travel to the archipelago from the Stockholm/Uppsala region. We will thus use the TDB only to get an estimate of the number of visitors from other parts of the country.<sup>1</sup>

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<sup>1</sup> See Sandström (1996) for a discussion and a description of the TDB.

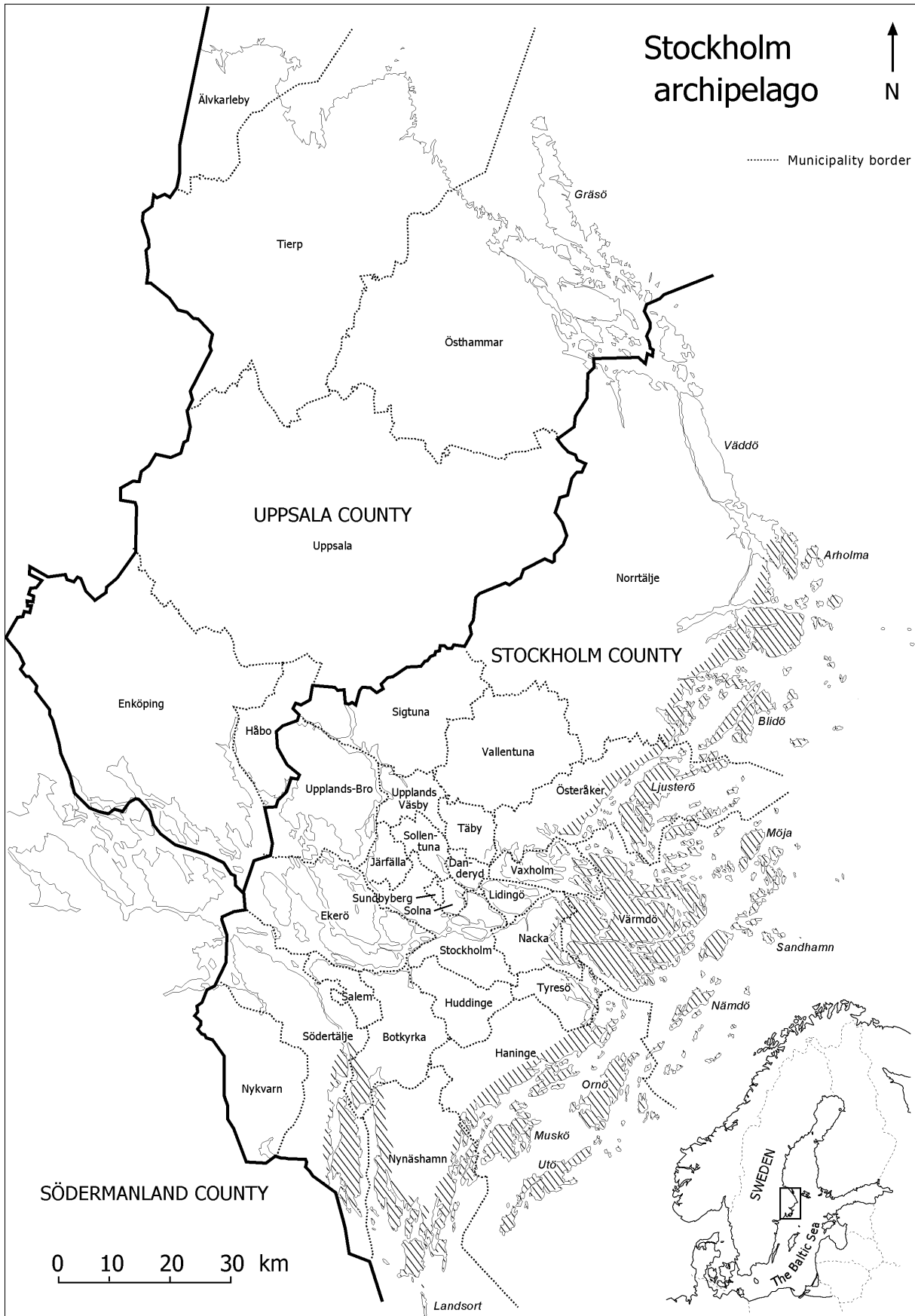


Figure 1. Map of Stockholm archipelago, as specified in the questionnaire.

The part of the questionnaire dealing with travel behavior was designed in the following way: Firstly, the respondents are asked if they have visited the archipelago during the summer of 1998. "Summer" is specified as the period 1 June – 31 August. Secondly, respondents who have answered the first question in the affirmative are asked if any of these visits involved travel by any means of transport other than foot or bicycle. This is to sort out "visits" to the archipelago by people who live there or own summer houses there. Thirdly, those who have traveled to the archipelago are asked if any of the trips were made in their spare time, in order to sort out work related visits. Fourthly, those who have answered this third question in the affirmative are asked if they took part in any of a number of activities involving contact with the sea. Respondents who are "filtered out" by this question are those about whose recreational travel we require more detailed information, and they are requested to state how many such trips they undertook, and then to complete the next part of the questionnaire. This part deals with the last such trip they have undertaken. Respondents are asked to describe the trip in considerable detail, with information on destination(s), travel mode(s), the time spent travelling and out-of-pocket cost for each travel mode used, the time spent on each destination, costs for lodging, and other costs.

### **3 The importance of the Stockholm archipelago**

That travel to the Stockholm archipelago is important to people living in the counties of Stockholm and Uppsala is evident from the fact that half (50.6 percent)<sup>2</sup>

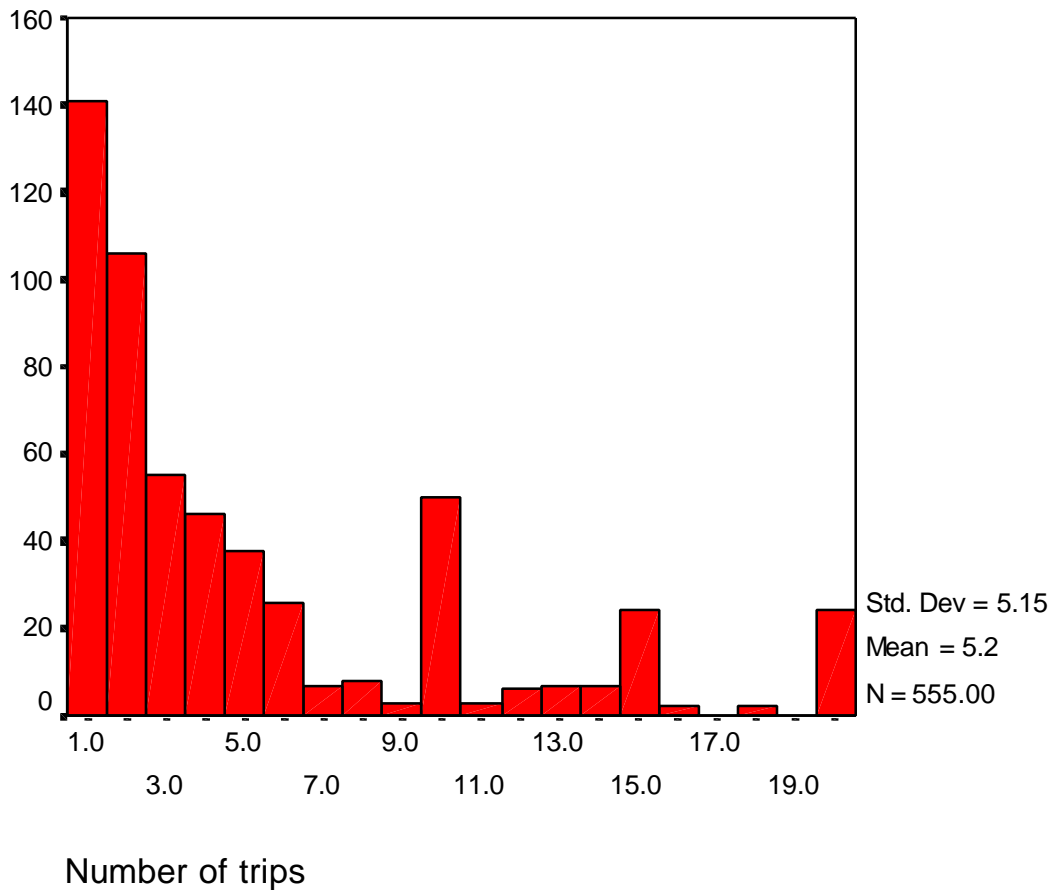
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<sup>2</sup> Excluding those who did not respond to this question.

of the respondents visited the archipelago at least once during the summer of 1998. For respondents from the county of Stockholm the figure is slightly higher, 54.4 percent, while it is considerably lower for respondents from Uppsala (27.4 percent).

It is also striking how large a proportion of the population either owns a summer home in the archipelago, or owns a boat. Of the full sample, 15.0 percent own summerhouses, and almost a third, 29.1 percent are boat owners. The corresponding figures for the County of Stockholm are slightly higher. (16.5 percent and 29.3 percent.) In the county of Uppsala, a considerably smaller fraction own summer houses, 5.63 percent, while the proportion of boat owners is approximately the same (27.9 percent).

Turning to the number of visits, we find further evidence of the very large importance of the Stockholm archipelago as a recreational area. The histogram below, in Figure 2, depicts the distribution of the number of visits to the archipelago, for those who made at least one visit. For expositional purposes, the histogram is truncated at 20 trips. (Less than 5 percent of the respondents made more than 20 trips to the archipelago.) In total, the 577 respondents who have stated that they made at least one recreational trip to the archipelago made 3 797 trips during the summer of 1998.



**Figure 2 – Histogram over the number of visits to the archipelago, truncated at 20 visits.**

To extrapolate these figures to population estimates requires information or at least assumptions concerning the non-respondents of the questionnaire. In order to obtain indications on the reasons for non-response, a follow-up questionnaire was sent by mail to 500 randomly selected non-respondents in March 1999. They were asked to answer a question on why they did not respond to the original questionnaire. 108 answers to the non-response question were obtained. (See Söderqvist and Scharin (2000) for details.) It turned out that about 25 percent



reported a lack of interest in the archipelago or not being a visitor to the archipelago as the reason for not responding. We will assume that this result is valid for the whole group of non-respondents.

We will thus carry out the extrapolation to population estimates by multiplying with the inverse of the sampling ratio, and then adjust the results downward by 25 percent. This would imply that the total number of visitors to the archipelago during the summer of 1998 is almost 610 000 persons, corresponding to around 43 percent of the adult population of the two counties, and that these visitors made, in total, over 3 100 000 trips. It is thus beyond doubt that recreation in the Stockholm archipelago is very important to the population of the counties of Stockholm and Uppsala.

Quite naturally, the number of visitors from other parts of the country is much smaller. Taken altogether, but excluding Stockholm and Uppsala counties, around 0.8 percent of the respondents in the TDB made at least one visit to the Stockholm archipelago. Multiplying by the inverse of the sampling ratio, and adjusting for recreational trips not described in detail in the TDB,<sup>3</sup> we get a population estimate of around 58 000 visits. The major fraction of these, 55 000, are visits with at least one over-night stay. Not surprisingly, areas close to Stockholm, such as the county

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<sup>3</sup> Only the last two trips in each of a number of categories are described in detail in the TDB. However, the database also contains information on the total number of trips each respondent has undertaken. About 80 percent of all trips undertaken are followed up in the TDB. Thus, if we assume that the trips that are not followed up do not differ systematically from those that are followed up, we can multiply our estimates by the inverse of 0.8, i.e. 1.25, to obtain an estimate of the total number of trips of a given kind in the database.

of Östergötland, have a higher proportion of visitors than areas far away, such as the county of Norrbotten. It also appears as if counties with ample opportunities for seaside recreation, such as the counties of Göteborg and Bohus, Älvsborg<sup>4</sup> and Kalmar have a smaller fraction of visitors to Stockholm than do the land-locked counties of Jämtland and Dalarna. It should be noted that the figure for Södermanland county is probably a serious underestimation. Södermanland borders to the county of Stockholm, and is closer than 100 kilometers to many parts of the archipelago. Thus, a large number of day trips are most likely excluded from the TDB.

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<sup>4</sup> Since the TDB data was collected before the change of administrative borders made in 1998, we use the old names of the counties. Göteborg and Bohus County and Älvsborg County now belong to Västra Götaland County.

County	At least one visit (share of total sample)	Estimated number of daytrips	Estimated number of trips with over-night stay	Estimated total number of trips
Södermanland	0.30%	1061	6463	7802
Östergötland	2.75%	349	4614	5054
Jönköping	1.18%	0	1965	1965
Kronoberg	0.56%	0	648	648
Kalmar	0.36%	0	1793	1793
Gotland	0.74%	0	945	945
Blekinge	1.64%	0	426	426
Kristianstad	0.28%	0	1493	1493
Malmöhus	0.51%	0	3503	3503
Halland	0.44%	0	672	672
Göteborg och bohus	0.25%	0	885	885
Älvsborg	0.12%	0	2318	2318
Skaraborg	0.52%	0	2344	2344
Värmland	0.84%	0	1746	1745
Örebro	0.61%	506	2550	3187
Västmanland	1.08%	171	6048	6263
Dalarna	1.90%	364	4590	5048
Gävleborg	1.50%	386	5592	6079
Västernorrland	1.68%	0	3012	3012
Jämtland	1.07%	0	728	728
Västerbotten	0.54%	0	1346	1346
Norrbotten	0.52%	0	1181	1181
<b>Total:</b>	<b>0.78%</b>	<b>2838</b>	<b>54864</b>	<b>58441</b>

**Table 1 – Travel to the municipalities in the Stockholm archipelago from areas outside the counties of Stockholm and Uppsala.**

## **4 The purpose and duration of the trips**

In the questionnaire, the respondents were asked if they took part in one or several of a number of activities involving contact with the sea. 87.5 percent of those who had made a recreational visit to the archipelago stated that they had taken part in at

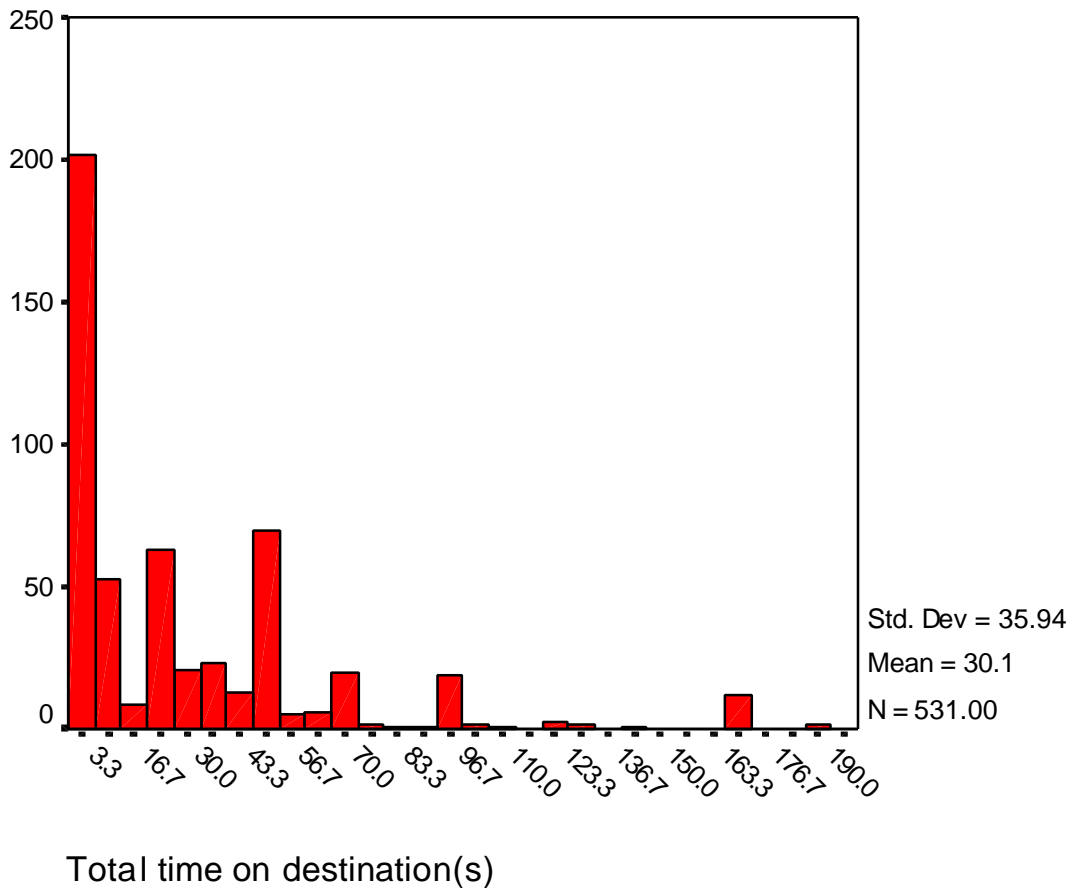
least one such activity. For this sub sample, the most common such occupations were sunbathing and swimming, something over half stated they had done. (56.8 percent and 52.8 percent, respectively.) 39.0 percent stated that they had “walked along the beach”, about a third (33.9 percent) had been fishing, 8.6 percent had been diving or surfing, and 55.0 percent stated that they had participated in some other activity involving contact with the sea.<sup>5</sup>

In spite of the short distance from the Stockholm to the archipelago, a considerable amount of time is spent travelling to the destination. The average total travel time is around four and a half hours. On average, the recreationists spend quite a short time on the sites they visit. The average time spent on the sites is only around one and a half days. In fact, only around half of the trips involved an over-night stay. The relatively high “travel time to on-site-time ratio” can perhaps be explained by the fact that travel in the archipelago is often part of the attraction. However, as can be seen in Figure 3, some recreationists stay at the sites of destination for a very long time.

The typical trip thus seems to be a trip with none or one over-night stay, and the prime attractions are swimming, sunbathing, and other activities that involve contact with the sea.

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<sup>5</sup> The percentages do not sum to 100, since respondents were allowed to mark more than one alternative.



**Figure 3 – Histogram over the total time (in hours) on the site or sites of destination. The sample is truncated at 200 hours for expositional reasons.**

## 5 Determinants of the number of trips

Two econometric models were used to estimate the determinants of respondents' travel behavior. A simple probit model was run to attempt to explain factors determining whether an individual will make a positive number of trips or if he will make zero trips. Results from this regression are presented in Table 2. A count data model was run to attempt to explain the number of recreational trips undertaken by

respondents. The model was specified as a Poisson regression. (See e.g. Greene 1993.) Results are presented in Table 3.

The dependent variable in the probit model is thus a dichotomous variable being one if the respondent has undertaken one or several recreational trips, and zero otherwise. In the Poisson regression, the dependent variable is number of trips undertaken. Explanatory variables are, firstly, dummy variables for ownership of summer houses and boats. A dummy variable is also included for women, as are the age of the respondent and the number of children at home in the household. The next five variables are dummy variables connected to the occupational status of the respondent. The “base case” occupational status is “employed”. For this category no dummy variable is included, to avoid the “dummy variable trap”.

Variable	Coefficient	Standard error	t-value	Prob. value	Mean of indep. var.
Constant	-.2994	.1521	-1.969	.0490	
Boat	.3092	.8237E-01	3.754	.0002	.2855
Summer house	.8215	.1090	7.540	.0000	.1480
Woman	-.1401	.6818E-01	-2.055	.0399	.5449
Age	-.5753E-02	.3092E-02	-1.861	.0628	42.70
Childr. at home	.6273E-01	.3563E-01	1.761	.0783	.6922
On leave	.2609E-01	.2292	.114	.9094	.2292E-01
Work at home	-.3587	.3611	-.993	.3206	.9168E-02
Unemployed	-.4329	.1983	-2.183	.0291	.3602E-01
Retired	-.8060E-01	.1360	-.593	.5535	.1382
“Other” occ. st.	.1177685475	.2398	.491	.6234	.2096E-01
Single	.3158E-01	.9090E-01	.347	.7283	.3261
Household inc.	.9376E-05	.3836E-05	2.444	.0145	19760

**Table 2 – Probit regression of the dichotomous variable for at least one recreational trip.**

Quite predictably, people who own summer houses in the archipelago or who are boat owners are more likely to have made at least one recreational trip. The coefficients for these two variables are both positive and significant at any usual level of significance. Some care in interpreting the results is warranted, however, since there is an obvious risk for an endogeneity problem. It is quite likely that the decision to buy a summer home or a boat is not exogenous. Thus, we would need to instrument for these variables. In want of any obvious instrument, however, we have chosen to ignore this problem. The other coefficients turning out to be significant in the regression are those of the dummy variable for women, the unemployment dummy, the household income variable (all these at least at the 5 percent level of significance), the age variable and the variable for the number of children at home in the household. (These two are significant at least at the 10 percent level). Thus, it appears as if women visit the archipelago less than do men, and unemployed people less than employed. The higher the household income of the respondent, the likelier it is that he will recreate in the archipelago. Old people are less likely to visit the archipelago than are young people, and the more children a family has, the more likely it is to visit the archipelago.

Variable	Coefficient	Standard error	t-value	Prob. value	Mean of indep. var.
Constant	.7691	.8264E-01	9.307	.0000	
Boat	.3798	.3966E-01	9.575	.0000	.4260
Summer house	.5725	.3925E-01	14.584	.0000	.2671
Woman	-.2143	.3471E-01	-6.174	.0000	.4819
Age	.1796E-01	.1622E-02	11.070	.0000	41.24
Childr. at home	.1579E-01	.1673E-01	.944	.3454	.8213
On leave	.7184	.8126E-01	8.841	.0000	.2888E-01
Work at home	.2396	.2313	1.036	.3001	.5415E-02
Unemployed	-.1185	.1692	-.701	.4836	.1625E-01
Retired	-.3995	.7052E-01	-5.665	.0000	.1029
"Other" occ. st.	-.2332E-01	.1065	-.219	.8267	.2708E-01
Single	-.1253	.4946E-01	-2.534	.0113	.2942
Household inc.	.3616E-05	.1601E-05	2.258	.0239	21290

**Table 3 – Poisson regression for the number of trips.**

Turning to the Poisson regression, we find the results being largely similar. The only variable being significant in both regressions but with different signs is the age variable. Thus, age has a significantly negative effect on the probability that a person will recreate at all in the archipelago, but a significantly positive effect on the number of trips. The coefficient on the number of children in the household is not significant in the Poisson regression. Nor is the unemployment dummy. Instead, the “on leave” and “retired” dummies turn up with significant signs. The first one is positive and the second one is negative. Also, the dummy for people living as singles has a significantly negative effect on the number of trips undertaken.

In summary, we can conclude that people with summer houses or boats tend to be more likely to recreate in the archipelago, and make a larger number of trips, than do others. This should hardly be surprising. Also, there is a clear positive influence of the household income both on the probability that a respondent has made



at least one recreation trip and on the number of such trips. This result should hardly come as a surprise either. The only somewhat surprising result is that women tend to be less likely to visit the archipelago, and make fewer trips.

## **6 Total cost of the trips**

In the data, the costs of the trips are specified in some detail. In the following, we will mainly present summaries, beginning with the “grand total”. We also attempt to make population estimates. On average, the out-of-pocket cost of a trip to the Stockholm archipelago was SEK 515.<sup>6</sup> If we make the assumption that the trips described in the data represents a random sample of all trips undertaken, and use our estimate of the total number of trips, presented above, this would imply that visitors from the counties of Stockholm and Uppsala spent almost SEK 1.6 billion on these trips. This corresponds to about 0.4 percent of the gross regional product of the two counties.<sup>7</sup> This share can perhaps be compared with the share of tourism in the national satellite accounts which is around 3.3 percent. (Around SEK 120 billion.)<sup>8</sup> Thus, if the share of tourism in the gross regional product of Stockholm and Uppsala does not differ dramatically from the national average, tourism to the archipelago would account for a little over 10 percent of tourism in the area. Of the

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<sup>6</sup> As of January 20, 2000, SEK 1  $\approx$  EURO 0.1167  $\approx$  USD 0.1178.

<sup>7</sup> The gross regional product (GRP) of Stockholm and Uppsala counties was SEK 395.2 billion in 1993. (Statistics Sweden 1996.) Since then, the GDP of Sweden has risen with about 10 percent. Thus, the GRP today would be around SEK 435 billion.

<sup>8</sup> The information on the tourism share in the national satellite account is from the Swedish Research Institute of Trade (HUI).

total sum, around one third is out-of-pocket travel cost, around 13 percent is lodging costs, and the remainder are unspecified “other” costs.

## **7 Concluding remarks**

It should be quite obvious that the Stockholm archipelago is of major significance as a recreational area. According to our estimates, it receives over 3 million visits each summer from residents of the two counties of Stockholm and Uppsala. It should be noted however that these estimates are based on travel data from the summer of 1998, whose weather conditions were unusually poor in the Stockholm region.<sup>9</sup> Our estimates should thus probably be interpreted as a lower-boundary estimate of the number of visits. The TDB data indicate that an additional 60 000 visitors arrive from other parts of the country. Tourism in the Stockholm archipelago also has economic significance. The inhabitants of the two counties spend around SEK 1.6 billion on such recreation. Again, the poor weather conditions of 1998 is likely to imply that this amount is higher in “normal” years.

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<sup>9</sup> The mean temperature in Stockholm in June, July and August 1998 were 13.5, 16.5 and 14.9 Centigrades respectively. This can be compared with the corresponding figures for the considerably better summer of 1999: 17.2, 20.2 and 17.1 Centigrades respectively. The precipitation in June, July and August 1998 (1999) were 70 (36), 106 (18) and 40 (48) mm respectively. (SMHI, 1999)

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County	Municip.	"Archip."	Pop.	Mean
Stockholm	Danderyd	Yes	28245	70%
Stockholm	Österåker	Yes	31600	63%
Stockholm	Värmdö	Yes	25193	62%
Stockholm	Haninge	Yes	63948	59%
Stockholm	Nacka	Yes	67321	59%
Stockholm	Täby	Yes	57992	56%
Stockholm	Solna	No	53509	51%
Stockholm	Lidingö	Yes	38368	50%
Stockholm	Huddinge	No	75537	47%
Stockholm	Ekerö	No	20359	45%
Stockholm	Stockholm	Yes	692954	45%
Stockholm	Vallentuna	No	23061	43%
Stockholm	Norrtälje	Yes	49402	42%
Stockholm	Tyresö	Yes	35126	41%
Stockholm	Salem	No	12963	38%
Stockholm	Sundbyberg	No	31074	38%
Stockholm	Vaxholm	Yes	7392	38%
Uppsala	Östhammar	Yes	22591	38%
Stockholm	Järfälla	No	57638	37%
Stockholm	Nynäshamn	Yes	22536	35%
Stockholm	Södertälje	Yes	81489	34%
Stockholm	Upplands-Bro	No	19848	33%
Stockholm	Sollentuna	No	53068	30%
Stockholm	Botkyrka	Yes	69225	27%
Uppsala	Uppsala	No	178011	27%
Stockholm	Sigtuna	No	32618	25%
Uppsala	Håbo	No	16514	25%
Stockholm	Upplands-Väsby	No	35764	20%
Uppsala	Tierp	No	20410	13%
Uppsala	Enköping	No	36109	4%
Uppsala	Älvkarleby	No	9371	0%

**Table 4 – This table the proportion of the population that made at least one recreational trip to the Stockholm archipelago for each municipality in the counties of Stockholm and Uppsala. The second column indicates whether or not the municipality is adjacent to the archipelago.**