

**CLIMATE AND THE DESTINATION CHOICE OF GERMAN TOURISTS:
A SEGMENTATION APPROACH**

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ABSTRACT

The purpose of this study was to examine the climate preferences of German tourists in terms of their demand for various countries. A survey of the holiday travel behaviour of German citizens during 1997 was segmented using three criteria: phase in the life cycle, holiday motivation and holiday activities, and region of origin. Statistical regression analysis was used to estimate 14 different demand equations, which included average monthly temperature, average monthly precipitation and the monthly frequency of wet days as explanatory variables. The results showed that there were indeed different preferences across age, activity groups, and regions. Optimal temperature ranged from 22°C to 24°C, and differences in the steepness of the climate-demand relationship could be seen. Spain had the highest climate index values for the month of August for all segments, and the segment *swimming and sunbathing* had the highest index values for all segments. This study provides useful information for the construction of tourism scenarios, which could be used to improve climate change impact studies.

KEYWORDS: *Segmentation, Tourism demand, Climate index*

INTRODUCTION

Climate is an important factor in determining tourism demand. Climate change will therefore affect tourism by making certain locations more attractive, and others less. Previous papers on the impact of climate change on tourism are largely restricted to the behaviour of the average tourist (1,2,3). However, there is little reason to assume that all tourists are a homogenous group. Scenarios based on the behaviour of the average tourist are likely to be wrong if one considers that the age structures of populations change, and that new trends are always developing. This paper investigates the climate-related behaviour of several classifications of German tourists.

Market segmentation involves defining tourist groups according to certain demographic, behavioural, or psychographic traits. In the numerous segmentation studies in the literature the segments are compared according to socio-economic characteristics, holiday characteristics, or preferences for certain destination characteristics. The objective of this study was to combine the segmentation approach and the travel cost model approach, used in the studies by Hamilton, Maddison and Lise and Tol (1,2,3), to examine the climate preferences of different segments. A survey of the holiday travel behaviour of German citizens during 1997 was segmented using three different means: phase in the life cycle, holiday motivation and holiday activities, and region of origin. In the following section, the methods used to segment the survey data and to analyse the climate-demand relationships of the segments are presented. The climate optima and, as a means of comparison, the climate index values for certain destinations are discussed in section three. The fourth section concludes with a discussion of the results.

METHODS

The original survey used in the study by Hamilton (1) contained the responses of 7780 German citizens in 1998 about the holidays that they took in 1997 (4). The data set was originally constructed so that, for every destination and month, the total number of visits by the survey group was calculated. This was used as the dependent variable in the statistical estimation. In this study fourteen different datasets were created for the segments defined in Table 1. Firstly, segmentation according to the stage in the life phase of the respondents was carried out. There were eight possible responses covering three age groups and whether or not there were dependent children in the household. These were combined to form four clusters. Secondly, there were eight survey questions on motivation and nine on holiday activities.

Three segments were produced for both motivation and activities. Thirdly, information was available on the federal state-of-residence of the respondent. There are 16 federal states in Germany. These were used to form four segments, which captured broad regions of topographic and climatic similarity.

Table 1: Segment definitions

Segment name	Definition
<i>Life phase segments</i>	
YOUNG	From 14 to 39 years old
CHILDREN	Families with children under 14
MIDDLE	From 40 to 59 years old
SENIOR	Older than 60 years
<i>Regional segments</i>	
EAST	Berlin, Brandenburg, Saxony, Saxony-Anhalt and Thuringia
NORTH	Bremen, Hamburg, Mecklenburg-Western Pomerania, Lower Saxony and Schleswig-Holstein
SOUTH	Baden-Württemberg and Bavaria
WEST	Hessen, North Rhine-Westphalia, Rhineland-Palatinate and Saarland
<i>Motivation and activity segments</i>	
SPORT	Taking part in sport
HEALTH	Doing something for one's health and appearance
FAMILY	Spending time with one's partner, friends and family
OUTDOOR	Walking, hiking, cycling and other outdoor activities
SIGHTS	Sightseeing and taking part in cultural events
SWIMSUN	Sunbathing and swimming

In Hamilton (1) the following specification was estimated using panel corrected least squares regression for the complete data set:

$$\log(VISITS) = \alpha + \beta_1 X + \beta_2 TEMP^2 + \beta_3 TEMP^3 + \beta_4 TEMP^4 + \beta_5 PRE + \beta_6 PRE^2 + \beta_7 WETD + \beta_8 WETD^2 + e$$

where X represents all other non –climate characteristics of the countries (see (1) for more detail on these other variables), TEMP is the average monthly mean temperature, PRE is the average monthly precipitation (mm) and WETD is the average number of wet days per month (5). For each segment, it is possible to compare the estimated coefficients. Moreover, the estimated coefficients can be used to estimate the optimal value of the climate variables (2). In addition, climate index values for a particular month and destination can be calculated using the estimated coefficients of the climate variables. In the following section the climate index values for the month of August are presented and compared for certain European countries and segments.

RESULTS

The temperature optima ranged from 22°C to 24°C. There were, however differences in the steepness of the temperature-demand relationship. The segment CHILDREN had the highest optimal temperature of 24°C, and the relationship between temperature and demand was much more peaked for this segment. Those with children prefer destinations that are near this optimal temperature. A change in the temperature would lead to larger changes in demand than it would for the YOUNG segment, that had a similar optimal temperature but a less peaked temperature-demand relationship. The optimal wet day frequency ranged from 11 to 13 wet days per month. Again, the segment CHILDREN had a more peaked wet days-demand relationship than the other segments. SOUTH and WEST had an optimal temperature of 23°C. The estimated temperature-demand relationship, however, was much steeper for the segment SOUTH. It is interesting that SOUTH and WEST had significant climate optima, as the south west of Germany is the warmest and sunniest region of Germany. It would seem that tourists with a warmer home climate are more particular about their holiday destination climate. There was little difference in the optima for temperature or for wet days across the motivation segments. Nevertheless, differences in the steepness of the climate-demand relationships could be seen.

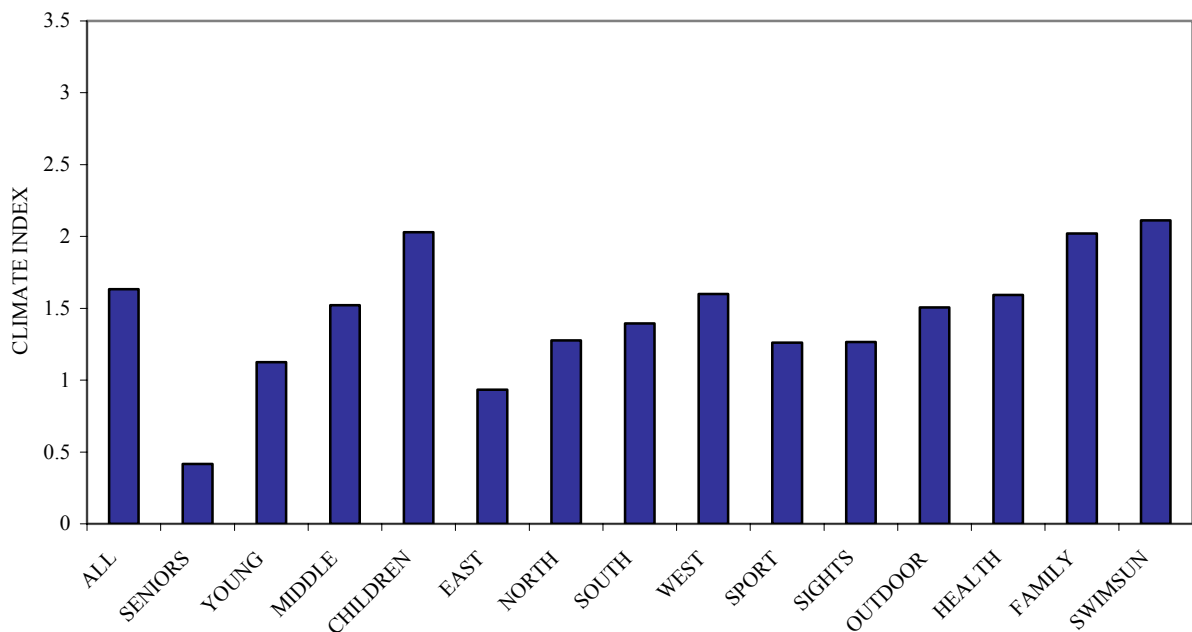


Figure 1: Climate index values for Germany in the month of August for all segments

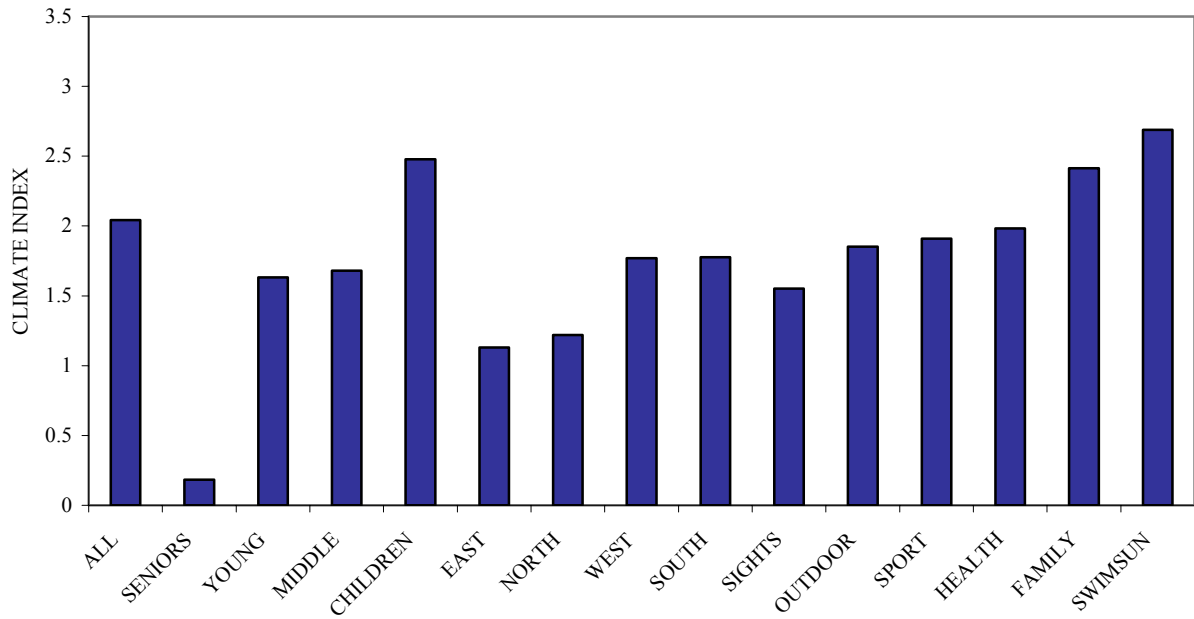


Figure 2: Climate index values for Greece in the month of August for all segments

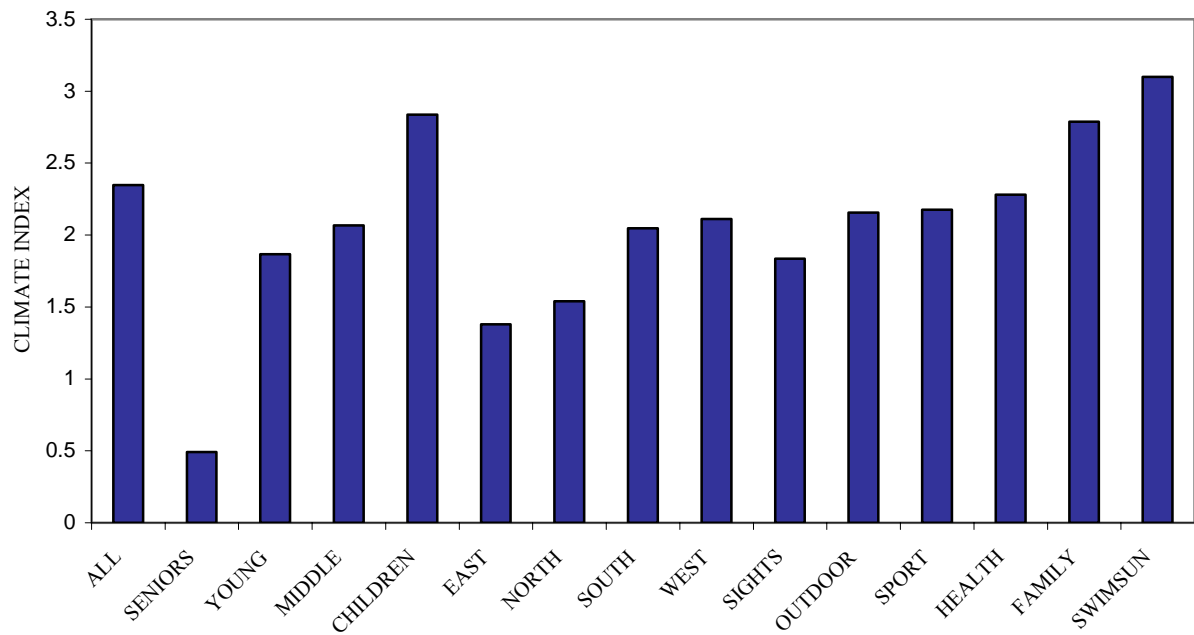


Figure 3: Climate index values for Spain in the month of August for all segments

The segment FAMILY had the steepest and highest demand relationship for temperature and wet day frequency. As before, there were differences in the steepness of the temperature-

demand relationships. SWIMSUN had the steepest relationship, particularly as the temperature climbed above 23°C.

The climate index values for Germany, Greece, and Spain were calculated for all of the segments and are shown in Figures 1 to 3. It can be seen that Spain had the highest index values of these three countries for all of the segments. The index values were highest for the segments with dependent children, those motivated to spend time with their families, and the segment of tourists who were swimming and sunbathing on their holiday.

DISCUSSION

For the fourteen segments presented here, the temperature optima ranged from 22°C to 24°C. There were, however, differences in the steepness of the temperature-demand relationship. This was markedly so for the segments of tourists with dependent children and for those whose activities included sunbathing and swimming. Moving away from the optimal temperature lead to a sharp drop in demand, particularly for temperatures above the optimal. More than one third of the days in a month with rain may seem high for an optimal holiday climate. It must be borne in mind that a wet day is one where there is more than 1mm of rain and such a frequency is normal for a central European summer, or early and late summer in southern Europe. Moreover, climate is not just a thermal or physical factor it is also an aesthetic one, in that it affects the appearance and type of flora, the appearance of the built environment and visibility among other things. Occasional rain is not necessarily detrimental for tourism demand. There are also some more practical effects of regular rain, such as water availability, which may be considered by the tourist. The ranking of tourist destinations, using the climate index developed in Hamilton (1), did not differ significantly across the segments. Nevertheless, the size of the climate index, on average and for the individual destinations, did differ. The most preferred destination in August, in terms of climate, was Spain.

The results of this study confirm many of the results of previous segmentation studies. This can be seen in the differences in preferences across the life cycle or across activities. Like Mykletun et al. (6), this study examined several kinds of segmentation and used regression analysis to provide detail on the different preferences of the different groups. Previous studies that examined destination image preferences did so using a ranking of attributes (7). In this study, demand for a destination has been estimated with respect to environmental characteristics, such as climate or beaches. This not only provides information on what is important for each segment, but also on how this quantitatively affects demand.

For climate change impact studies a segmentation approach can provide useful information.

Scenarios of population and economic change are only two aspects that will shape the development of tourism in the future. New trends or structural changes in the population will also affect demand. This study provides quantitative relationships, for different segments, such as seniors, health tourists or tourists from different geographic regions. It was shown that regions with a warmer climate generate tourists that are more particular about their holiday destination climate. It would seem that home climate is less of a push factor than a pull factor. Applying this to countries, we would then expect that warmer countries would also produce tourists that are less tolerant of temperatures away from the optimal. This has implications for climate change impact studies. Climate change may result in many origin countries having a climate closer to their optimal temperature, which combined with a preference, *ceteris paribus*, for domestic tourism, would result in a reduction in international tourism. Moreover, as a warmer climate becomes the norm, the tourists may also become more particular about their holiday destination climates.

This study examined the destination choices of German tourists in a single year. To obtain a more complete picture it would be useful to repeat this study for different years, and for different countries/regions at various scales. It is planned to use the results of this study and subsequent repetitions to generate tourism-climate scenarios to develop impact studies further, so that other aspects of societal change can be examined.

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