Tourism Impact Studies

The Case of Bornholm

by

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Preface

In the latter part of 1994, the Danish Research Council for the Social Sciences awarded a grant to establish a Unit of Tourism Research at the Research Centre of Bornholm (RCB). The focus of the research programme was tourism in the peripheral areas of Europe, principally in the Northern or cold water climates. Many peripheral areas have strong natural environments, which make them attractive to tourists, particularly in the light of the public's concern with environmental issues. Experience has shown that tourism has been able to safeguard and create jobs in marginal regions, which have little prospect of attracting alternative industries.

In September 1997, the RCB hosted an international conference on the subject of Peripheral Area Tourism. The call for papers uncovered a worldwide interest in this subject amongst researchers and generated a number of journal publications and a book of case studies. Although the remit for the Centre is much wider than Bornholm, this report marks a contribution to understanding tourism in an island context. Tourism plays a more important role on Bornholm compared with other regions in Denmark and Jie Zhang and Charlotte Rassing show how this role can be measured either from the share of the tourism-related sector in gross regional production, or from tourist expenditure. The technique used is one of tourism multiplier analysis, which recognises the economic linkages between one industry and another, where the expansion of sales by one industry requires inputs to be purchased from other sectors of the economy in order to support that same expansion. The value of the multiplier is standardised so as to measure the impact of an additional unit of expenditure introduced into the economy. The higher the value of the multiplier, the greater is the intensity of the economic linkages, and therefore dependency, between one industry and another. This implies that regions with high multiplier values are more able to meet the demands of tourists within their own production capabilities, than those with low multiplier values. This report shows that both income and employment multipliers are relatively high on Bornholm, which is a reflection of the structure of the tourism industry on the island: it is dominated by small, often family-run businesses that are self-reliant and use local suppliers as much as possible.

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1. Introduction

Bornholm is located in the middle of the Baltic Sea and is one of the important tourism destinations in Denmark. Bornholm has a population of 45,018[1]; however, it attracts about 486,000 tourists every year[2], which is more than ten times its population. It has about 90 accommodation centres,[3] including hotels, holiday centres and guesthouses. The total bed capacity of the above three types of accommodation amounts to about 8300 beds. There are also 19 campsites, nine youth hostels, a number of harbours for tourist yachts and a lot of holiday cottages on the island. If the bed capacity of these types of accommodation is accounted, the total capacity for tourists on Bornholm is about 36 270 beds (see Table 7). The main limit on tourism development on Bornholm is the fact that the summer season for tourists is rather short. Bornholm tourism businesses are strongly influenced by seasonal fluctuations.

The Research Centre of Bornholm has carried out a visitor survey since July 1995. One of the survey's questions concerns tourists' expenditure on the island, which is divided into several categories of expenditure items. The purpose of this question is to obtain data for dividing the total tourist expenditure on the island into several categories and to better understand tourists' expenditure patterns. At the beginning of 1998, surveys of tourism-related businesses were made, including hotels, guesthouses, holiday centres, youth hostels, campsites, restaurants, fast food establishments, cafeterias, taxis, museums, etc. The purpose of this survey was to obtain data for the spending patterns of these businesses and their labour inputs both in terms of labour compensation and physical labour inputs.

The above two surveys can be taken as representing the demand side in one case and the supply side in the other. The general idea of this project is to use input–output modelling to assess the economic impact of tourism on the island. The visitor survey is important for this project because estimates of total tourist expenditure can not be made without it. The business survey is also crucial because input–output modelling needs inputs from other sectors and from labour supply to tourism-related businesses in order for these to be run. When multipliers are obtained from the input–output analysis, we can estimate the tourism impact on the island by using the data from tourist expenditure.

The main purpose of this report is to discuss the economic impact of tourism on Bornholm. Section two gives a description on the overall economic and employment structure on Bornholm. The purpose of the section is to offer readers an overview of the economic situation, which is compared with the economic and employment structure in Denmark as a whole. The overview also includes discussion of recent passenger flows to Bornholm and tourism overnight trends. Section three presents the results from visitor surveys carried out

1 This figure is for 1 January, 1997.
2 The number of tourists is based on estimations in the period 1994-1997.
3 The hotel number was recorded at end of 1997.

by the Research Centre of Bornholm. The focus here is on numbers of tourists, visitor nights spent and tourist expenditure per day in different types of accommodation/sectors.

Section four gives a description of tourism-related sectors in general and the sectors on Bornholm in particular, and it will also present the results of the tourism business survey on Bornholm. The linkage between the tourism-related sectors and other economic sectors will be discussed. Section five discusses the concept of the multiplier; the main terms, such as direct effect, indirect effect and induced effect, as well as output multiplier, income multiplier and employment multiplier, will be defined. This section also deals with the construction of a tourism-based input–output model and methods of dealing with the surveyed data. Sectoral output, income and employment multipliers for Bornholm are also presented.

Section six presents the results of income and employment impacts of tourism on Bornholm. The results will not only show the actual amount of income and actual number of jobs created by tourism, they will also reveal which tourism-related sectors are the most important sectors on Bornholm. Marketing implications and policy suggestions are presented in Section seven. This aims to evaluate the tourism-related sectors or tourist activities from two perspectives, i.e. from the income perspective and the employment perspective. The results aim to help policy makers consider which tourist activity should be further developed on the island. Finally, conclusions are presented in Section eight, highlighting the principal findings for tourism on Bornholm. Areas covered include gross tourist revenues, personal income and employment generated by tourism in 1997.

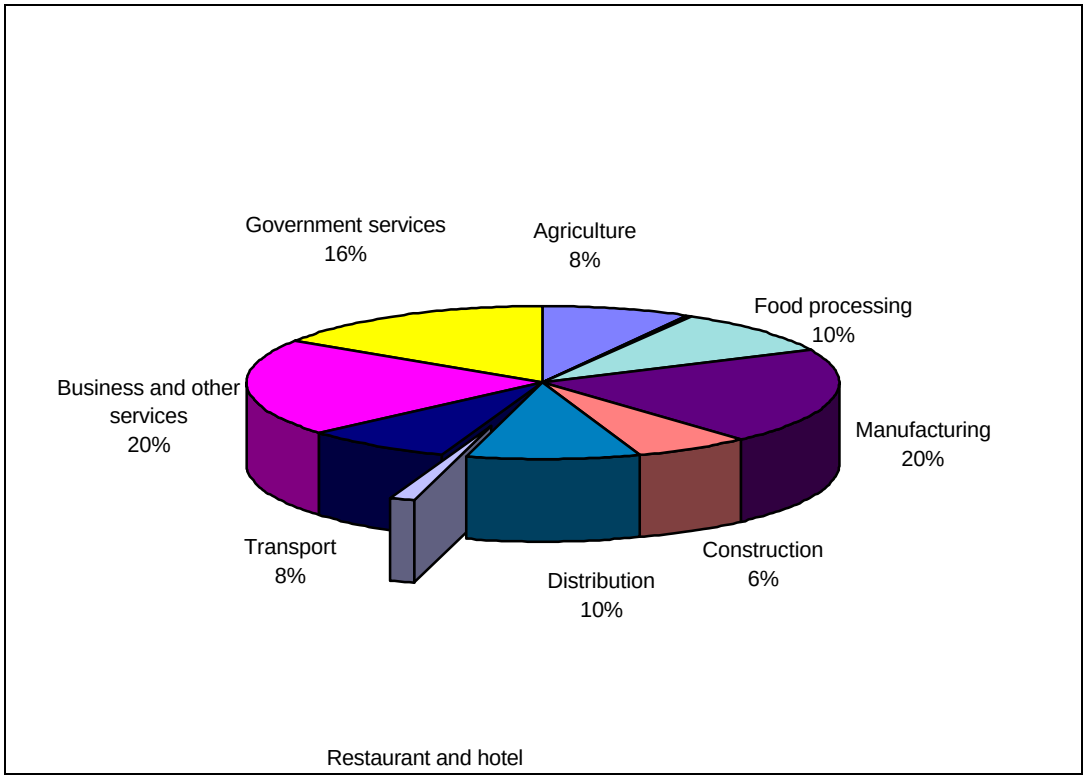
2. Economic and employment overview of Bornholm

A general overview of the economic and employment structure of, and the part tourism plays on, Bornholm will be presented in this section. Bornholm has an area of 588.4 square kilometres, which accounts for 1.37 percent of Denmark's total area (see Table 34 in Appendix 1). Bornholm's population, however, only accounts for 0.85 percent of the total, showing that Bornholm is less densely populated than the average for Denmark. It can also be seen that gross output and gross factor income on Bornholm are about 0.7 percent of the national total in 1997, which is lower than the share of population. Compared with the economic and employment structure across the whole of Denmark, Bornholm's economic foundation is rather weak. This is indicated by the share of the main sectors in Bornholm's gross output. Questions raised here are, should Bornholm be developing tourism in the future? What part does tourism play in the local economy? What economic consequences will tourism bring to Bornholm? Will tourism be creating employment for the local community? The answers to these questions are found in the sections below.

2.1 Economic structure on Bornholm

Figure 1 shows the average share of gross output by sector in Denmark during 1988-1996: agriculture accounted for 8 percent, food processing 10 percent, manufacturing 20 percent, construction 6 percent, distribution 10 percent, etc. In addition to the sectors visible in the figure, the fishing sector has also been calculated - but at only 0.3 percent of the total gross output, it is too small to be displayed.

Figure 1. Average share of gross output by sector in Denmark, 1988-1995

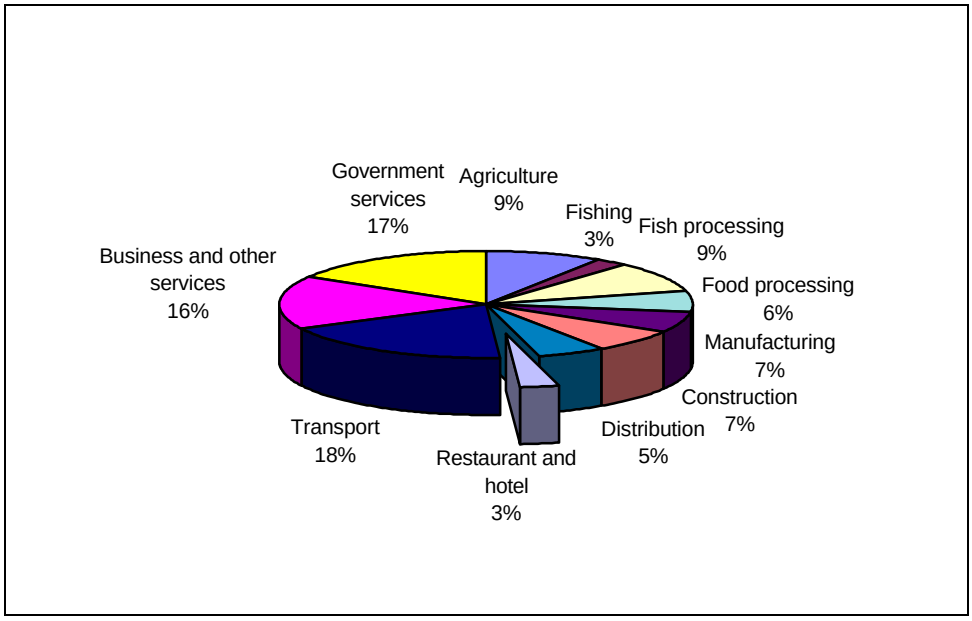


Source: Calculation is based on fixed price production value data from Statistics of Denmark.

Figure 2 shows the average share of gross output by sector on Bornholm. From the figure it can be seen that Bornholm's share of production in the agriculture and food processing sectors were slightly higher; however, the share of the fishing industry was much higher than across the whole of Denmark. It should be noted that the fishing industry is included in the agriculture sector and fish-processing is included in the food-processing sector in Figure 1 because of the smaller numbers. The output share of the manufacturing sector was very low on Bornholm, accounting only for 7 percent of regional output.

The average share of distribution was also lower than the national average; however, the transport sector accounted for 18 percent of the total regional output, with sea transport accounting for 15 percent.

Figure 2. Average shares of gross output by sector on Bornholm, 1988-1995

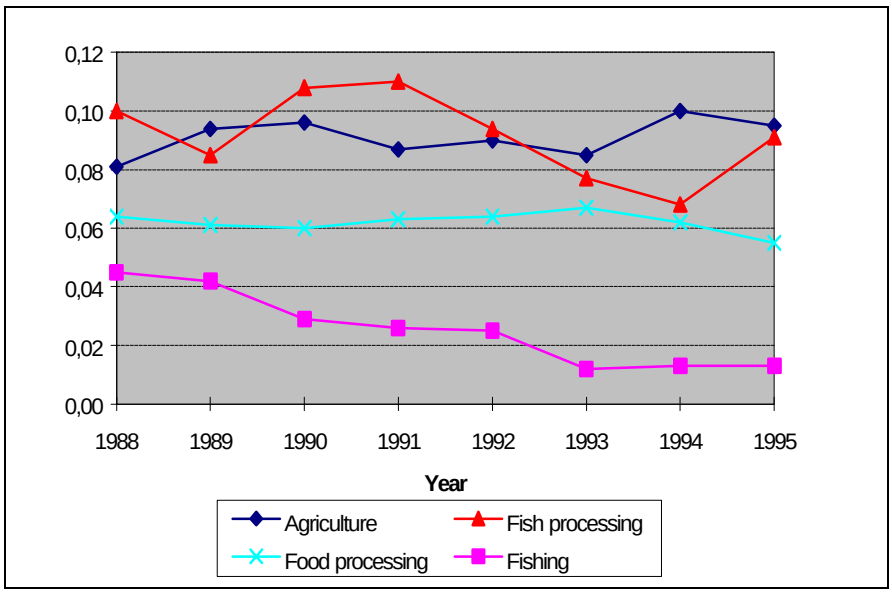


Source: Calculation is based on the production value at a fixed price. The regional data are from AKF, Denmark.

A time-series trend is presented in Figure 3 for the changes of output shares in primary and basic manufacturing sectors on Bornholm during 1988-1995. It shows that agriculture accounted for 8-10 percent of the gross output, fluctuating very little in the period. The share of the fishing industry dropped tremendously from 4.5 percent in 1988 to 1.3 percent in 1995. The output of the fish-processing industry varied within the range of 7-11 percent. Similarly, the output of the food-processing industry seems to be quite stable, accounting for 6.5 percent on average.

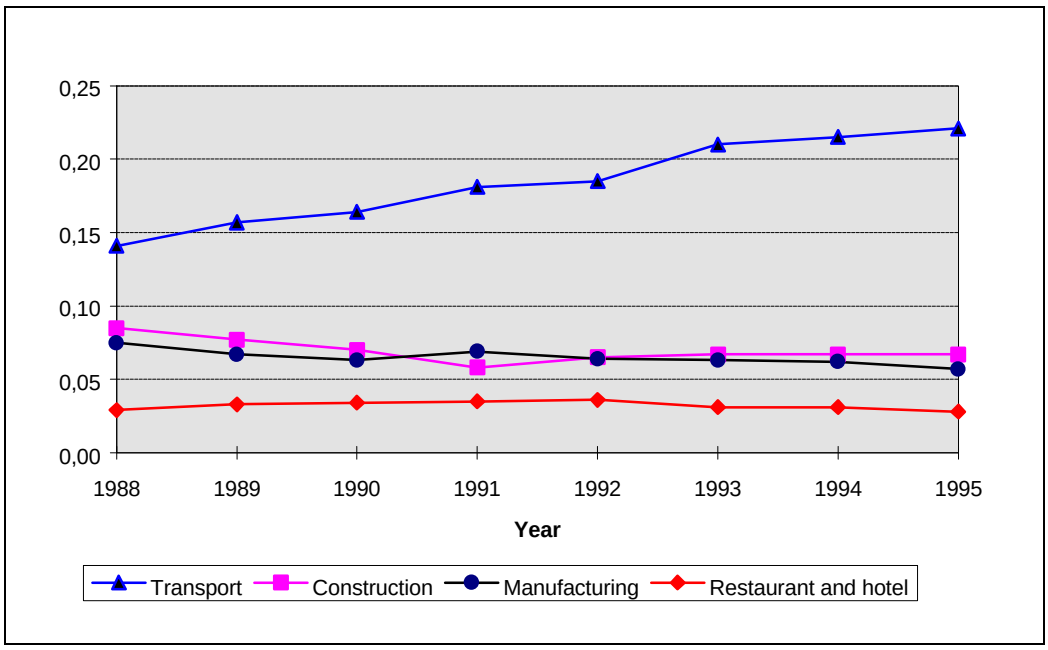
The decline in the shares of primary sectors reflects a general trend in the EU countries, as the agriculture and fishing sectors have relied heavily on subsidies thanks to the EU's agricultural policy. These sectors face severe competition from countries both in- and outside the EU when new members enter the Union.

Figure 3. Changing shares of gross output in primary sectors on Bornholm



Source: Regional data are from AKF, Denmark. The calculation is also based on a fixed price.

Figure 4. Changing shares of gross output in selected sectors on Bornholm



Source: Regional data are from AKF, Denmark. The calculation is also based on a fixed price.

Manufacturing industry on Bornholm is fragile for historical reasons, as is indicated in Figure 4**,** where it accounts for about 6-7 percent in 1988-1995. The share of construction in gross output has declined continuously in the period 1986-1991, and has been stagnating at 6.5 percent from 1992. The restaurant and hotel sector on Bornholm accounts for about 3 percent of the total regional output.

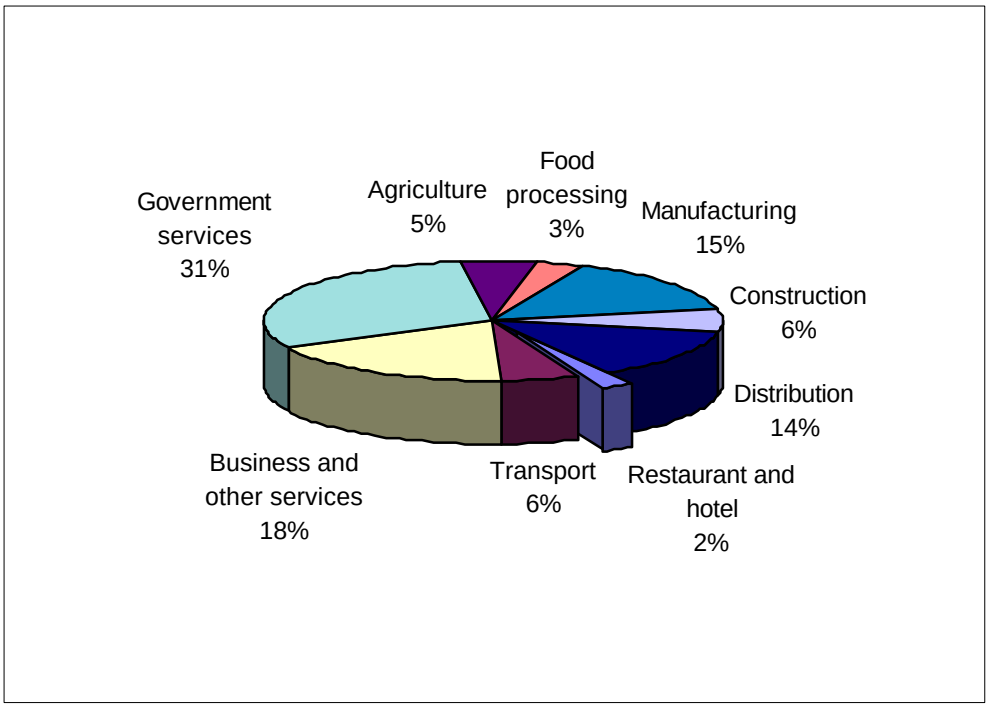
2.2 Employment structure on Bornholm

Table 34 in Appendix 1 also shows employment in both Denmark and Bornholm in 1997. The number of employed persons on Bornholm accounted for 0.77 percent of the national total, which is lower than its share of population. This section will show the employment structure by main sectors in Denmark and Bornholm.

Figure 5 shows the average employment shares by sector across Denmark. From the figure it can be found that agriculture, including fishing and extraction of raw materials, accounted for only 5 percent of total employment in Denmark, food processing, including fish processing, for 3 percent of the total employment in Denmark, while manufacturing accounted for 15 percent, construction 6 percent, distribution 14 percent and government and other services 31 percent in the period 1988-1995. Looking at the employment shares on Bornholm in Figure 6, the average share of employment in agriculture accounted for 8 percent of the total employment on Bornholm. The fishing industry accounted for 2 percent, fish processing 6 percent, and food processing 3 percent, giving a total share of 19 percent in the primary and basic manufacturing sectors. This is much higher compared with the same sectors (8 percent) in the country as a whole. However, the share of employment in the manufacturing sector accounted for only 8 percent, matching its share of gross output, which is much lower than the average share in Denmark. Distribution, accounting for 9 percent of the total employment on Bornholm, is lower than the average (14 percent) in Denmark. Employment in the public sector (33 percent) is slightly higher than the national average. If the employment share of the public sector is added to the business and other services sector, 47 percent of the labour force on Bornholm can be considered to be employed in the service sector.

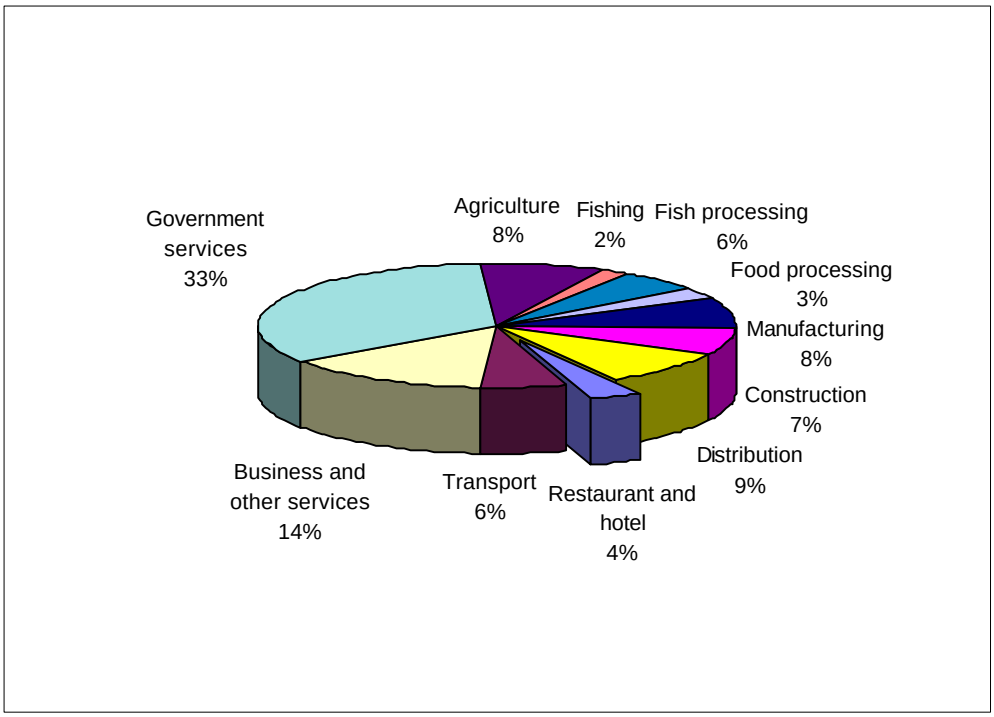
Looking at employment on Bornholm over time shows that the share of employment in the business and other services sector dropped from 22 percent of total employment during 1980-1987 to 20 percent during 1988-1990, and further to 15-16 percent during 1993-1995. Employment in manufacturing remains at around 7-8 percent, while employment in construction decreased from 9 percent to 6 percent during 1980-1995. During the same period the share of employment in the restaurant and hotel sector has been around 3-4 percent of total employment, which matches the share of its output in the local economy.

Figure 5. Average share of employment by sector in Denmark, 1988-1995



Source: Calculation is based on data from Statistics of Denmark.

Figure 6. Average share of employment by sector on Bornholm, 1988-1995



Source: Calculation is based on regional data from AKF, Denmark.

2.3 Tourism development on Bornholm

The above two sub-sections have described the economic and employment structure on Bornholm compared with the situation in the entire country. Even though the shares of both gross output and employment in the restaurant and hotel sector and other tourism-related sectors are small, an increase in the number of tourists visiting the island of Bornholm will still have great significance for the local economy. This presumption can be supported by two kinds of facts. The first is shown in Table 34 in Appendix 1, i.e. the gross output in the hotel and restaurant sector on Bornholm accounted for 1.44 percent of the total national output in this sector in 1997. This is much higher than both the population share (0.85 percent) and the output share (0.7 percent) of Bornholm. This means that the hotel and restaurant sector on Bornholm plays a more important role than that for Denmark as a whole. The second fact is described below in the sections dealing with the impact studies. Tourist expenditure on Bornholm will not only generate turnover, employee income and employment in the hotel and restaurant sector and other tourism-related sectors, it will also create more output, income and jobs in other sectors in the local economy through its indirect and induced effects.

The concepts concerning tourism impacts and input–output modelling will be presented in Section 4. This section will focus on tourism development on Bornholm, which is analysed by passenger flows by both ferry and airline, plus visitor overnight trends on the island over the past decades. As there is no information on tourist flows to the island, passenger flows can be used to show the trend in tourism development on the assumption that the comings-and-goings of residents are constant. Apart from this, visitor overnight information is also a good indictor of tourism development.

Figure 7 shows ferry passenger flows to Bornholm over the past 28 years. Apart from a peak period during 1990-1992 resulting from the German unification, the general trend is that ferry passenger numbers to Bornholm have been growing gradually. A linear regression analysis based on the passenger data for 1970-1997 has estimated that passenger numbers on average are increasing annually by 30 000 people. However, airline passenger flows to Bornholm presented in Figure 8 have shown quite a stable trend compared with ferry passenger flows. During the period 1978-1996, the average number of airline passengers per year was around 90 000 persons, with the lowest number being 71 400 in 1983 and the highest number 112 700 in 1979.

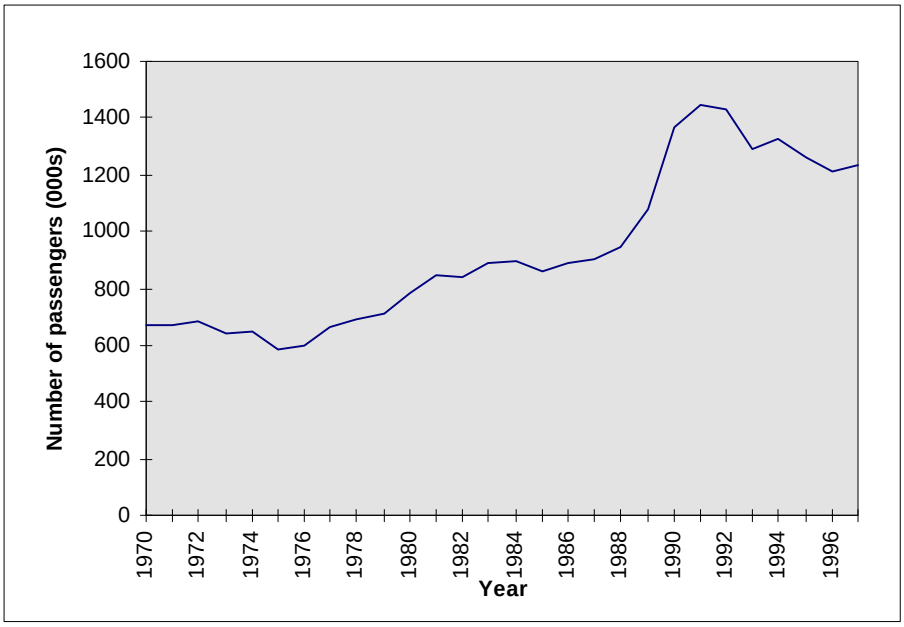
Figure 9 shows the index of ferry passenger flows and the index of total overnights on Bornholm in the period 1970-1997. By way of comparison it is seen that overnights by accommodation follow the same trend as ferry passenger flows.

Figure 10 shows visitor overnights on Bornholm by accommodation. The peak in ferry passenger flows during 1990-1992 helped produce the large increase in overnights in holiday cottages. Overnights in hotels and campsites in that same period also increased to a certain extent. Looking at the data more specifically we shall find that, in the peak year, i.e.1991-1992, the increase in overnights was caused mainly by German visitors, and not by domestic visitors. The number of overnights spent in hotels by foreign (mainly German) visitors increased by 16 percent in 1991-1992 compared with 1990. And the overnights spent in hotels by Danish visitors decreased by 10 and 20 percent respectively in 1991 and 1992 compared with 1990. The number of overnights spent in campsites increased by 55 percent in 1991-1992 for foreign visitors and by 12 percent for Danish visitors compared with 1990.

In the same way the number of overnights spent in youth hostels by foreign visitors increased by 14 and 22 percent in the years 1991 and 1992, but overnights spent in youth hostels by Danish visitors dropped a little in 1991 and increased by only 5.6 percent in 1992. The most striking increase in overnights relates to holiday cottages. Here foreign visitor overnights rose by 79 and 131 percent in the years 1991 and 1992; the increase among Danish visitors was large, up by 138 and 53 percent respectively in 1991 and 1992. However, a huge drop of 52 percent in the number of Danish overnights was found in 1990 compared with 1989, therefore we should compare the number of overnights in the peak years with the number in 1989. 1989 is set as a base year: the number of overnights spent in holiday

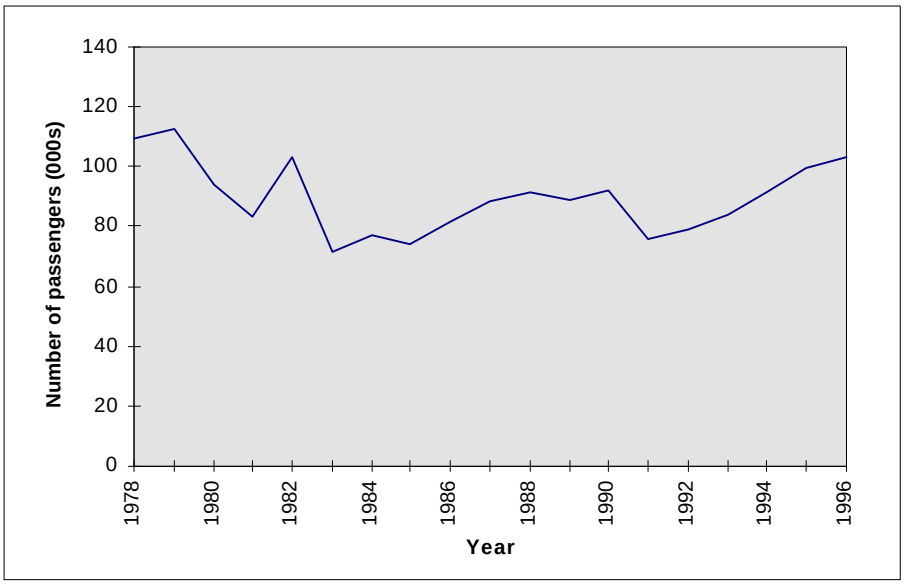
cottages by Danish visitors increased by only 16 percent in 1991 and was reduced by 26 percent in 1992.

Figure 7. Ferry passenger flows to Bornholm, 1970-1997



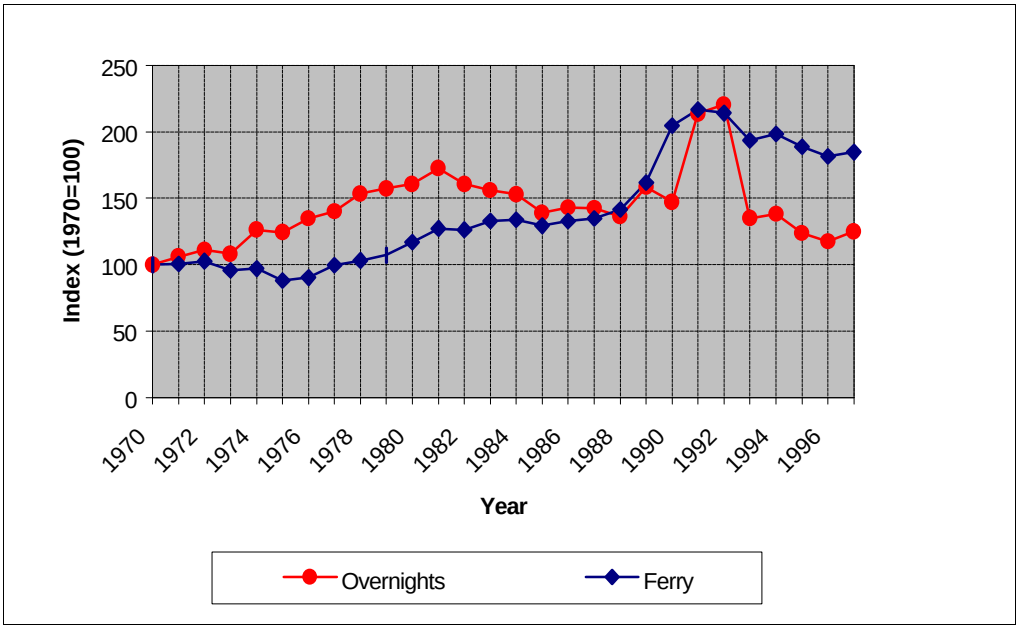
Source: BornholmsTrafikken and Statistics of Denmark: Samfærdsel og Turisme.

Figure 8. Airline passenger flows to Bornholm, 1978-1996



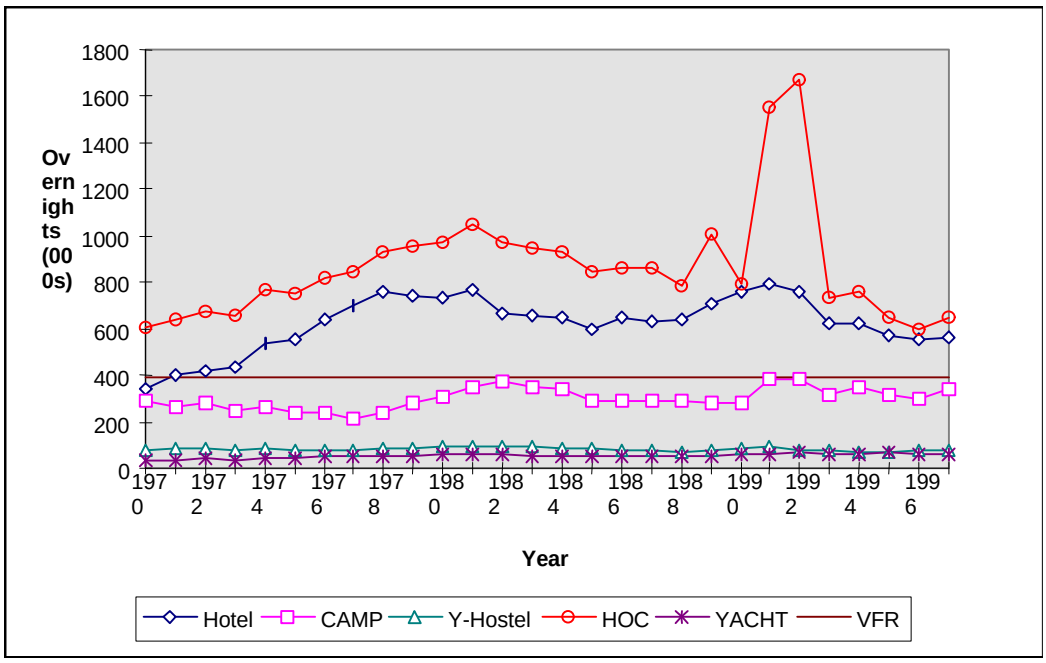
Source: Statistics of Denmark: Samfærdsel og Turisme.

Figure 9. Indices of ferry passenger flows and total number of overnights on Bornholm, 1970-1997



Source: Calculation is based on data covering ferry passenger flows and the total number of overnights on Bornholm.

Figure 10. Overnights on Bornholm by type of accommodation, 1970-1997



Note: HOC - holiday cottage; VFR - visiting friends and relatives; CAMP - camp sites; Y-Hostel - youth hostel; YACHT - overnights spent on board ship in Bornholm harbours.
Source: Data for 1970-1992 are from Thomas Rafn, 1995. Data for 1993-1997 are from Statistics of Denmark.

After the general overview of the economic and employment structure on Bornholm, which has been compared with both economic and employment structures across the whole of Denmark, it is found that the tourism sector on Bornholm has a relatively larger share than the average level in Denmark. A tourism development trend over the last 30 years indicated both by the passenger flows to Bornholm and visitor overnights on Bornholm shows that tourism has played a more important role in recent years than before. The conclusion from this section is that tourism should be one of the key sectors on Bornholm. To sustain and further develop tourism on Bornholm should be taken as one of the regional policies in Denmark.

3. Visitor expenditure pattern on Bornholm

To find out how much tourists spend on different types of accommodation on Bornholm, data collected by the Research Centre of Bornholm have been used together with data from the airport and Statistics Denmark.

3.1 Survey method used by the Research Centre of Bornholm

From July 1995 the Research Centre of Bornholm has been interviewing visitors leaving Bornholm. The purpose of the survey is to be able to characterise the visitors on Bornholm.

Interviewing is carried out at the main points of exit and departure so that data collection takes place mostly on BornholmsTrafikken's ferry departures to Copenhagen, Ystad (Sweden) and Neu Mukran (Germany) and DFO's ferry departure to Saßnitz (Germany). The length of the questionnaire and terminal arrangements make it necessary for the interviewers to conduct the survey on the ferries. Costs dictate that respondents will be introduced to the questionnaire and thereafter complete it themselves, with interviewers on hand to deal with any issues that may arise.

The limited numbers of source markets for Bornholm indicate that the working sample size need not be large. But the paucity of information about visitors to the island commended a strategy of over-sampling so as to ensure results that were robust. A pilot questionnaire was run among tourists visiting the island by ferry in early June with a sample of 50 respondents. A target of 3000 visitor contacts (departures) per year was set, with a screening questionnaire to filter out local residents. It was anticipated that the chosen method of interviewing would lead to some wastage in the form of unusable returns, but this could be accommodated within the target.

The questionnaire used (see Appendix 2) includes the following as objectives of the enquiry:

- demographics: the profile and characteristics of visitors;
- communication: awareness and influences on the decision to visit;
- organisation: channels for arranging the visit;
- behaviour: what visitors do on the island;
- attitudes: what visitors think about their experiences on Bornholm;
- expenditure: how much do visitors spend on the island?

The main results of the survey are presented in reports published from the centre on a yearly basis.

In this report the data collected in the period January 1997 - December 1997 are used. In total around 2000 respondents (holidaymakers, business travellers, people combining holiday with visiting friends and relatives, etc.) were interviewed in 1997. The following tables are based on these data

3.2 Expenditure questions

Visitors to Bornholm are asked among other things to specify how much money they have spent on the island and on which items (see Q28 in Appendix 2).

Category 2 represents how much the tourists have spent on accommodation. Each amount of money covers only one person if the person is travelling alone but two or more persons if the size of the party is more than one.

3.3 Spending in different types of accommodation

By using the amount of money spent on accommodation, together with data covering party sizes and the number of visitor nights spent on the island, it is possible to calculate the average spending per person on different types of accommodation.

- $E_{acc,pp}$ = expenditure on accommodation per party
- VN_{pp} = number of visitor nights spent per party
- P_{vp} = number of visitors per party

Average spending per person per visitor night

$$Ea_{pp} = \frac{\sum E_{acc,\,pp}}{\sum VN_{pp} * P_{vp}} \quad (1)$$

In the questionnaire (enclosed as Appendix 2) the respondents are asked about their nationality, what kind of accommodation they have used during their stay and the name of the accommodation.

By using the results of these questions the average amount of money spent per person can be divided into nationalities and type of accommodation (Table 1). Because visitors have also stated the name of their hotel, it is possible to classify the hotels into different groups dependent on their size.

Table 1. Average accommodation expenditure per person per day, 1997

DKK

	Denmark	Sweden	Germany	Others	Average
Holiday centres	138	167	124	159	135
Hotels +85	220	231	353	465	314
Hotels 40-85	201	360	254	113	237
Hotels <40	239	148	-	-	231
Youth hostels	150	120	116	-	144
Camping	63	68	52	61	58
Holiday cottages	127	102	125	139	126
Average	***116***	***154***	***123***	***140***	***124***

Note: Blanks mean no registered users of this category.

Visitors staying in large hotels with more than 85 beds spent the most on accommodation per day while people using a campsite spent the least. On average people from Sweden spent the most per day while people from Denmark spent the least.

Table 2 shows the spending in the different kinds of accommodation as index numbers. Average spending equals 100.

Table 2. Average accommodation expenditure per person per day (index), 1997

DKK, Index: average spending=100

	Denmark	Sweden	Germany	Others	All
Holiday centres	119	108	101	114	109
Hotels +85	190	150	287	332	253
Hotels 40-85	173	234	207	81	191
Hotels <40	206	96	-	-	186
Youth hostels	129	78	94	-	116
Camping	54	44	42	44	47
Holiday cottages	109	66	102	99	102
***Average*[1]**	100	100	100	100	100

Notes: 1. Average by each nationality.
Blanks mean no registered users of this category.

The table clearly shows that tourists staying in large hotels spend a lot of money on accommodation. These visitors spent more than twice as much on accommodation as the average tourist. Tourists using campsites as accommodation spent half as much as the average tourist.

3.3.1 Number of visitor nights

Data collected by the research Centre of Bornholm together with data from Danish Statistics on the ferry traffic between Bornholm and Denmark/Germany can be used to estimate the total number of visitor nights taken on Bornholm.

Table 3. Number of overnights per year, 1997

(000s)

	Denmark	Sweden	Germany	Others	Sum
Holiday centres	125	33	47	22	227
Hotels +85	75	37	90	19	221
Hotels 40-85	40	20	49	10	119
Hotels <40	27	3	16	-	46
Youth hostels	47	16	7	6	76
Camping	141	49	120	31	341
Holiday cottages	411	29	866	60	1366
Sum	***866***	***187***	***1195***	***148***	***2396***

Note: Blanks mean no registered users of this category.
Source: Statistics of Denmark and Research Centre of Bornholm.

In total about 2.4 overnights are spent per year in holiday centres, hotels, youth hostels, campsites and holiday cottages on Bornholm. Visitors from Germany account for half the total number of visitor nights and Danes account for 36 percent. More than half the overnights take place in holiday cottages and Germans in particular prefer this form of accommodation.

Table 4. Number of overnights per year (percentages), 1997

	Denmark	Sweden	Germany	Others	All
Holiday centres	14	17	4	15	9
Hotels +85	9	20	8	13	9
Hotels 40-85	5	11	4	7	5
Hotels <40	3	2	1	-	2
Youth hostels	5	9	1	4	3
Camping	16	26	10	21	14
Holiday cottages	48	15	72	40	58
Sum	100	100	100	100	100

Note: Blanks mean no registered users of this category.

3.3.2 Total spending on accommodation

By multiplying Table 1 and Table 3 the total amount of money spent per year by Danes, Swedes, Germans and others in different types of accommodation can be calculated.

Table 5. Total accommodation expenditure in 1997

DKK (000s)

	Denmark	Sweden	Germany	Others	Sum
Holiday centres	17 250	5 500	5 850	3 500	32 100
Hotels +85	16 500	8 550	31 750	8 850	65 650
Hotels 40-85	8 000	7 200	12 450	1 150	28 800
Hotels <40	6 450	450	3 700	-	10 600
Youth hostels	7 050	1 900	800	850	10 600
Camping	8 900	3 350	6 250	1 900	20 400
Holiday cottages	52 200	2 950	108 250	8 350	171 750
Sum	***116 350***	***29 900***	***169 050***	***24 600***	***339 900***

Note: Blanks mean no registered users of this category.

In 1997 tourists on Bornholm spent DKK 340 million on accommodation. Half of this amount was spent on holiday cottages. German visitors in particular spend a lot of money on holiday cottages. Large hotels also contributed with a great amount of money.

Table 6. Total accommodation expenditure in 1997 (percentages)

	Denmark	Sweden	Germany	Others	All
Holiday centres	15	18	4	14	9
Hotels +85	14	29	19	36	19
Hotels 40-85	7	24	7	5	8
Hotels <40	6	2	2	-	3
Youth hostels	6	6	*	3	3
Camping	8	11	4	8	6
Holiday cottages	44	10	64	34	52
Sum	100	100	100	100	100

Notes: * means less than 0.5%.
Blanks mean no registered users of this category.

In total Bornholm has around 36 000 beds for visitors (Table 7). Holiday cottages are the dominant type of accommodation but campsites also have room for many visitors.

Table 7. Types of accommodation, stock and average number of beds, 1997

Accommodation	Stock	Average number of beds	Total number of beds	Percentages
Hotels with less than 40 beds	28	22	627	2
Hotels with 40-85 beds	31	58	1 804	5
Hotels with more than 85 beds	20	141	2 819	8
Holiday centres	8	378	3 024	8
Youth hostels	8	123	984	3
Camping sites	19	424	8 056	22
Holiday cottages	3 742	5	18 710	52
Total	-	-	36 270	100

Source: Statistics of Denmark and Research Centre of Bornholm.

Different kinds of accommodation attract different types of tourists. From the tables in Appendix 3 the following can be seen:

- The small hotels are mainly visited by middle-aged German couples who return year after year and are very satisfied with the accommodation.
- The medium and large hotels attract business travellers and singles and couples on short-break holidays from (other parts of) Denmark, Sweden, Germany and *other countries*. The medium and large hotels have comparatively many first time visitors with a high expenditure per day.
- The campsites on the island also attract many singles and couples; the majority of the visitors are repeat visitors from Denmark with a low expenditure per day.
- Mostly families visit the holiday centres on Bornholm on short break holidays; more than half the visitors only stay for 1-3 nights. They are mainly repeat visitors from Denmark and Germany.
- Germans are the typical guests in the holiday cottages. Most of the visitors are families and couples with a long average stay who have been to Bornholm before.

- The youth hostels mainly attract small party sizes, i.e. singles and couples. The guests are Danes who have visited the island before and stay for a short period of time.

3.4 Spending on different items

As can be seen in Q29 in Appendix 2 respondents are not only asked to state how much money their party spent on accommodation but also to say how much they spent on food and beverages, transport, shopping, etc. By using an equation like (2) it is possible to estimate how much money the visitors spent on restaurants, public buses and ferries, tourist buses and taxis, museums and attractions.

- T_{sj} = total expenditure on sector j per year
- N = number of visitors per year
- $E_{sj,vt}$ = expenditure on sector j per visitor per trip
- $E_{sj,vd}$ = expenditure on sector j per visitor per day
- A_v = average length of stay per visitor

$T_{sj} = E_{sj,pt} * N = E_{sj,ppd} * A_v * N$ (2)

3.4.1 Restaurants

The category *food and beverages* includes not only money spent in restaurants but also shopping in supermarkets, kiosks, etc. To estimate how much an average tourist spent per day on food and beverages only people who have stated they have been eating out are included. This means that people who have stayed in a holiday cottage, buying all their food in the local supermarket, are not included but people who have stayed in a youth hostel, been at a restaurant once but bought the rest of their food in the supermarket are included. It is important to be aware of this estimation since the amount of money spent on restaurants per tourist per day could be too high.

3.4.2 Public buses

Visitors are asked to state how much they have spent on transport in total. It is not possible to separate money spent on public buses from money spent on rented cars. In another question visitors are also asked to say which modes of transport they have been using during their stay.

To estimate the spending per day on public buses, people who have been using them are selected. This means that money spent on, say, rented bikes will also be included in the make ups. Again this could mean that the estimate is too high. On the other hand, the amount of money spent on public buses may only cover one person from a family. In the calculations the amount is assumed to include the whole party. This pulls spending per person per day in the other direction.

3.4.3 Taxis

The estimation takes place in the same way as described above, except that the database here is those tourists who have used taxis during their visit to the island, and the same reservations have to be made. The result of the estimation is adjusted according to interviews with people employed in this sector.

3.4.4 Attractions and museums

In Q28 in Appendix 2 visitors are asked to say how much they had spent on entertainment. In the questionnaires they are also asked to mark which attractions or museums they had visited. To estimate how much a tourist spent on average per day on attractions/museums, only visitors to attractions or museums with an entrance fee are included in the base.

If a tourist has been visiting an attraction or museum with an entrance charge, the money he has inserted in category 4 in Q28 in Appendix 2 is reckoned as money spent on attractions or museums. The tourist could of course have visited both an attraction and a museum. This will mean double accounting because of the method used.

3.4.5 Ferry

The people interviewed on the ferry were also asked about the amount of money spent *per party* on the ticket. The average amount of money spent per party from different countries can be calculated.

3.4.6 Shopping

Category 5 *(general shopping)* is the base for these calculations together with the tourists who mention they have been shopping during their visit.

The results of the estimations are shown in Table 8.

Table 8. Average expenditure per person per trip, 1997

DKK

	Denmark	Sweden	Germany	Others	Average
Restaurants	247	212	249	316	253
Public buses	53	18	68	25	52
Taxis	66	23	-	12	25
Attractions	26	14	121	23	48
Museums	15	8	25	21	18
Shopping	39	60	68	41	53
Ferry *per party*	1 537	1 009	1 438	1 303	1 426

Note: Blanks mean no registered users of this category.

Visitors from countries other than Denmark, Sweden and Germany spend most money in restaurants. The Germans seem to be by far the most active visitors to attractions. It is more expensive to travel from other parts of Denmark to Bornholm than from Germany, Sweden and *other countries*.

Table 9. Average expenditure per person per trip (percentages), 1997

Percentages, Index: average spending=100

	Denmark	Sweden	Germany	Others	Average
Restaurants	97	84	98	125	100
Public buses	101	35	130	48	100
Taxis	264	92	-	48	100
Attractions	54	28	250	48	100
Museums	83	43	139	115	100
Shopping	74	113	129	78	100
Ferry *per party*	108	71	101	91	100

Note: Blanks mean no registered users of this category.

Compared to the average, visitors from *other countries* spent a lot of money on public transport while German visitors spent a lot of money on attractions.

The average expenditure per trip multiplied by the number of tourists on the island per year gives the total amount of money spent on restaurants, public buses, tourist bus/taxis, attractions, museums and shopping per year by tourists on Bornholm. Spending on ferries per party per trip multiplied by the number of parties travelling to Bornholm in 1997 gives the total amount of money spent on ferry tickets.

Table 10. Total expenditure per year, 1997

DKK (000s)

	Denmark	Sweden	Germany	Others	All
Restaurants	50 035	16 461	38 525	24 787	129 808
Public buses	10 652	1 407	10 526	1 990	24 575
Taxis	4 140	1 426	-	734	6 300
Attractions	5 311	1 050	18 712	1 824	26 897
Museums	3 023	603	3 870	1 617	9 113
Shopping	7 989	4 646	10 594	3 233	26 462
Ferry	104 210	28 654	77 023	37 313	247 200

Note: Blanks mean no registered users of this category.

Tourists on Bornholm spend about DKK 247 million every year on ferry transport and DKK 130 million in restaurants. In total it is Danish and German visitors who put most money into restaurants.

Table 11. Total expenditure per year (percentages)

	Denmark	Sweden	Germany	Others	Sum
Restaurants	39	13	30	19	100
Public buses	43	6	43	8	100
Taxis	66	23	-	12	100
Attractions	20	4	70	7	100
Museums	33	7	42	18	100
Shopping	30	18	40	12	100
Ferry	42	12	31	15	100

Note: Blanks mean no registered users of this category.

As can be seen from Table 11 most of the tourist money received by attractions, museums and shops comes from German visitors. The Danes spend lot of money on restaurants and transport.

3.5 Visitor expenditure by type of accommodation

The visitors on Bornholm spend in total more than DKK 810 million. The greatest amount of money is spend on accommodation (DKK 340 million) followed by the ferries (DKK 247 million) and the restaurants (DKK 130 million). The expenditure can be divided by type of accommodation. As Table 12 shows, visitors in the summer cottages spend the most in total. Visitors in the summer cottages account for 27% of the total spending by visitors. As can be seen the visitors using summer cottages, holiday centres and campsites as accommodation do not spend much money on transportation; they very often bring their own car. On the other hand the visitors staying in the hotels use both public bus and taxi.

Table 12. Visitor expenditure by type of accommodation, 1997

DKK (000s)

Category	Visitor expenditure by type of accommodation							
	HC	LH	MH	SH	YH	CMP	HOC	Total
HC	32 100	-	-	-	-	-	-	32 100
LH	-	65 650	-	-	-	-	-	65 650
MH	-	-	28 800	-	-	-	-	28 800
SH	-	-	-	10 600	-	-	-	10 600
YH	-	-	-	-	10 600	-	-	10 600
CMP	-	-	-	-	-	20 400	-	20 400
SUM	-	-	-	-	-	-	171 750	171 750
Restaurant	16 716	18 603	21 221	26 424	16 270	15 013	15 561	129 808
Public bus	346	18 737	1 280	1 824	1 453	439	495	24 574
Taxi	53	893	998	3 990	-	263	105	6 302
Attractions	5 986	6 048	3 187	2 923	2 612	2 488	3 654	26 898
Museums	1 161	3 150	1 448	855	874	714	912	9 114
Shopping	3 144	3 828	3 506	6 730	1 358	3 480	4 417	26 463
Ferry	24 905	45 451	41 076	46 725	35 980	28 428	24 636	247 201
Total	84 411	162 360	101 516	100 071	69 147	71 225	221 530	810 260

Note: HC – holiday centre; LH – large hotel; MH – medium-size hotel; SH – small hotel; YH – youth hostel; CP – campsite; and HOC - holiday cottage.

As Table 13 shows visitors in the small hotels account for much of the spending in the restaurants. The reason why the visitors in the large and medium hotels do not spend that much money on restaurants is that these types of hotels very often have their own restaurant. The money spent in these restaurants is included in the accommodation category.

Table 13. Visitor expenditure by type of accommodation (percentages)

Category	Visitor expenditure by type of accommodation							
	HC	LH	MH	SH	YH	CMP	HOC	Total
HC	100	-	-	-	-	-	-	100
LH	-	100	-	-	-	-	-	100
MH	-	-	100	-	-	-	-	100
SH	-	-	-	100	-	-	-	100
YH	-	-	-	-	100	-	-	100
CMP	-	-	-	-	-	100	-	100
SUM	-	-	-	-	-	-	100	100
Restaurant	13	14	16	20	13	12	12	100
Public bus	1	76	5	7	6	2	2	100
Taxi	1	14	16	63	-	4	2	100
Attractions	22	22	12	11	10	9	14	100
Museums	13	35	16	9	10	8	10	100
Shopping	12	14	13	25	5	13	17	100
Ferry	10	18	17	19	15	11	10	100

Note: HC – holiday centre; LH – large hotel; MH – medium-size hotel; SH – small hotel; YH – youth hostel; CP – campsite; and HOC - holiday cottage.

4. Tourism-related sectors and transaction flows

Tourism is a demand-based concept and a single tourism sector does not exist in any national accounting system. However, a tourism impact study using an input–output model will be concerned with the sectors which are relevant to tourism. This section deals with the definition of tourism-related sectors, interviews with tourism-related businesses on Bornholm and the linkages between the tourism-related sectors and other economic sectors. The results of the interviews will be presented and analysed in section 4.2.

4.1 Tourism-related sectors

What is a tourism-related sector?

A single tourism industry or sector does not exist according to the Standard Industrial Classification (SIC) code. This is because SIC categorises an industry according to the goods/services it produces. This is also because tourism is a demand-based concept and the commodities or services demanded by visitors classify the tourism industry. As tourists consume a variety of goods and services (for example, tourists spend their money on hotels, restaurants, varied means of transportation and other services, as well as on tourism attractions, shopping, souvenirs and tourist agencies, etc.) these goods or services are spread across several industries according to SIC classifications. Therefore, we use *tourism-related sectors* to define those sectors within a certain industry which are most relevant to tourism. The degree of tourism-generated activity is different in the different tourism-related sectors according to their relevance to tourism. Generally speaking, accommodation and catering sectors receive a higher percentage of tourist revenue than other sectors. Recreational, cultural and travel services can also generate high revenue from tourism. Transport services have a different percentage of tourism revenues according to types of transportation and retail distribution has the least revenue generation from tourism.

Accommodation

Accommodation comprises many different types of establishments: hotels, motels, guest houses, holiday centres, youth hostels, farm houses, bed and breakfast establishments, campsites, caravan sites, and holiday cottages, etc. These types of accommodation provide customers with different levels of service according to their features and their business targets. Within the same type of accommodation, service levels can be very varied, as shown by the star rating system for hotels: the level of service is very different between a five-star hotel and a three-star hotel. The degree of tourism revenue depends on services provided by an establishment in addition to the provision of rooms, which may include breakfast, restaurants and bars, room service and portage. Most hotels have a higher service level than other accommodation types. Self-catering tourist accommodation includes rented apartments, holiday cottages, campsites and caravan sites, etc., which have a lower service level than hotels. They generate less tourist revenue than hotels in terms of a single guest.

There are also other types of tourist accommodation, which are non-commercial. These include second homes, private yachts and staying with friends and relatives. Tourists using such forms of accommodation can bring some revenue to the destination by eating out in restaurants or spending at attractions, but from the point of view of accommodation, they have the least impact on the local economy.

Catering sector
The catering sector includes restaurants, fast-food establishments, cafeterias and bars, etc. The service level varies greatly according to type of establishment and its equipment. Unlike the accommodation sectors the catering sector serves both tourists and local residents; the tourist contribution accounts for about half the revenues in the restaurants on Bornholm.

Spending on food and drink accounts for a substantial proportion of tourist expenditure but the revenue from tourism is not same for all establishments, because of the wide variety of types.

Transportation and travel services
The transport sector related to tourism comprises airlines, railways, shipping lines (both cruise lines and ferry operators), bus operators, car-rental and taxi operators. Private cars and private yachts dominate non-commercial transport means.

Travel organisers also play a role in tourism services. Travel organisers can be retail travel agents or tour operators; however, conference organisers also function as travel organisers, connected with business travel. Retail travel agents provide services directly to tourists, while tour operators mainly function as wholesalers, their holiday package being sold through retail travel agents.

Recreation or attraction sectors
The tourism attraction sector covers a variety of establishments, made up of both natural and built resources. It comprises gardens, national parks, country parks, wildlife parks, castles, ancient monuments, museums, industrial heritage sites, art galleries, theatres, theme parks, amusement parks, sports facilities, casinos, shopping malls, shops selling tourist products, etc. Apart from these *permanent* attractions there are many temporary attractions, such as events and festivals.

Indirectly related tourism sectors
The tourism-related sectors mentioned above should be called the *directly* related tourism sectors as they provide services directly to tourists. There are also sectors which do not directly serve tourists, but which are indirectly related to tourism by supplying products or providing services to the directly related tourism sectors. These sectors can include all the sectors in the economy; however, those mentioned here are closely related to it, and include the food/fish processing sectors, wholesalers and retailers, construction companies connected with repairs and maintenance, business services including banking, insurance,

auditor and marketing services, telephone communication services and household services including laundry and cleaning companies, etc.

The relationship between the directly related and the indirectly related tourism sectors is reflected through the input–output transaction table and through the multipliers that the input–output model will generate.

4.2 Interviews in tourism-related sectors on Bornholm

A general description of tourism-related sectors has been given above and the focus is now on these sectors on Bornholm. The questions asked here are: which classification is used to divide types of accommodation on Bornholm? What kinds of businesses have been interviewed? What are the survey results?

Tourism-related sectors on Bornholm

In 1997 there were 88 hotels on Bornholm. These include hotels, holiday centres and guesthouses (pensions). According to our investigation there is a bed capacity of roughly 8300 beds (about 2215 rooms and 670 flats) in the above mentioned hotels, making an average of 2.4 beds per room in the hotels and guest houses, and 5.2 beds per flat in the holiday centres. There are about 980 beds in the nine youth hostels and 2600 units (approximately 8000 beds) in the 19 campsites. Also there are 3742 holiday cottages (roughly 18 710 beds on the basis of five beds per cottage) on the island. The gross occupancy rate ranges between 20 and 24 percent for accommodation on Bornholm.[4]

Accommodation can be classified according to the rate structure, location, and type of guests, etc. For our purpose we classify it according to both type and size. Therefore, the accommodation on Bornholm can be divided into seven categories: (1) holiday centres; (2) large hotels; (3) medium-sized hotels; (4) small hotels; (5) youth hostels; (6) campsites; (7) holiday cottages. The criterion for dividing hotels is based on the number of beds available in the hotel. A hotel is considered large if it has more than 85 beds, a medium-sized hotel is one with 40-84 beds and a small hotel has below 40. Pensions, farm houses and bed and breakfast establishments are included either in the medium-sized hotel or the small hotel categories according to the number of beds they have. The difference between the hotels and holiday centres is that hotels provide more services, such as inclusive breakfast, room service, etc. Holiday centres are rented flats, some including breakfast, others not, but normally without room service. Because of these differences the revenue and employment generation from tourism is also different in the different types of accommodation.

Youth hostels, campsites and holiday cottages are divided into separate accommodation types. Youth hostels (called *vandrerhjem* in Danish) are normally used by groups of young travellers or by groups of school pupils. Normally breakfast is included when staying in youth hostels. Family travellers and groups of young people use campsites more intensi-

4 Source: Statistics of Denmark.

vely. Campsites provide a comparatively lower service level than other types of accommodation, as they do not offer breakfast to their customers. Holiday cottages are preferred by family holidaymakers, especially families with children, and they tend to stay longer at the destination than other tourists. Most holiday cottages on Bornholm are privately owned and rented out through agencies, but some are also rented out through private channels. As individual owners of holiday cottages are likely to have differing expenditures on repairs, maintenance and other operating costs, it is difficult to get data on their spending patterns. Therefore the input data for holiday cottages in the national I-O table 1990 have been taken as a reference point.

The catering sector covers quite different type of businesses. Surveys in this sector on the island mainly include two types of businesses: traditional restaurants, and fast-food establishments, i.e. pizzerias, cafeterias and bars.

The transport sector on Bornholm is a mixture of public buses, tourist buses, taxis and car rental, ferry lines and airlines; there are no railways on the island. Quite a lot of tourists bring their cars, and even though they may buy petrol on the island, as Bornholm does not produce petrol itself, this will not have a significant effect on the local economy. For the transport sector our survey covers only taxis and tourist buses.

Bornholm has a few tourist attractions which charge entrance fees and a number of free museums as well. Museums are included in the survey.

Table 14. The tourism-related business survey list

Number	HC	LH	MH	SH	YH	CP	RES*	FF	TX	MS	Total
Surveyed	5	8	6	7	5	5	15	8	5	5	68
Total	8	20	31	28	9	18	45	30	12	10	211
PCT(%)	62.5	40	19.4	25	55.6	27.8	33.3	26.7	41.7	50	32.2

Notes: HC - holiday centre; LH - large hotel; MH - medium-sized hotel; SH - small hotel; YH - Youth hostel; CP - campsite; RES - restaurant; FF - fast food establishment; TX - taxi; MS - museum. The first row of figures is the number of businesses, which have been surveyed. The second row is the total number of businesses in the category. The last row (PCT) is the percentage of each type of business surveyed.

* Restaurants here do not include restaurants within hotels.

The characteristics of the tourism-related sectors can be summarised as follows: (1) small, often family-operated businesses dominate the tourism-related sectors on Bornholm. The family operators run most medium-size and small hotels, restaurants and other catering businesses, apart from a few large hotels and holiday centres on Bornholm. This feature influences the size of the businesses, as they are normally small and medium-size businesses. (2) A variety of businesses offer different levels of services in terms of quality range, physical facilities and geographical location. Apart from the different geographical locations of hotels and restaurants on the island, these businesses provide tourists with different facilities and services, even if they belong to the same type of business. For example, some

hotels have a swimming pool, but others do not. Catering business can be a normal restaurant or a cafeteria, but also a food provider, offering ready-cooked food for private home parties. (3) The tourism-related sectors are highly seasonal. Nearly all the campsites and youth hostels on Bornholm are seasonal. Many holiday centres (88 percent), large hotels (65 percent), medium-size hotels (84 percent) and small hotels (65 percent) are also seasonal. Some catering businesses are seasonal too. (4) Profit is difficult to assess. This feature can be explained by two factors: firstly, the small family-owned businesses have comparatively limited profits; secondly, profits can not be substantial because of the seasonal characteristics of tourism on the island and the high costs of maintenance during the low season.

Questionnaire results and comparison of surveys

The questionnaire for the business survey is attached in Appendix 4. The design of the questionnaire attempts to cover all the expenditure categories found in the tourism-related businesses. The same questionnaire was designed for use with the accommodation and catering businesses. The expenditure categories include food/drink costs, other sales costs, room and kitchen variable costs, energy costs (including electricity, water, oil or gas, and heating), costs for repair and maintenance, laundry and cleaning, telephone use (including use of telephone by the guests), insurance, advertisement and marketing expenditure, and other administrative costs including auditor services. Rent expenditure is also included in the category, but is connected with another category, i.e. ownership of the building. If the company owns the building, then there is no rent paid, and this category is replaced by their loan and interest paid to the bank. One section of the questionnaire deals with salary and wage expenditure. This question is connected with the physical number of employees, including full-time, part-time and seasonal employees. Finally, taxation and other public expenditure, such as VAT and property tax, are included in the questionnaire.

We have different questionnaires for interviewing taxi and museum operators, as they may have different expenditures in their operations. In the questionnaire for taxis, we excluded costs of food/drink and sales, etc., but added some new categories, such as fuel costs, the fee for annual safety examinations, new investments (including newly purchased cars and newly installed equipment in the car). In the questionnaire for museums, the first part of the questionnaire is the same as for hotels and restaurants, as most museums run a cafeteria themselves. But because of the special expenditure connected with operating a museum, some new categories have been added, such as expenditures on research and investigation, publication, exhibitions and maintenance, etc.

The survey results for the different types of accommodation are presented in Table 16. These results were obtained by calculating the average share of the expenditures in the turnover of these establishments. From the table it can be seen that the various inputs to the different types of accommodation are different. Large hotels have a larger share of food/drink expenditure than other types of accommodation, because most large hotels have restaurants attached. They can offer customers lunch and dinner as well as breakfast. Some medium-size hotels have restaurants, but most medium and small hotels only offer

their customers breakfast, therefore the inputs of food and drink are considerably smaller. Most campsites do not offer breakfast, some have limited simple fast food, so the share of food/drink inputs in campsites is small.

Table 16 shows that some input categories in these accommodations are similar, such as expenditure on energy, cleaning and laundry in various sized hotels, marketing costs (exclusive of holiday centre), insurance (exclusive of holiday centre and large hotel), administration and auditor. Some input categories can be very different from each other, such as repair and maintenance and expenditure on kitchens and rooms. We learned from the interviews that these expenditures varied from year to year, and also among different types of accommodation. A certain hotel may invest more on construction and repair in one year, but less in another. The data we obtained are mainly from 1997, but a few interviewees gave us their average expenditure on these categories over five years.

Table 15. Hotel spending patterns on Bornholm by hotel type

Percentage of turnover

Hotel type division:	**HC**	**LH**	**MH**	**SH**	**YH**	**CMP**
Expenditures:						
Food/drink, etc.	13.9	19.4	14.6	16.3	16.2	8.2
Kiosk	7.6	1.2	0.3	0	2.9	5.7
Kitchen and rooms	3.6	1.5	7.2	2.6	3.6	3.8
Energy	7.2	4.0	5.6	7.8	5.3	6.1
Cleaning	1.5	1.4	1.7	2.3	0.8	0
Laundry	2.5	2.0	2.8	3.0	0.6	0
Repairs and maintenance	9.1	1.7	4.2	5.6	2.4	20.1
Use of telephone	1.0	0.6	1.3	0.9	0.8	0.9
Sales and marketing	1.0	3.6	3.7	3.6	4.0	4.2
Insurance	0.6	1.2	2.0	2.7	1.7	2.3
Administration	1.1	1.2	1.2	0.9	0.4	2.5
Auditor	1.1	1.1	1.8	2.5	1.3	1.7
Wages and salaries, hotel	22.8	28.1	17.5	17.1	10.8	11.8
Expenditure, total:	**73.0**	**67.0**	**63.9**	**65.3**	**50.8**	**66.9**
VAT	8.5	10.3	13.2	10.7	8.1	12.1
Property tax	2.0	1.4	2.4	1.8	1.9	2.5
Depreciation	8.1	12.0	11.8	9.4	14.6	12.1
Surplus before interest	8.4	9.3	8.7	12.8	25.6	6.4
Total:	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

The above data can be compared with the hotel spending patterns in the whole of Denmark provided by HORESTA (see Table 44 and Table 45 in Appendix 5). Compared with the data from HORESTA, the expenditure on food/drink in the large hotels on Bornholm is similar to the expenditure patterns of small or medium-size hotels in the whole of Denmark. But for the small or medium-size hotels there remain some differences in this category. However, the expenditure on wages and salaries in all the small- medium- and large-sized hotels on Bornholm is quite similar to that in the whole of Denmark. The other categories, such as expenditure on laundry, sales and marketing were quite similar. Other categories appear dissimilar because of the difference in questionnaire design.

Table 16. Restaurant analysis on Bornholm

Percentage of turnover

Restaurant type:	**Restaurant**	**Fast food**
Expenditures:		
Food/drink, etc.	39.1	35.3
Kiosk	0.8	3.7
Kitchen and rooms	2.6	3.1
Energy	3.7	3.0
Cleaning	0.1	0
Laundry	0.5	0.2
Repairs and maintenance	1.8	1.4
Use of telephone	0.4	0.3
Sales and marketing	1.6	0.8
Insurance	1.4	1.2
Administration	0.6	0.3
Auditor	1.4	1.2
Wages and salaries	19.8	17.4
Expenditure, total:	**73.8**	**67.9**
VAT	7.5	10.3
Property tax	2.9	4.6
Depreciation	6.9	8.2
Surplus before interest	8.9	9.0
Total:	**100.0**	**100.0**

The survey results for restaurants and fast food establishments are shown in Table 16. Apart from their expenditure on kiosks and sales and marketing, these two catering businesses seem quite similar to each other, with the input coefficients in the fast food estab-

lishments a little lower than in the restaurants. This shows that fast food establishments have a larger share of kiosk business, but spend less on marketing.

These survey results can be compared with the results from HORESTA listed in Table 46 and Table 47 in Appendix 5. Expenditure on food/beverages in restaurants on Bornholm is slightly higher than in Denmark as a whole. However, other categories are more similar to each other. Comparing the restaurant businesses on Bornholm with the international operating statistics (which are listed in Table 48 in Appendix 5), it shows that production costs (including both food and beverage costs) in Bornholm restaurants are higher than the international standards, but that labour costs are lower on Bornholm than the international standards.

4.3 The linkages between the tourism-related sectors and other economic sectors

Tourist revenue generated by tourism-related businesses should have an effect on a local economy through their purchasing from other sectors. In Figure 17 in Appendix 5, we use a hotel as an example to illustrate how tourist expenditure results in a series of impacts on the local economy. A hotel obtains revenue from tourists by providing them with rooms, restaurants, services, etc.; however, not all the revenue is left as profit for the hotel, as it has to purchase various inputs from suppliers in the other sectors as illustrated in Figure 17. As described above in the questionnaire, a tourism-related business (here a hotel) purchases raw materials and beverages for its restaurant, or purchases kitchenware and other commodities for rooms and kitchen usage. The goods listed here are mainly purchased through retailers and wholesalers, and may originally come from the agriculture, fish or food processing and manufacturing sectors. Even if the energy supplier sectors do not account for a large share of hotel purchasing, they are still key suppliers for the accommodation and catering sectors. Besides, repair and maintenance (i.e. construction sector) plays an important role in the hotel and restaurant operations. Household services, including laundry and cleaning, communication services, including telephones, business services including insurance, banking, marketing and auditor services are all closely related to the hotel and catering businesses.

When interviewed, the hotels, restaurants and other tourism-related businesses informed us about their spending on each main category of expenditure, such as how much they spent on food and beverages, on oil and electricity, and on insurance, telephones, etc. They also informed us broadly on where these goods and services came from (i.e. from Bornholm or from elsewhere). But they were not able to identify which exact sectors the goods (especially food and beverages) came from.

If we put all the expenditures on food and beverages into the retail and wholesale sector, this would cause problems, since distribution sectors only obtain a mark-up on the goods they have purchased from other sectors. Therefore, this expenditure has to be broken down

and shared among several other sectors as described in the figure. The way we broke the expenditure down is described below.

In the first step the shares of expenditure on food and drink were allocated among the agriculture, fishery, food-processing, fish-processing, wholesale and retail sectors, according to information on the input shares of these sectors in the regional input–output table 1995 in the column for hotel and restaurants for Bornholm. Then the data were further broken down into input shares from local sources, the rest of Denmark, and imports using the same information sources obtained from AKF. In this way expenditure on food and drink by the tourism-related businesses is taken as supplying all the primary sectors and distribution sectors. For the manufacturing sector, the survey data showed that only about 5 percent of manufacturing goods are purchased from local suppliers, therefore, the inputs of manufacturing goods from the local inputs have been re-calculated to take account of a 95 percent import share (including *imports* from other regions of Denmark). In the same way expenditure on oil, gas, electricity and telephone are divided by the share of local inputs versus that from the rest of Denmark and imports. Bornholm has no oil and gas production at all, therefore, 100 percent of its oil and gas is imported. Local suppliers mainly provide repair/maintenance (i.e. construction sector), laundry, cleaning and other household services and business services.

After breakdown into 34 sectors (i.e. 23 original other sectors plus 11 tourism-related sectors) the local input coefficients to the 11 tourism-related sectors on Bornholm are shown in Table 49 in Appendix 5. As tourism-related businesses have been surveyed, the eight sub-sectors within the hotel/restaurant sector replace the original H/R sector. Moreover, the taxi business is separated from the general transport sector, museums are separated from the general attraction sector, and holiday cottages are separated from the general residence sector. The last row in the table shows the sum of local inputs in the I-O table for Bornholm. For example, local suppliers provide 23.8 per cent of the total inputs in large hotels. In the input–output table, the column sum should add up to one, containing the inputs from local suppliers, from imports (both from other regions of Denmark and from abroad) and the other value-added inputs, including labour inputs, operating profits and various taxes. The 11 columns in the table show the shares of the inputs from local suppliers to the tourism-related businesses on Bornholm, where the sum of the total input is 1.

The input data for holiday cottages are obtained by referring to the input information for holiday cottages from the special tourism related national input–output table in 1990 from Statistics of Denmark, as it has 124 sectors including the holiday cottage sector, which was separated from the residence sector. Apart from these 11 tourism-related sectors surveyed, general shopping, public transport, ferry transport and the recreation sector (this represents general attractions) are also relevant to tourism to some extent. As general shopping, transport and attractions might have many businesses involved, we have not surveyed them to create specific sectors, therefore original data are being used in the analysis. For ferry transport (which has a specific relevance to tourism on Bornholm), we used

the same surveyed data as for the project *BornholmsTrafikken's economic and employment impacts*.[5] The data for the ferry business replace the input data of ocean transportation in the original I-O table. The retail sector represents general shopping. However, there is a problem in both the wholesale and the retail sector, since these two sectors use trade margin data to balance the basic value matrix by applying the percentage trade margins from preceding years.[6] When the income or employment coefficients are calculated based on these total margin figures, they tend to be larger than expected. Therefore, the income and employment coefficients for these two sectors are calculated by taking account of the average margin rates in the Danish wholesale and retail sectors.

5 Zhang, J. and S. Lundtorp, 1997.
6 Thage, B., 1986, p. 40.

5. Tourism multipliers and input–output modelling

Multiplier analysis is frequently used in tourism impact studies. When tourism revenue brings about changes in the local economy, an assessment is needed to estimate tourism's impacts on the local industries and the economy. Every local economy has its own characteristics in the sense that one economy can be highly dependent on imports from surrounding areas and another may depend more on its own suppliers. Generally speaking, the smaller the geographical area being considered, the higher the propensity to imports, and therefore the lower the multiplier effects for the local economy. Furthermore, the degree of linkage between the various sectors within the local economy is also relevant. Therefore, input–output modelling is used for impact studies with a focus on tourism-related sectors.

5.1 The concept of the multiplier

As the various sectors in an economy are interdependent, a change of output caused by external demand for one sector will bring changes to the other sectors in the economy. In Figure 17 we have seen the linkage between the sectors. For example, if tourists increase their expenditure on various items, e.g. they spend more money at hotels, restaurants or various kinds of attractions, this will not only affect the hotels, restaurants and attraction sectors, but it will also affect the other sectors which are suppliers to the tourism-related sectors. Moreover, the income, the employment and the government revenue within the local economy will also increase at the time when the tourism-related sectors expand their production. Thanks to the increase in income, the employees in all these sectors will consume more than before, and this will bring about an induced effect on production in all sectors in the economy.

Three concepts will be introduced here: direct effect, indirect effect and induced effect.

5.1.1 The direct effect

The direct effect of a change in tourist expenditure refers to the changes in the tourism-related sectors where the tourists spend their money at hotels, restaurants, tourist attractions, etc. The direct effect can be divided into direct output effect, direct income effect and direct employment effect. The direct output effect is normally 1, because the amount of increased expenditure (e.g. DKK 1 million) tourists spend on a tourism-related sector, will always increase the output of this sector by the same amount, i.e. DKK 1 million.

The direct income effect will be determined by the proportion of inputs attributable to wages, salaries and profits in the tourism-related sectors. Take for example the direct income effect in a hotel: if the hotel spends 25 per cent of its turnover on gross wages, the direct income effect will be 0.25. It means that, if there is an increase of DKK 1 million in the tourist revenue at the hotel, the direct gross income at the hotel will be increased by DKK 250 000. A note has to be made here: if we talk about income, we have to make clear

which income is referred to. Income can be compensation to employees, including gross wages, salaries and pension contributions. It can also refer to wages, salaries, and business profits or business depreciation. The latter should be called the gross value added.

The direct employment effect will be the number of additional persons employed directly in the tourism-related sector as a result of the increase in tourist expenditure.

5.1.2 The indirect effect

The indirect effect of a change in tourist expenditure refers to the changes in all the other sectors which are suppliers of the tourism-related sectors. For example, the food-processing sector and laundries (which belong to the service sector) are suppliers to the hotel sector. When an increase in the demand for hotel accommodation occurs, hotels will purchase more from the food processing sector and laundry businesses. In the same way the food processing sector will demand more from its suppliers (e.g. the agriculture sector) and the laundry business will demand more water from the water supply sector. This process of sectoral interaction continues until the amount of money being re-spent during each round of activity becomes negligible.

The indirect effect can also be divided into three types: indirect output effect, indirect income effect and indirect employment effect. The indirect output effect indicates that an increase in tourist expenditure will cause an increase in output in indirectly related sectors, i.e. the sectors that are suppliers, or suppliers' suppliers. The indirect income effect refers to the changes in gross income in these relevant sectors. The indirect employment effect refers to the number of jobs created in these sectors.

5.1.3 The induced effect

The induced effect can be obtained when the household sector is taken into consideration in the input–output model. This means that the household sector provides labour inputs to the other economic sectors. In return the household sector receives income as compensation for its labour and it will then consume commodities produced by other sectors. Therefore the household sector is treated just like a single economic sector. When there is an increase in the demand for hotel accommodation, it also brings an increase into other sectors. The hotels plus the other sectors will demand more labour input from the household sector, giving an increase in gross income of the employees in all the sectors and causing more consumption within the local economy. The effect additional to the direct and indirect effects (which can include output, income, employment and government revenue) caused by this re-spending of local income is called the induced effect.

There are three types of multipliers, as mentioned above. They are the output multiplier, the income multiplier and the employment multiplier.

5.1.4 The output multiplier

The output multiplier measures the ratio of the change in total output of each sector of the local economy to the initial change in tourist expenditure. The total tourism output effect means the direct output effect plus the indirect and induced output effect, showing the total changes of output in all the sectors caused by the increase in tourist expenditure. For example, if the total output multiplier in the hotel sector is two, this means that an increase of DKK 1 million in tourist spending in the local area will cause an increase of DKK 2 million of total output in the economy, of which DDK 1 million of the output increase is in the hotel sector and the other DKK 1 million is in all the other sectors.

5.1.5 The income multiplier

The income multiplier measures the change in household income throughout the economy as a result of a change in tourist expenditure. In most studies it is recommended to use gross personal income in accordance with national accounting concepts. In this report expenditure on gross wages and salaries in each business is used as gross personal income. When estimating the local income multiplier, the additional income earned by non-local employees should be adjusted by taking account of repatriated wages and salaries. Income, which is not repatriated, should remain in the analysis so that the multiplier effects created by the re-spending are reflected in the final results. The total income effect indicates the direct plus indirect and induced income effects, showing the total changes of income in all the sectors of the local economy caused by the increase in the tourist expenditure.

5.1.6 The employment multiplier

The employment multiplier measures the change in employment level with direct, indirect and induced effects from changes in tourist expenditure. Employment can mean different things depending on how it is accounted. It can be termed full-time equivalent jobs on a year-round basis, working 30 hours or more per week. It can also be the number of persons employed during the year. Because of the seasonal nature of tourism on Bornholm, most tourism-related sectors operate only during the tourism season and employment is also seasonal. The annual average full-time equivalent job is used in this analysis. Therefore, the results concerning the employment impact must be seen as based on this term.

5.2 The tourism-based input–output model

One of the major uses of input-output information, in the format of an input-output model, is to assess the effect on an economy of changes in elements that are exogenous to the model of that economy.[7] In order to assess the tourism impact on Bornholm, we made a survey study of tourism businesses on Bornholm as described in section 3.2. The purpose of constructing a tourism-based regional input–output model is to identify and assess tourism generation in terms of income and employment within the tourism-related sector in as detailed a manner as possible.

7 Miller and Blair, 1985, p. 100.

The method of constructing the local input–output table can be described as a mix of the survey-based method and the non-survey-based method. Most tourism-related sectors (there are about 12 sectors including ferry transport) are based on the surveyed data. Some tourism-related sectors, such as public transport, general attractions and general shopping, and all the other economic sectors are based on the non-surveyed data which were obtained from the regional input–output table for Bornholm provided by AKF.

On the basis of the *original* regional I-O table with 117 sectors constructed and made by AKF, the intention is to expand the tourism-related sectors and aggregate non-tourism sectors. At first the total 117 sectors are aggregated into 24 sectors, then the original hotel and restaurant sector is split up into eight sectors. The museum sector is split off from the recreation sector. The taxi sector is split off from the public transport sector, and finally the holiday cottage sector is separated from the residential dwelling sector. The name of new sectors and aggregation (or separation) keys can be found in Table 50 in Appendix 5, from which 34 sectors are listed and formed as the main sectors in the tourism-based input –output model for Bornholm.

The technical details of the regional I-O model can be described as follows, with matrix (1) representing the original I-O table:

$$
\begin{aligned}
X_1 &= Z_{11} + Z_{12} + \ldots\ldots. + Z_{1rh} \ldots + Z_{1n} + Y_1 \\
X_2 &= Z_{21} + Z_{22} + \ldots\ldots. + Z_{2rh} \ldots + Z_{2n} + Y_2 \\
&\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\
X_{rh} &= Z_{rh1} + Z_{rh2} + \ldots . + Z_{rhrh} \ldots + Z_{rhn} + Y_{rh} \qquad (1) \\
&\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. \\
X_n &= Z_{n1} + Z_{n2} + \ldots\ldots. + Z_{nrh} \ldots + Z_{nn} + Y_n
\end{aligned}
$$

where X : output value in each sector;

Z : intermediate transaction value;

Y : final demand for each sector.

Subscript with 1, 2, .. rh .. n represents each of the sectors, so that rh is the sector of hotels and restaurants (H/R).

The eight sectors (HC-holiday centres; LH-large hotels; MH-medium-size hotels; SH-small hotels; YH-youth hostels; CMP-campsites; RES-restaurants and FF-fast food establishments) are inserted in the column to replace the original H/R sector. In the same way, the columns for museums, taxis and holiday cottages are also inserted in the I-O table by

the surveyed data. The original row of the H/R sector is split into eight rows. The rows for museums, taxis and holiday cottages should also be inserted into the table, therefore, the regional I-O table is changed into matrix (2), with only two tourism-related sectors (i.e. HC and LH) inserted as an illustration:

$$
\begin{aligned}
X_1 &= Z_{11} + Z_{12} + \ldots\ldots + Z_{1hc} + Z_{1lh} \ldots + Z_{1n} + Y_1 \\
X_2 &= Z_{21} + Z_{22} + \ldots\ldots + Z_{2hc} + Z_{2lh} \ldots + Z_{2n} + Y_2 \\
&\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\
X_{hc} &= Z_{hc1} + Z_{hc2} + \ldots\ldots + Z_{hchc} + Z_{hclh} \ldots + Z_{hcn} + Y_{hc} \qquad (2) \\
X_{lh} &= Z_{lh1} + Z_{lh2} + \ldots\ldots + Z_{lhhc} + Z_{lhlh} \ldots + Z_{lhn} + Y_{lh} \\
&\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\
X_n &= Z_{n1} + Z_{n2} + \ldots\ldots + Z_{nhc} + Z_{nlh} \ldots + Z_{nn} + Y_n
\end{aligned}
$$

Dividing the row of the original H/R sector into eight rows is done according to the shares of each sub-sector's turnover based on the data in Table 17 below.

Table 17. Share of turnover by type of business

Type of business	Turnover (in million DKK)	Share (%)
HC	32.10	7.50
LH	65.65	15.35
MH	28.80	6.73
SH	10.60	2.48
YH	10.60	2.48
CP	20.40	4.77
Sub-total	168.15	39.31
RES+FF*	259.62	60.69
TOTAL	427.77	100.00

Note: Abbreviation for type of business is the same as in Table 14.

* Restaurants and fast food establishments are merged together as tourists could not be identified by which type of catering business they used. The tourists expenditure in restaurants and fast food establishments is multiplied by two as tourists accounted for half of restaurants' turnovers, while another half comes from local residents.

The share in each new sub-sector multiplied with the coefficients in the original row of the H/R sector forms the eight new rows of the hotel and restaurant sectors. The rows of museums, taxis and holiday cottages are inserted in the same way by taking account of their shares in the original rows. The tourism-based input–output table for Bornholm with 34 sectors has been constructed and used for local tourism impact studies.

5.3 The multipliers in the tourism-related sectors

Let I = the identity matrix
A = an n*n matrix of technical coefficients
X = an n*1 vector of gross output
Y = an n*1 vector of final demand

Matrix (2) can be written as

$$X = AX + Y \qquad (3)$$

or

$$(I - A)X = Y \qquad (4)$$

which can be written as

$$X = (I - A)^{-1}Y \qquad (5)$$

The coefficient matrix (i.e. A matrix) with 34 rows multiplied by 34 columns can be obtained from the local input matrix in the regional input–output table for Bornholm. The *Leontief inverse matrix* (i.e. the $(I - A)^{-1}$ matrix, which will be called the C matrix hereafter) is then calculated. Each column sum in the C matrix shows the direct plus indirect output multiplier for each sector on Bornholm. When the household sector is included in the local input matrix and the *new* Leontief inverse matrix (called the C^n matrix) is calculated, the column sum in the C^n matrix represents the direct plus indirect and induced output multiplier for each sector in the local economy. By subtracting the column sums of the C matrix from the column sums of the C^n matrix, the induced effects are obtained.

Table 18 shows the sectoral output multipliers with direct, indirect, induced and total effects for the tourism-related sectors on Bornholm. It can be seen that the attraction sector and museums have the highest total output multiplier among these 15 tourism-related sectors. The total output multipliers in the sectors of public transport, holiday centres, large hotels, taxis and ferry are also pretty high, while the output multiplier in the holiday cottage sector is the lowest. Among the other six accommodation sectors, youth hostels and campsites show comparatively lower output multipliers.

In Table 18 the percentages of the direct, indirect and induced effects of the total output effect have also been given in parentheses. It can be seen that the holiday cottage sector has the highest percentage of direct output effect among all the sectors. The direct output effects in general shopping, youth hostels and campsites are also comparatively high. The indirect output effects in the sectors of holiday centres, small hotels, camping and restaurants are comparatively high.

Table 18. Sectoral output multipliers for the tourism-related sectors, Bornholm, 1997

Sector	Direct	Indirect	Induced	Total
Holiday centres	1.00	0.34865	0.45047	1.79912
(% of total effect)	(55.6)	(19.4)	(25.0)	(100.0)
Large hotels	1.00	0.31740	0.47901	1.79641
(% of total effect)	(55.7)	(17.7)	(26.6)	(100.0)
Medium-size hotels	1.00	0.30164	0.38696	1.6886
(% of total effect)	(59.2)	(17.9)	(22.9)	(100.0)
Small hotels	1.00	0.31476	0.33704	1.6518
(% of total effect)	(60.5)	(19.1)	(20.4)	(100.0)
Youth hostels	1.00	0.26129	0.30075	1.56204
(% of total effect)	(64.0)	(16.7)	(19.3)	(100.0)
Campsites	1.00	0.29508	0.28888	1.58396
(% of total effect)	(63.1)	(18.6)	(18.2)	(100.0)
Holiday cottages	1.00	0.22928	0.13097	1.36025
(% of total effect)	(73.5)	(16.9)	(9.6)	(100.0)
Restaurants	1.00	0.30636	0.39433	1.70069
(% of total effect)	(58.8)	(18.0)	(23.2)	(100.0)
Fast food establishments	1.00	0.27987	0.33508	1.61495
(% of total effect)	(61.9)	(17.3)	(20.8)	(100.0)
Public transport	1.00	0.34212	0.50406	1.84618
(% of total effect)	(54.2)	(18.5)	(27.3)	(100.0)
Taxis	1.00	0.18775	0.5882	1.77595
(% of total effect)	(56.3)	(10.6)	(33.1)	(100.0)
Attractions	1.00	0.15972	0.7331	1.89282
(% of total effect)	(52.8)	(8.4)	(38.7)	(100.0)
Museums	1.00	0.16964	0.71688	1.88652
(% of total effect)	(53.0)	(9.0)	(38.0)	(100.0)
General shopping	1.00	0.15709	0.30291	1.4600
(% of total effect)	(68.5)	(10.8)	(20.7)	(100.0)
Ferry	1.00	0.2741	0.4837	1.7578
(% of total effect)	(56.9)	(15.6)	(27.5)	(100.0)

Source: The results are obtained from the tourism-based input–output model for Bornholm.

For the income multiplier, we have the household income input coefficient H as a row in the input–output model. The simple household income multiplier (i.e. the direct plus indirect effects) is calculated by formula (6):

$$Multiplier_H = H_{ij} \times C_{jk} = \sum_{j=1}^{n} (H_{ij} \times C_{jk}) \qquad (6)$$

where $i = 1$, $j = 1, 2, 3, \ldots\ldots n$, and k = HC, LH, MH … etc., i.e. the columns in the Leontief inverse C matrix for all the tourism-related sectors. The results from the model (6) will show the simple income multipliers for these sectors. The total income multiplier is calculated by using the relevant columns in the C_n matrix in replacement of the C matrix. In the same way, by subtracting the results of the simple income multipliers from the total income multipliers, the induced, as well as the direct and indirect income effects will be obtained.

Table 19. Sectoral income multipliers for the tourism-related sectors, Bornholm, 1997

Sector	Direct	Indirect	Induced	Total
Holiday centres	0.22462	0.10156	0.02129	0.34747
(% of total effect)	(64.6)	(29.2)	(6.2)	(100.0)
Large hotels	0.26047	0.0861	0.02271	0.36928
(% of total effect)	(70.5)	(23.3)	(6.2)	(100.0)
Medium-size hotels	0.19206	0.08798	0.01833	0.29837
(% of total effect)	(64.4)	(29.5)	(6.1)	(100.0)
Small hotels	0.15909	0.08493	0.01594	0.25996
(% of total effect)	(61.2)	(32.7)	(6.1)	(100.0)
Youth hostels	0.1500	0.06778	0.01421	0.23199
(% of total effect)	(64.7)	(29.2)	(6.1)	(100.0)
Campsites	0.1299	0.07949	0.01360	0.22299
(% of total effect)	(58.3)	(35.6)	(6.1)	(100.0)
Holiday cottages	0.0163	0.07872	0.00615	0.10117
(% of total effect)	(16.1)	(77.8)	(6.1)	(100.0)
Restaurants	0.21249	0.07292	0.01967	0.30408
(% of total effect)	(69.9)	(24.0)	(6.1)	(100.0)
Fast food establishments	0.17801	0.06459	0.01584	0.25844
(% of total effect)	(68.9)	(25.0)	(6.1)	(100.0)
Public buses	0.27812	0.10528	0.01948	0.40288
(% of total effect)	(69.0)	(26.1)	(4.8)	(100.0)
Taxis	0.3590	0.06701	0.02779	0.4538
(% of total effect)	(79.1)	(14.8)	(6.1)	(100.0)
Attractions	0.47534	0.05479	0.03482	0.56495
(% of total effect)	(84.1)	(9.7)	(6.2)	(100.0)
Museums	0.4680	0.05012	0.03412	0.55224
(% of total effect)	(84.7)	(9.1)	(6.2)	(100.0)
General shopping	0.17121	0.04942	0.01402	0.23465
(% of total effect)	(73.0)	(21.0)	(6.0)	(100.0)
Ferry	0.28247	0.07112	0.02208	0.37567
(% of total effect)	(75.2)	(18.9)	(5.9)	(100.0)

Source: The results are obtained from the tourism-based input–output model for Bornholm.

Table 19 shows the sectoral income multipliers for the tourism-related sectors on Bornholm. It can be seen from the table that the sectors of attractions, museums, taxis, public transport and ferry have the highest total income multipliers among these 15 tourism-related sectors. This is because these sectors have higher direct income effects as they attribute a higher proportion of their turnovers to wage expenditure. The holiday cottage sector has the lowest total income multiplier and the income multipliers in the sectors of youth hostels and campsites are also very low. The percentages of the direct, indirect and induced effects of the total income effect have also been given in parentheses. It can be seen that some sectors have a higher percentage of direct income effects, while others have higher indirect income effects, but they all have more-or-less the same induced effect as the consumption patterns are assumed to be similar.

The figures in Table 19 for the total income multiplier should show the total *amount* of new household income generated in the local economy through one kroner of tourist expenditure for each tourism-related sector, when all the direct, indirect and induced effects are converted into an estimate of income. For example, for every DKK 1000 of tourist

expenditure at large hotels, DKK 369 of local direct, indirect and induced income will be generated. For every DKK 1000 of tourist expenditure at restaurants, DKK 304 of local total income will be generated. The lowest income generation is at holiday cottages: for every DKK 1000 of tourist expenditure at holiday cottages, only DKK 101 of total income is generated. The highest income generation is for attractions: for every DKK 1000 of tourist expenditure spent on attractions, DKK 565 of the total income will be generated in the local economy.

For the employment multiplier, we have the physical labour input coefficients L as a row in the input–output model. The simple employment multiplier (i.e. the direct plus indirect effects) is calculated by formula (7):

$$Multiplier_L = L_{ij} \times C_{jk} = \sum_{j=1}^{n} (L_{ij} \times C_{jk}) \qquad (7)$$

where i = 1, j = 1, 2, 3, ……. 34, and k = HC, LH, MH … etc., i.e. the columns in the Leontief inverse C matrix for all the tourism-related sectors. The results from the model (7) will show the simple employment multipliers for these sectors. The total employment multiplier is calculated by using the relevant columns in the C_n matrix in replacement of the C matrix. In the same way, by subtracting the results of the simple employment multipliers from the total employment multipliers, the induced, as well as the direct and indirect employment effects are obtained.

Table 20 shows the sectoral employment multipliers for the tourism-related sectors on Bornholm. The table shows that the sectors of small, large and medium hotels have received the highest total employment multipliers among these 15 tourism-related sectors. Restaurants, fast food establishments and attractions also have high total employment multipliers. This is because of higher direct employment effects, indicating that they need more employees to generate the same amount of tourist expenditure. The holiday cottage sector has the lowest total employment multiplier as it generates the lowest direct employment effect, hence also the lowest indirect and induced employment effect among the sectors listed here. General shopping, taxis and ferry have comparatively low employment multipliers. The percentages of the direct, indirect and induced effect in the total employment effect have been given in parentheses. Some sectors have a higher percentage of direct employment effects (such as small or medium-size hotels or fast food establishments), while others have a higher percentage of indirect or induced employment effects.

Table 20. Sectoral employment multipliers for the tourism-related sectors, Bornholm, 1997

***Employment multiplier*: (per million DKK)**				
Sector	**Direct**	**Indirect**	**Induced**	**Total**
Holiday centres	1.20	0.59	0.13	1.92
(% of total effect)	(62.4)	(30.8)	(6.8)	(100.0)
Large hotels	2.13	0.57	0.14	2.84
(% of total effect)	(75.2)	(19.9)	(4.9)	(100.0)
Medium-size hotels	2.16	0.56	0.11	2.83
(% of total effect)	(76.1)	(19.9)	(4.0)	(100.0)
Small hotels	2.54	0.52	0.10	3.17
(% of total effect)	(80.3)	(16.6)	(3.1)	(100.0)
Youth hostels	1.60	0.46	0.09	2.15
(% of total effect)	(74.7)	(21.2)	(4.1)	(100.0)
Campsites	1.47	0.49	0.08	2.05
(% of total effect)	(71.8)	(24.1)	(4.1)	(100.0)
Holiday cottages	0.08	0.39	0.04	0.51
(% of total effect)	(16.1)	(76.5)	(7.4)	(100.0)
Restaurants	1.85	0.48	0.11	2.45
(% of total effect)	(75.6)	(19.7)	(4.7)	(100.0)
Fast food establishments	1.84	0.43	0.10	2.37
(% of total effect)	(77.8)	(18.1)	(4.1)	(100.0)
Public buses	1.57	0.57	0.12	2.26
(% of total effect)	(69.2)	(25.3)	(5.4)	(100.0)
Taxis	1.05	0.41	0.17	1.63
(% of total effect)	(64.3)	(25.2)	(10.4)	(100.0)
Attractions	2.01	0.28	0.21	2.50
(% of total effect)	(80.3)	(11.1)	(8.5)	(100.0)
Museums	1.28	0.30	0.21	1.79
(% of total effect)	(71.7)	(16.6)	(11.7)	(100.0)
General shopping	1.09	0.27	0.09	1.44
(% of total effect)	(75.4)	(18.6)	(6.0)	(100.0)
Ferry	1.13	0.41	0.14	1.67
(% of total effect)	(67.6)	(24.3)	(8.1)	(100.0)

Source: The results are obtained from the tourism-based input–output model for Bornholm.

The total employment multipliers shown in Table 20 measure the effects in the same way as the total income multipliers, but by using the physical labour input coefficients. The employment effects shown here suggest how many jobs are created per million kroner of new tourist expenditure. For example, for every million kroner of tourist expenditure at large hotels, 2.13 jobs will be created at large hotels and 0.57 jobs will be created in other sectors - 2.84 jobs in total will be created in the local economy. In other words, an increase in tourist expenditure at large hotels of DKK 449 000 will generate one new full-time equivalent job opportunity in the large hotels sector. In the local economy, an increase in tourist expenditure at large hotels of DKK 352 000 will generate one new full-time equivalent job opportunity for Bornholm.

6. Income and employment impact of tourism on Bornholm

We have presented the sectoral output multipliers, income multipliers and employment multipliers in the tourism-related sectors on Bornholm in the previous section. The purpose of this section is to present the results of actual income and the employment impacts of tourism on Bornholm by using the actual tourist expenditure in the various tourism-related sectors shown in Table 5 and Table 10. The results will not only reveal the actual amount of income and actual number of jobs created by tourism, but will also indicate which tourism-related sectors are the most important.

6.1 Income impacts of tourism

Table 21 shows the income impacts for the accommodation sectors on Bornholm. It shows not only the direct, indirect, induced and total income generated by tourist expenditure, but also income generated by different nationalities of visitors. It can be seen from the table that large hotels generate the highest income among the accommodation sectors.

Table 22 shows the total income impact of all the accommodation sectors, with the total direct, indirect and induced income impact, as well as the share of income impacts in each type of accommodation sector. The total income generated by tourist expenditure on accommodation on Bornholm in 1997 was DKK 71.1 million, of which DKK 38.6 million (54.2 percent) was generated in the accommodation sectors, DKK 28.2 million (39.7 percent) was generated in the other economic sectors and DKK 4.4 million (6.1 percent) was generated as a result of induced effects. We can see that large hotels accounted for the largest share in the direct, induced and total income impacts; however, holiday cottages had the largest share of indirect impacts.

Table 23 shows the income impacts for other tourism-related sectors on Bornholm. A note has to be made here: the visitor survey can provide data on tourist expenditure concerning food and beverages, but it is unable to distinguish between the catering businesses the tourists used. Therefore, we assume in the analysis that 70 percent of the expenditure went to restaurants and 30 percent of it was spent in fast food establishments. As in Table 21, direct, indirect, induced and total income generated by tourist expenditure in these categories is shown, as is income generated by different nationalities of visitors. The table indicates that the ferry business generated the highest income of all, and that catering also generated a high total income.

Table 24 shows the total income impact of all other tourism-related sectors according to their total direct, indirect and induced income impact, as well as to the share of income impacts in each type of industry. The total income generated in 1997 by tourist expenditure in these types of industries on Bornholm was about DKK 170 million, of which DKK 126.7 million (74.7 percent) was generated within these sectors, DKK 33 million (19.4

percent) was generated in other economic sectors and DKK 10 million (5.9 percent) was generated as a result of induced effects. The ferry industry accounted for the largest share in all types of income impacts and restaurants took second place. Attractions, fast food establishments and public transport have comparatively higher income generation than taxis and museums.

Table 21. Income impact for the accommodation sectors, Bornholm, 1997

DKK (000s)

Sector	Country	Direct	Indirect	Induced	Total
Holiday centres:	Denmark	3 874.7	1 751.9	367.3	5 993.9
	Sweden	1 235.4	558.6	117.1	1 911.1
	Germany	1 314.0	594.1	124.5	2 032.7
	Others	786.2	355.5	74.5	1 216.1
	All	**7 210.3**	**3 260.1**	**683.4**	**11 153.8**
Large hotels:	Denmark	4 297.8	1 420.7	374.7	6 093.1
	Sweden	2 227.0	736.2	194.2	3 157.3
	Germany	8 269.9	2 733.7	721.0	11 724.6
	Others	2 305.2	762.0	201.0	3 268.1
	All	**17 099.9**	**5 652.5**	**1 490.9**	**24 243.2**
Medium-size hotels:	Denmark	1 536.5	703.8	146.6	2 387.0
	Sweden	1 382.8	633.5	132.0	2 148.3
	Germany	2 391.1	1 095.4	228.2	3 714.7
	Others	220.9	101.2	21.1	343.1
	All	**5 531.3**	**2 533.8**	**527.9**	**8 593.1**
Small hotels:	Denmark	1 026.1	547.8	102.8	1 676.7
	Sweden	71.6	38.2	7.2	117.0
	Germany	588.6	314.2	59.0	961.9
	Others	0	0	0	0
	All	**1 686.4**	**900.3**	**169.0**	**2 755.6**
Youth hostels:	Denmark	1 057.5	477.8	100.2	1 635.5
	Sweden	285.0	128.8	27.0	440.8
	Germany	120.0	54.2	11.4	185.6
	Others	127.5	57.6	12.1	197.2
	All	**1 590.0**	**718.5**	**150.6**	**2 459.1**
Campsites:	Denmark	1 156.1	707.5	121.0	1 984.6
	Sweden	435.2	266.3	45.6	747.0
	Germany	811.9	496.8	85.0	1 393.7
	Others	246.8	151.0	25.8	423.7
	All	**2 650.0**	**1 621.6**	**277.4**	**4 549.0**
Holiday cottages:	Denmark	850.9	4 109.2	321.0	5 281.1
	Sweden	48.1	232.2	18.1	298.5
	Germany	1 764.5	8 521.4	665.7	10 951.7
	Others	136.1	657.3	51.4	844.8
	All	**2 799.5**	**13 520.2**	**1 056.3**	**17 375.9**

Source: Calculation is based on the income multipliers in Table 19 and the visitor expenditure on different types of accommodation in Table 5.

Table 22. Total income impact and share in each type of accommodation sector on Bornholm, 1997

(DKK 000s)

	Direct	Indirect	Induced	Total
All:	38 567.4	28 207.0	4 355.5	71 129.7
(% of total impact)	(54.2)	(39.7)	(6.1)	(100.0)
Share in each type of accommodation (%)				
Holiday centres	18.7	11.6	15.7	15.7
Large hotels	44.3	20.0	34.2	34.1
Medium-size hotels	14.3	9.0	12.1	12.1
Small hotels	4.4	3.2	3.9	3.9
Youth hostels	4.1	2.5	3.5	3.5
Campsites	6.9	5.8	6.4	6.4
Holiday cottages	7.3	47.9	24.2	24.3
Sum	100.0	100.0	100.0	100.0

Note: The figures for total income impacts are the sums from Table 21.

Table 25 shows the total income impact for all the 15 tourism-related sectors on Bornholm. The total income generated by tourism in 1997 was DKK 241 million, of which DKK 165 million (62.6 percent) was generated directly by these tourism-related industries and DKK 75.6 million (37.4 percent) was generated indirectly by other economic sectors. The share in total income impact of each sector shows the importance of that business in terms of income generation from tourism and demonstrates that the ferry is the most important industry on Bornholm, since it received 39 percent of the total income created by tourist expenditure in 1997. The catering industry (restaurants and fast food establishments together) is the second most important and the large hotel sector is the third most important tourism-related business. Attractions and holiday cottages are more important than the remaining sectors, leaving youth hostels, small hotels and taxis as the least important businesses in terms of income generated by tourism.

Table 23. Income impact for other tourism-related sectors, Bornholm, 1997

DKK (000s)

Sector	Country	Direct	Indirect	Induced	Total
Restaurants	Denmark	7 436.9	2 552.1	653.4	10 642.5
	Sweden	2 446.6	839.6	215.0	3 501.2
	Germany	5 726.2	1 965.0	503.1	8 194.3
	Others	3 684.2	1 264.3	323.7	5 272.1
	All	**19 293.9**	**6 621.1**	**1695.2**	**27 610.2**
Fast food	Denmark	2 676.0	971.0	238.1	3 885.1
	Sweden	880.4	319.5	78.3	1 278.2
	Germany	2 060.3	747.6	183.3	2 991.2
	Others	1 325.6	481.0	118.0	1 924.6
	All	**6 942.4**	**2 519.0**	**617.8**	**10 079.2**
Public buses	Denmark	2 962.5	1 121.4	207.5	4 291.5
	Sweden	391.3	148.1	27.4	566.9
	Germany	2 927.5	1 108.2	205.0	4 240.7
	Others	553.5	209.5	38.8	801.7
	All	**6 834.8**	**2 587.3**	**478.7**	**9 900.8**
Taxis	Denmark	1 486.2	277.4	115.0	1 878.6
	Sweden	512.0	95.6	39.6	647.3
	Germany	NA	NA	NA	NA
	Others	263.5	49.2	20.4	333.1
	All	**2 261.7**	**422.2**	**175.1**	**2 858.9**
Attractions	Denmark	2 524.5	291.0	184.9	3 000.4
	Sweden	499.1	57.5	36.6	593.2
	Germany	8 894.6	1 025.2	651.6	10 571.3
	Others	867.0	99.9	63.5	1 030.5
	All	**12 785.2**	**1 473.7**	**936.6**	**15 195.5**
Museums	Denmark	1 414.8	151.5	103.1	1 669.4
	Sweden	282.2	30.2	20.6	333.0
	Germany	1 811.2	194.0	132.0	2 137.2
	Others	756.8	81.0	55.2	893.0
	All	**4 264.9**	**456.7**	**310.9**	**5 032.6**
Shopping	Denmark	1 367.8	394.8	112.0	1 874.6
	Sweden	795.4	229.6	65.1	1 090.2
	Germany	1 813.8	523.6	148.5	2 485.9
	Others	553.5	159.8	45.3	758.6
	All	**4 530.6**	**1 307.8**	**371.0**	**6 209.3**
Ferry	Denmark	29 436.2	7 411.4	2 301.0	39 148.6
	Sweden	8 093.9	2 037.9	632.7	10 764.4
	Germany	21 756.7	5 477.9	1 700.7	28 935.2
	Others	10 539.8	2 653.7	823.9	14 017.4
	All	**69 826.6**	**17 580.9**	**5 458.2**	**92 865.6**

Source: Calculation is based on the income multipliers in Table 19 and the visitor expenditure on other tourism-related sectors in Table 10.

Table 24. Total income impact and share in other tourism-related sectors on Bornholm, 1997

DKK 000s

	Direct	Indirect	Induced	Total
All:	126 740.1	32 968.7	10 043.5	169 752.3
(% of total impact)	(74.7)	(19.4)	(5.9)	(100.0)
Share in each sector (%)				
Restaurants	15.2	20.1	16.9	16.3
Fast food businesses	5.5	7.6	6.2	5.9
Public transport	5.4	7.8	4.8	5.8
Taxis	1.8	1.3	1.7	1.7
Attractions	10.1	4.5	9.3	8.9
Museums	3.4	1.4	3.1	3.0
Shopping	3.6	4.0	3.7	3.7
Ferry	55.1	53.3	54.3	54.7
Sum	100.0	100.0	100.0	100.0

Note: The figures for total income impacts are the sums from Table 23.

Table 25. Total income impact and share in all tourism-related sectors on Bornholm, 1997

DKK 000s

	Direct	Indirect	Induced	Total
All:	165 307.5	61 175.7	14 399.0	240 882.2
(% of total impact)	(62.6)	(25.1)	(12.3)	(100.0)
Share in each sector (%)				
Holiday centres	4.4	5.3	4.7	4.6
Large hotels	10.3	9.2	10.4	10.1
Medium-size hotels	3.3	4.1	3.7	3.6
Small hotels	1.0	1.5	1.2	1.1
Youth hostels	1.0	1.2	1.0	1.0
Campsites	1.6	2.7	1.9	1.9
Holiday cottages	1.7	22.1	7.3	7.2
Restaurants	11.7	10.8	11.8	11.5
Fast food businesses	4.2	4.1	4.3	4.2
Public buses	4.1	4.2	3.3	4.1
Taxis	1.4	0.7	1.2	1.2
Attractions	7.7	2.4	6.5	6.3
Museums	2.6	0.7	2.2	2.1
Shopping	2.7	2.1	2.6	2.6
Ferry	42.2	28.7	37.9	38.5
Sum	100.0	100.0	100.0	100.0

Note: The figures for total income impacts are the sums of Table 21 and Table 23.

6.2 Employment impacts of tourism

Table 26 shows the employment impacts for the accommodation sectors on Bornholm. It shows not only the direct, indirect, induced and total employment generated by tourist expenditure, but also the employment generated by different nationalities of visitors. It can be seen from the table that large hotels generated the highest level of employment among the accommodation sectors.

Table 26. Employment impact for the accommodation sectors, Bornholm, 1997

(Number of full-time equivalent jobs)

Sector	Country	Direct	Indirect	Induced	Total
Holiday	Denmark	20.7	10.2	2.3	33.2
centres:	Sweden	6.6	3.3	0.7	10.6
	Germany	7.0	3.5	0.8	11.3
	Others	4.2	2.1	0.5	6.7
	All	**38.5**	**19.0**	**4.2**	**61.7**
Large	Denmark	35.2	9.3	2.3	46.8
hotels:	Sweden	18.2	4.8	1.2	24.3
	Germany	67.7	18.0	4.4	90.1
	Others	18.9	5.0	1.2	25.1
	All	**140.0**	**37.1**	**9.1**	**186.3**
Medium-	Denmark	17.3	4.5	0.9	22.7
size hotels:	Sweden	15.5	4.1	0.8	20.4
	Germany	26.9	7.0	1.4	35.3
	Others	2.5	0.6	0.1	3.3
	All	**62.2**	**16.2**	**3.2**	**81.6**
Small	Denmark	16.4	3.4	0.6	20.4
hotels:	Sweden	1.1	0.2	0.0	1.4
	Germany	9.4	1.9	0.4	11.7
	Others	0	0	0	0
	All	**27.0**	**5.6**	**1.0**	**33.6**
Youth	Denmark	11.3	3.2	0.6	15.1
hostels:	Sweden	3.0	0.9	0.2	4.1
	Germany	1.3	0.4	0.1	1.7
	Others	1.4	0.4	0.1	1.8
	All	**17.0**	**4.8**	**0.9**	**22.8**
Camp	Denmark	13.1	4.4	0.7	18.2
sites:	Sweden	4.9	1.7	0.3	6.9
	Germany	9.2	3.1	0.5	12.8
	Others	2.8	0.9	0.2	3.9
	All	**30.0**	**10.1**	**1.7**	**41.8**
Holiday	Denmark	4.3	20.2	2.0	26.4
cottages:	Sweden	0.2	1.1	0.1	1.5
	Germany	8.8	41.9	4.1	54.8
	Others	0.7	3.2	0.3	4.2
	All	**14.0**	**66.5**	**6.5**	**87.0**

Source: Calculation is based on the employment multipliers in Table 20 and the visitor expenditure on different types of accommodation in Table 5.

Table 27 shows the total employment impact of all the accommodation sectors, with the total direct, indirect and induced employment impact, as well as the share of employment impacts in each type of accommodation sector. The total employment generated in the accommodation sectors from tourist expenditure on Bornholm in 1997 was 514 full-time equivalent jobs, of which 329 jobs (63.9 percent) were created in the accommodation sector, 159 jobs (30.9 percent) were generated in the other economic sectors and 27 jobs (5.2 percent) were generated by induced effects. Large hotels accounted for the biggest share of the direct, induced and total employment impacts, whereas holiday cottages had the largest share of indirect impacts.

Table 27. Total employment impact and share in each type of accommodation sector on Bornholm, 1997

(Number of full-time equivalent jobs)

	Direct	Indirect	Induced	Total
All	328.7	159.3	26.6	514.6
(% of total impact)	(63.9)	(30.9)	(5.2)	(100.0)
Share in each type of accommodations (%)				
Holiday centres	11.7	11.9	15.8	12.0
Large hotels	42.6	23.3	34.2	36.2
Medium-size hotels	18.9	10.2	12.0	15.9
Small hotels	8.2	3.5	3.8	6.5
Youth hostels	5.2	3.0	3.4	4.4
Campsites	9.1	6.3	6.4	8.1
Holiday cottages	4.3	41.8	24.4	16.9
Sum	100.0	100.0	100.0	100.0

Note: The figures for total employment impacts are the sums from Table 26.

Table 28 shows the employment impacts for other tourism-related sectors on Bornholm. As in Table 26, direct, indirect, induced and total employment generated by tourist expenditure is shown, as is employment generated by different nationalities of visitors. As with income, the ferry generated the highest employment, with restaurants in second place.

Table 29 shows the total employment impact of all the other tourism-related sectors on Bornholm. The total employment generated in 1997 by tourist expenditure in these sectors was 916 full-time equivalent jobs, of which 659 jobs (71.9 percent) were generated within these sectors, 195 jobs (21.3 percent) were generated in other economic sectors and 62 jobs (22.1 percent) were generated as a result of induced effects. Again the ferry accounted for the largest share in all types of employment impacts and restaurants took second place. The fast food sector and attractions generated more employment than taxis and museums.

Table 28. Employment impact for other tourism-related sectors, Bornholm, 1997

Number of full-time equivalent jobs

Sector	Country	Direct	Indirect	Induced	Total
Restaurants	Denmark	64.8	16.9	4.0	85.8
	Sweden	21.3	5.6	1.3	28.2
	Germany	49.9	13.0	3.1	66.0
	Others	32.1	8.4	2.0	42.5
	All	**168.2**	**43.9**	**10.4**	**222.5**
Fast food	Denmark	27.7	6.4	1.5	35.6
	Sweden	9.1	2.1	0.5	11.7
	Germany	21.3	4.9	1.1	27.4
	Others	13.7	3.2	0.7	17.6
	All	**71.8**	**16.7**	**3.8**	**92.3**
Public buses	Denmark	16.7	6.1	1.3	24.1
	Sweden	2.2	0.8	0.2	3.2
	Germany	16.5	6.0	1.3	23.8
	Others	3.1	1.1	0.2	4.5
	All	**38.5**	**14.1**	**3.0**	**55.6**
Taxis	Denmark	4.3	1.7	0.7	6.8
	Sweden	1.5	0.6	0.2	2.3
	Germany	0	0	0	0
	Others	0.8	0.3	0.1	1.2
	All	**6.6**	**2.6**	**1.1**	**10.3**
Attractions	Denmark	10.7	1.5	1.1	13.3
	Sweden	2.1	0.3	0.2	2.6
	Germany	37.6	5.2	4.0	46.8
	Others	3.7	0.5	0.4	4.6
	All	**54.1**	**7.5**	**5.7**	**67.3**
Museums	Denmark	3.9	0.9	0.6	5.4
	Sweden	0.8	0.2	0.1	1.1
	Germany	5.0	1.1	0.8	6.9
	Others	2.1	0.5	0.3	2.9
	All	**11.7**	**2.7**	**1.9**	**16.3**
Shopping	Denmark	8.7	2.1	0.7	11.5
	Sweden	5.1	1.2	0.4	6.7
	Germany	11.5	2.8	0.9	15.3
	Others	3.5	0.9	0.3	4.7
	All	**28.8**	**7.1**	**2.3**	**38.2**
Ferry	Denmark	117.6	42.3	14.2	174.1
	Sweden	32.3	11.6	3.9	47.9
	Germany	86.9	31.3	10.5	128.7
	Others	42.1	15.2	5.1	62.3
	All	**279.0**	**100.4**	**33.6**	**413.0**

Source: Calculation is based on the employment multipliers in Table 20 and the visitor expenditure on other tourism-related sectors in Table 10.

Table 29. Total employment impact and share in other tourism-related sectors on Bornholm, 1997

(Number of full-time equivalent jobs)

	Direct	Indirect	Induced	Total
All	658.7	195.0	61.8	915.5
(% of total impact)	(71.9)	(21.3)	(6.8)	(100.0)
Share in each sector (%)				
Restaurants	25.5	22.5	16.8	24.3
Fast food businesses	10.9	8.6	6.1	10.1
Public buses	5.8	7.2	4.9	6.1
Taxis	1.0	1.3	1.8	1.1
Attractions	8.2	3.8	9.2	7.3
Museums	1.8	1.4	3.1	1.8
Shopping	4.4	3.6	3.7	4.2
Ferry	42.4	51.5	54.4	45.1
Sum	100.0	100.0	100.0	100.0

Note: The figures for total employment impacts are the sums from Table 28.

Table 30 shows the total employment impact for all the 15 tourism-related sectors on Bornholm. The total employment generated by tourism in 1997 was 1430 full-time equivalent jobs, of which 987 jobs (69 percent) were generated directly in these tourism-related businesses and 443 jobs (31 percent) were generated indirectly in other economic sectors. The share of the total employment impact of each sector in the table shows the importance of that sector in terms of employment generated by tourism. The ferry took first place as the most important tourism-related sector on Bornholm, as it generated 29 percent of the total full-time jobs created by tourist expenditure in 1997. Catering was second, leaving large hotels as the third most important tourism-related sector in terms of employment creation. Holiday cottages, medium-sized hotels, attractions and holiday centres are also fairly important, while taxis, museums and youth hostels rank as the least important sectors in terms of employment generation.

Table 30. Total employment impact and share in all tourism-related sectors on Bornholm, 1997

(Number of full-time equivalent jobs)

	Direct	Indirect	Induced	Total
All	987.4	354.3	88.4	1 430.1
(% of total impact)	(69.0)	(24.8)	(6.2)	(100.0)
Share in each sector (%)				
Holiday centres	3.9	5.4	4.8	4.3
Large hotels	14.2	10.5	10.3	13.0
Medium-size hotels	6.3	4.6	3.6	5.7
Small hotels	2.7	1.6	1.1	2.3
Youth hostels	1.7	1.3	1.0	1.6
Campsites	3.0	2.9	1.9	2.9
Holiday cottages	1.4	18.8	7.4	6.1
Restaurants	17.0	12.4	11.8	15.6
Fast food businesses	7.3	4.7	4.3	6.5
Public buses	3.9	4.0	3.4	3.9
Taxis	0.7	0.7	1.2	0.7
Attractions	5.5	2.1	6.5	4.7
Museums	1.2	0.8	2.1	1.1
Shopping	2.9	2.0	2.6	2.7
Ferry	28.3	28.3	38.0	28.9
Sum	100.0	100.0	100.0	100.0

Note: The figures for total employment impacts are the sums of Table 26 and Table 28.

7. Marketing implications of tourism's impact – a comparison

The income and employment impact of tourism on Bornholm shown in Chapter 6 was analysed from the supply side, i.e. from the viewpoint of each supplier of tourism-related services. But tourism impact can also be analysed from the tourism demand side. This means the impact of tourism can be deduced from the behaviour of different groups of tourists. Tourists can be grouped according to the type of accommodation they stay in, for example. Tourism impact analysis from the tourism demand side will have stronger marketing implications than that from the supply side.

In this section an evaluation of tourism income and employment generation from both tourism suppliers and the tourism demand side is presented, followed by a comparison of the two results and conclusions.

7.1 Evaluation of tourism impact from tourism suppliers' side

There are at least two ways to evaluate tourism-related sectors and tourist activities, i.e. either from the income or the employment generated. An evaluation of income generation will show which activities are more important in terms of generated income for the local economy. On the other hand, an evaluation of employment generation will show which activities (or tourism suppliers) are more important in terms of employment generated for the local economy.

7.1.1 Conclusions on income generation

From the data on total income multipliers given in Table 19, a graph is produced in Figure 11 showing the gross income generated by DKK 1000 of tourist expenditure in the 15 tourism-related sectors on Bornholm. The first thing that stands out is that attractions and museums generate the highest unit income. For example, if tourists spend DKK 1000 on tourist attractions, this will generate DKK 565 of gross income for Bornholm. This also means that Bornholm will receive more income if tourists spend more money on attractions and museums. This suggests that day-trippers are as important as those who stay overnight. Secondly, the transport sector is also important in terms of income generation. The local economy will benefit more if tourists use local transport rather than their own cars. In the accommodation and catering sectors large hotels and holiday centres provide greater income generation for the local economy than youth hostels, campsites and holiday cottages.[8]

The above evaluation was made from the income created by DKK 1000 of tourist expenditure. We should also evaluate these tourism-related sectors by their real contributions to

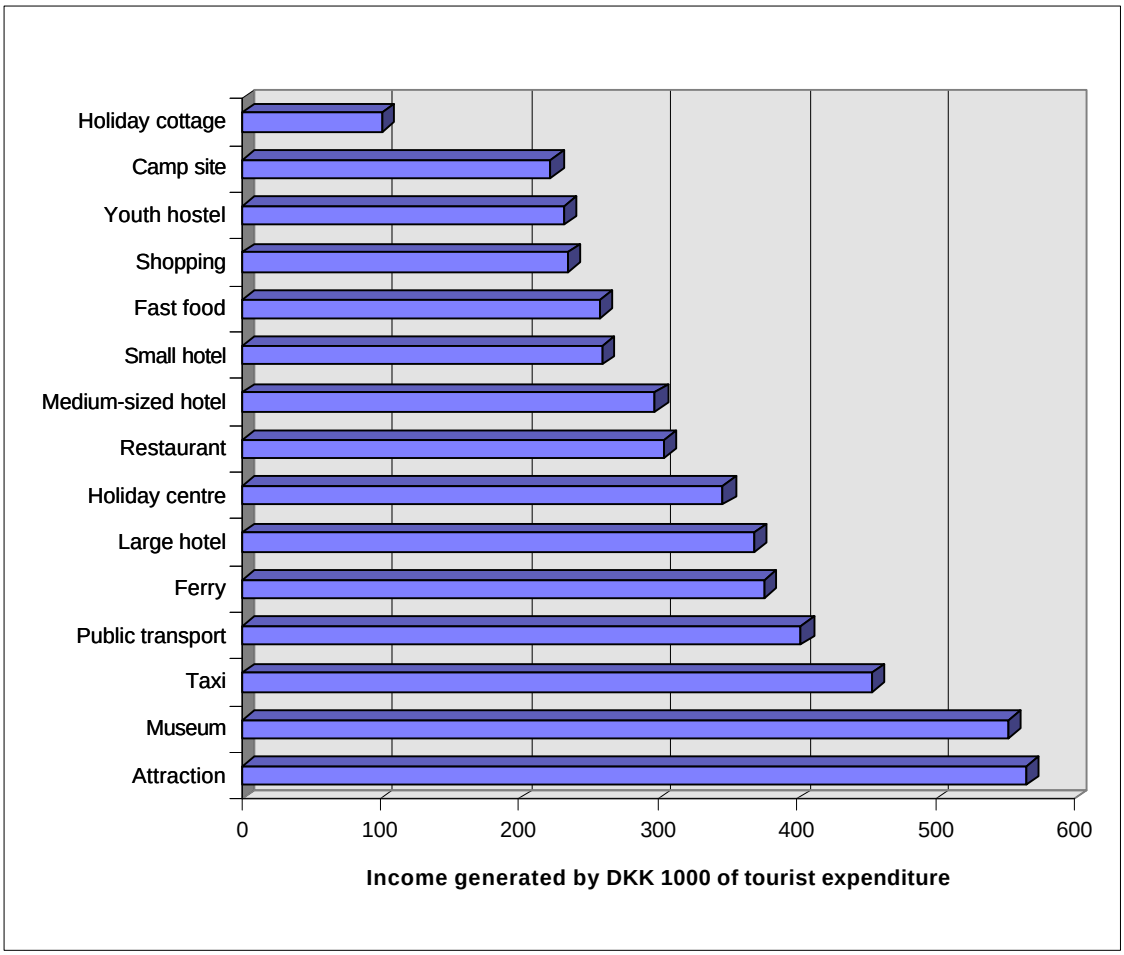
8 Income generation from holiday cottages does not include the capital income of the owners.

the local economy. Figure 12 shows the share of income contribution created by tourist expenditure in the tourism-related sectors on Bornholm, which was produced from Table 25. It shows more clearly that the biggest contributors amongst these tourism-related sectors were the ferry company, restaurants, large hotels, holiday cottages and attractions. In fact, holiday cottages have a large share (22%, see Table 25) of indirect income generation as they have more connection with the local economy than other tourism-related sectors.

The amount of real income contribution is influenced by the capacity of the sector, the scale of the tourist expenditure in the sector and the relevance of the sector to tourism. For example, large hotels have the largest capacity amongst all hotel types; they also generated the largest real gross income among them. Holiday cottages have the least unit income generation[9] (see Figure 11); however, they make a relatively larger income contribution than other types of accommodation, as they have a relatively large scale in both bed stock and tourist revenue. Taxis have a relatively large unit income generation, but they do not make a large income contribution to the local economy from tourism, both because of the limited scale of the sector and their limited relevance to tourism.

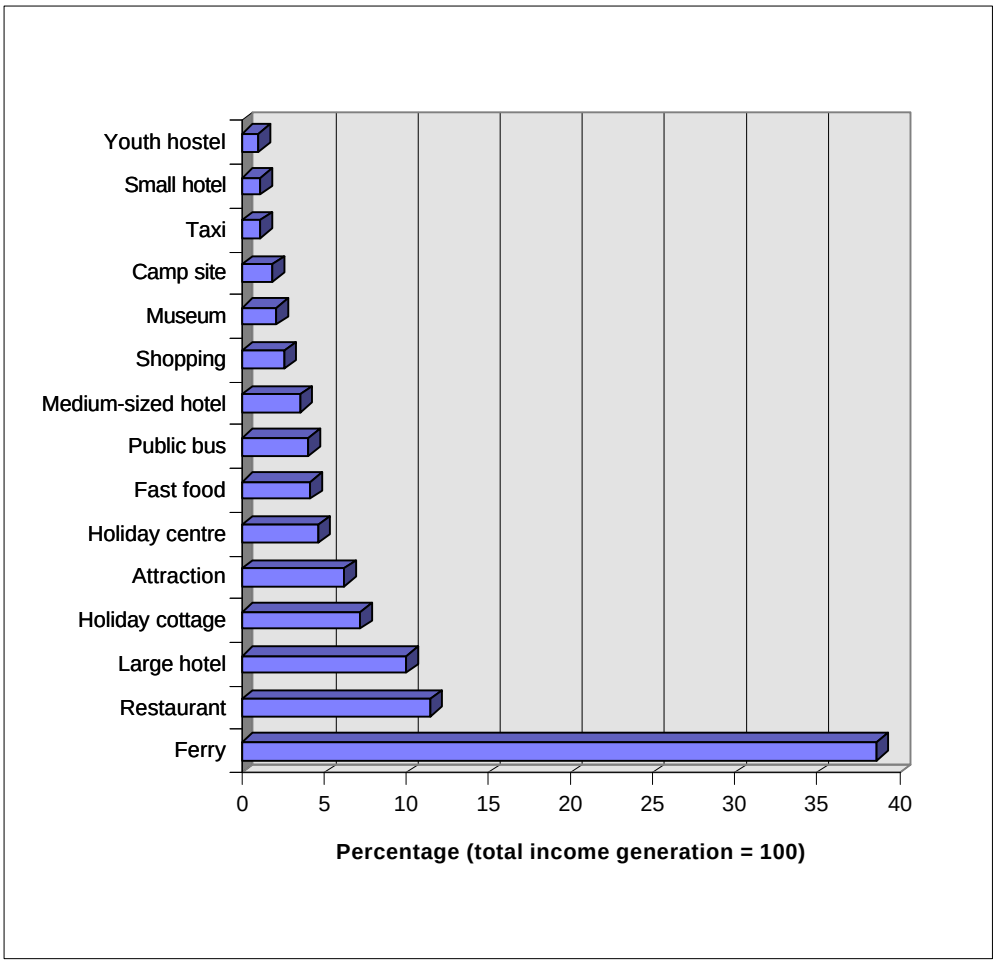
9 Refer to note 8.

Figure 11. Unit income generation in the tourism-related sectors on Bornholm



Source: The figure is produced from the data on total income multipliers in Table 19.

Figure 12. Share of real income contribution from tourism on Bornholm, 1997



Source: The figure is produced from the data on shares in Table 25.
Note: Total income generation from tourist expenditure on Bornholm was DKK 241 million in 1997.

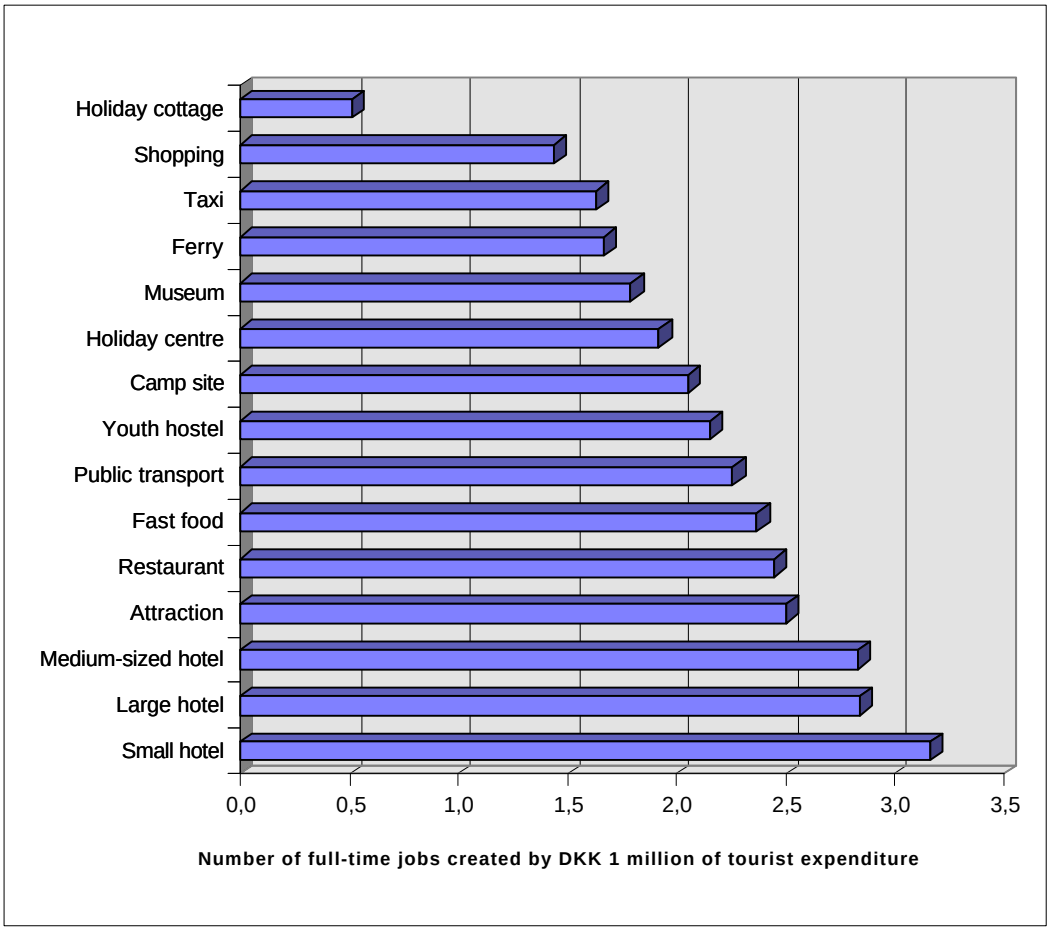
7.1.2 Conclusions on employment generation

From the data on total employment multipliers in Table 20, a graph is produced in Figure 13 showing the amount of full-time employment generated by DKK 1 million of tourist expenditure in the 15 tourism-related sectors on Bornholm. It can be seen from the figure that all three types of hotels have higher unit employment creation than the other sectors. This is because hotels are more labour-intensive than the other sectors and have low labour productivity. The same goes for the catering sector. On the other hand, holiday cottages do not require a large labour input - they depend heavily on capital investment and

fixed assets. In comparison, shopping, taxis and the ferry have a lower unit of employment generation than the accommodation sectors.

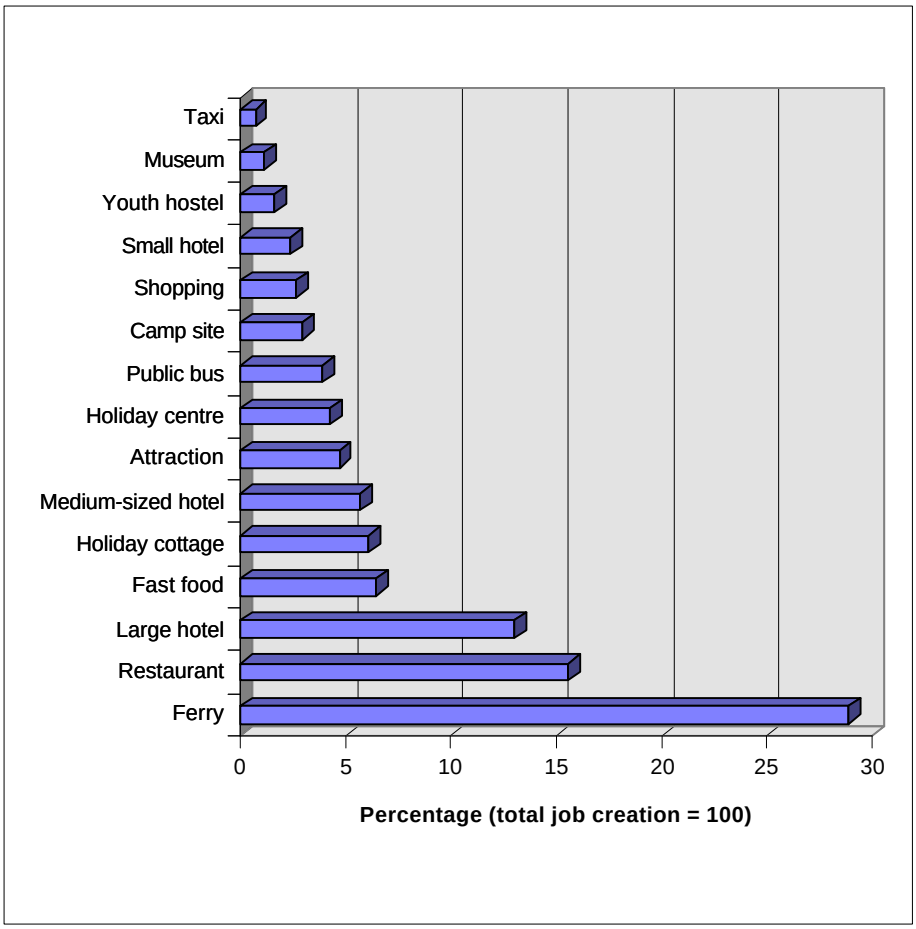
Evaluation of employment generation should also consider a sector's real contribution to the local economy. Figure 14 shows the shares of employment contribution by tourism in the 15 tourism-related sectors on Bornholm. The figure is produced from Table 30, providing the share of employment creation in each sector from total employment creation. The greatest contributors were the ferry operators, restaurants, large hotels, fast food businesses and holiday cottages. The ferry operators accounted for 29% of total employment creation by tourism. Restaurants and large hotels accounted for 16 and 13 percent, respectively of the total employment generation by tourism. Fast food businesses, holiday cottages and medium-sized hotels accounted for about 6% of employment creation.

Figure 13. Unit employment generation in the tourism-related sectors on Bornholm



Source: The figure is produced from the data on total employment multipliers in Table 20.

Figure 14. Share of real employment contribution from tourism on Bornholm, 1997



Source: The figure is produced from the data in Table 30.
Note: Total full-time employment created by tourist expenditure on Bornholm in 1997 was 1430 jobs.

With regard to suggestions for local tourism strategy, more effort should be made to promote tourist attractions and activities on Bornholm, as well as promoting Bornholm as a tourist destination. Tourism marketing should not only concentrate on attracting overnight tourists, focusing on same-day tourists, weekend tourists and tourists from cruise ships is also important. This marketing strategy is connected to other regional development policies, such as high-speed ferry development. The high-speed ferry line between Rønne and Ystad will no doubt increase the number of visitors, both overnight tourists and same-day or weekend visitors, from Sweden and other regions of Denmark.

7.2 Evaluation of tourism impact from the tourism demand side

Table 12 showed visitor expenditure by type of accommodation on Bornholm. The calculation was made by using the same multipliers shown in Section 5 for the tourism-related sectors; however, the presentation of income and employment generation is shown by different groups of visitors according to the type of accommodation. Therefore, income multipliers by type of accommodation can also be calculated by the amount of income generated by tourist expenditure (see Table 29). The calculation is the same for the employment multipliers. Table 30 show the number of jobs created by the amount of tourist expenditure and employment multipliers by type of accommodation.

Table 31. Income generation by tourist expenditure and income multipliers by type of accommodation

(DKK 000)

Accommodation	Expenditure	Direct	Indirect	Induced	Total
Holiday centre	84 411	21666.6	6 790.0	1 831.5	30 288.1
(Multiplier)		0.2567	0.0804	0.0217	0.3588
Large hotel	162 360	44235.1	12 905.9	3 587.5	60 728.5
(Multiplier)		0.2725	0.0795	0.0221	0.3740
Medium-size hotel	101 516	24 930.9	7 571.6	2 075.2	34 577.8
(Multiplier)		0.2456	0.0746	0.0204	0.3406
Small hotel	100 071	25 107.8	7 079.1	2 043.3	34 230.2
(Multiplier)		0.2509	0.0707	0.0204	0.3421
Youth hostel	69 147	17 329.4	4 830.1	1 403.1	23 562.7
(Multiplier)		0.2506	0.0699	0.0203	0.3408
Camping	71 225	16 044.0	5 108.6	1 348.3	22 500.8
(Multiplier)		0.2253	0.0717	0.0189	0.3159
Holiday cottage	221 530	15 999.4	16 891.4	2 110.4	35 001.2
(Multiplier)		0.0722	0.0762	0.0095	0.1580
Sum:	810 260	165 314.6	61 177.2	14 399.6	240 891.4
(Multiplier)		0.2040	0.0755	0.0178	0.2973

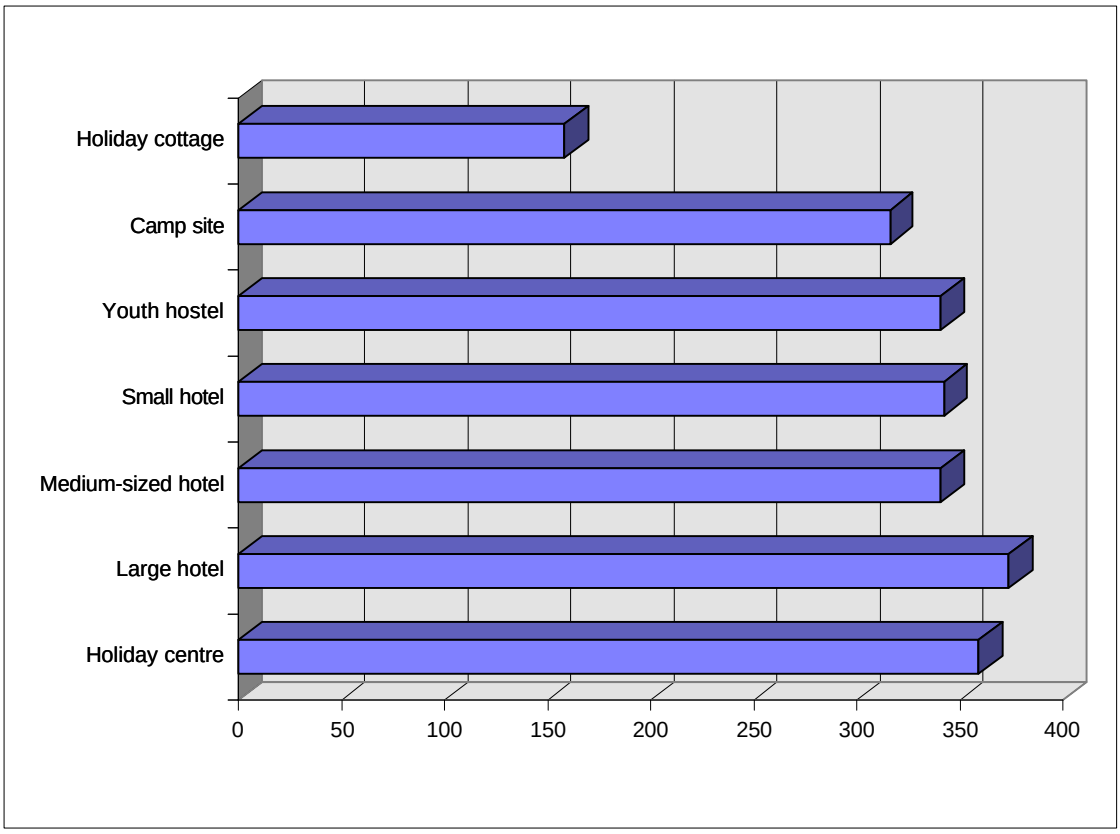
Table 32. Employment generation by tourist expenditure and employment multipliers by type of accommodation

(DKK 000 000)

Accommodation	Expenditure	Direct	Indirect	Induced	Total
Holiday centre	84.4	115.1	40.0	11.2	166.3
(Multiplier)		1.3632	0.4742	0.1332	1.9707
Large hotel	162.4	276.4	79.0	22.1	377.5
(Multiplier)		1.7021	0.4868	0.1360	2.3249
Medium-size hotel	101.5	162.9	46.2	12.8	221.9
(Multiplier)		1.6046	0.4552	0.1256	2.1854
Small hotel	100.1	149.9	42.4	12.6	204.9
(Multiplier)		1.4981	0.4241	0.1255	2.0477
Youth hostel	69.1	97.8	29.2	8.6	135.7
(Multiplier)		1.4146	0.4225	0.1248	1.9619
Camping	71.2	100.5	30.8	8.3	139.6
(Multiplier)		1.4111	0.4327	0.1163	1.9602
Holiday cottage	221.5	84.8	86.6	13.0	184.3
(Multiplier)		0.3827	0.3909	0.0585	0.8321
Sum:	810.3	996.3	357.0	89.3	1442.6
(Multiplier)		1.2296	0.4406	0.1102	1.7805

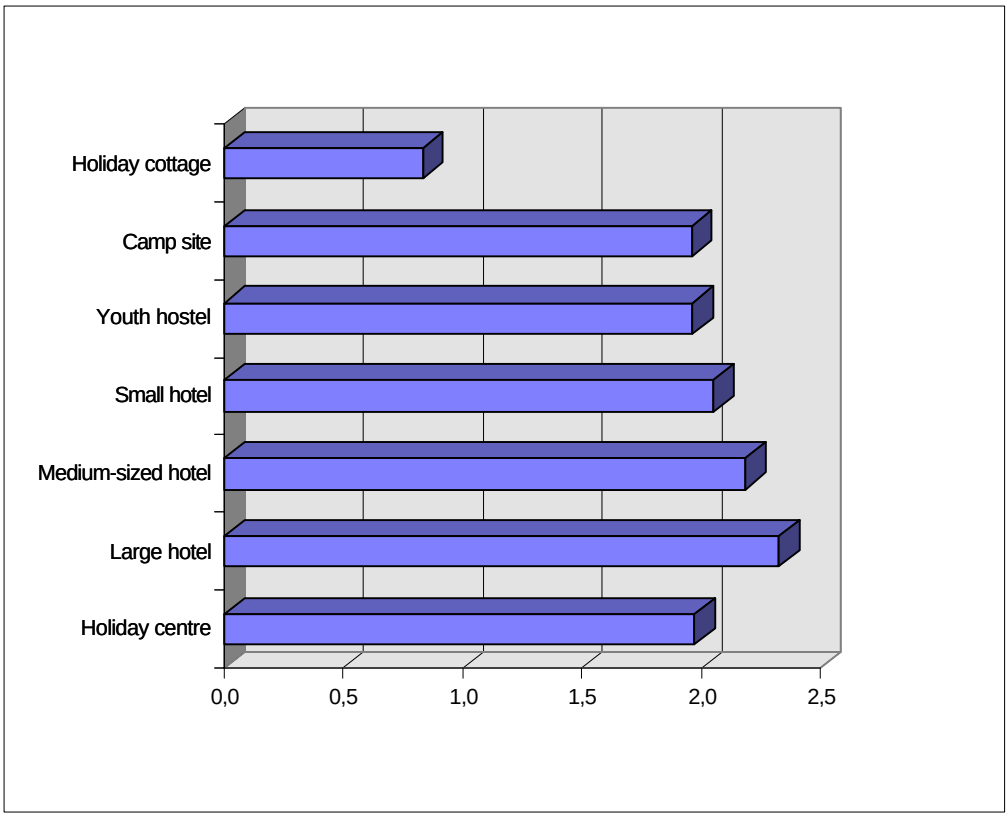
In order to compare the results of the multipliers from both the tourism suppliers' side and the tourism demand side, Figure 15 and Figure 16 show the unit income and employment generation by type of accommodation. Compared with the unit income and employment generation by tourism-related sectors, we find that both income and employment multipliers are more similar by type of accommodation than by sector, apart from for holiday cottages. The lower income (or employment) multipliers in the holiday cottages are surely influenced by the lower income (or employment) multipliers in the holiday cottage sector, since, as explained above, income from holiday cottages does not included capital income from assets.

Figure 15. Unit income generation by type of accommodation



Source: The figure is produced from the data on total income multipliers in Table 29.

Figure 16. Unit employment generation by type of accommodation



Source: The figure is produced from the data on total employment multipliers in Table 30.

8. Conclusion and comparison

Economic impact studies can be used to assess the effects of any economic activity. There are different ways to conduct an impact analysis. Input–output modelling is a traditional method. This report has used the surveyed data for the tourism-related sectors and constructed a regional tourism-based input–output model. Based on the regional input–output model, the output, income and employment multipliers for the tourism-related sectors have been estimated. The income and employment multipliers have been applied to estimate income and employment generation from tourism on Bornholm by using the actual tourist expenditure from 1997.

8.1 Principal findings

Gross tourist revenue

- The gross tourist revenue in the accommodation sector including holiday centres, hotels, youth hostels, campsites and holiday cottages was DKK 340 million. Gross tourist revenue in the catering business was DKK 130 million. Gross tourist revenue in the museums and attractions sector was DKK 36 million and tourist revenue from the ferry business was DKK 247 million.
- The total tourist revenue from all kinds of tourism-related sectors on Bornholm is estimated at DKK 810 million.

Personal income

- The direct personal income generated by tourist expenditure in the accommodation sector was DKK 39 million; direct personal income generated by tourist expenditure in the catering business was DKK 26 million; direct personal income generated by tourist expenditure in the museums and attractions sector was DKK 17 million; direct personal income generated by tourist expenditure on shopping was DKK 4.5 million and the direct personal income generated by tourist expenditure on the ferry was DKK 70 million.
- The total direct income generation from all the tourism-related sectors was DKK 165 million; the total income generated by tourist expenditure, including direct, indirect and induced effect, in all the economic sectors on Bornholm was DKK 241 million.
- On average, for every DKK 1000 spent by visitors in the hotels on Bornholm, DKK 310 of local direct, indirect and induced income is generated; for every DKK 1000 spent by visitors in the holiday centres, DKK 347 of local total income is generated; for every DKK 1000 spent by visitors on eating out, DKK 280 of local total income is generated; for every DKK 1000 spent by visitors on the ferry, DKK 376 of local total income is generated. For every DKK 1000 spent by visitors at museums and attractions, DKK 558 of local total income is generated.

Employment

- Tourism created 329 full-time jobs in the accommodation sector. It created 240 jobs in the catering business; 66 jobs in the museums and attractions sector; 29 jobs in the retail sector; and 279 jobs in the ferry business.
- The total direct employment generated by tourist expenditure in the tourism-related sectors was 987 full-time equivalent jobs; the total employment generated by tourist expenditure, including direct, indirect and induced effects, in all economic sectors on Bornholm was 1430 full-time equivalent jobs. This accounted for about 7.2 percent of total full-time equivalent employment on Bornholm.[10]
- On average, an increase in tourist expenditure at hotels of DKK 442 000 will generate one new full-time equivalent job opportunity in a hotel; an increase in tourist expenditure on eating out of DKK 542 000 will generate one new job opportunity at restaurants or fast food businesses; an increase in tourist expenditure at youth hostels of DKK 624 000 will generate one new job at a youth hostel and an increase in tourist expenditure at museums and attractions of DKK 640 000 will generate one new job in this sector. However, holiday centres and the transport sector require more tourist expenditure to generate one new job, and holiday cottages require even more.

8.2 Comparison with TØBBE

There exists another tourism survey in Denmark, i.e. TØBBE. TØBBE means tourism economic and employment consequences *Turismens økonomiske og beskæftigelsesmæssige betydning in Danish*. The Danish Tourist Board incorporated with AKF (Institute of Local Government Studies, Denmark) conducted this study. A survey of tourism consumption was based on approximately 41 000 interviews carried out in all regions of Denmark in 1996-1997. The results from the survey are applied in a multi-regional input–output model for Denmark, AIDA, which examines the economic impact of tourism. It is important to make a comparison between the findings of this report and the results obtained from TØBBE for Bornholm.

Table 33 shows the results from both TØBBE and this report. The results from these two different surveys appear to be quite similar in overnights, daily consumption and the total tourist consumption. However, income and employment generations from tourism seem to be different. It should be mentioned that the income terms used in these two studies are different. TØBBE results were obtained from the AIDA model, which applied a *gross factor income*, i.e. gross income of employees plus gross profits of the businesses, as its concept of *income*. In this report, employees gross income, i.e. the gross wages and salaries before tax are applied is used. Therefore, the gross profits of the businesses are excluded from *income* in this report. The total income generation by tourism was DKK 241 million on Bornholm from the results in this report, which accounts for 64 percent of DKK 375 million of the gross factor income generation by tourism obtained from AIDA. This seems to be consistent with the average share in the gross factor income in Denmark. For exam-

10 The estimation of full-time equivalent employment on Bornholm in 1997 on a yearly average is 19 914 jobs.

ple, compensation to employees (i.e. gross wages before tax) accounted for 63 percent of GDP at factor costs in 1998, according to the *National Accounting Statistics 1998* from Statistics Denmark.

Table 33. Comparison between surveys by the Danish Tourist Board (TØBBE) and the results from Research Centre of Bornholm (RCB)

	TØBBE data for 1996	RCB data for 1997
Number of tourist overnights (000)	2208	2396
Average daily consumption (DKK)	363.8	338.2
Total tourist consumption (mil. DKK)	803.4	810.3
Income generation by tourism (in million DKK)	375.1[1]	241[2]
Employment generation by tourism (full-time jobs)	986	1430
Total employment multipliers	1.23	1.76
Share of tourism employment in the total employment on Bornholm	4%	7%
Sample size	1078	2349

Source: TØBBE model and *Turismens økonomiske betydning nationalt og regionalt*, 1996, Danmarks Turistråd and the results from this report.

Notes: 1. The concept of income presented by AIDA is gross factor income (i.e. bruttofaktorindkomst in Danish).
2. The concept of income presented in this report is gross compensation to employees, i.e. gross wages and salaries paid to employees.

The greatest difference between these two tourism impact studies exists in the employment generation by tourism on Bornholm. The result from TØBBE/AIDA shows 986 full-time jobs created by tourism, but this report gives 1430 full-time jobs generated by tourism. The explanation for the difference could be suggested as follows. 1) The data for employment are different, although both studies use a *full-time equivalent job* as a measure for employment. The AIDA employment data are based on Statistics Denmark which records employment figures by sector at the end of November every year. This analysis employs the annual average full-time equivalent jobs for all other sectors and the employment figures for the tourism-related sectors on Bornholm are based on the business survey. 2) Another reason might be a conceptual difference between the two studies with regard to tourism generated employment. The employment generation in this study includes 15 tourism-related sectors on Bornholm. This means that the employment generation by tourism in ferry, attractions and museums, and transportation are also considered and inclu-

ded in the analysis. 3) As shown in the table, the total employment multipliers are different, 1.23 in TØBBE/AIDA and 1.76 from this report. The difference in employment multipliers for the tourism-related sectors might be a result of the different employment figures. Finally, the shares of tourism employment in the total employment on Bornholm are shown in the table as 4 percent in TØBBE and 7 percent from this report, respectively. We assume that 7 percent is more realistic, as it is shown in the first section that employment in the hotel and restaurant sector itself accounts for 4 percent of the total employment on Bornholm.

From the comparison above, it can be concluded that there are some advantages for constructing one region's tourism-based input–output model for the purpose of a tourism impact study. The daily consumption is based on the visitor survey at RCB, which collects 2-3000 respondents every year, therefore daily consumption data can be updated every year by nationality and accommodation forms used by visitors. The tourism-based input–output model for Bornholm is based on the tourism business survey, it is closer to reality than the models constructed by non-survey based data. Besides, the tourism sectors are split up at a more detailed level, for example, the hotel sector has been spilt into large, medium-size and small hotels, offering the different multipliers for each tourism-related sector. Furthermore, ferry, attractions, museums and taxis are also included in the model.

We have to mention here that there are some limitations to this study. Firstly, a single regional input–output model ignores inter-regional linkages. Bornholm is an island, isolated by waters; however, it is one of the regions of Denmark. It must have some inter-regional effect by regional linkage. This analysis can not demonstrate the inter-regional impact of tourism; for example, it can not give an answer to the question, *what is the impact on Copenhagen region if tourist numbers increase on Bornholm*. Secondly, this impact analysis mainly focuses on income and employment impacts: the impact on government revenue can not be conducted because of a lack of data. Thirdly, as data for gross profits are difficult to obtain from the business survey, they are excluded from the analysis. Therefore the income impact here can not be directly compared with results based on the *gross factor income* notion of *income*. Finally, holiday cottages are a unique type of accommodation and also an important part of tourism on Bornholm. As there are around 3-4000 holiday cottages on Bornholm, it is impossible to conduct a survey in the individually owned holiday cottages. Therefore, input coefficients to holiday cottages were adopted from a special national input–output table in 1990 and it is uncertain that this represents the inputs to the holiday cottages on Bornholm. Furthermore, there is no information on capital investment in holiday cottages, although revenue from capital investment composes a large part of the income of the owners of holiday cottages. As mentioned before, the income term adopted here is gross compensation to employees. Therefore the income multipliers and income generation in holiday cottages show up as very low. It is suggested that the results for holiday cottages should be used carefully.

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Appendix 1. Comparative statistics for Denmark and Bornholm

Table 34: Comparative statistics for Denmark and Bornholm

	Denmark	Bornholm	Bornholm's share (%)
Area (km^2)	43 094.41	588.37	1.37
Population[1]	5 275 121	45 018	0.85
Numbers in employment[2]	2 664 386	20 502	0.77
Gross output[3]	1 814 400	12712*	0.70
Gross output in H/R[4]	30 307	436*	1.44
BFI[5]	956 617	6601*	0.69

Notes: 1. The population figure is for January 1997.
2. Employment is the number of persons registered by workplaces in 1997, obtained from EMIL, AKF.
3. Gross output value in 1997 in current prices (million kroner).
4. Gross output in the hotel and restaurant sector in 1997 in current prices (millions).
5. BFI (*bruttofaktorindkomst* in Danish) means gross factor income in 1997 in current prices.
* Estimated by shares in 1995.

Sources: Statistisk tiårsoversigt 1998, Denmark Statistics, and EMIL (a regional model), AKF, Denmark.

Appendix 2. Questionnaire for sea departures

SEA DEPARTURES

Thank you for participating in our survey. Where indicated, please complete by crossing the boxes so ☒ . If you wish to change your answer then alter the previous response in this manner ☒. Any information given in this questionnaire will be treated strictly private and confidential.

Q1 Please give the name of your home town (where you have your current permanent address): _____

Q2 Which County/Municipality is that in?
County/Municipality _____
Own Postcode _____

Q3 On this trip are you touring, that is staying elsewhere in Denmark or in other countries?
(1) Elsewhere in Denmark
(2) Countries outside Denmark
Which ones _____
(99) Not touring

Q4 On what date did you arrive in Bornholm? _____

Q5 In total, how many days have you spent in Bornholm? _____

Q6 Which of the statements below *best* corresponds to the composition of your personal party?
(1) Travelling alone
(2) Husband/wife only
(3) Family group with children under 15 years
(4) Family group with grown up children
(5) Family group/relations with...
(6) Friend/friends
Other _____
(please specify)

Q7 What is the *main* purpose of your visit?

(1) Business conference/meeting/exhibition
(2) General business - buying, selling, installation or other
(3) Holiday
(4) Holiday/visiting friends or relatives
(5) Visiting friends or relatives solely
(6) Sporting event
(7) Education/school event
(8) Cultural event
Other _____
(please specify)

Q8 Is this your first visit to Bornholm?

(1) Yes
(99) No

Q9 Have you ever lived (i.e. had a per manent address) in Bornholm?

(1) Yes
(99) No

Q10 How often have you visited (holiday, business trips, visits to friends and relatvies etc.) Bornholm before? Please give the number of times:_____

Q11 Did you ever come to Bornholm as a child?

(1) Yes, with my family/relatives/friends
(2) Yes, visiting family/relatives/friends
(3) Yes, with my school
(4) Yes, with my sporting club
Yes, in another way _____
(please specify)
(99) No

Q12 When was the last time you visited Bornholm?

(1) Earlier this year
(2) Last year
(3) Within the last 2 years
(4) Within the last 5 years
(5) More than 5 years ago
(99)First visit

Q13 How did you find out about Bornholm as a holiday destination?
You may choose as many possibilities as you wish.

(1) Always known/been before
(2) Family/friends/relatives on Bornholm
(3) Through military
(4) Saw an advertisement in a newspaper or magazine
(5) Read a newspaper/magazine article
(6) Saw a poster advertising Bornholm
(7) Recommendation of travel agent
(8) Through a club or association
(9) Recommendation of family/friends
(10) Saw a guide book/brochure
(11) Saw a TV advertisement/programme
(12) Heard about Bornholm on the radio
Visited a travel show/exhibition Where: _____
Other _____
(please specify)

Q14 How important were the following aspects of Bornholm in making your decision to visit the island? *Please look at all aspects.*

	Very important (1)	*Im-portant* (2)	*Less important* (3)	*Un-important* (4)
Beaches				
Landscapes				
Cycle routes				
Walking routes				
Fishing villages and towns				
Nature				
Golf courses				
Fishing				
Cultural history				
Restaurants				
Craft/art workers				
Atmosphere				
A variety of activities				
Family/friends/ rela-tives in Bornholm				

Q15 Were there any other aspects of Bornholm that were very important to your visit? Which ones?

_____
_____

Q16 Booking arrangements - please look at the following statements and indicate as appropriate:

	Yes	No
I booked transport directly with the carrier		
I booked transport through a travel agent		
My company took care of my bookings		
Family/friends in Bornholm took care of the booking of transportation		
I booked accommodation directly with the landlord/proprietor		
I booked accommodation through a travel agent		
I am staying with friends/relatives, so I did not have to book		
Family/friends in Bornholm took care of the booking of accommodation		
I bought a package/inclusive tour, e.g. one price for transport and accommodation, from a travel agent		
I used a travel agent near my home		
I used a travel agent in Bornholm/Bornholm tourist office to make my bookings		
I booked through a summer house booking agency in Bornholm		
I booked through a summer house agency elsewhere		
I travel with a club or an association		
Apart from the above regarding bookings, I did the following:		

Q17 When did you book this trip? _____
(date)

Q18 Have you visited any of the Tourist Information Centres listed below? Please indicate for all whether you visited or not. Please comment on the quality of the service you received at those you visited.

	Visited		*Quality of service*				
	Yes	*No*	*Ex - cellent*	*Good*	*Ave- rage*	*Not good enough*	*Poor*
Bornholms Velkomstcenter	(1)	(99)	(1)	(2)	(3)	(4)	(5)
Gudhjem Turistbureau							
Hasle Turistbureau							
Nexø-Dueodde Turistbureau							
Nordbornholms Turistbureau							
Svaneke Turistbureau							
Sydbornholms Turistbureau							

Q19 Type of accommodation used during your stay: Please state all places of accommodation and the number of days spent in each.

Accommodation	*Days*	*Nearest towns or villages*
Hotel/Guesthouse/Pension, please give name		
Youth hostel		
Rented summer house through agency		
Rented summer house through other than agency		
Borrowed summer house from friends etc.		
Stayed with family/friends		
Farmhouse		
B&B/private home		
Camp site:		
* Tent/camplet		
* Cabin		
* Own caravan		
* Rented caravan		
Holiday Centre		
Other (please specify)		
None / on a day visit		

Q20 In terms of the features listed below, what did you think of the quality of your place of stay?
Please look at all aspects.

	Excellent (1)	***Good*** (2)	***Average*** (3)	***Not good enough*** (4)	***Poor*** (5)	***Not available*** (6)
Service						
Accommodation						
Food and beverages						
Standard of cleanliness						
Price level						
Facilities						
Location/situation						
Decor						
Overall value for money						

Q21 Do you have any other comments on your accommodation? Please state

_____

_____

Q22 Which of the attractions mentioned below did you visit? *Please look at all aspects*.

Attractions	*Visited this trip* (1)	*Visited before* (2)	*Not visited* (3)	*Un-Known* (99)
Hammershus Castle				
Hammershus Exhibition				
Østerlars Round Church				
Other churches				
Brændesgårdshaven				
Christiansø				
Fish smoke houses, where:				
Gardens				
Glass factory/shop				
Ceramic factory/shop				
Art galleries				
Bornholm Art Museum				
Bornholms Museum				
Gudhjem Museum				
Oluf Høst Museum				
Nexø Museum				
Andersen Nexø Museum				
Defence Museum				
Quarry Museum				
Farm Museum				
Automobile Museum				
Erichsens Gaard				
Zoo				
Randkløve Skaar				
Paradisbakkerne				
Ekkodalen				
Rytterknægten				
Helligdomsklipperne				
Jons Kapel				
A lighthouse				
None of these				
Other (please specify)				

Q23 Which of the activities mentioned below did you participate in? ***Please look at all activities mentioned*****.**

Activities	*Participated this trip* (1)	*Participated before* (2)	*Not participated at all* (3)
Going to the beach			
Swimming			
a) in the sea			
b) in a pool			
Windsurfing			
Cycling			
Guided coach tour			
Guided walks			
Walks on my/our own			
Scenic air flight			
Boat trips			
Fishing			
Golf			
Horseracing			
Music recitals			
Going to the cinema			
Eating out			
Shopping			
Just relaxing			
Driving around			
None of these			
Other (please specify)			
_____			
_____			
_____			
_____			

Q24 What were the main methods you used for travelling around Bornholm? Please choose the *three* most important. Max. three options

(1) Public bus
(2) Taxi
(3) Own car
(4) Hire car
(5) Private car provided by firm or friends/relatives
(6) Own bicycle
(7) Rented bicycle
(8) Coach tour
(9) On foot
Other_____
(please specify)

Q25 Overall, during your stay, what kind of weather have you had?

(1) Fine and sunny
(2) Sunny but windy
(3) Cold but sunny
(4) Cloudy
(5) Warm but wet
(6) Cold and wet

Q26 How has the weather been for you?

Excellent	Good	Average	Not good enough	Poor
(5)	(4)	(3)	(2)	(1)

We would now like to ask you about your expenditure on this trip.

Q27 Including travelling to and from Bornholm, how much did you and your personal party spend on Bornholm?
Please don't forget any expenditure by credit card or personal cheque.
Total amount DKK _____
If you are on a package tour/inclusive tour please give price of that tour
DKK _____
Just checking: How many people does this cover?
Number of persons _____

Q28 May we have your estimate of the breakdown of this expenditure?
Please state all amounts in Danish kroner (DKK).

		DKK	incl. in package
1	Ferry payments to and from Bornholm		
2	Accommodation on Bornholm to cover room, any meals, tips and taxes included in the bill. Don't forget any deposit prior to arrival		
3	Eating and drinking		
4	Entertainment		
5	General shopping		
6	Souvenirs		
7	Transport on Bornholm		
8	Purchase of fuel, repairs and other items at garages		
9	Expenditure at attractions (include entrance fees, cafe meals and shop purchases)		
10	Other travel expenditure such as insurance		
	Total amount		

Q29 Does this relate solely to your trip to Bornholm?
(1) Yes
(99) No

Q30 Are you able to make an estimate of the amount of your package tour attributable to your trip to Bornholm (including travel to and from the island)?
(1) Yes Total amount DKK _____
(99) No

Q31 What is the name of the tour company who supplied you the package tour?
Tour operator _____
Arranged the trip myself

Q32 Overall, what is your opinion of Bornholm as a destination to visit?

	Excellent (1)	*Good* (2)	*Average* (3)	*Not good enough* (4)	*Poor* (5)
For holidays and recreation.					
Value for money					

Q33 How likely would you be to return to Bornholm for a holiday in the near future?

Certain	*Likely*	*Maybe*	*Unlikely*	*Certainly not*
(1)	(2)	(3)	(4)	(5)

Q34 If you were likely to return, how soon would this be?

	Certain (1)	*Likely* (2)	*Maybe* (3)	*Un-likely* (4)	*Certainly not* (5)
This year					
Next year					
Within next 2 years					
Within next 5 years					

Now we would like to ask you something about yourself

Q35 What is(was) your occupation (and that of your spouse/partner)?

Own occupation: Job title_____
Type of company _____
Occupation of spouse: Job title_____
Type of company _____

Q36 Are you retired?

(1) Yes
(99) No

Q37 Which age group do you belong to?

(1) 16-24 years
(2) 25-34 years
(3) 35-49 years
(4) 50-59 years
(5) 60-69 years
(6) over 69 years

Q38 Which of the following best describes your *full-time* education?

(1) Up to 9 years
(2) 9-12 years
(3) 12 years + vocational education
(4) 12 years + academic education

Q39 Which of the following best describes your total family/household income?[11]

(1) Less than 200,000 DKK per year
(2) 200,000-400,000 DKK per year
(3) 400,000-700,000 DKK per year
(4) More than 700,000 DKK per year

Q40 Is there anything you want to say about Bornholm that has not been covered? What, if anything, did you particularly *like* about the island? Was there anything *outstanding* or extra that you did not expect?

_____
_____
_____
_____
_____

Q41 Equally important: what, if anything, did you particularly *dislike* about Bornholm? Was there anything *unsatisfactory*? Was there something missing from what you expected to find?

_____
_____
_____
_____
_____

Q42 Would you like us to communicate your *likes* and *dislikes* to the Tourist Bureau? They may want to get in touch with you. If so would you please PRINT your NAME, ADDRESS, POST CODE and TELEPHONE NUMBER here.

_____
_____
_____
_____

THANK YOU VERY MUCH FOR YOUR CO-OPERATION - YOUR HELP IS HIGHLY APPRECIATED.

[11] DKK 100 = US$ 20 = UK£ 10 = HLG 30 = FF 90.

Appendix 3. Profiles of visitors in different types of accommodation

All tables are laid out in a manner that shows all cell entries as percentages, unless otherwise specified. The basis on which these percentages are calculated are the number of respondents answering that question, or questions in the case of cross-tabulations. The number of respondents is shown in bold type at the top of each table. That number for a given category may change from table to table because of incomplete answers.

Table 35. Purpose of visit

Percentages

Purpose **Base: All visitors**	**Small hotels** **130**	**Medium hotels** **548**	**Large hotels** **560**	**Holiday centres** **308**	**Youth hostels** **133**	**Camp sites** **738**	**Holiday cottages** **1590**	**Total** **4007**
Business	4	8	24	3	4	2	1	6
Holiday	85	83	68	85	71	87	86	83
Holiday/VFR	7	4	3	7	10	7	9	7
VFR	0	1	*	1	4	*	1	1
Other[1]	4	4	5	4	11	4	3	3
Sum	100	100	100	100	100	100	100	100

Notes: * means less than 0.5%

1. Includes scout camp, sport arrangements, etc.

Table 36. Country of residence

Percentages

Purpose **Base: All visitors**	**Small hotels** **111**	**Medium hotels** **457**	**Large hotels** **379**	**Holiday centres** **262**	**Youth hostels** **94**	**Camp sites** **642**	**Holiday cotta-ges1371**	**Total** **3316**
Denmark	21	25	11	48	51	39	32	31
Sweden	18	18	17	12	27	13	3	10
Germany	57	52	64	28	14	36	62	52
Norway	4	3	6	4	6	5	2	3
Other	1	3	2	9	2	7	2	4
Sum	100	100	100	100	100	100	100	100

Table 37. Type of visit

Percentages

Type of visit **Base: Holiday makers**	**Small Hotels** **111**	**Medium hotels** **456**	**Large hotels** **379**	**Holiday centres** **262**	**Youth hostels** **94**	**Camp sites** **643**	**Holiday cottages** **1371**	**Total** **3316**
First time visitors	41	53	60	45	34	44	42	46
Repeat visitors	59	47	40	55	66	56	58	54
Sum	100	100	100	100	100	100	100	100

Table 38. Party size

Percentages

Party size Base: Holiday makers	Small Hotels 109	Medium hotels 450	Large hotels 375	Holiday centres 258	Youth hostels 91	Camp sites 642	Holiday cottages 1363	Total 3288
1 person	10	13	10	4	9	6	4	7
2 persons	72	65	61	31	43	48	36	46
3 persons	10	11	11	16	17	15	16	14
4 persons	3	8	13	30	18	25	27	22
5 persons	2	1	3	12	7	5	9	6
6+ persons	3	2	2	7	6	1	8	5
Average	2.18	2.23	2.62	3.75	3.07	2.84	3.30	2.98

Table 39. Evaluation of accommodation

Percentages

Evaluation Average score[1] Base: Holiday makers	Small hotels 106	Medium hotels 425	Large hotels 355	Holiday centres 240	Youth hostels 89	Camp sites 427	Holiday cottages 1057	Total 2699
Service	4.4	4.2	4.2	3.9	3.8	4.2	3.9	4.1
Accommodation	4.1	4.0	4.1	3.8	3.7	4.1	4.1	4.0
Food and beverages	4.3	4.2	4.2	3.7	3.7	3.9	4.1	4.1
Cleaning standard	4.3	4.0	4.0	3.3	3.7	4.0	3.7	3.8
Price level	3.8	3.7	3.5	3.4	3.1	3.5	3.4	3.5
Facilities	3.8	3.6	3.8	3.5	3.4	3.9	3.8	3.8
Location	4.4	4.4	4.3	4.1	4.2	4.5	4.3	4.3
Decor	3.8	3.8	3.8	3.5	3.3	4.0	3.9	3.8
Value for money	4.0	3.8	3.7	3.6	3.3	3.7	3.6	3.7

Note: 1. The range was 'Excellent'=5 to 'Poor'=1.

Table 40. Length of stay

Percentages

Length of stay Base: Holiday makers	Small hotels 111	Medium hotels 456	Large hotels 377	Holiday centres 261	Youth hostels 94	Camp sites 641	Holiday cottages 1370	Total 3310
1-3 days	5	17	15	7	18	6	1	7
4-7 days	50	45	42	44	48	28	27	34
8-14 days	31	29	33	41	30	45	45	40
15-21 days	11	8	8	8	3	16	22	15
More than 21 days	3	1	2	*	1	5	5	4
Sum	100	100	100	100	100	100	100	100
Average (days)	8.96	7.58	8.04	8.44	6.48	10.78	12.09	10.20

Note: * means less than 0.5%.

Table 41. Party composition

Percentages

Party composition Base: Holiday makers	Small hotels 111	Medium hotels 454	Large hotels 377	Holiday centres 262	Youth hostels 94	Camp sites 639	Holiday cottages 1367	Total 3304
Travelling alone	7	7	6	1	9	2	1	3
Husband/wife/partner only	64	56	55	29	31	37	31	39
Family group: children under 15	6	9	15	41	25	36	41	31
Family group: children grown up	5	4	8	14	12	6	10	8
Family/friends	15	17	10	11	18	15	16	15
Shopping tour	3	4	4	2	1	0	*	1
Other	0	3	2	2	4	4	1	3
Sum	100	100	100	100	100	100	100	100

Note: * means less than 0.5%.

Table 42. Respondents' Age

Percentages

Age Base: Holiday makers	Small hotels 106	Medium hotels 420	Large hotels 351	Holiday centres 239	Youth hostels 88	Camp sites 617	Holiday cottages 1298	Total 3119
16-24 years	3	2	2	7	5	9	4	5
25-34 years	12	6	7	16	23	22	16	15
35-49 years	26	24	30	45	47	41	43	38
50-59 years	28	28	27	20	15	19	25	24
60-69 years	21	26	23	9	9	8	9	13
Over 69 years	10	14	11	3	1	1	3	5
Sum	100	100	100	100	100	100	100	100

Table 43. Gross family income per annum

Percentages

Family income Base: Holiday makers	Small hotels 91	Medium hotels 332	Large hotels 270	Holiday centres 204	Youth hostels 80	Camp sites 550	Holiday cottages 1119	Total 2646
Less than DKK 200 000	26	24	16	18	18	20	14	18
DKK 200 000-400 000	51	50	47	44	50	52	46	48
DKK 400 000-700 000	22	19	27	33	32	25	31	28
Greater than DKK 700 000	1	7	10	5	0	3	9	6
Sum	100	100	100	100	100	100	100	100

Appendix 4. Questionnaire for business survey

Revenue and expenses (in current prices, DKK 000s)

1. Gross revenue

Revenue from hotel:	
Revenue from restaurant:	
Revenue from kiosk sales:	
Revenue from guided tour:	
Other revenue:	
Total revenue:	

2. Detailed information on gross expenses

Category	**Direct purchase** (DKK 000s)	**Direct purchase from** (% of direct purchase)		
	amount	**Bornholm**	**Denmark**	**Import**
Food				
Beverages				
Other purchase for sale (for example, cigarettes, confectionery, etc.)				
Kitchenware and equipment				
Other variable costs (e.g. for the hotel rooms)				
Electricity				
Water				
Oil/gas				
Heating				
Rent				
Repair/maintenance				
Laundry				
Cleaning by outside contractors				
Telephone				
Insurance				
Advertising and marketing				
Administration				
Auditing				
Others (Please indicate)				
Total:				

3. Gross wages

Wages to:	**Bornholm**	**Denmark**	**Other country**
Administration:			
Fixed employees:			
- in restaurant			
- in kitchen			
- for cleaning			
- at reception			
Seasonal employees:			
- in restaurant			
- in kitchen			
- for cleaning			
- at reception			
Total wage expenses:			

4. Taxes and other public expenses

Income tax/company tax:	
VAT and other expenditure (e.g. green taxes):	
Property tax:	
Total amount:	

5. Property expenses

Interests and loan repayment:	
Instalments:	
Other expenditure (e.g. dividend to owner and shareholders):	
Total expenses:	

6. Employment

Please tell us the number of employees in the following groups:
Year-round/seasonal, full-time/part-time.

From Bornholm

	Year-round		**Seasonal**[1]	
	Full-time	Part-time[2]	Full-time	Part-time[2]
Owner(s)				
Spouse				
Manager				
Skilled				
Unskilled				
Total				

1 The average number of weeks for a seasonal employee in the current year is ____.
2 Part-time employee means one who works less than 25 hours a week.

From other regions of Denmark

	Year-round		**Seasonal**[1]	
	Full-time	Part-time[2]	Full-time	Part-time[2]
Owner(s)				
Spouse				
Manager				
Skilled				
Unskilled				
Total				

1 The average number of weeks for a seasonal employee in the current year is ____.
2 Part-time employee means one who works less than 25 hours a week.

From other countries

	Year-round		**Seasonal**[1]	
	Full-time	Part-time[2]	Full-time	Part-time[2]
Owner(s)				
Spouse				
Manager				
Skilled				
Unskilled				
Total				

1 The average number of weeks for a seasonal employee in the current year is ____.
2 Part-time employee means one who works less than 25 hours a week.

Table 44. Hotel analysis across the whole of Denmark by geographical area

Figures are percentages of turnover

Geographical areas:	**Whole of Denmark** (1)	**Greater Copenhagen** (2)	**Whole of Denmark excluding (2)** (3)	**Denmark provinces** (4)
Revenue:				
Sale of hotel rooms	45.55	53.54	41.90	39.02
Restaurant revenue, incl. services	41.91	30.40	47.16	50.79
Hiring out of rooms/meeting halls	3.89	3.03	4.29	4.15
Room telephones	2.52	4.66	1.53	1.18
Other	6.13	8.37	5.12	4.86
Revenue, total:	**100**	**100**	**100**	**100**
Expenditures:				
Food/drink, etc.	12.25	7.03	14.63	15.31
Cleaning	5.4	5.2	5.49	4.87
Laundry	2.1	1.93	2.17	2.16
Repairs and maintenance	2.85	3.89	2.38	2.54
Sales and marketing	3.57	4.82	3.00	2.59
Credit card commission	1.24	1.53	1.11	1.20
Administration	1.27	2.66	0.63	0.78
Rent	3.85	0	5.6	5.4
Wages and salaries, hotel	12.21	8.01	14.13	11.18
Wages and salaries, restaurant	14.13	12.57	14.84	15.97
Other	0.56	0.94	0.39	0.52
Expenditure, total:	**59.43**	**48.58**	**64.37**	**62.52**
Other specific expenditure	28.29	33.58	25.89	27.15
Depreciation	6.96	15.00	3.29	3.19
Surplus before interest	5.32	2.84	6.45	7.14

Source: *Sektoranalyse af hotel - & restaurnaterhvervet i Danmark*, Solutions for Business, July 1992, p. 103.

Table 45. Hotel analysis across the whole of Denmark by hotel size

Figures are percentages of turnover

Hotel size division: (in million kroner)	**0 - 1** (1)	**1 - 2.5** (2)	**2.5 - 10** (3)	**10 - 50** (4)
Revenue:				
Sale of hotel rooms	45.07	41.50	40.23	47.63
Restaurant revenue, incl. services	38.71	51.32	54.44	43.05
Hiring out of rooms/meeting halls	0.18	2.03	1.73	4.25
Room telephones	9.71	0.47	1.04	2.35
Other	6.33	4.68	2.56	2.72
Revenue, total:	**100**	**100**	**100**	**100**
Expenditures:				
Food/drink, etc.	19.99	19.67	19.13	11.98
Cleaning	4.30	3.70	4.22	5.38
Laundry	1.96	2.66	2.53	2.52
Repairs and maintenance	3.77	3.56	2.81	2.61
Sales and marketing	1.64	2.90	3.02	2.32
Credit card commission	0.33	0.18	1.90	1.26
Administration	0.29	0	0.02	1.08
Rent	0.45	0.53	2.66	6.14
Wages and salaries, hotel	14.39	12.66	14.90	10.24
Wages and salaries, restaurant	3.40	6.39	13.15	17.25
Other	0.13	0.06	0.40	0.21
Expenditure, total:	**50.65**	**52.31**	**64.74**	**60.99**
Other specific expenditure	24.18	24.03	23.15	25.98
Depreciation	15.88	6.29	5.55	4.38
Surplus before interest	9.29	17.37	6.56	8.65

Source: *Sektoranalyse af hotel - & restaurnaterhvervet i Danmark*, Solutions for Business, July 1992, p. 104.

Table 46. Restaurant analysis across the whole of Denmark by geographical area

Figures are percentages of turnover

Geographical areas:	**Whole of Denmark** (1)	**Greater Copenhagen** (2)	**Whole of Denmark excluding (2)** (3)	**Denmark provinces** (4)
Revenue:				
Sales of food	53.69	59.95	51.25	52.94
Sales of drink	39.58	37.59	40.35	37.60
Hiring out of rooms/meeting halls	2.78	1.75	3.20	3.65
Other	3.95	0.71	5.20	5.37
Revenue, total:	**100**	**100**	**100**	**100**
Expenditures:				
Food/drink, etc.	31.86	28.51	33.16	33.35
Cleaning	2.38	3.05	2.12	2.13
Laundry	1.50	1.66	1.44	1.54
Repairs and maintenance	1.94	1.53	2.10	2.26
Sales and marketing	2.47	3.28	2.16	2.24
Administration	0.23	0.48	0.14	0.17
Rent	1.67	1.97	1.56	1.83
Wages to services	13.06	13.24	12.99	11.47
Wages and salaries in restaurant	20.53	27.03	17.99	18.84
Other	0.08	0.01	0.12	0.12
Expenditure, total:	**75.72**	**80.76**	**73.78**	**73.95**
Other specific expenditure	12.50	6.35	14.87	15.32
Depreciation	2.79	2.29	2.99	2.87
Surplus before interest	8.99	10.60	8.36	7.86

Source: *Sektoranalyse af hotel - & restaurnaterhvervet i Danmark*, Solutions for Business, July 1992, p. 108.

Table 47. Restaurant analysis across the whole of Denmark by restaurant size

Figures are percentages of turnover

Restaurant size: (in million DKK)	**0.5 - 1** (1)	**1 - 2.5** (2)	**2.5 – 5** (3)	**over 5** (4)
Revenue:				
Sales of food	44	50	59	54
Sales of drink	48	46	36	37
Hiring out of rooms/meeting halls	2	1	2	4
Other	6	3	3	5
Revenue, total:	**100**	**100**	**100**	**100**
Expenditures:				
Food/drink, etc.	36	34	35	29
Cleaning	1	1	2	3
Laundry	2	1	2	1
Repairs and maintenance	3	2	2	2
Sales and marketing	2	3	3	2
Administration	0	0	0	0
Rent	1	1	2	2
Wages to services	9	11	17	12
Wages and salaries in restaurant	15	12	14	27
Other	0	1	0	2
Expenditure, total:	**68**	**66**	**76**	**80**
Other specific expenditure	6	16	13	8
Depreciation	3	3	3	3
Surplus before interest	23	15	8	9

Source: *Sektoranalyse af hotel - & restaurnaterhvervet i Danmark*, Solutions for Business, July 1992, p. 109.

Table 48. Comparison of US operating statistics

As a percentage of sales

	Quick-service restaurants	Limited menu table-service restaurants	Table-service restaurants
Food costs[a]	34.3	35.6	36.2
Beverage costs[b]	32.3[f]	28.2	27.8
Product costs[c]	34.6	34.2	34.5
Payroll and related costs[d]	29.2	31.1	33.4
Prime costs[e]	63.8	65.3	67.9
Other operating costs	13.7	15.9	16.5
Occupancy and capital costs[g]	14.4	12.1	12.4
Profit before income taxes	8.2	4.3	3.2

Notes: a Food cost as percentage of food sales.

b Beverage cost as percentage of beverage sales.

c Total food and beverage cost as percentage of total food and beverage sales.

d Includes employee benefits.

e Total of product cost and labour cost.

f Applies to some operations.

g Includes other deductions.

Source: Lundberg, D. et al, 1995, *Tourism Economics*, p. 87.

Figure 17. Linkage between the tourist-related sectors and other sectors

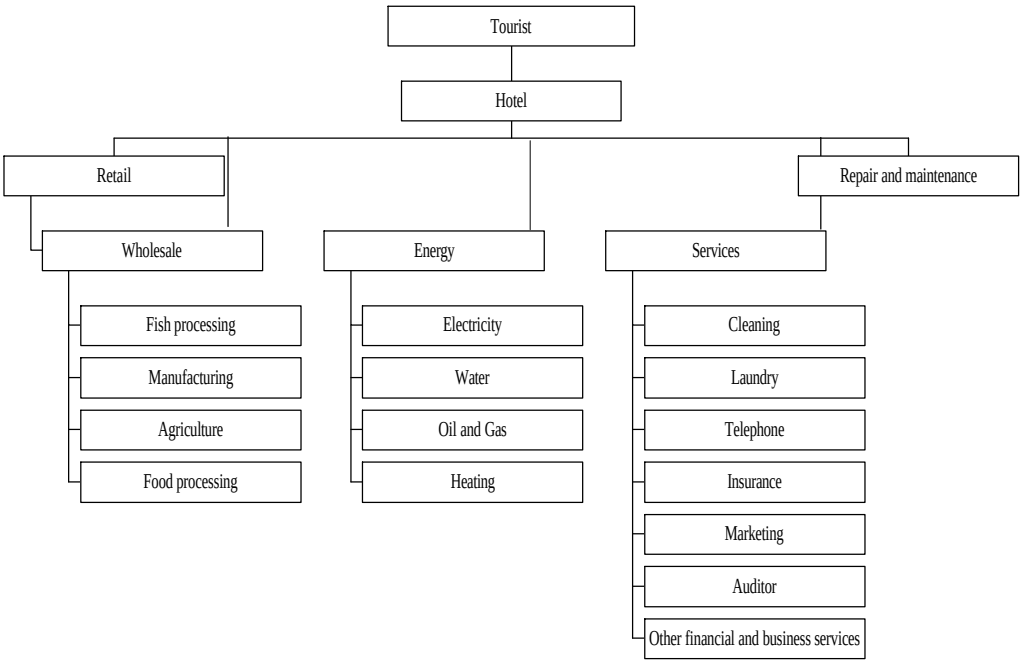

Table 49. Local input coefficients from 34 sectors to the tourism-related sectors on Bornholm

Sector:	HC	LH	MH	SH	YH	CMP	RES	FF	MU	TAXI	HOC
Agriculture/mining	0.00132	0.00184	0.00139	0.00155	0.00154	0.00078	0.00311	0.00335	0.00048	0.00000	0.00000
Fishing	0.00063	0.00089	0.00067	0.00074	0.00074	0.00037	0.00149	0.00161	0.00023	0.00000	0.00000
Fish processing	0.00527	0.00736	0.00554	0.00618	0.00614	0.00311	0.01240	0.01338	0.00190	0.00000	0.00000
Food processing	0.03134	0.04374	0.03292	0.03675	0.03653	0.01849	0.07373	0.07959	0.01127	0.00000	0.00000
Manufacturing	0.00350	0.00250	0.00040	0.00020	0.00180	0.00191	0.00135	0.00155	0.00120	0.00020	0.00050
Electricity and gas	0.01517	0.00375	0.00468	0.00412	0.00936	0.01614	0.00974	0.00899	0.00832	0.00026	0.00045
Heating and hot water	0.01050	0.02000	0.00100	0.00000	0.00000	0.00000	0.00000	0.00000	0.01000	0.00000	0.03500
Water	0.00100	0.00200	0.01220	0.00770	0.00180	0.00134	0.00500	0.00100	0.00290	0.00000	0.00800
Construction	0.10050	0.01670	0.04220	0.05560	0.02440	0.04880	0.01800	0.01380	0.02050	0.00200	0.08200
Wholesale	0.00389	0.00460	0.00257	0.00229	0.00555	0.01020	0.00459	0.00554	0.00070	0.00500	0.00010
Retail	0.00826	0.01153	0.00867	0.00968	0.00963	0.00487	0.01943	0.02097	0.00297	0.01200	0.00030
Public transport	0.00090	0.00036	0.00036	0.00036	0.00036	0.00036	0.00045	0.00045	0.00027	0.00450	0.00027
Sea transport	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00300	0.00010
Air transport	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00002	0.00001	0.00002
Communication	0.01060	0.00640	0.01270	0.00890	0.00780	0.00930	0.00550	0.00340	0.00550	0.00500	0.00095
Financial/insurance	0.02000	0.02150	0.02020	0.02730	0.01720	0.02350	0.01400	0.01160	0.01500	0.02328	0.03333
Dwelling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Business service	0.01230	0.02300	0.01220	0.03480	0.01640	0.04150	0.02000	0.01420	0.02500	0.01750	0.00250
Market service	0.02530	0.03500	0.03750	0.03560	0.03960	0.04170	0.01900	0.00830	0.01130	0.00520	0.00001
Recreation	0.00007	0.00007	0.00000	0.00007	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00007
Household service	0.01540	0.03400	0.03580	0.00010	0.01450	0.00100	0.00600	0.00180	0.01200	0.01600	0.01130
Other services	0.00110	0.00110	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00050	0.05660	0.00200
Public services	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00400
Holiday centres	0.00007	0.00007	0.00007	0.00015	0.00015	0.00015	0.00007	0.00007	0.00001	0.00001	0.00003
Large hotels	0.00015	0.00015	0.00015	0.00031	0.00031	0.00031	0.00015	0.00015	0.00002	0.00002	0.00006
Medium-size hotels	0.00007	0.00007	0.00007	0.00013	0.00013	0.00013	0.00007	0.00007	0.00001	0.00001	0.00003
Small hotels	0.00002	0.00002	0.00002	0.00005	0.00005	0.00005	0.00002	0.00002	0.00000	0.00000	0.00001
Youth hostels	0.00002	0.00002	0.00002	0.00005	0.00005	0.00005	0.00002	0.00002	0.00000	0.00000	0.00001
Campsites	0.00005	0.00005	0.00005	0.00010	0.00010	0.00010	0.00005	0.00005	0.00000	0.00000	0.00002
Restaurants	0.00042	0.00042	0.00042	0.00085	0.00085	0.00085	0.00042	0.00042	0.00004	0.00004	0.00017
Fast food	0.00018	0.00018	0.00018	0.00036	0.00036	0.00036	0.00018	0.00018	0.00002	0.00002	0.00007
Museums	0.00003	0.00003	0.00000	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00003
Taxis	0.00020	0.00008	0.00008	0.00008	0.00008	0.00008	0.00010	0.00010	0.00006	0.00100	0.00006
Holiday cottages	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Sum:	0.26840	0.23757	0.23230	0.23419	0.19557	0.22559	0.21501	0.19075	0.13032	0.15165	0.18139

Appendix 5. Aggregation key for regional I-O table

Table 50. Aggregation key for regional I-O table from 117 to 34 sectors

New sector no	Sector	Number in 117-industry group
01	Agriculture and mining	1-5, 7-8
02	Fishing	6
03	Fish processing	15 and 18
04	Food processing	9-14, 16-17, 19-29
05	Manufacturing	30-90
06	Electricity and gas	91-92
07	Heating	93
08	Water	94
09	Construction	95
10	Wholesale	96
11	Retail	97
12	General transport	99-100, 102, 104
13	Ferry	101
14	Air transport	103
15	Communications	105
16	Financial and insurance service	106-107
17	Residential	108
18	Business services	109
19	Market service	110
20	Recreation	112
21	Household service	114
22	Other services	111 113, 115-116
23	Government service	117
24	Holiday centres	split from 98
25	Large hotels	split from 98
26	Medium-size hotels	split from 98
27	Small hotels	split from 98
28	Youth hostels	split from 98
29	Campsites	split from 98
30	Restaurants	split from 98
31	Fast food establishments	split from 98
32	Museums	split from 112
33	Taxis	split from 99
34	Holiday cottages	split from 108