Analysing seasonal tourism demand variations in Wales.

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ANALYSING SEASONAL TOURISM DEMAND VARIATIONS IN WALES

by

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DECLARATION

The work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

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DEDICATION

This dissertation is dedicated to the memory of my dad
who always inspired me to reach high.
I miss you, Dad.

SUMMARY

This research examines temporal variations in tourism demand in Wales from two different perspectives. It looks at Wales in general as a destination as well as the Welsh serviced accommodation sector, the focus of the thesis being on the latter.

A range of methods is used when analysing the annual demand patterns for Wales at a national level. A comparative evaluation highlights the merits and limitations of various seasonality measures. The study demonstrates that tourism demand in Wales is significantly different from that observed in Scotland and England. It shows that lessons learned from other UK regions can only to a limited extent be transferred to Wales.

Regarding the accommodation sector, room occupancy rates from 1998 to 2002 are analysed from the viewpoint of seasonal variations. The extent to which the outbreak of foot and mouth disease and the September 11th terror attacks in 2001 affected demand patterns is also a prominent research question. The approach used is based on a combination of principal components and cluster analysis. Some modifications to existing methodologies in this area are made in order to focus on seasonality and changes in occupancy patterns. The work seeks to identify the structural components which underlie the empirical observations of occupancy performance. It also attempts to pinpoint statistically significant relationships between the characteristics of establishments and a range of typical performance profiles. As the study extends not only to the hotel sector, but also to other parts of the serviced accommodation industry, comparisons can be drawn between the different sectors.

The study's main contributions lie in the area of industry segmentation. The research reveals that conventional classifications of accommodation establishments are of only limited use when explaining the observed seasonal fluctuations and occupancy changes. Performance clusters, identified through the data-driven approach used in this study, provide a much more comprehensive picture of which establishments performed poorly and which did well. The research also demonstrates the use of the identified performance indicators for the purpose of benchmarking. In terms of the changes in 2001, the study illustrates that the effects of the crisis were by no means uniform across individual regions or particular types of establishments.

The conclusions drawn from the analysis of both seasonal demand variations at the national level and for the serviced accommodation sector are put forward as a basis for refining tourism marketing and development policies aimed at tackling seasonality in Wales.

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LIST OF ABBREVIATIONS

ACS	Average Component Score
AMC	Annual Mean Corrected
ANOVA	Analysis of Variance
AR	Amplitude Ratio
ARIMA	Autoregressive Integrated Moving Average
B&B	Bed and Breakfast Establishment
BHO	British Hospitality Organisation
BTA	British Tourist Authority
CMSC	Culture, Media and Sport Committee
CRS	Computer Reservation System
CV	Coefficient of Variation
ECM	Error Correction Modelling
FMD	Foot and Mouth Disease
GC	Gini Coefficient
IPS	International Passenger Survey
I_s	Index of Similarity
KMO	Kaiser-Meyer-Olkin
MC	Moffat Centre
MUS	**M**aximal Annual **U**tilisation Factor constrained by **S**easonality
PC	Principal Component
PCA	Principal Components Analysis
PSS	Peak Season's Share
RC	Reference Curve
RS	Research Sample
SI	Seasonality Indicator
SUF	**S**easonal **U**nder-Utilisation **F**actor
UKTS	United Kingdom Tourism Survey
VFR	Visits to Friends and Relatives
WSAOS	Wales Serviced Accommodation Occupancy Survey
WTB	Wales Tourist Board
WTO	World Tourism Organization

CHAPTER 1
INTRODUCTION

Chapter 1 outlines the scope of this work. The first section presents the background and the development of the study during the research period. This includes a general overview of the phenomenon of seasonality in tourism demand and a brief discussion concerning the importance of measuring these temporal variations. The aims and the objectives driving and guiding this research are described in the chronological sequence they were approached. The second section presents an outline of the structure of the dissertation.

1.1 Aims and Objectives of this Study

1.1.1 Regional Analysis of Seasonality in Wales

The original, fairly broad objective of this research was the analysis of seasonal demand variations in Wales from a marketing and development perspective. Temporal variations in tourism demand, particularly seasonal fluctuations, are widely recognised both as a phenomenon and an issue, by practitioners as well as in the academic literature. Seasonality is often seen as one of the most distinctive and typical features of global tourism. Most destinations, especially those in the northern hemisphere, experience some kind of variability of tourism demand with a distinct seasonal pattern.

There are several reasons why Wales was chosen as the region for this research. Tourism contributes 7% to the GDP in Wales, which is more than both agriculture (2.4%) and the construction industry (5.3%) (WTB, 2001a). However, Wales experiences a particularly pronounced tourism seasonality. The causes for these variations in visitor numbers between different times of the year are manifold, ranging from natural factors, such as the weather, to institutional factors, such as the timing of school holidays.

The mismatch between supply and demand at certain times of the year is widely seen as a problem for tourism managers and visitors. For example, in the Wales Tourism Business Monitor, tourism operators frequently cite seasonal variations as a problem affecting business performance during the winter months (WTB & MC, 2002). The seasonality issues during the winter are primarily related to the under-utilisation of resources and capacities, low returns on investments, low profitability, the high fixed costs of the facilities and their permanent staff. Bad weather, the closure of attractions and facilities and the lack of entertainment are generally the reasons for not visiting a particular destination during the off-peak season. In contrast, the peak season is often associated by visitors with over-stretched facilities and infrastructure, under-qualified seasonal staff, problems such as overcrowding, congestion, lack of parking, reduced holiday enjoyment, lack of service quality and a degree of resentment by the local population.

Extending the season, in order to spread the volume and value of tourism throughout the year, has therefore been identified as a major strategic issue for Wales, from both an economic and social perspective (WTB, 2000a). The long-term economic and environmental benefits would include more full-time job opportunities, a reduction of the over-dependency on the gradually declining peak season long holiday market, a decrease in overcrowding and less pressure on the environment in the peak season, thus improving the quality of experience for visitors (WTB, 2000a). The Wales Tourist Board (WTB) also states that a concerted programme of co-ordinated action is needed to tackle the seasonality problem efficiently by emphasising that "piecemeal and sporadic campaigns directed at niche markets will achieve only limited results" (2000a:53).

In order to develop a comprehensive framework for refining marketing and development strategies which tackle the seasonality problem, the measurement and evaluation of temporal variations are crucial. Lundtorp (2001) names the following most important reasons for measuring the phenomenon of seasonality:

- the economic importance and the price influence of seasonality,
- the implications of seasonality for tourism forecasting, and
- the importance for the assessment of the impacts of season extensions.

There is a wide variety of literature which analyses the phenomenon of seasonality from many differing angles, e.g. the motivations of people to travel at certain times of the year, the economic impacts of seasonality and case studies analysing the seasonal problem for particular destinations. However, even though the number of available studies and research papers has rapidly increased over the last ten years, relatively little research has been undertaken into the development of generally accepted models and measurements of seasonality. This is one of the reasons why tourist boards and tourism managers have applied different concepts and measurements, thus making it difficult to compare the acuteness of seasonal variations between destinations or across tourism industries. This study includes both an overview and an evaluation of the different seasonality measures available from a policy-making perspective.

While seasonality has been identified as a problem in the Welsh tourism industry, most studies analysing and quantifying seasonality in the UK have been focused on either Scotland or England. Therefore, an initial research aim was to explore whether the seasonal pattern of tourism demand in Wales differs from that observed for the UK as a whole, or for the regions of England and Scotland separately. An examination of the available data sources, for such an analysis, showed clearly that the United Kingdom Tourism Survey (UKTS) was the most suitable data source for the purpose, as it provides monthly figures for different types of domestic tourism trips for the UK overall, as well as its regions. Even a cursory inspection of the UKTS data suggested that the seasonal pattern of tourism demand in Wales is significantly different from that observed in other parts of the UK. The study attempts to pinpoint not only where these differences lie but also to investigate to what extent tourism policies, relating to seasonality, appropriate for other regions might prove suitable for Wales.

The detailed regional analysis revealed that there are not only differences between seasonality patterns in Wales, compared to the other UK regions, but also between the different types of tourism trips. The research questions were therefore further refined to include the consideration of differences in the seasonal pattern between, for example, seaside and countryside locations in Wales or between these in South and North Wales, highlighting the possible need for different marketing approaches for different destinations, sectors or segments. In order to provide more specific pointers for refining tourism marketing strategies and development policies relating to seasonality, it was decided to complement the regional analysis by a study at sectoral level.

1.1.2 Analysis of Seasonality for the Accommodation Sector

The accommodation sector was chosen as the topic in this part of the research, as it is one of the most important sectors in tourism when considered from an economic perspective. The WTB (2000a) refers to the accommodation sector as "the bedrock of a successful tourism industry" (2000a:31). An inspection of the available quantitative data sources for Wales showed that occupancy surveys for the serviced accommodation sector provide one of the few reliable sources of monthly figures, over several years, for a large and representative panel across Wales. Furthermore, for accommodation establishments, especially where serviced accommodation is concerned, the relatively high fixed costs make demand variations an important issue. The WTB states that occupancy performance in Wales, despite the improvements in recent years, is far below that achieved in many other parts of the UK. Occupancy in the off-season, for example, averages only 16% for guesthouses and approximately 30% for hotels in Wales (WTB, 2000a). Seasonality, in particular, is thus regarded as one of the main constraints in reaching high returns on investments, which then leads to a lack of regular investment in facilities and staff training (WTB, 2000a). Low seasonal variations, an extended main season and a high occupancy level are generally regarded as desirable goals.

Previous published studies concerning seasonal variations in the accommodation sector, have dealt exclusively with England and Scotland and focused only on the hotel sector. For example, occupancy patterns for English hotels have been identified in a number of studies conducted primarily in the 1980's and 1990's. The temporal patterns underlying the individual hotel occupancy series have generally been used to distinguish regional patterns of hotel occupancy performance and to predict expected occupancy profiles (Jeffrey, 1983; Jeffrey & Barden, 2000a; Jeffrey *et al.*, 2002). As none of the previous studies investigated the seasonal pattern of hotels in Wales, this research explores whether similar structural components of seasonality can be derived for Welsh hotels. Since 1997 not only hotels but also guesthouses, B&Bs and farmhouses are included in the monthly occupancy surveys. It therefore became possible to widen the scope for examining the likely effects of different marketing and development strategies. For example, not only differences in the seasonal pattern between different types of hotels, but also between seaside guesthouses, town B&Bs, countryside hotels and countryside farmhouses could be explored.

This research analyses room occupancy rates for hotels, guesthouses, B&Bs and farmhouses from 1998 to 2000 and attempts to separate the common regular patterns of variation, which define the overall structure of seasonality, from sources of variability, which are attributable to individual establishments. Using the dimensions of performance, thus obtained, the research seeks to classify groups of establishments with similar occupancy profiles. Furthermore, the study examines the relationships between key attributes, such as location, type or price, and the groupings based on empirical demand patterns, in order to provide a framework for targeting marketing strategies aiming at lengthening the main season.

1.1.3 Disturbances of Established Seasonality Patterns

The original research was based on data for the period up to, and including, the year 2000. During this work the occupancy figures for 2001 and 2002 also became available. In 2001 a number of unforeseen, dramatic events occurred. The outbreak of the foot and mouth disease (FMD) in February and the September 11th attacks severely affected the business performance of tourism enterprises in Wales. It is estimated that the FMD outbreak cost the tourism industry in Britain, an estimated £2 billion in lost business (BTA, 2002). Wales, as a rural tourism destination, was hit particularly hard and experienced a proportionally greater decline in domestic tourism volume than either England or Scotland, with 13% fewer such trips taken in 2001 (UKTS, 2002b).

The inclusion of the 2001 data in the occupancy research provided an opportunity for the analysis of the impacts of such disasters on the seasonal pattern. As fluctuations in visitation levels will be reflected in the room occupancy rates, understanding the underlying components of occupancy patterns and changes is clearly an important issue from various perspectives. The study examines the extent to which the events of 2001 have affected the occupancy performance of hotels and other accommodation establishments in Wales, as well as attempting to identify the factors which have allowed some to continue to perform well, or even to improve their occupancy rates, whilst others suffered badly.

The analysis of the 2002 data seeks to identify the stability of the seasonal patterns and the extent to which the substantial deviations, from the established patterns experienced in 2001, were reversed. Jonathan Jones, Chief Executive of the Wales Tourist Board, gave the following statement about the recovery process in 2002:

> "Evidently, the industry in Wales has taken the first steps on the road to recovery this season. There is however a lot of work still to be done, with 2001 still having a lasting effect on businesses in Wales. It is encouraging to see that nearly three quarters of those participated in the survey felt positive about the season. However, the picture for Wales as a whole is patchy, with some areas and sectors faring better than others" (WTB, 2002).

This research attempts to identify the characteristics of businesses which successfully recovered in 2002 and those of enterprises which are still in need of improvement. The study also seeks to gain insights into the occupancy change patterns, by revisiting the identified '2001 winner' and '2001 loser' establishments, in 2002. It therefore aims to provide a framework for monitoring recovery processes after a crisis, and for targeting funding, training, marketing and development policies more efficiently at those establishments, or groups of establishments, which most need them.

Below is a summary of the objectives driving and guiding this research:

- to provide an overview of the different seasonality measures, as well as their benefits, and limitations, from the perspective of a tourist board,
- to analyse the seasonal pattern of different types of tourism demand in Wales, and to compare these to other parts of the UK, notably Scotland,
- to identify to what extent marketing strategies, successfully employed in the other UK home nations, are suitable for Wales,
- to detect the general and regular common temporal patterns underlying the occupancy time series for the Welsh serviced accommodation sector, including hotels, guesthouses, B&Bs and farmhouses,
- to classify groups of establishments with similar occupancy profiles,
- to identify statistically significant relationships between the characteristics of establishments and a range of typical performance profiles,
- to develop a framework for tailoring marketing campaigns and mechanisms to the precise requirements of different segments of the accommodation sector,
- to examine the extent to which the events of 2001 have affected the occupancy performance of hotels and other accommodation establishments in Wales,
- to identify the factors which are responsible for the differentiated occupancy performance of the accommodation establishments during 2001,
- to assess the stability of the identified seasonal patterns,
- to measure the recovery process in 2002, by identifying those businesses which improved their performance and those which are still in need of improvement,

- to provide a framework for monitoring the recovery processes after a crisis, and
- to demonstrate the possible use of the performance indicators obtained for benchmarking purposes.

The structure of the dissertation reflects the chronological sequence in which the research objectives were approached. The objectives show clearly that the main contributions of this research will relate to tourism policy rather than to theory or methodology. A summary of the likely contributions is given below:

- improving the understanding of the merits and limitations of available seasonality measures, which have been used in isolation,
- providing a basis on which macro-level policies for extending the season can be evaluated,
- providing tourism practitioners with a tool for analysing seasonal variations to support tourism planning,
- providing a summary of the variable performance of the accommodation industry in Wales in relation to seasonality and changes in occupancy performance, rather than developing a scientific theory or methods for modelling seasonality,
- the main contribution is therefore likely to be in the field of 'industry segmentation' in order to provide a comprehensive picture of which establishments did perform poorly and which did well,
- providing an overview to what extend conventional classifications used to describe market segments in the accommodation sector align with the occupancy performance of identified groups of establishments, and
- to provide tourism policy makers with a basis on which marketing and development policies aimed at tackling seasonality in the accommodation sector can be evaluated.

1.2 Structure of this Study

The remaining part of this dissertation is organised as follows:

Chapter 2 presents a review of the relevant literature in the field of temporal demand variations in tourism. This includes a summary of the factors which influence demand levels and the different types of demand variations. Definitions and causes of seasonality are presented, and the various impacts on destinations and tourism businesses are outlined. An overview of the range of policy implications, tackling the seasonality problem, is provided and a number of case studies are presented. A major focus of chapter 2 is the review of articles and reports quantifying seasonal variations in general, and in the hotel industry in particular.

Chapter 3 gives a general overview of international and domestic tourism trends in the UK from 1994 to 2002, especially focusing on Wales. This includes a summary of the UK tourism data sources used for the analyses, together with their limitations. The economic importance of the tourism industry is stated both for the UK as a whole, and Wales as a region. The impacts of the different events in 2001, especially the foot and mouth outbreak, on the tourism industry are outlined. It also includes some background information on measures taken by the government to reduce the risk of spreading the disease, and their implications for tourism enterprises.

Chapter 4 deals with the methodological approach for the analysis of seasonality in Wales, at the regional level. It provides an overview of the various seasonality measures and their practical relevance. A variety of approaches are presented, ranging from simple tools, such as Seasonal Plots and Concentration Indices, to more complex methods, such as Seasonal Decomposition or Amplitude Ratios. It is also demonstrated how useful insights into patterns of seasonality can be gained by analysing the data from various different perspectives. The chapter concludes with an attempt to compare the relative merits and limitations of the different approaches introduced.

Chapter 5 presents the results for the comparative analysis of Welsh tourism seasonality. More specifically, it examines how the seasonality pattern in Wales compares to that of the UK overall, as well as that observed in Scotland, one of its main competitors in the crucially important domestic market. The overall demand picture for the period 1994 to 2002 is presented for different types of domestic tourism demand. The analysis is concerned not only with the peaks and troughs of overall demand, but also with the patterns which its various components follow during the year. A special focus is placed on the impact of the various events in 2001 on the different types of tourism demand. The chapter concludes with an attempt to distil from the analyses, some implications for marketing and development strategies in the Welsh tourism sector.

Chapter 6 provides an overview of the data source and its limitations, as well as a detailed description and discussion of the methods used for investigating temporal demand variations in the accommodation sector. The approach used in this research is based on a combination of Principal Components Analysis (PCA), ANOVA and cluster analysis. The main method is adapted from the principal components approach applied in other studies of occupancy data. There are, however, a number of important differences in the approach, which allow for a more detailed examination of seasonality patterns and occupancy changes.

Chapter 7 analyses the seasonal variations in occupancy rates for the serviced accommodation sector in Wales over the period 1998 to 2000. Some general relationships between occupancy performance and the characteristics of accommodation businesses in Wales are identified. The results are used to group establishments with similar occupancy performance profiles. As they are based on empirical demand patterns, rather than conventional classification systems, the groupings attained are of particular relevance for broad strategic planning purposes at the level of a tourist board, or other regional associations. Several concrete pointers for tailoring marketing strategies to the requirements of different segments of the accommodation sector are discussed. The application of the identified performance indicators for benchmarking purposes, using spider plots, is also demonstrated.

Chapter 8 analyses the changes in demand patterns in the serviced accommodation sector following the FMD outbreak in 2001 and the September 11th terror attacks in the USA. A major focus is on the examination of the differences between 2002, 2001 and the preceding three-year period, not only in terms of the overall occupancy levels, but also with respect to the relative performance of different types of accommodation enterprises and regions. Detailed conclusions are drawn about the temporal and spatial shifts in demand. 'Winners' and 'losers' are identified and several concrete implications for marketing and development policies are discussed. Spider plots, as a tool for the monitoring and assessment of the recovery process after a crisis on the basis of occupancy changes, are also presented.

Finally, in **Chapter 9** an overview of the study's main findings is given. The contributions of the research are discussed from theoretical and practical standpoints. The methods employed are reviewed and assessed, and the implications for Welsh tourism development are summarised. The chapter concludes with some comments on potentially fruitful directions for further research.

CHAPTER 2

LITERATURE REVIEW

Temporal variations in tourism demand provide the broad context for this research. This chapter reviews the literature relevant to this study, and is divided into four sections. First, the basic concepts and the nature of tourism demand are briefly explained and the various factors influencing demand levels are introduced. This is followed by an outline of the different types of temporal variations in tourism demand, a presentation of the general approaches to measuring tourism demand levels and a short introduction to tourism demand modelling and forecasting. Section 2.2 discusses the phenomenon of seasonality, as one of the most striking features of tourism demand variability. Allock (1994) states that, even though all share- and stakeholders, i.e. the industry, the government, the tourists and the locals acknowledge the presence and importance of seasonality of tourism, it is at the same time one of the least researched features. However, the number of available studies and research papers has rapidly increased over the last ten years. The diversity of seasonality studies available, and the lack of general standards and measurements, make it difficult for policy makers to decide how to quantify seasonality. An overview of various definitions and the causes of temporal variations in tourism demand over the course of a year are provided. This is followed by a review of the studies examining the impacts of seasonality on the tourist destination, the economy, the local communities and the visitors themselves. An outline of the various policy implications tackling the seasonality problem together with a number of case studies, analysing tourist motivations and behaviour in different seasons, are also presented. The discussion of different papers which quantify the seasonal variations, in section 2.3, serves as the research background for the study's objectives. Section 2.4 presents a summary of relevant reports, analysing temporal variations in the hotel industry focusing specifically on the application of the principal components analysis on room occupancy rates for English hotels. The chapter concludes with a summary of the main results.

2.1 Variations in Tourism Demand

2.1.1 Tourism Demand Factors

Tourism is a complex and dynamic phenomenon involving the temporary, short-term movement of people, at certain times of the year, to places away from home, and the activities undertaken during their stay at these destinations (Burkart & Medlik, 1981). The general accepted definition of tourism in a broad context is developed by the World Tourism Organization (WTO & UNSTAT, 1994) which states that:

> "Tourism comprises the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes" (1994:5).

Figure 2-1 shows the widely used model which places tourism within a systematic framework, as introduced and updated by Leiper (1979; 1995). The basic tourism system includes the movement of tourists from the tourist generating region, via a transit route region, to the tourist destination, using the components of the travel and tourism industry (Weaver & Oppermann, 2000). Leiper (1979) states that the tourism industry "consists of all those firms, organisations and facilities which are intended to serve the specific needs and wants of tourists" (1979:400).

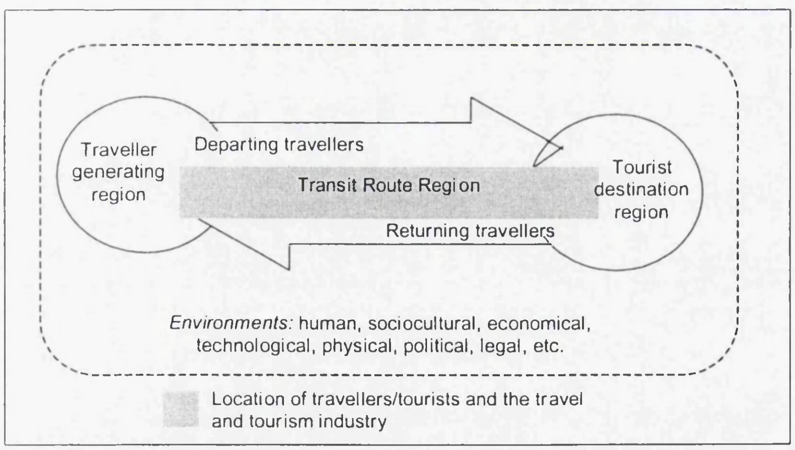


Figure 2-1: The Tourism System
Source: (Leiper, 1995)

The tourist flows and interaction between the regions are highly complex and are influenced by a variety of interrelated variables (Boniface & Cooper, 1994). There are several methods analysing these tourist flows and thus a wide variety of definitions for tourism demand are available. Mathieson and Wall (1982) define tourism demand as "the total number of persons who travel, or wish to travel, to use tourist facilities and places away from their places of work and residence" (1982:1). Pearce (1995) looks at tourism demand "in terms of the relationship between individuals' motivation [to travel] and their ability to do so" (1995:18). Cooper, Fletcher, Gilbert and Wanhill (1998) stress that there are a number of useful approaches to defining tourism demand. The economic approach, for example, views the relationship between demand and variables, such as the price, by introducing the concept of elasticities. The geographer implies a wider range of influences in addition to the price. In contrast, psychologists take especially the motivation and behaviour of the travellers into consideration, when analysing tourism demand (Cooper *et al.*, 1998).

The majority of the demand definitions, introduced so far, are based especially on the actual or effective demand, which is the most commonly measured in tourism statistics. In conceptual terms, there are however two other elements in tourism demand. First, the suppressed demand, which can either refer to potential demand which includes that part of the population which is unable to travel due to specific circumstances which might include a lack of income, or to deferred demand, which is postponed demand caused by a lack of capacities in the supply environment (Hall & Page, 1999). Second, there is the 'no demand' category which refers to the population with no desire to travel (Boniface & Cooper, 1994). These additional components have also to be taken into consideration when analysing the determinants of tourism demand.

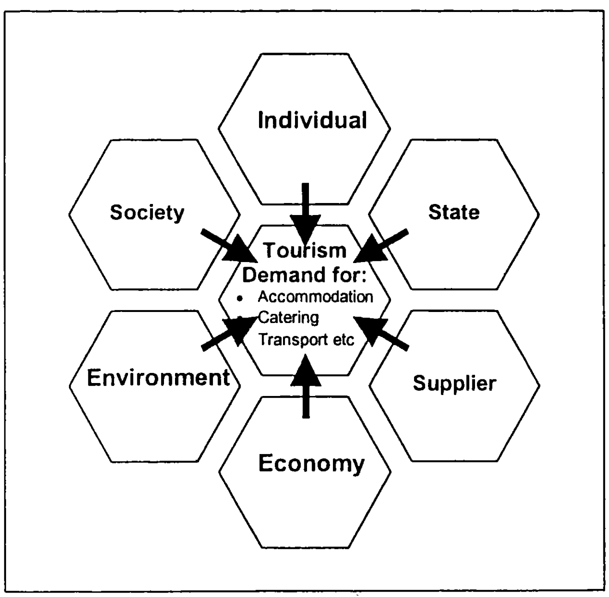


Figure 2-2: Sectors Influencing Tourism Demand
Source: (adapted from Freyer, 1995)

The timing, volume and value of tourism demand is not stable and subject to frequent changes. For example, tourist flows and the tourism industry are highly vulnerable, in some manifestations, to changes in weather, fashion and socio-political conditions (Weaver & Oppermann, 2000). An overview of the various sectors influencing tourism demand is presented in figure 2-2. The model shows clearly that the nature of tourism demand is not only complex but also dynamic. The factors, which influence the demand levels, originate in a wide variety of sectors and are interdependent of each other. For instance, economic factors, such as the amount of disposable income, not only influence tourism demand levels, but also the quality of the environment and the values of the society. As the determinants of tourism demand are well researched in the academic tourism literature only a brief outline will be given here.

As shown in Leiper's model of the tourism system (see figure 2-1), the various factors influencing the volume, value, timing and the characteristics of the tourist flows originate not only in the traveller generating region, but also in the transit region and the tourist destination. Laws (1995), for example, differentiates the influences on tourism flows to a particular destination in:

- "origin pushes (e.g. free time, discretionary income),
- inhibitors (e.g. expenses, visa requirements, difficult access, language barriers),
- diversions (e.g. new destinations, increased awareness of other destinations),
- repellents (e.g. politics, religion, violence, catastrophes), and
- destination pulls (e.g. culture, climate, unique features, advertising)" (1995:22).

Weaver and Oppermann (2000) distinguish between push-factors, which stimulate demand by 'pushing' consumers away from their usual place of residence, and pull-factors, which help to stimulate a tourism product by 'pulling' consumers towards particular destinations. Demographic, economic, political, social and technological factors are listed as push-factors. These include, for example, paid holiday entitlement, the ageing of the population, and motivational factors, such as education, marketing and urbanisation (Lickorish & Jenkins, 1997). In contrast, pull-factors comprise the accessibility to markets, the affordability and availability of attractions and services, cultural links, geographic proximity, the market image, peace and political stability and pro-tourism policies (Weaver & Oppermann, 2000). Lickorish and Jenkins (1997) emphasise the fact that pull-factors are often based on tourism attractiveness and determined within the tourism-receiving region. They list as pull-factors the quality of the tourism infrastructure, the development and quality of supportive and direct services for the tourism industry, government funds, price levels, exchange rates, value for money and marketing factors (Lickorish & Jenkins, 1997). Weaver and Oppermann (2000) stress that supply side disruptions within a destination, such as political uncertainty or shortages in the infrastructure, can have major negative impacts on the level of visitation. The most frequent used differentiation of the factors influencing tourism demand in the academic literature is in economic and non-economic factors. Table 2-1 presents a summary of the most common variables explaining the variations in the volume of tourism demand following the model by Freyer (1995) as shown in figure 2-2. It has to be noted that all factors are interlinked with each other.

Demand Factors	Examples
economic factors	standard of living, GNP, discretionary income, discretionary free time, inflation, interest rates, exchange rates, employment, paid holiday entitlement
demographic factors	current ageing of the population in tourism generating countries, reduced family size, life-cycle
socio-economic factors	population concentration, urbanisation, level of education, occupation structure, life-style, values and norms, mobility levels
political factors	legislation, passport and visa regulations, holiday regulations, 'social tourism' (opportunities for 'disadvantaged')
technological factors	transportation, electronic ticketing, CRS, internet, Virtual Reality, 'recreational technology'
environmental factors	weather, climate change, landscape, ecology
individual factors	motivations, attitudes, perceptions
supply factors	relative price, promotion, quantity and quality of tourist services, attractiveness of destination, image

Table 2-1: Factors Influencing Tourism Demand
Source: (Boniface & Cooper, 1994; Burkart & Medlik, 1981; Cooper *et al.*, 1998; Freyer, 1995; Hall & Page, 1999; Laws, 1995; Weaver & Oppermann, 2000)

The degree of influence on overall tourism demand levels and patterns varies between the factors. The majority of the general economic, political, demographic or socio-economic factors are stable and have, by nature, long-term effects. These global forces are generally beyond the influence of any individual tourism enterprise or tourism organisation (Ritchie & Crouch, 2003). In contrast, the individual and supply factors are subject to constant change and influence demand levels in the medium- or short-term.

2.1.2 Temporal Tourism Demand Variations

Policy makers and tourism managers have to ensure that the supply is able to meet the corresponding tourism demand, in terms of the needs and characteristics of the traveller, the volume of present and possible future tourist flows, and the timing of demand. Due to the nature of tourism demand, i.e. the consumer must travel to the destination, the vast majority of tourism destinations, and their tourism enterprises, experience some kind of systematic demand variations (Weaver & Oppermann, 2000). Wall and Yan (2003) emphasise, in this regard, the high demand elasticities in tourism and the only limited possibilities for tourism enterprises to adjust supply to sudden changes in demand due to the fixed cost factor. As the tourism industry tends to have generally high fixed costs and restrained capacities, it is essential to have a full understanding of the different temporal demand variations. Only then can a higher level of control over the demand side of the demand/supply equation be achieved, as insufficient demand for the capacities available will result in reduced profits (Weaver & Oppermann, 2000). In contrast, if tourism demand is exceeding the capacities of a destination, then a reduction in the quality of the visitor experience, resentment of the local population and/or long-term negative impacts on the environment and the built infrastructure are very likely. Therefore, a steady tourism demand throughout the year, as well as between the years is not only vital for the survival of an individual tourism business, but also for the economic well-being of the whole tourist destination in the long-term.

Weaver and Oppermann (2000) point out, that only by identifying these temporal demand patterns, are destination and operation managers able to develop the market strength of their product and counteract market weaknesses. The temporal variability of tourism demand variations can be differentiated in:

- long-term variations which occur over a period of several years, or even decades, and are generally related to the product life cycle,
- seasonal variations which can be identified on an annual basis, with a distinction being made between high and low season,
- weekly variations which are related to the differences in demand levels between weekdays and weekends, e.g. business and leisure visitors at hotels, and
- daily variations which relate to different peak times of services during the day, e.g. the morning as the peak check-out time in a hotel or the afternoon as the peak visitation time in a theme park (Weaver & Oppermann, 2000).

These temporal demand variations follow generally some kind of identifiable patterns. Long-term trends have to be distinguished from cyclical movements, such as economic cycles, which are shorter. These business cycles are well-known in the economies of industrial nations and are characterised by decreases in income, investments, employment and prices during times of depression (BarOn, 1975). In addition to these more or less predictable demand variations, random or short-term variations, by unusual and unpredictable events, can affect the level of tourism demand for a certain time period. Examples of such events are the terrorist attacks of 11 September 2001, the FMD in 2001 in the UK, the floods in Europe in 2002 or the canoeing tragedy in Switzerland in 2000. Ritchie and Crouch (2003) point out that destinations need to be able to respond to such crises in an effective way to enable the reduction of the negative immediate impacts of the events, as well as its longer-term consequences, to enhance their competitive position. The measurement and monitoring of tourist flows, and the identification of their temporal patterns, are therefore crucial for the profitability of a tourist destination.

2.1.3 Measuring Tourism Demand

The interest in and the value of various tourism statistics differ between the main users – the government, tourist organisations at national, regional or local levels, and the providers of tourist services. Burkart and Medlik (1981) also summarise the reasons for the statistical measurement of tourism. They state that tourism statistics are required to evaluate the magnitude and significance of tourism to a destination and to quantify the contribution to the economy or society, especially the effect on the balance of payments. Furthermore, statistics are essential in the planning and development of physical facilities to assess the need for capacities and the requirements of different volumes of tourists. The assessment of the actual and potential markets, and their characteristics, is important for the development and implementation of effective marketing and promotion activities. Tourism statistics in general can be categorised in:

- measurement of tourist volume, such as enumerating arrivals, departures and the number of visits and stays,
- expenditure-based surveys which quantify the value of tourist spending at the destination and during the journey, and
- the characteristics and features of tourists to construct a profile of the different markets and segments visiting a destination (Burkart & Medlik, 1981; Hall & Page, 1999).

There are several approaches to analysing the volume, timing and characteristics of tourism demand. These can be distinguished in tourism demand studies, focusing on the characteristics, motivations, attitudes and perceptions of the individual traveller and studies focusing on the aggregate level analysing the pattern and volumes of tourism demand (Cooper *et al.*, 1998). The micro-perspective (the understanding of the consumer behaviour of the individual traveller) is especially vital for individual tourism enterprises, such as a hotel or a tourist attraction. Consumer behaviour studies involve typically a qualitative approach, including personal interviews, focus groups or expert interviews. The macro-perspective of tourism demand (the aggregate level) is especially important for destination managers or policy makers, as they are interested in general trends and demand patterns. These studies are mostly quantitative in nature and are essential to analyse the temporal variability of tourism demand. Tourism demand statistics can be presented for the whole country, a specific region, a tourist destination or a tourism sector. Information relating to individual industries is especially important in the assessment of their performance and plans, as well as in the evaluation of their roles in the economy. In contrast, tourist organisations are more concerned with the value and volume of tourism as a whole to their destinations (Burkart & Medlik, 1981).

In general, tourism destinations derive the majority of their customers domestically. Domestic tourism is generally measured using sample surveys. These include household surveys relating to trips already made, e.g. the UKTS, en-route surveys while travelling, destination surveys and surveys by suppliers, such as accommodation occupancy surveys. It has to be borne in mind that tourism statistics derived from sample surveys are liable to varying errors, which relate to sample sizes and methodologies employed (Cooper *et al.*, 1998). One of the main problems of statistical measurement of tourism arises from the difficulty of differentiating between tourists and other travellers, and between them and the local residents and workers (Burkart & Medlik, 1981).

Demand expenditure figures are required in order to estimate the economic impact of tourism using multiplier models (Fletcher, 1994; Frechtling, 1994a) or to examine the structure of the economy using input/output analyses (Frechtling, 1989, 1994b). Demand levels are also needed, for instance, for econometric demand forecasting using market size (Witt, 1994), measuring of demand elasticities analysing the responsiveness of demand to changes in price, income etc. (Witt & Witt, 1994) or international demand forecasting using univariate time series methods (Frechtling, 1994a, 2001; Witt & Witt, 1992). There is a wide range of literature available on the topic of tourism demand modelling and forecasting. As seasonality plays a significant role in the way tourism demand is modelled, a number of studies demonstrating the variety of forecasting methods are briefly introduced in the next subsection.

2.1.4 Tourism Demand Modelling and Forecasting

The majority of the papers relating to tourism demand forecasting attempt to predict international tourist flows. Examples are the papers by Dharmaratne (1995), Lim and McAleer (2001b), Smeral and Weber (2000), and Smeral and Witt (1996). An exception is the study by Witt, Newbould and Watkins (1992) which uses several models to generate forecasts for the domestic tourism demand of visitor arrivals in Las Vegas. An overview of different forecasting models is given by Smith (1995), Frechtling (2001), Song and Witt (2000), and Witt and Witt (1992). Different forecasting methods are compared, and their accuracy in the context of tourism is assessed by Chu (1998), Martin and Witt (1989), Song, Witt and Jensen (2003), Witt, Song and Louvieris (2003), and Witt and Witt (1995). Contributions in the literature to the topic of tourism demand modelling and forecasting have shown that no single forecasting method performs consistently best across different situations, but that autoregression, exponential smoothing and econometrics are useful alternatives to the 'no change' model (Song & Witt, 2000; Witt & Witt, 1995).

Witt, Newbould and Watkins (1992) state that:

> "There is evidence that domestic tourist flows are more predictable than international tourist flows, and it seems possible to capture the major features of the data series pattern, thus generating relatively accurate forecasts of tourism demand" (1992:40).

They demonstrate that the accuracy of different forecasting methods used for international tourism demand will change when applied to domestic tourism demand, as domestic tourism is less susceptible to external influences, such as exchange rate fluctuations or the political stability. It is also shown that the exponential smoothing technique outperforms the 'no change' extrapolation model (Witt, Newbould & Watkins, 1992).

Turner and Witt (2001b) compared the forecasting performance of the causal structural time series model with the univariate structural time series model – the traditional approach to demand forecasting – in a tourism context and found that the multivariate model does not outperform the univariate model. This is also confirmed by du Preez and Witt (2003) and Kim and Ngo (2001). Kulendran and Witt (2001) examine the differences between cointegration analysis and the least squares regression approach in tourism forecasting. It is shown that even though the cointegration analysis provides more accurate forecasts than those obtained by the least squares regression, these econometric models still underperform when compared to the 'no change' model and statistical time series models.

A detailed discussion of error correction modelling (ECM) can be found in Song and Witt (2000), who have generated ECM forecasts of UK outbound holiday tourism demand. Kulendran and Witt (2003) introduce leading indicator transfer function models to generate forecasts of international tourism demand from the UK to six major destinations. The study shows that the forecast accuracy is not improved by moving from a univariate ARIMA model to a more complex leading indicator model. The research also suggests that time series models are more accurate for short-term forecasts whilst ECM models are more accurate for medium- and long-term forecasts (Kulendran & Witt, 2003).

Gonzales and Moral (1995; 1996), for example, use structural time series modelling to study the evolution of international tourism demand for Spain to forecast its trends. Structural time series modelling is also applied by Greenidge (2001) to explain and forecast tourist arrivals at Barbados from its major generating markets. The theoretical background of structural equation modelling to tourism demand analysis is discussed in detail by Turner, Reisinger and Witt (1998), and Turner and Witt (2001a).

Pattie and Snyder (1996) compare the classical time series forecasting techniques with the neural network model. They demonstrate in their study, which attempts to forecast visitor behaviour, that the neural network model is a valid alternative to classical forecasting techniques in tourism. This approach is also used by Law and Au (1999) in the forecast of Japanese tourist arrivals in Hong Kong.

Song and Witt (2003) introduce the general-to-specific approach to econometric modelling and forecasting which involves a clear model specification and estimation. They employ a general autoregressive distributed lag model which is then reduced to various specific models by imposing parameter restrictions (Song & Witt, 2003). Data on inbound tourism to South Korea from its four major generating countries are used for the estimation of the models. Song, Wong and Chon (2003) employ the general-to-specific modelling approach to forecast the demand for Hong Kong tourism by residents from the 16 major origin countries/regions.

A number of studies, available in the literature, attempt to forecast the demand for hotels. Choi (2003), for example, develops an economic indicator system for the US hotel industry to project the industry's growth and turning points, using the 'National Bureau of Economic Research turning point criteria' and the correlation method. It is shown that the performance of the indicator system has great potential as a forecasting method. The use of room occupancy rates in the forecasting of tourism demand is the topic of a wide variety of studies. For example, by applying neural networks to the forecasting of room occupancy rates for the Hong Kong hotel industry, Law (1998) found that this method outperforms the traditional approaches of multiple regression and extrapolation. The application of time series models in the forecasting of hotel occupancy rates is demonstrated in the studies by Aislabie (1992), Andrew, Cranage and Lee (1990) and Chow, Shyu and Wang (1998).

De Gooijer and Franses (1997) highlight that seasonality accounts for a major part in the variation of growth rates in quarterly and monthly business and economic time series. Research has shown that the traditional approach of seasonally adjusting economic data is linked to a number of problems. Thus there are several reasons to include seasonal fluctuations for forecasting purposes, which led to a revival of interest in seasonal modelling techniques (De Gooijer & Franses, 1997). A similar view can be taken when tourism demand forecasting is considered. The review of the wide range of tourism demand forecasting approaches revealed that there is a need, not only to incorporate long-term and cyclical variability, but also seasonal variations. This research examines tourism demand variations with a special focus on seasonality and attempts to identify the structural components underlying these seasonal variations. Therefore a detailed overview of the phenomenon of seasonality is given in the next section. Some seasonal modelling techniques with the aim of improving forecasting models will also be presented in section 2.3 of this chapter.

2.2 Seasonality

2.2.1 Importance of Seasonality Research

Seasonal variations in tourism demand are widely recognised, both as a phenomenon and an issue, by practitioners as well as in the academic literature. The first comprehensive study of tourism seasonality was published by BarOn (1975) and examines arrivals data from 16 different countries, covering a period of 17 years. Since then a vast amount of articles, research reports and case studies, dealing with several seasonality issues, have been published. These range from general concepts, definitions and measurement of seasonal variations (BarOn, 1975; Baum & Lundtorp, 2001; Butler, 1994; Grainger & Judge, 1996; Hartmann, 1986; Lundtorp, 2001; Sutcliffe & Sinclair, 1980) to topics such as sport and seasonality (Higham & Hinch, 2002) or types of seasonal visitors (Bonn, Furr & Uysal, 1992; Calantone & Johar, 1984). According to Butler (1994):

> "Seasonality has long been recognised as one of the most distinctive features of tourism, and indeed, after the movement of people on a temporary basis, may be the most typical characteristic of tourism on a global basis" (1994:332).

Allock (1994) stresses the fact that seasonality is a key feature of tourism projects, as the wide variations in demand will determine overall capacity utilisation and thus, profitability. Hartmann (1986) sees seasonality as a solely western concept by looking from a historic and cross-cultural perspective. Western industrial countries generate the majority of world tourism and were also the first to enshrine summer school holidays in legislation (Butler, 1994). As tourism destinations derive the majority of their customers domestically, seasonal variations occur especially in destinations in the northern hemisphere. It is therefore not surprising that seasonality is well documented, particularly in relation to peripheral, cold-water regions of Northern Europe and America (Lundtorp, 2001).

Even though the importance of seasonality in tourism is widely acknowledged, it is argued that the phenomenon of seasonality is, at the same time, one of the least understood (Higham & Hinch, 2002). Hinch and Jackson (2000) state that tourism seasonality research has been dominated by a focus on practice, rather than being based on theoretical models. Lundtorp (2001) also points out that there is no scientific theory on tourism seasonality. Baum and Lundtorp (2001) name the lack of in-depth and longitudinal research as one of the problems in fully understanding tourism seasonality. They furthermore state that a comprehensive picture of tourism demand variations can only be created through a detailed empirical analysis of seasonal behaviour (Baum & Lundtorp, 2001).

The majority of the academic literature dealing with the issue of seasonality identifies these systematic demand fluctuations as a 'problem', which has to be overcome or, at least, modified and reduced in effect (Butler, 1994). BarOn (1975) refers to the social and personal costs of seasonality, such as, lower quality standards of service in the peak months and overcrowding at beaches and airports, as 'seasonal loss'. The tourist industry spends considerable time, money and efforts to modify the seasonal patterns with the development and implementation of strategies to extend the summer season into the shoulder months or to create 'all season' destinations (Higham & Hinch, 2002). It is also argued that seasonality in tourism has advantages, especially when an ecological and socio-cultural view is taken in evaluating seasonality, as the off-peak season provides a time to recover. Hartmann (1986) states, therefore:

> "It would be wrong to evaluate tourist seasonality in economic terms only and to isolate a regional tourist service system from its social environment and its ecological base" (1986:31).

A close examination of the vast number of studies, reports and research papers published on the topic of tourism seasonality revealed that these can be differentiated as follows:

- definitions, general concepts, causes and impacts of seasonality (BarOn, 1975; Butler, 1994),
- seasonal employment (Ashworth & Thomas, 1999; Ball, 1988, 1989),
- policy implications and strategies tackling the seasonality problem (Baum & Hagen, 1999; McEnnif, 1992),
- qualitative case studies analysing the motivations and behaviour of tourists in different seasons (Bonn, Furr & Uysal, 1992; Calantone & Johar, 1984; Spotts & Mahoney, 1993),
- overview of methodologies and quantitative measurement of seasonal demand variations at different levels (Drakatos, 1987; Lundtorp, 2001), and

- analysis of seasonality for the hotel sector specifically (Campbell, 1995; Jeffrey & Barden, 1999).

These different aspects of seasonality in tourism demand will be discussed in the remainder of this chapter.

2.2.2 Definitions of Seasonality

Seasonality exists not only in tourism, but also has applications in a wide range of other industrial and agricultural sectors. Kuznets (1933) studied the economic problem of seasonal variations, and their statistical measurement, for four groups of industries and trade, i.e. food products, cotton, automobiles and construction. He describes seasonal variations as recurring changes in the rate of activity attributable to the influence of climatic and conventional seasons (Kuznets, 1933).

Even though today everyone refers to the concept of seasonality in general in daily language, only very few have thought about an applicable definition (Hylleberg, 1992). A general definition of seasonal variations in business enterprises characterises these as recurring movements in a time series during a particular time of the year (Moore, 1989). Hylleberg (1992) not only describes the phenomenon but also includes the main causes for general seasonal variations in his definition:

> "Seasonality is the systematic, although not necessarily regular, intra-year movement caused by changes in the weather, the calendar, and timing of decisions, directly or indirectly through the production and consumption decisions made by the agents of the economy. These decisions are influenced by the endowments, the expectations and the preferences of the agents, and the production techniques available in the economy" (1992:4).

There is no generally accepted definition of seasonality with reference to tourism. Butler (1994) explains seasonality as:

> "a temporal imbalance in the phenomenon of tourism, [which] may be expressed in terms of dimensions of such elements as numbers of visitors, expenditure of visitors, traffic on highways and other forms of transportation, employment, and admissions to attractions" (1994:332).

Seasonality refers to the concentration of tourist flows in relatively short periods of the year (Allock, 1994). This annual peaking of tourism activity during a few hectic weeks or months is likely to result in inefficiency within the industry and is a great burden on the physical and social resources of the destination area and therefore an important contributor to the carrying capacity problem (Mitchell & Murphy, 1991). Hartmann

(1986) not only refers to the annual peaking, but emphasises the reliable recurrence of the tourist phenomenon in the course of a year that also changes over the years. A similar view is taken by BarOn (1975), who defines seasonality as the effects occurring each year, with more or less the same timing and magnitude. It should be noted that all these definitions stress that 'the systematic intra-year movement' is one of the crucial elements of seasonality and it is suggested that seasonality can be described as some sort of pattern in the visits which reoccur every year. Hartmann (1986) argues that this reliable and predictable recurrence of tourists, needing services over a predictable period of time, has formed the economic base for the development of the tourist industry, and stresses therefore that tourism is naturally seasonal.

Most definitions and general concepts of seasonality describe only the phenomenon in general, or relate to the causes. There is a lack of quantifiable definitions stating when tourism seasonality occurs, how tourism seasons can be differentiated and how seasonality can be compared between different regions or years. Kuznets (1933) points out that the annual recurrence and the limited duration of the swing (e.g. tourism peak season) distinguish seasonal variations clearly from other significant changes in a time series, such as trend, cyclical and random movements. An example of a quantifiable definition of the appearance of tourist seasons is given by Lim and McAleer (2001a), who define tourist seasons as:

> "months for which the corresponding average indices exceed 1.0, which means that the seasonal factors increase tourist numbers above the trend and cyclical components" (2001a:72).

Different measures of seasonality have been proposed in the academic literature with no widely accepted unique method. A detailed review of the literature to the various measures of seasonality is presented later in this chapter, in section 2.3.

2.2.3 Causes of Seasonality

Even though the causes of seasonality in general are well known, it is often stressed that they are not well understood. Hylleberg (1992) groups the basic causes into the three different categories weather (e.g. temperature, hours of sunshine), calendar effects (e.g. timing of religious festivals such as Christmas or Easter) and timing decisions (e.g. school vacations, industry vacations, tax years, accounting periods, dates for dividend and bonus payments etc.). He emphasises that some causes are stable over long periods (e.g. the timing of Christmas), some change at discrete intervals (e.g. vacations, tax years), some vary continuously but predictably (e.g. the timing of Easter), whilst others are unpredictable (e.g. the weather) (Hylleberg, 1992).

Author	Categories of causes of tourism seasonality
BarOn 1975	natural seasonality, institutionalised seasonality, calendar effects, sociological and economic causes
Hartmann 1986	natural seasonality, institutionalised seasonality
Butler 1994	natural seasonality, institutionalised seasonality, social pressure and fashion; sporting seasons; inertia and tradition
Butler/Mao 1997	physical and socio/cultural factors in the tourism generating and receiving areas
Frechtling 2001	climate/weather, social customs/holidays, business customs, calendar effects
Baum and Hagen 1999	as Frechtling 2001 but add supply side constraints

Table 2-2: Classification of Causes of Tourism Seasonality

Seasonality in tourism is caused by similar conditions. Several attempts to identify and classify the different causes of seasonality in tourism can be found in the literature. Table 2-2 presents an overview of the different classifications of seasonality causes. It can be seen that natural and institutionalised factors are generally recognised as the two major causes for tourism seasonality. BarOn (1975) states that natural seasonality is related to the

> "considerable variations in the climate throughout each year, in the hours of daylight and of sunshine, the minimum and maximum temperatures, rainfall, snow etc." (1975:2).

These are often considered as the true seasons of the year, as they are particularly associated with the cyclical climatic changes. Natural seasonality impacts upon the society to varying degrees, as the seasonal differences increase with the distance from the equator (Butler, 1994; Hartmann, 1986). Problems caused by seasonality are therefore most difficult to overcome at high latitude destinations, particularly in the peripheral regions in the northern or southern hemisphere (Lundtorp, Rassing & Wanhill, 1999). A similar view is taken by Hinch and Jackson (2000) who point out that seasonal variations are closely linked with other cyclical events in the natural realm, such as animal migrations and plant growth, and that these fluctuations are especially significant in the higher latitudes.

As the majority of outdoor tourism activities rely on natural 'climate-dependent' attractions, the extent of tourist activity in a natural area is hence dependent on weather and climate (Smith, 1990). Destinations relying on predominantly outdoor facilities are thus most likely to experience a great influence of natural seasonality on their tourism businesses. Examples are coastal resorts and countryside attractions, where the actual pattern of tourist activities is strongly weather dependent (Grant, Human & Le Pelley, 1997; Smith, 1990). Higham and Hinch (2002) point out, that even though climate is particularly important to attract visitors to Canada, it is often considered as a constraint to tourist development.

Hartmann (1986) declares that seasonal variations caused by these natural factors are predictable as they are relatively stable in a particular destination, and recur with only small changes. However, climatic changes, such as the global warming will inevitably have an affect on the natural seasonality of tourism (Butler & Mao, 1997). Global temperatures, for example, have risen by 0.5°C in the 20th century and estimates show that temperatures will continue to rise in the 21st century (Agnew & Viner, 2001). Agnew and Viner (2001) review the potential impacts of global warming for 10 international tourist destinations and emphasise that the trend towards warmer temperatures will have major consequences for the tourism industry, especially for those regions for which outdoor recreations are important. Examples of serious impacts include rising sea levels, with a loss of sand on beaches, disappearance of wetlands, with a loss of ecological diversity, flooding, changed migration patterns for animals and birds, an increased risk of forest and heathland fires, with the closure of large areas for summer visitors or the shortening/loss of the skiing season, especially in low-level ski resorts (Smith, 1990). Domestic holiday makers are influenced by short-term weather fluctuations (Agnew & Viner, 2001). Northern hemisphere tourist destinations may therefore benefit, in the short term, from warmer temperatures during the summer months, as these encourage many visitors to favour domestic tourism destinations over exotic or Mediterranean destinations, such as in the hot summer months in 1995 and 2003. The unusually high summer temperatures in 1995 in the UK were a major contributor to the high number of domestic tourists, which provided a boost to British seaside resorts (Giles & Perry, 1998). Giles and Perry (1998) also emphasise that warmer temperatures in the UK will, in the long-term, not only mean a more favourable climate for tourism in general, but also greater potentials for an extension of the holiday season and for spontaneous out-of-season short breaks, which are most affected by climate or climate-related factors. The trend to warmer weather might cause a shift in the attractiveness of tourist destinations around the globe (Agnew & Viner, 2001). Smith (1990) argues therefore, that climatic change will make some revision of tourist seasons necessary.

Institutionalised seasonality refers to traditional and often legislated temporal variations formed by human decisions (Butler, 1994). BarOn (1975) points out that these variations exist due to holidays and other events at specific times of the year, such as Christmas, summer vacations of schools, universities and work places. It thus reflects the social norms and practices of a society (Hinch & Hickey, 1996). As a result of religious, cultural, ethnic, social and other factors, institutionalised seasonality varies much more widely, with a much less regular pattern, in contrast to natural seasonality (Butler, 1994).

Public holidays are one of the most common forms of institutionalised seasonality. Butler (1994) emphasises that public holidays used to be single days, but these have been expanded into weekends and have become longer breaks, with an increasing importance for the tourism industry. It is important to point out that some public holidays, such as Easter, have variable dates and therefore may cause differing effects on certain months from year to year (BarOn, 1975). There are also certain events that recur regularly over a period, such as festivals or other celebrations in specific destinations which have great influence on the seasonality in particular years (Frechtling, 2001).

School and industrial holidays are, however, of greater relevance for tourism seasonality than bank holidays. The scheduling of school holidays during the summer was originally arranged because children and students might be needed to assist with busy agricultural periods, such as during the summer harvest (Butler, 1994). Even though this is not a current factor, the tradition of the summer family holiday, together with the pleasant weather during the summer months, are the main reasons for the regular peaking of tourist activities during that season (Butler, 1994; Hinch & Jackson, 2000). Butler (1994) argues that the traditional long summer school holiday remains the largest single impediment to reducing seasonality. Not only school and public holidays, but also work holidays influence the acuteness of the seasonal peaking of the tourist activities, especially since the introduction of paid holidays and the closure of some industrial sectors for one or two weeks during the summer months (Butler, 1994). This is particularly apparent in France, where August is the traditional and institutional vacation month, and 20% of the population takes to the roads during the first weekend of August (Murphy, 1985). The ageing of the population may, in the long-term, have positive effects, as this might change seasonal patterns considerably since the elderly population is less constricted in the timing of their holidays (Butler & Mao, 1997). BarOn (1975) also draws attention to the effects of sociologic and economic events on seasonality, such as the difference in the prices for tourism services and air fares during different seasons, or reduced price sales in shops after Christmas. These events can either increase or decrease the seasonal concentration of tourist activities.

Butler (1994) argues that the following additional three causes of seasonality are also significant and should be added: social pressure or fashion, the sporting season and tradition/inertia. Social pressure and fashion refer to the social necessity to participate in specific activities at certain destinations at particular times of the year. This includes socialising in appropriate capitals at certain times, breaks at spas or spending the winter season at certain fashionable destinations. The sporting season also reflects the changing patterns of recreational and tourist activities (Butler, 1994). Examples include the hunting season and the appearance of other distinct sporting seasons, such as those involving skiing, surfing or golf. These activities require a combination of climatic and physical factors, along with the necessary infrastructure (Butler, 1994). The third additional cause of seasonality in tourism refers to tradition and inertia. Butler (1994) points out that:

> "...many people take holidays at peak seasons because they have always done so, and old habits tend to die hard. In some cases there may be good reasons for continuing a pattern even when one no longer has to do so, when, for example, children are no longer in school" (1994:333f).

Not only natural or institutional factors influence seasonality but also calendar effects (Frechtling, 2001). These calendar effects refer either to the variability of the number of days in a month, i.e. the fact that February has usually only 28 days and is therefore often the 'low month' in many tourism series, with a slight increase every fourth year, or to the number of weekends in the month, quarter, season or year. Leisure tourism is mostly concentrated on weekends, especially in the shoulder and off-peak seasons. Weekends are not distributed equally throughout the months or the years and will, therefore, influence tourism figures. Frechtling (2001) points out that the normal pattern is for a month to have four weekends and that two or three months in a year will have five weekends. However the years 1995, 2003, 2005 and 2011 will have or had four months with five weekends and the year 2000 was, in recent terms, unique, in having five months which had five full weekends, in a total of 53 complete weekends (Frechtling, 2001). These calendar effects would suggest evaluating seasonality not on a monthly but on a weekly data basis, in order to remove these calendar effects. As stated earlier, Easter is a festival which alters its timing each year and therefore has different effects on each year, which needs to be taken into account when measuring seasonality. Table 2-3 presents the four main causes of seasonality, as identified by Frechtling (2001) with amplifying remarks by Baum (1998).

Causes of seasonality	Tourism examples
Climate/weather	Summer vacations, snow skiing, fall foliage tours, popularity of tropical destinations in the winter, cruise line departures, ocean resort demand, transport access
Social customs/ holidays	Christmas/New Year holidays, school breaks, *industrial holidays or 'fortnights'*, travel to visit friends and relatives, fairs and festivals, religious observances, pilgrimages
Business customs	Conventions and trade shows, government assemblies, political campaign tours, sports events
Calendar effects	Number of days in the month; number of weekends in the month, quarter, season or year, *date of Easter*
Supply side constraints	Availability of labour (school holidays, competition from other sectors, i.e. agriculture); alternative use of facilities (schools to hotels)

Table 2-3: Causes of Seasonality in Tourism Demand

Source: (Frechtling 2001, italicised material has been added from Baum 1998)

The above discussion outlines the major causes for seasonality in tourism but these causes should not be viewed in isolation. Butler and Mao (1997) draw attention to the fact that seasonality refers not only to a temporal variance in the tourism phenomenon, but also to a spatial component. Lundtorp, Rassing and Wanhill (1999) point out that little research is done about which is the more important – the desire to travel at certain times of the year or the restrictions, e.g. many tourists have to travel in the peak season due to the fixed school holidays of their children. Even though the main vacation period may still be somewhat fixed for the majority of travellers today, the destination is mostly optional (Hartmann, 1986). Therefore, similar to the factors which influence the general demand levels and the variations, described at the beginning of chapter 2, the causes of seasonality can also be differentiated in push- and pull-factors (Lundtorp, Rassing & Wanhill, 1999), which are shown in figure 2-3.

This means that seasonality is not only implied by factors in the receiving area, such as a desired climate or the timing of special events, but also by factors in the generating area, such as school holidays or tradition, which sometimes act as constraints when the time of travelling is being decided. The push- and pull-factors are not independent of one other, but interrelated, and interact with one other. Butler and Mao (1997) emphasise that the physical factors and climate in the receiving area are the foundations for the 'true tourism seasons', as many tourist activities require a set of unique natural conditions. They also state that the temporal distribution of religious, cultural, ethnic, and social events and activities in a destination profoundly influence the number and characteristics of visitors. In order to tackle the seasonality problem efficiently in a destination it is therefore important to realise where seasonality is generated.

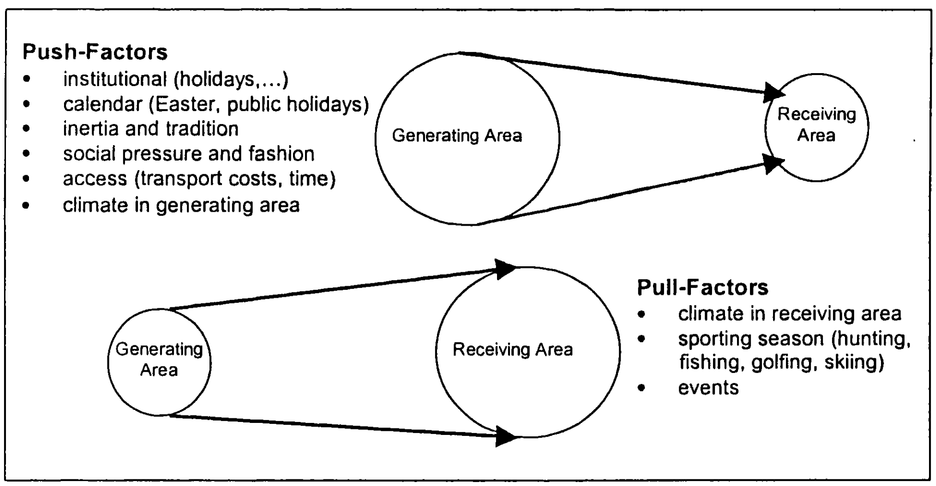


Figure 2-3: Push- and Pull-Factors Causing Seasonality in the Tourist Destination
Source: (based on Lundtorp, Rassing &Wanhill, 1999)

Hinch and Jackson (2000) argue that there is a lack of empirical evidence to establish the validity, the relative strength and the influence of natural versus institutional factors with any certainty. Even though the tourist industry has made considerable efforts to modify seasonal patterns, there has been much less effort placed by academics to understand the fundamental causes of seasonality (Hinch, Hickey & Jackson, 2001). Butler and Mao state, that "the relationship between seasonality and the motivation of visitors is not known" (1997:21). For example, it is not identified whether tourists take their main holiday in the summer peak season because they want to, because they have to or because they have always done so (Butler & Mao, 1997).

Hinch and Jackson (2000) claim that the widely accepted causes of seasonality provide insights into the seasonality phenomenon only on a very speculative basis. They therefore adopt the 'theoretical leisure constraints' research framework to examine the causes of tourism seasonality for their study, which explores people's attitudes towards seasonal visitation to Fort Edmonton Park, Canada (Hinch, Hickey & Jackson, 2001). Their study findings are discussed in the context of the two alternative leisure constraints models – the hierarchical and the non-hierarchical model. The hierarchical model of leisure constraints differentiates between general attitudes and motivations, intrapersonal (seasonal travel preferences, e.g. natural factors), interpersonal (e.g. companions with similar seasonal travel preferences) and structural constraints (e.g. institutional factors). It is assumed that these factors are taken into account in a hierarchical way as part of the decision-making process of an individual regarding the timing and destination of the holiday. The non-hierarchical leisure constraints framework explores seasonality, such as the relationship between natural and institutional factors, using qualitative methods (Hinch, Hickey & Jackson, 2001). These theoretical models can be helpful both in the design of questionnaires and in the development of guidelines for in-depth interviews. The analyses of the causes of seasonality, from this micro-perspective of an individual traveller, are similar to the consumer behaviour models which explore tourism demand in general. As this study intends to gain insights into the structural components and the acuteness of seasonality in different regions, the analysis from the aggregate view, the macro-perspective, is therefore considered more appropriate.

Rosello, Riera and Sanso (2003), for example, analyse the causes of seasonality at the national level and thus from a macro-perspective. They point out that the majority of the published research in tourism seasonality has been unable to identify exactly which factors influence the particular seasonal pattern of tourism demand beyond the very general assumptions. In their study, they investigate, therefore, the relationship between the Gini coefficient, a common measure of temporal variations, and a set of economic indicators, i.e. GDP, relative prices, national exchange rate and the consumer price index using data of the Balearics and its most important markets, the UK and Germany

(Rossello, Riera & Sanso, 2003). They have found evidence that, with increased income and lower relative prices, people tend to separate their holidays during the year which decreases seasonal concentration, whilst a favourable exchange rate tends to increase seasonality as tourists prefer to take their holidays in the peak season.

Butler and Mao (1997) argue that it is not enough simply to identify the push- and pull-factors when explaining the nature of seasonality. Whilst the causes of seasonality discussed above are generally accepted, the interactions between the causes are mostly ignored. Figure 2-4 presents Butler and Mao's model describing the mechanism of tourism seasonality, which emphasises that these variations are a result of the seasonal generating process, the seasonal receiving process, the modifying process and their interactions. They further state that these interactions have resulted in two industrial policy implications: diversified multiple attractions and seasonalised pricing, both of which will be examined in detail in section 2.2.5 (Butler & Mao, 1997).

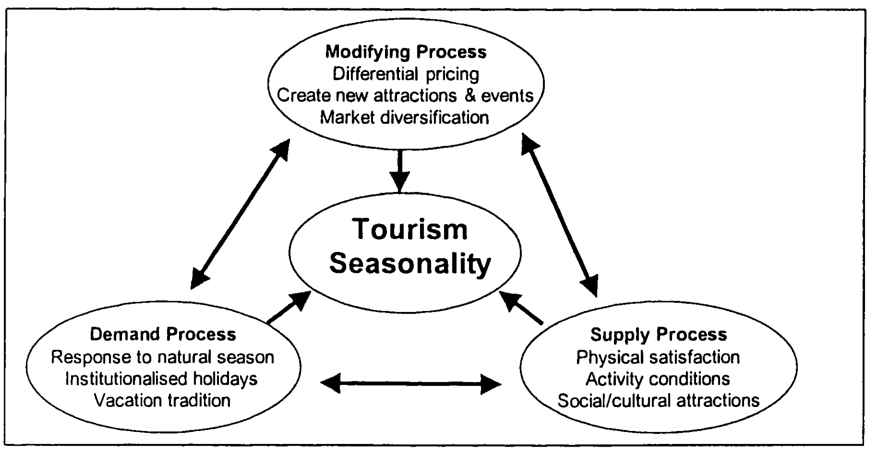


Figure 2-4: The Mechanism of Tourism Seasonality
Source: (Butler & Mao, 1997)

Butler (1994) emphasises that, even though there have been considerable efforts by public and private sectors to overcome or reduce seasonality aspects, most have not been aimed at the above mentioned causes, but have concentrated upon the destination areas rather than the customer. This shows that in order to gain a deeper theoretical knowledge of the complex issue of seasonality and its causes, it is crucial to establish the impacts of seasonality on the economy, environment and the society of a destination and to develop standards for the quantification of seasonal variations. An overview of these topics is therefore given in the next sections.

2.2.4 Impacts of Seasonality

According to Wall and Yan (2003) it is likely that the impacts of seasonality have become greater with the growth of mass tourism. This is due to the fact that the number of enterprises depending on tourism has increased and tourism businesses have expanded in size, and thus the ability to adapt to changes in demand has been reduced (Wall & Yan, 2003). They stress the importance of analysing tourism demand fluctuations and their impacts in order to assess market trends and to profit from opportunities, in addition to minimising losses (Wall & Yan, 2003).

The impacts of seasonality vary considerably with the location of the destination itself and the location of the tourism enterprises within a destination, reflecting in part the variety of physical conditions and the nature of the attractions. Climatic seasonality, for example, is much less marked the closer the destination is located in relation to the equator (Hartmann, 1986). In particular, peripheral northern destinations experience a pronounced degree of seasonality, due to the 'bad' weather, the lack of a local consumer market for short breaks and day visits, access problems, longer periods of travel and labour problems (Baum & Hagen, 1999). Furthermore, the WTO (1984) states that:

> "The most specialized destinations (some beach, mountain, hunting or fishing destinations at certain times of the year, etc.) are usually the most seasonal because of the seasonal factor associated with tourist utilization of their basic resources. Tourist destinations supported by large urban centres, while having high points of activity, have more continuous operations throughout the year because they depend upon a more diversified demand" (1984:43).

Nevertheless, Murphy (1985) argues that seasonality is not only restricted to tourism resorts. Urban destinations also experience seasonal variations, even though these are not as pronounced as in seaside locations. London, a destination with all-weather attractions and year-round events, for example, still records a summer peaking and a winter low, caused especially by the high number of overseas visitors during the summer months (Murphy, 1985).

As has been already stated, the academic literature gives the overwhelming impression that seasonality in tourism is viewed as a problem (Butler, 1994). The negative impacts are especially emphasised when talking about the economic loss due to inefficient usage of facilities. Even though the economic problems are the most visible and marked, seasonal variations also influence the quality of the environment, the society and the visitor experience, and are discussed in detail in this section. The following summary by McEnnif (1992) demonstrates the diversity of these effects:

> "The seasonality of tourism demand creates a range of problems for the tourism industry and the wider economy. These include underutilisation of capacity at one end of the scale and congestion, environmental damage, saturation of transport infrastructure, increased risk of road accidents, higher prices and a negative impact on the quality of the tourism product on the other. The seriousness of these problems differs across and within the EC member states. Although some suffer from traffic congestion and damage to cultural and heritage tourism products through overutilisation, most are chiefly concerned with off-peak underutilisation of capacity. Seasonality also causes particular problems in certain resort areas, particularly seaside and mountain resorts and the core areas of historic towns" (1992: 68).

Economic Impacts

The economic impacts of seasonality refer mostly to problems in the off-peak season, particularly the loss of profits due to the inefficient use of resources and facilities (Manning & Powers, 1984; Sutcliffe & Sinclair, 1980; Williams & Shaw, 1991). Murphy (1985) states that businesses and the community need to attain sufficient revenues from a few hectic weeks in the summer in order to ensure success for the whole year. Due to the consequently low returns on capital, it is also difficult to attract both investors and lenders from the private sectors, and investments from public authorities may thus prove necessary (Mathieson & Wall, 1982).

In the accommodation sector, the negative effects of the seasonal fluctuations may lead to a shortage of hotel rooms in the peak season. On the contrary, the creation of excess capacity can have economically disastrous effects, as tourism is an industry with low consumer loyalty. The consequent underutilisation of facilities in the off-peak season along with greatly reduced revenues is inevitable, because the majority of the capital assets are inflexible with few alternative uses. Even though some enterprises in the serviced accommodation sector close during the off-peak season, many must remain open to obtain sufficient income in order to cover fixed costs, which represent a large proportion of the total costs (Mathieson & Wall, 1982).

Grant and Human (1997) argue that not all economic impacts are negative. For example, the needed maintenance work on accommodation enterprises or attractions in the off-peak season, supports construction jobs and specialist trades at the destination.

According to Murphy (1985), up-market hotels in the serviced accommodation sector have been very successful in attaining usage efficiency. These hotels are generally committed to be open all year round for business, in order to keep their highly skilled staff and to maintain their profits. This is achieved by making concessions to attract off-peak season trade, such as reduced commercial rates to the business sector to try to attract business travellers during the week, and off-peak season rates and 'get-away' specials as incentives to the public to visit during the weekends, as well as their continued activities with coach tours (Murphy, 1985). In contrast, small guesthouses and family owned B&Bs have, in general, little or no motivation to generate business in the off-peak season, as they are usually able to live off the revenues generated in the summer months. Murphy (1985) highlights that the primary function of small guesthouses and B&Bs is to supplement the hotel sector and states that:

> "In this regard they play an important role during the hectic summer months, but they can only sustain such a role for a short period of time since they need to revert back to the normalcy of family life in order to survive and fulfil their primary function"(1985:80).

Ecological Impacts

Ecological impacts, in contrast, refer mostly to the negative effects occurring due to the concentration of visitors during the peak season at a destination. These include, for example, congested rural lanes, disturbance of wildlife, physical erosion of footpaths and litter problems (Grant, Human & Le Pelley, 1997). Manning and Powers (1984) emphasise the strain of tourism activities on the ecological carrying capacity of a particular destination, due to the heavy usage during the peak season. Butler (1994) points out that the intensity of the pressure on often fragile environments caused by overcrowding and overuse during the summer, is often mentioned in discussions of the environmental effects of tourism seasonality. However, he also argues that areas with high peak usage may be in the long run better off than having the use spread more evenly throughout the year. A similar view is taken by Hartmann (1986), who states that the lengthy 'dead' season is the only chance for the ecological and the social environment to recover fully.

Socio-Cultural Impacts

The socio-cultural impacts refer not only to the effects of seasonal variations on the host community but also on the visitor. The academic literature relating to these impacts focuses mainly on the local community. Problems for local people include, for example, congestion, crowded streets, slower traffic, lack of parking, queues for services, significant increases in the costs of community services, due to dramatic increases in population during the summer months, which place a strain on regular infrastructure and services (Murphy, 1985). Mathieson and Wall (1982) bring attention to the link between tourism and increased crime due to the higher number of people present during the peak season. Murphy (1985) argues that extra facilities are required and extra police, sanitary, health and park personnel have to be hired during the tourist peak season so that levels of services may be maintained. He further states that the amount raised from the local tax base and central government grants is not always sufficient, as the amounts are usually calculated in relation to the resident population. Funds for the required extra personnel are, therefore, not always available, which will inevitably result in a decline in the quality of services for visitors and residents alike.

Other seasonal impacts relate to higher prices during the peak season, increased risks of accidents and negative influences on the quality of life (Fitzpatrick Associates, 1993). Manning and Powers (1984) regard these problems as a strain on the social carrying capacity of the destination, which might result in resentment from the local community to all tourism activities.

Positive impacts of tourism seasonality for the locals are widely recognised. Murphy (1985) states that for some communities: "The lull before and after the storm helps to make the season more bearable and the industry tolerable" (1985:81). Many residents only take full advantage of local amenities and facilities in the off-peak season, e.g. beaches, more popular pubs, restaurants, theatres etc., when parking again becomes available and special out of season rates apply (Murphy, 1985). The 'dead' season allows the community relief from stress and helps preserve its identity, as traditional social patterns in a community are sometimes disrupted during the summer peak (Hartmann, 1986; Mathieson & Wall, 1982). Butler (1994) stresses, therefore, that strategies to lengthen the main season or to attract more visitors outside the season, need the full support of the host communities if they are to be successful in all aspects.

Even though the concentration of visitor activities during the peak season produces similar effects on the tourists themselves, these impacts have been mostly neglected by researchers. Visitor enjoyment might be reduced due to overcrowding at attraction sites and the lack of capacities during the peak demand periods. In contrast, in the off-peak season, many facilities might be closed and the full range of services may not be available along with only limited transport (Butler, 1994). The closure of attractions during the low season not only affects potential visitors but also lowers the reputation of the overall image of a destination (Flognfeldt, 2001).

Employment

Seasonal employment affects the economy, the employees and the local community, and is therefore considered separately from the other impacts. Seasonality and employment in tourism is a well researched topic in the academic literature, even though there is a general lack of theory (Ashworth & Thomas, 1999; Ball, 1988, 1989; Baum, 1993; Flognfeldt, 2001; Krakover, 2000).

Krakover (2000) examines the factors responsible for the numerical flexibility in the hotel labour force and attempts to reveal the mechanism of adjustment between labour and demand in the tourism industry, by applying a model to 8 tourist centres in Israel. It is interesting to note that only the effect of the occupancy rate was found to be inversely related to the level of variation in monthly hotel employment (Krakover, 2000). Ashworth and Thomas (1999) analysed the effects of counter-seasonal strategies on the seasonal employment between 1982 and 1996 in the UK, using econometric tests. They found that seasonality in tourism employment in the UK decreased by 30% in the summer and 24% in the winter quarter, due to less employees being fired at the end of the season and thus fewer people having to be hired at the start of the peak season. Ball (1989) investigates the job-motivated 'seasonal in-migration' of staff from major urban centres to their proximate coastal resort areas, where the demand for seasonal staff exceeds the capacity of the local labour markets.

The most important issue of tourism seasonality regarding employment is the difficulty in recruiting and retaining full-time staff (Yacoumis, 1980). Murphy (1985) emphasises that staff relations and skills remain minimal, since only little training is provided for temporary employees. This again makes it particularly difficult to maintain product and quality standards (Baum, 1999). Seasonal work is also often seen as less 'meaningful' and tends to attract those on the periphery of the labour market, who are less educated and semi-skilled or unskilled (Mathieson & Wall, 1982; Mill & Morrison, 1998). Some destinations have to import labour to meet seasonal demand. For example, in Anglesey, Wales, an additional 800 workers had to be employed to meet the summer demand (Archer, 1973). It should also be noted that seasonal employment might discourage other industries from establishing businesses in the destination (Mathieson & Wall, 1982).

As already mentioned, "seasonality is not necessarily bad for everyone" (Murphy, 1985:80). On the positive side, tourism generates employment. Mourdoukoutas (1988) stresses that some people choose seasonal occupations to suit their non-market activities during the off-peak season, e.g. students, artists or housewives. Farmers receive with seasonal employment in tourism, such as farmhouse accommodation not only increased revenues, but also a higher status (Mill & Morrison, 1998). Ball (1989) emphasises the possible long-term symbiotic relations between tourism and other economic sectors. Flognfeldt (2001) argues similarly, with his remark that seasonal employment can complement traditional patterns of employment and unemployment, rather than competing with each other. He presents a number of business strategies applied in rural Norway, including mixed employment (e.g. tourism and teaching), use of student and migrant workers, and moving away to work or study in the off-peak season (Flognfeldt, 2001).

Even though the impacts of seasonality are widespread and vary considerably within and between destinations, the following statement by Mathieson and Wall (1982) is generally accepted by tourism academics as well as tourism practitioners:

> "The effects of seasonality probably cannot be totally removed and seasonality is a factor with which the tourist industry must learn to live" (1982:39).

McEnnif (1992) highlights that even though seasonality will never be totally eliminated, there are numerous ways to even out the peaks and troughs. An overview of the efforts undertaken by the industry to reduce the negative effects of seasonal variations will be presented in the next subsection.

2.2.5 Policy Implications

The benefits of more evenly spread tourism demand over the year are well known and include, for instance, increased visitor satisfaction due to less overcrowding, more efficient utilisation of facilities and resources, more 'even' employment, improved quality of service and higher profitability (BarOn, 1975). Considerable research has been undertaken into the opportunities to combat seasonality effects. Yacoumis (1980), for example, examines options to tackle the seasonality problem in Sri Lanka. Several studies analyse Canada's potential as an all-season tourism destination and the opportunities for stretching their seasons by appealing to multiple market segments with new product developments (Owens, 1994; Winter Tourism Sub-Committee Members & Apropos Planning, 2002). The aim is to achieve the Canadian Tourism Commission's vision which sees Canada as a 'premier four-season destination' (Wilton & Wirjanto, 1998). The Scottish Tourist Board has also supported a number of seasonality studies relating to the opportunities to reduce seasonal concentration and the assessment of the success rate of those strategies (Scottish Tourist Board, 1997, 1998, 2000b, 2000a). Baum and Hagen (1999) emphasise in this regard that even though a wide variety of studies are available there is a lack of longitudinal studies to evaluate the impacts of such strategies over an extended time period.

Butler (1994) highlights that seasonality is a difficult problem to overcome and even argues that despite the efforts in reducing seasonal peaks, the seasonal range has in fact increased in many countries with the rapid growth of tourism, which seems to 'swamp' any efforts to redirect visitation into quieter periods of the year. BarOn (1975) also points out that tourism expansion often means an expansion of the main season. Only when tourist numbers are stable, or show only slow increases, is attention more likely to be focused on the off-peak season and methods to spread tourism throughout the year (Butler, 1994). The most successful attempts to reduce seasonality can thus be found in destinations with well-established tourism industries and overall declining visitation levels (Butler & Mao, 1997). Weaver and Oppermann (2000) identify the following supply/demand matching strategies: increase, reduce and redistribute demand, and increase, reduce and redistribute supply. This categorisation is used for the following overview in order to group the various strategies tackling the seasonality problem in a destination.

Increase Demand outside Peak Season

The ability to extend the season or to introduce a second season is largely dependent on the location and competitiveness of the destination, e.g. remote and peripheral areas may encounter difficulties when trying to develop an all-year season tourism product (Allock, 1994). In order to successfully implement counter-seasonal strategies, it is important that the consumers are aware of the advantages, and availability, of off-peak season holidays (Fitzpatrick Associates, 1993).

One strategy to attract additional visitors to a destination, when demand levels are below capacity, is the modification and diversification of the product. Yacoumis (1980) stresses the direct relationship between the product/market mix and the degree of seasonality and points out that the wider the product/market mix of an area or sector, the lower is its seasonality.

Events and festivals are, by far, the most common single strategy to combat seasonality (Baum, 1998; Getz, 1991). These can either be traditional festivities or artificially created events, designed specially to attract visitors in the off-peak season. Examples of the latter are the Oktoberfest in Munich, Germany, which even created a 'mini-season' of its own, and the famous illuminations provided at the seaside resort Blackpool during the month of October (Allock, 1994; Murphy, 1985). Events and festivals can also be launched in the main season and moved to shoulder or off-peak season periods when they become more popular with a well established clientele (Baum, 1998). Brännäs and Nordström (2002) present a model which evaluates the effects of festivals. Econometric models are used to examine the tourism accommodation impact of festivals and special events, for two large Swedish festivals held in August. The model incorporates spare capacities, displacement effects and the costs to the visitors. It is found that the net effect of the festivals analysed in their study is positive, as average visitors stay longer during festival periods (Brännäs & Nordström, 2002). Even though the festivals were not used to lengthen the season in this case, the model itself can be applied to examine the impact of any events or festivals. It might therefore be of great use in evaluating the effectiveness of introducing events in order to lengthen the season. The development of wet-weather facilities, diversified multiple attractions and resorts, such as Centerparks, can also help to provide a strong year-round offer. Butler (1994) stresses that these product development strategies must be placed within the context of the overall development strategy so that the new products complement and support one other.

According to Baum and Hagen (1999), another strategy to increase demand outside the peak season relates to the identification of new market segments, rather than focusing on the same groups of visitors coming traditionally to the destination. New or alternative sources of demand for existing products and facilities include, for example, senior citizens, business travellers, incentive and conference market travellers, short break holidaymakers and affinity groups, as these are most able and willing to travel in the shoulder or off-peak seasons (McEnnif, 1992). Figure 2-5 provides a summary of the different demand and supply strategies required to attract visitors in the off-peak season, together with the constraints determining the success of these strategies.

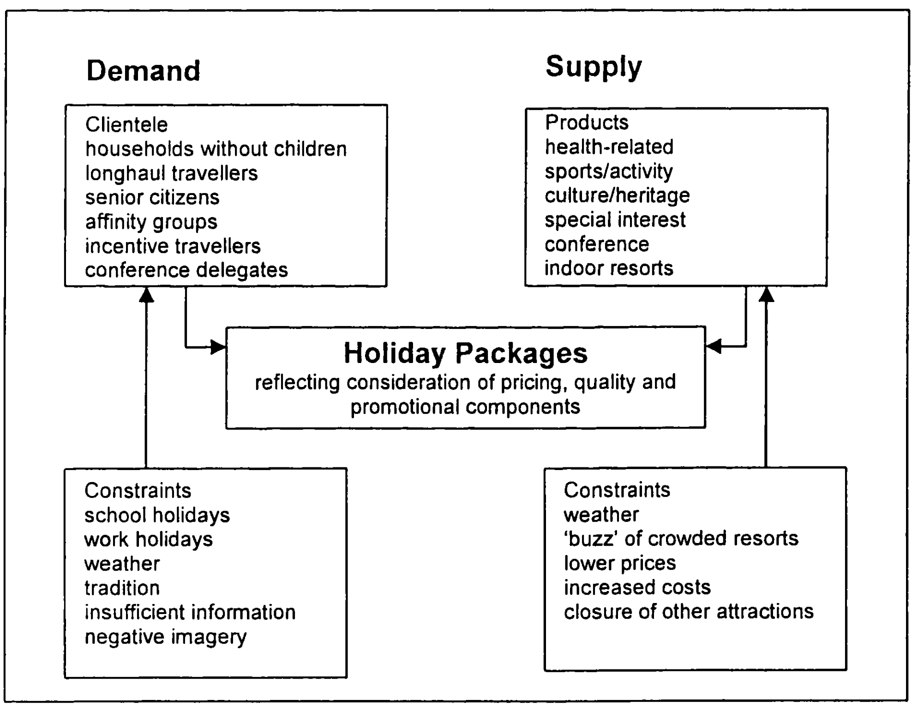


Figure 2-5: Demand and Supply Elements of Tourism Seasonality
Source: (Fitzpatrick Associates, 1993)

It also becomes clear from figure 2-5 that alternative packaging, presentation, promotion, distribution and pricing play an important role in attracting off-peak season visitors. Examples include special interest weekends, getaway breaks, health, sport and activity based holidays, culture and heritage tourism or educational tours. Grant, Human and Le Pelley (1997) emphasise in this regard that the costs of special offers must not compromise the quality or the product image. BarOn (1975) also highlights the dangers in promoting off-peak season tourism on the image of a destination, as some travellers might be disappointed as a result of poor weather, insufficient entertainment, closed attractions and facilities, or inadequate food and service in hotels as a result of cost cutting.

Baum (1998) points out that the co-ordination between all public and private sector bodies and operators, working together at all levels, is essential to overcome some of the effects of seasonality. The following policies, directed towards the commercial sector, should be implemented at a national level so as to support the above named demand and supply strategies:

- "incentives for development of off-peak season products,
- marketing subsidies for all-season products or for all-season client markets,
- providing information to operators on products, potential off-season clientele groups or on promotional strategies,
- co-ordinating co-operation across tourism sub-sectors to facilitate the development and marketing of attractive off-season packages and
- encouraging attractions and other tourism products to remain open during the shoulder and off-season" (Fitzpatrick Associates, 1993:49).

Reduce Demand in the Peak Season

The reduction in demand can be necessary if the number of tourists exceeds the capacities, resulting in reduced visitor satisfaction and low quality services. This measure is especially required when the negative impacts considerably outweigh the positive effects. Strategies can include an increase in prices or the introduction of entrance fees to protected areas (Weaver & Oppermann, 2000).

Redistribute Demand

Redistribution of demand includes, on the one hand, the transfer of demand from time of excess use to times of low demand and, on the other hand, the spatial spreading of demand at peak times. For example, 'seasonalised' pricing is practised widely to improve the temporal spreading of tourism demand and off-peak season performance (Butler & Mao, 1997). The complete success of these pricing policies has been questioned because of the limits in the price elasticity of the tourism product, as price cuts cannot be very large if profitability is to be maintained (Mathieson & Wall, 1982).

Batchelor (2000) discusses the positive and negative effects of the staggering of school holidays over a longer period, such as a change in the UK from the traditional three-term year to a five-term year. He also analyses already successful employed concepts of the geographical staggering of holidays in other European countries. McEnnif (1992) emphasises that the ten days off school, which parents in the UK can choose within the year for their children, resulted in more flexibility in arranging short breaks and other holidays out of season. It is interesting to note that the spreading of domestic holidays into off-peak season and shoulder periods is most evident in those EU countries where school holidays are staggered or where other flexibilities are introduced into the system (Fitzpatrick Associates, 1993). The timing of public holidays is also important, as this can lead to 'mini-peaks' outside the main season (Fitzpatrick Associates, 1993).

Spatial redistribution of demand at peak times can also reduce the negative impacts of overcrowding. Strategies include better visitor management techniques and more efficient transport arrangements, including developing and publishing of alternative routes to holiday destinations or the promotion of alternative transport possibilities (Fitzpatrick Associates, 1993). Allock (1994) suggests the development of 'circuits' of attractions, twin attractions or two-centre holidays, e.g. one week spent at the seaside and one week in the countryside to spread tourists away from congested or ecologically sensitive areas.

Increase Supply in the Peak Season

Weaver and Oppermann (2000) emphasise that by expanding the current capacity, e.g. new facilities or the utilisation of external facilities on a temporary basis, higher demand during the peak season can be accommodated. This measure should not be employed in isolation from other developments, as the increased supply might result in an overloading at other existing facilities (Mathieson & Wall, 1982). It has to be borne in mind that this strategy can also lead to an increased problem of underutilisation of facilities in the off-peak season, if the capacity is expanded on a permanent basis.

Reduce Supply

Another strategy to reduce the negative economic effects of seasonality, caused by the underutilisation of resources and facilities during the off-peak season, is the closure of parts or of the entire tourism enterprise in the low season. This is a radical measure for reducing the fixed and variable costs which is generally employed when it is not possible to increase demand outside the peak season substantially (Weaver & Oppermann, 2000). Restricted supply of tourist facilities, or services, can help to reduce overcrowding at peak times and to redistribute excess demand throughout the season. Yacoumis (1980) points out that restrictions of supply, e.g. limited room capacity, also entail a slower rate of growth for the whole industry, which again might not be desirable from an economic perspective. Mathieson and Wall (1982) state that even though this strategy may cause dissatisfaction for those tourists unable to use facilities, it ensures that those tourists whose demands are met, receive high quality products. It is clear that this radical strategy should be employed only if the negative ecological and sociological impacts at the peak season require such an approach.

Alternative strategies to closing tourism enterprises are the temporary expansion of facilities in the peak season or the usage of tourist facilities for different purposes in the off-peak season. Grant, Human and Le Pelley (1997) note that destinations with a flexible and cost-effective infrastructure are able to cope with peaks without requiring expensive year round maintenance. For example, temporary coach parking areas and the alternative utilisation of tourist facilities outside the main season, such as the use of tourist information centres as business information centres, enables the cutting of costs considerably (Grant, Human & Le Pelley, 1997).

Redistribute or Restructure Supply

If the existing product is no longer suited to the original demand, product diversification can help to attract different consumer segments (Weaver & Oppermann, 2000). This includes, for example, the conversion of hotel rooms to suitable accommodation for business tourists.

It has to be noted that the effects of the above-presented counter-seasonal strategies are not always positive. Most attempts to reduce seasonality have been primarily focused on increasing the number of tourists in the off-peak season with the aim of boosting revenues. This resulted in some destinations in increased acuteness of seasonal concentration, as the efforts made to attract tourists in the off-peak season also increased the number of peak season visitors (Netherlands & Ministerie van Economische Zaken, 1991). Butler (1994) also argues that the shift to more off-peak season holidays is not due to a shift of the primary holiday but due to an increase in additional holidays. He therefore stresses that the provision of additional holidays will not necessarily reduce seasonal concentration, but may even create seasonality in another location. Furthermore, the increased popularity of second holidays has also reduced the main holiday lengths and thus the revenues gained (Fitzpatrick Associates, 1993). This demonstrates the importance of research into the motivations of tourists visiting a destination in different seasons and into the measurement of the success of the strategies implemented to reduce the seasonality effects. The next subsection presents an overview of different case studies, segmenting tourists according to their seasonal behaviour, and analysing the extent to which strategies to lengthen the season have been successful.

2.2.6 Case Studies Analysing the Seasonal Behaviour of Tourists

Several studies are available which examine the motivations and behaviour of tourists in different seasons of the year. They are similar to the consumer behaviour studies which analyse the decision process for buying products and services. Most of these seasonal behaviour studies focus on a particular tourist attraction, e.g. National Park or a region, and the results are primarily based on data gathered from questionnaires, personal interviews or focus groups. Insights into the seasonal behaviour of tourists, e.g. motivations, as well as the types of attractions and activities in which they are interested, are essential for successful product modifications and market diversifications to increase the length of the season. The deeper the understanding of the characteristics of the tourists, their motivations and needs, in different seasons of the year in a destination, the more effective are the strategies and policies developed on this basis to tackle the seasonality problem.

O'Driscoll (1985), for example, studied the possibilities of increasing off-peak holiday travel, from the USA to Europe, by examining the responses of approximately 1000 telephone interviews, which were carried out in October 1983. The products and marketing strategies, which could maximise such off-peak travel, are discussed.

Calantone and Johar (1984) analyse in their study of seasonal benefit segmentation, the influence of different factors in the choice of activities in different seasons. The data came from approximately 1500 questionnaires distributed between the autumn 1974 and summer of 1975 in Massachusetts, USA. A factor/cluster analysis was used to segment the visitor market according to the benefits sought (e.g. nature, attractions). It was found that travellers seek different benefits at different times of the year. The implications of these results for the product development and marketing for the destination are discussed.

Manning and Powers (1984) study the visitor reactions to specific management strategies which attempt to redistribute visitors throughout the year, such as differential fees or the altering of opening and closing dates. A survey of 617 campers in Vermont State Park, USA was the basis for the analysis. Among other things, they found that a variety of strategies were likely to be effective and individual groups of visitors could be targeted. The potential value of price reductions in attracting visitors during the low season is emphasised, and potential target markets are identified.

Bonn, Furr and Uysal (1992) analyse 1760 questionnaires of visitors to Hilton Head Island, South Carolina, USA, between December 1987 and November 1988, in order to identify significant seasonal differences between them. They identify the length of stay relating to the accommodation type, the trip origin and the factors influencing the decision to visit as the most useful factors for a segmentation of the visitor market by seasonality.

Spotts and Mahoney (1993) investigate differences in the characteristics between autumn and summer tourists in Michigan's Upper Peninsula, USA on the basis of approximately 3800 interviews which were carried out during 1984. A cluster analysis is applied to segment the autumn tourists, based on their participation in recreation activities, and possible marketing strategies are introduced.

Owens (1994) examines the all-season resort sector in Canada in order to determine its overall competitive position. A survey of Canadian, and comparable US all-season resorts, as well as a survey of a small sample of visitors in Canadian ski resorts were carried out between 1990 and 1992. The Canadian resorts are assessed, guest profiles are compared and resultant marketing opportunities are discussed.

Some of the studies found that, for certain destinations, there is no potential for a successful lengthening of the summer season and thus marketing strategies aiming at increasing visitor numbers outside the peak season would be ineffective. Lundtorp, Rassing and Wanhill (1999), for example, analyse the possibilities of expanding the season in the Danish Baltic island of Bornholm. Over 3000 departing visitors were interviewed in 1995 and 1996. It is concluded that there are no realistic possibilities for increasing the shoulder, and certainly not the off-peak season, market by developing more activities and attractions.

Hickey and Jackson (2000) explore people's attitudes towards the seasonal visitation to Fort Edmonton, Canada. A survey of 118 park visitors in 1997 identifies how natural and institutional variables are related to the visit in a particular season. A more in-depth study interviewing 10 visitors attempts to explore their perceptions and feelings towards seasonal visitation with a view to attaining a better understanding of the relationships between natural and institutional variables as constraints to seasonal visitation.

Commons and Page (2001) examine the problem of seasonality in peripheral destinations in Northland, New Zealand. The patterns, trends and issues affecting tourism development in Northland are discussed, and the tourist behaviour of Northland's main domestic tourism market is analysed, using the results of a postal survey of 516 Auckland residents during 1998. The implications for the tourism industry to address the seasonality problem, in relation to the domestic tourism market, are then discussed.

Seasonality is also a major problem for the tourism industry in Scotland. In an attempt to find a solution, the 'Seasonality Working Group' was established in 1984. This group developed, for example, the 'Autumn Gold' campaign in 1996 to try to encourage visitors to come to Scotland in the quieter months of October and November (Scottish Tourist Board, 2000b). They also carried out a number of qualitative studies on seasonality in Scotland. These examine the motivations of visitors to Scotland at different times of the year, analyse the possibilities to lengthen the season and identify a range of products which visitors seek during different times of the year. In 1997, several extended group discussions and focus groups were held and it was found that, for example, packaging of accommodation offers is critical, especially for the short break market. Value for money is also highlighted as an important aspect. Furthermore, it is suggested, that simple short-term promotion of off-peak season products might not always be enough and that investments in new facilities might be needed to attract different markets (Scottish Tourist Board, 2000a). It is stated that the product driven promotion of Scotland in the off-peak period has been of only limited success and that a more market-oriented emphasis, which recognises the barriers to be overcome and the initiatives to be maximised, in order to persuade visitors to come to Scotland, should be pursued (Scottish Tourist Board, 1998).

2.3 Measuring Seasonality in Tourism Demand

The quantification of temporal fluctuations in tourist flows, e.g. the analysis of the timing or the degree of the acuteness of seasonality, is crucial from the development and marketing perspective of a tourist destination for the successful implementation of strategies to tackle the seasonality problem. Whilst there is an extensive body of literature on the phenomenon of seasonality in tourism, very few authors have focused on ways of quantifying empirically observed patterns. The majority of such attempts focus on international tourism. This is not surprising, as international arrival data, such as number of air passengers, are relatively easy to ascertain.

A number of studies quantifying the seasonal effect at the international, national and regional levels are introduced below. The aim is to provide an overview of the wide variety of approaches which have been presented in the tourist literature. A detailed technical description of appropriate measures for examining temporal variations in Wales at the national and the serviced accommodation sector level – the subject of this study – is given in chapters 4 and 6 of this dissertation.

Analysing Seasonality of Inbound Tourism

BarOn (1975) analyses the seasonal pattern of tourist arrivals at borders for 16 different countries including, for example, Austria, Canada and the UK, over a 17-year time frame. The average monthly seasonal factors for the evaluation of the seasonal patterns are estimated, using the moving average technique. These Seasonal Factors are then compared, using static measures such as the Seasonal Range (difference between highest and lowest monthly indices), the Seasonality Ratio (highest seasonal value divided by lowest) and the Peak Seasonal Factor. BarOn (1975) also introduces the 'Maximal Annual Utilisation Factor constrained by Seasonality' (MUS) and the complementary 'Seasonal Under-Utilisation Factor' (SUF) as a measure for the incomplete utilisation of resources during the year. The seasonal patterns of international tourist arrivals by air to Israel, by origin and selected age groups, are analysed, using seasonal factors derived from ARIMA models (Autoregressive Integrated Moving Average) (BarOn, 1999).

Sutcliffe and Sinclair (1980) look at tourist arrivals in Spain over the period 1951 to 1976. The total level of seasonality is measured by applying Lorenz curves, Gini Coefficients, Standard Deviations and a measure derived from information theory. They also provide two methodologies, based on a linear transformation and a time series approach, which decompose increases in seasonality into 'changes in the pattern' and 'pure changes in the level of seasonality', and calculate the extent and direction of the change in seasonality over time. These approaches give an indication of the stability of a seasonality pattern over time. The results show that the rise in the level of seasonality in Spanish tourist arrivals is due to the greater concentration of arrivals in certain months of the year and not to an increase in the fluctuations in the seasonality pattern. Therefore, a strategy to limit the concentration of arrivals in particular months is suggested, rather than trying to stabilise the patterns of tourist arrivals. Sutcliffe and Sinclair (1980) stress that the use of an inappropriate definition of a 'pure change in seasonality' (i.e. amplification of the existing seasonal pattern) can lead to an overstatement of the importance of the pattern changes. Even though the results are interesting from a managerial perspective, the two methods proposed are not easy to understand and are complicated to apply.

Drakatos (1987) examines the seasonal pattern of arrivals, by nationality, in Greece from 1980 to 1985, and compares the seasonality of tourism in Greece to its competitor countries. Seasonal Factors are obtained from a 12-month moving average. The Coefficient of Variability, Concentration Indices, Amplitude Ratio and Similarity Index are calculated to identify the seasonal profile. The study demonstrates that Greek tourism shows a greater seasonal concentration than that in all its other competitor countries. It is also shown that considerable differences exist amongst the seasonal patterns of particular nationalities arriving in Greece.

Donatos and Zairis (1991) complement Drakatos' study by analysing the seasonality of foreign tourism in the Greek Islands. They also examine the possibilities for extending the tourism season. The seasonal patterns are estimated for the period 1981 to 1986 based on foreign tourist arrivals (i.e. to enable comparisons to Drakatos' study) and on nights spent by foreign tourists for a selected group of tourist regions. Again the Seasonal Factors are derived from a 12-month moving average, and measures such as the Coefficient of Variation, Similarity Index and Concentration Indices are calculated to compare the tourist regions. The seasonal pattern of overnight stays by foreign tourists, which are differentiated by origin and accommodation category used, e.g. luxury vs. economy, is examined in more detail for Crete, one of the Greek Islands. It is interesting to note that the seasonal concentration in luxury accommodation is lower than that of economy accommodation from July to September, and higher for the rest of the season in Crete (Donatos & Zairis, 1991).

Yacoumis (1980) examines the seasonal pattern of foreign tourist arrivals, from different countries of origin, to Sri Lanka at a national level. Indicators such as the Coefficient of Variation, the Seasonality Ratio and the Seasonal Indices are calculated. He stresses that seasonality should also be analysed on a regional and sectoral level, since the national seasonal pattern of arrivals does not always reflect accurately the experiences of the accommodation sector nor the internal transport sector (Yacoumis, 1980). Furthermore it is highlighted that the often widely divergent regional patterns tend to be concealed by the results on the national level, as these are averages. Yacoumis (1980) compares, therefore, also the seasonal patterns of foreign guestnights in graded accommodation enterprises for different regions, using the above-mentioned measures. Marketing strategies to tackle seasonality are discussed. Wanhill's (1980) study is the first which compares different seasonality measures. He reveals some serious deficiencies of the Seasonality Ratio and the Coefficient of Variation used by Yacoumis (1980). Wanhill (1980) favours the use of the Gini Coefficient, as it takes account of the skewness of the distribution and is less influenced by extreme values than the other two measures.

Wall and Yan (2003) attempt to identify the structure, characteristics and intensity of temporal fluctuations in China's international visitor arrivals from 1980 to 1998. The classical time series approach is applied to decompose time series data into trend, seasonal, cyclical and irregular fluctuations. The seasonal variations are examined using monthly ratios (number of visitors for each month in a year to the average monthly numbers of visitors for that year) along with their deviations and the Seasonal Index. They also assess fluctuations in different market segments. Several methods to evaluate the relative importance of all different types of fluctuations in visitor numbers are presented.

Several papers have appeared in the literature using more sophisticated methods modelling tourism seasonality, with the aim of improving forecasting models. A number of forecasting models, ranging from univariate ARIMA, error-correction models (ECM) to cointegration analysis, are compared in the context of predicting quarterly international tourist flows into Australia from major tourist markets by Kulendran (1996) and Kulendran and King (1997). Kulendran and King (1997) emphasise in this regard the importance of seasonality, which requires careful handling. It is found that relative to time series models, ECM and the seasonal unit roots model perform poorly, which may be caused by decisions on how to model non-stationary and seasonal data (Kulendran & King, 1997). Goh and Law (2002), Gustavsson and Nordström (2001) and Kim and Moosa (2001) examine the effect of different specifications of seasonality on forecasting performance. Kim and Moosa (2001), for example, demonstrate that stochastic seasonality is more appropriate than deterministic, but that the forecasting performance does not improve by the stochastic treatment of seasonality, even in the presence of seasonal unit roots.

Lim and McAleer (2000; 2001b; 2001a; 2002; 2003) have published a number of studies relating to seasonal modelling, with the aim of forecasting international tourism demand from Asia to Australia. Lim and McAleer (2001a), for example, apply the moving average technique, to estimate the seasonal components, to time series of monthly tourist arrivals from Hong Kong, Malaysia, and Singapore to Australia during 1975 to 1996. They use Seasonal Indices, the Seasonal Range and the Seasonal Ratio, to compare the three international arrival series. As the seasonal pattern of the arrival series does not remain constant over time, several ARIMA models are estimated and tested for best fit of the seasonal patterns observed (Lim & McAleer, 2001a). They stress the importance of examining deterministic and stochastic seasonality and testing for seasonal unit roots in time series modelling in order to establish accurate forecasting models (Lim & McAleer, 2000). Seasonal Indices were also used by Hui and Yuen (2002) in their study of the seasonal variation of Japanese tourist arrivals in Singapore.

Analysing Seasonality at a National Level

Wilton and Wirjanto (1998) analyse in their study, prepared for the Canadian Tourism Commission, the seasonal variations in national tourism indicators, such as tourism expenditures on accommodation, vehicle rentals, entertainment, passenger air transport, employment and tourist exports, which are published on a quarterly basis. Statistical regression analysis is used to estimate the magnitude of the seasonal factors for 113 national tourism indicators over the period 1986 to 1997. Deviations from the seasonal factor are used to determine the acuteness of the seasonal fluctuations in each tourism indicator. The influence of temperature deviations from the seasonal norm on tourism expenditures is also examined. It is interesting to note that a positive temperature effect occurs predominantly on the domestic side of tourism demand in the summer quarter (Wilton & Wirjanto, 1998).

Kennedy (1999) analyses arrival data to Ireland between 1973 and 1995 in different seasons, using simple graphical and descriptive tools. The seasonal distribution of overseas visitors and domestic tourists, as well as their regional distribution, is included in the analysis. The aim of the study is not to present statistical measures to analyse seasonality, but to discuss policy initiatives and implications of seasonality trends for Irish tourism.

Analysing Seasonality at a Regional or Sectoral Level

Uysal, Fesenmaier and O'Leary (1994) examine the relative importance of seasonality and the seasonal variation in the length of stay for 48 states in the USA. The data analysed come from a survey of 50,000 households conducted in 1990. The trip index, comparing the days spent in a given state to the total number of days spent on vacation, is calculated and used to segment the visitors using cluster analysis. The results from the segmentation approach and the application of the concentration index show that there are profound geographical and seasonal differences between the states.

Soseilo and Mings (1987) examine the seasonal behaviour of tourists as reflected in sales tax collection data for Scottsdale, Arizona, for the period 1972 to 1984. The focus is on how particular types of businesses respond to monthly changes in visitor expenditure. Results show that tourist expenditure is not uniformly distributed throughout the year or amongst individual categories of businesses.

Snepenger, Houser and Snepenger (1990) analyse the seasonality of demand experienced by the tourism businesses in Alaska. The study analyses data acquired from telephone interviews from 179 travel businesses. The percent of revenue generated during the peak summer months is used as a measure of the level of seasonality of demand for each company (Snepenger, Houser & Snepenger, 1990). The relationships between the level of seasonality and organisational, environmental and demand structure characteristics of business enterprises are identified using regression analysis.

In summary, the majority of studies attempting to quantify seasonality of tourism demand focus on the seasonal variations of international tourist arrivals by different origin markets for a particular tourist destination. There is a lack of studies analysing the seasonal pattern of domestic tourism. As in northern hemisphere destinations, domestic tourism by far outweighs the importance of international tourism, the identification of differences in the seasonal patterns of domestic tourism demand is crucial for the development and implementation of marketing strategies which tackle seasonality. This study, therefore, analyses the seasonality of domestic tourism in Wales, comparing different types of trips, such as long and short holiday trips or business trips within Wales, and with such trips in Scotland and England. The results are presented in chapter 5 of this dissertation.

2.4 Temporal Variations in the Hotel Sector

The analysis of temporal variations for accommodation businesses is particularly important, as the season has a decisive influence on the economy of the enterprise (Lundtorp, 2001). The ultimate aim is to increase utilisation of capacity outside the main season, as hotels usually experience high fixed and variable costs. Cooper, Fletcher, Gilbert and Wanhill (1998) emphasise, in this regard, that accommodation businesses must at least cover the variable costs, such as heating, labour and insurance to justify remaining open during the off-peak season. Getz and Nilsson (2004) argue that this might be different in family businesses, which are able to avoid paying labour costs in the off-peak season if the family provides all the necessary staff. They also state that some of the costs, for example for heating, can be considered as family subsistence costs when living in the accommodation. Family businesses have therefore unique options in tackling the seasonality problem, e.g. by closing during the off-peak season (Getz & Nilsson, 2004). Phelps (1988) points out that the decision for a tourist enterprise to remain open is usually based on the demand and not the supply, but that economic viability depends on the scale of the operation.

As mentioned above, Getz and Nilson (2004) examine the impact of 'extreme' seasonality of demand on family businesses in the tourism industry in Bornholm, Denmark. The data come from 84 self-completion questionnaires and 33 structured interviews with owner-operators. Getz and Nilson (2004) categorise the strategies adapted to tackle seasonality in 'coping with' or 'combating' seasonality, 'terminating' the business or 'capitulating'. They found that most responses to 'extreme' seasonality have profound implications for family life as well as business growth and viability. Implications are not only drawn for family businesses but also for the destination. They suggest that destination managers should focus on supporting 'combaters' and encourage more all-year-round operations. The understanding of family business motives and needs are crucial for the identification of those enterprises with the greatest potential in tackling seasonality. This will also support the selection of marketing and development strategies which attract family business owners (Getz & Nilsson, 2004).

Campbell (1995) looks at the attitudes of 85 hoteliers in the Highlands and Islands of Scotland towards seasonality, based on information from a questionnaire conducted in 1994. The study focuses on the perceived barriers to off-peak season development and the activities undertaken to address seasonal problems. He found that the main impediments are climatic factors and foreign holiday prices. Campbell (1995) states that only a few hoteliers choose to tackle these issues directly through product and promotional activities, while the majority of hoteliers tend to rely on membership of an independent agency or the Scottish Tourist Board for promotional reinforcement. Only a few hoteliers offered special out of season packages, for example, all-weather theme holidays outside the summer season. The majority engaged in price discounting as a marketing tool, especially in the spring (Campbell, 1995).

Coenders, Espinet and Saez (2001) examine the effects of different characteristics of holiday hotels on the monthly price, in the sun and beach segment for the Spanish continental Mediterranean coast. They use random-effect models to study the peak level and seasonality of hotel prices and their predictors. The results from the structural equation models show that the zone/region (also includes the influence of weather), the hotel category, the closeness to the beach, the room equipment and the availability of parking have an effect on the peak price and the seasonality. Seasonality is, for example, higher for 3-star hotels than for 1-, 2- or 4-star hotels in the sample. It is also found that hotels located in the southern regions have the lowest seasonal variations, due to a warmer climate in the autumn (Coenders, Espinet & Saez, 2001).

Measuring Seasonality using Data on Occupancy or Hotel Nights

BarOn (1975) argues that domestic tourism demand is often more seasonal than inbound tourism. He therefore analyses, in addition to the arrival data at frontiers, hotel occupancy data for 16 countries, identifying monthly peaks and troughs (BarOn, 1975, 1999). The seasonal pattern of hotel nights in Israel and the resort Eilat in particular, are examined, comparing inbound and domestic tourism in different regions using measures such as the Seasonality Ratio and the MUS (BarOn, 1999).

Grainger and Judge (1996) analyse the changing patterns of seasonality in hotel arrivals in Portsmouth for the period 1987 to 1994. Total arrival figures are disaggregated into domestic and overseas, as well as holiday and business visitors. Time series plots, the Coefficient of Variation and the Gini Coefficient are used to analyse seasonal differences between peak and off-peak seasons. They stress that any attempt to measure seasonality, changes in the pattern or the causal factors depend on the way in which the seasonal factors are modelled. Three different types of models are presented – conventional decomposition methods with fixed deterministic seasonal dummies, the unobserved components structural time series model which allows for evolving stochastic seasonal dummies, and a causal dynamic regression model, incorporating either deterministic or stochastic seasonal effects (Grainger & Judge, 1996). Average monthly temperature effects, exchange rates and dummy variables for specific events are also incorporated in the regression approach. The study suggests that an unobserved components framework is superior to a conventional decompositions approach, as it allows for stochastic seasonals (Grainger & Judge, 1996). An attempt to examine the extent to which policies had an impact on the seasonal pattern is also made.

Sørensen (1999) examines regional differences in the seasonal concentration of tourists in the hotel sector in Denmark. He tests the hypothesis that the nature of the seasonal process has become more stochastic and less deterministic. A univariate econometric stochastic approach is used to model the seasonality of hotel nights in Denmark by county and nationality, between 1970 and 1996. A strategic framework for analysing seasonality, including graphical tools, is presented. The importance of testing for seasonal unit roots is emphasised when analysing seasonal changes in the long term, as unit roots are present in many time series on hotel nights and a varying and changing seasonal component is common in hotel time series (Sørensen, 1999).

Lundtorp (2001) presents a comprehensive summary of the different seasonality measures, including the Coefficient of Seasonal Variation, the Seasonality Ratio, the Gini Coefficient and the Seasonality Indicator. The seasonal pattern for Danish hotel overnights from 1989 to 1998 is analysed for the whole country, as well as for the 15 regions using the above-mentioned measures. Lundtorp (2001) also applies time series models, examines the stability of the seasonal patterns and looks at seasonal changes by introducing a measure to compare growth and seasonality.

Even though the studies mentioned above use occupancy data or hotel nights, the majority analyse seasonal variations at an aggregate level and at the most identify differences between regions. The hotel sector itself, with its different key characteristics, such as the size or grading and the resulting differences in temporal variations, is not of importance. The focus of this research is the analysis of temporal variations in the serviced accommodation sector with the aim of pinpointing statistically significant relationships between characteristics of establishments and a range of typical performance profiles. The approach used is based on studies by Jeffrey (1983), who not only examines seasonal variations, but also presents a comprehensive analysis of hotel occupancy performance, including short-term demand trends. It should be noted, however, that the technical side of the PCA method itself is outlined in chapter 6 of this dissertation.

Analysing Hotel Occupancy Performance using Principal Components Analysis

A number of studies identify a close relationship between profits and occupancy rates (Norkett, 1985; Russo, 1991). However, Abbey (1983) states that occupancy rates are only of limited use as an accurate measure of profitability as they are not able to reflect price cuts. It is, therefore, argued that occupancy levels should not be used to evaluate the success of marketing initiatives (Middleton, 2001), but, as there is a general lack of consistent and comparable financial performance measures in the fragmented hotel industry, occupancy rates can be seen as a surrogate for financial performance (Morrison, 1998). In the literature it is, thus, generally agreed that occupancy rates are important when determining the overall performance of accommodation establishments, as they represent a percentage measure of the capacity sold. It is, hence, not surprising, that the marketing initiatives of most accommodation establishments are dominated by the aim of achieving high and stable room and bed occupancy rates with low seasonal fluctuations (Jeffrey & Hubbard, 1994b).

As occupancy rates reflect the expressed demand for a particular establishment at a given time, they also provide a sensitive barometer, which enables the identification of trends and seasonal patterns for different types of hotels (Jeffrey, 1983; Jeffrey & Hubbard, 1994a). The analysis of occupancy rates thus plays an important role in the development of marketing and management strategies for hotels (Jeffrey *et al.*, 2002). Jeffrey and Barden (2000a) also stress that an effective monitoring system, which relates the occupancy performance of an individual hotel to industry, regional or hotel type norms, is required to fully exploit the potential of occupancy analysis for hotel marketing. The occupancy performance of hotels and the relationships between different key features and temporal demand variations are investigated in a number of studies by Jeffrey and his co-authors (Jeffrey, 1983; Jeffrey & Barden, 2000a; Jeffrey *et al.*, 2002; Jeffrey & Hubbard, 1985). A short overview of these articles is given below.

Jeffrey (1983) analyses occupancy rates for different types of hotels for the 12 English Tourist Board regions between 1976 and 1982. The application of the Principal Components Analysis (PCA) to the regional time series of monthly bed occupancy rates resulted in a comprehensive, concise and precise summary of the variable performance of the English hotel industry by location and hotel category (Jeffrey, 1983). The following structural components reflecting the differences between the 102 individual regional series of bed occupancy rates are identified: overall occupancy levels, the amplitude of seasonal fluctuations, long-term trends and the length of the season (Jeffrey, 1983). It is demonstrated that seasonality is closely linked to the location of the hotel and the composition of a region's tourist demand.

A number of studies examine monthly and daily bed occupancy rates for Yorkshire and Humberside hotels between 1982 and 1984 (Jeffrey, 1985a, 1985b; Jeffrey & Hubbard, 1985, 1986a, 1986b). The application of PCA revealed similar structural components underlying the empirical observations of bed occupancy rates for the Yorkshire and Humberside region. Hotels are differentiated in respect to their overall occupancy performance, the nature and intensity of their seasonal and weekly occupancy patterns and their changing occupancy performance between the period April 1982-March 1983 and April 1983-March 1984 (Jeffrey, 1985b). The results of a questionnaire survey conducted for a reduced sample of hotels are used in a multiple regression analysis which relates occupancy trends to a number of 'predictor' variables. Relationships between various characteristics of hotels, their management, differing marketing policies and occupancy performance are identified (Jeffrey & Hubbard, 1985). Jeffrey (1985a) also groups hotels on the basis of their individual parameters relating to occupancy levels, the intensity of seasonal fluctuations and the length of the season, using cluster analysis. It is shown how the spatial-temporal patterns identified can assist in the formulation of appropriate marketing and development policies for the hotel industry.

The original analysis by Jeffrey (1983) was extended to 266 hotels, drawn from a national representative sample across England which included 700 hotels (Jeffrey & Hubbard, 1988a). The application of PCA to monthly and weekly room and bed occupancy data, over the period 1984 to 1986, revealed similar temporal components as those identified in the previous studies. However, the wider national sample of hotels enabled the identification of consistent and distinct geographical patterns in English hotel occupancy performance (Jeffrey & Hubbard, 1988a). Foreign tourism is also analysed by applying the PCA to monthly overseas visitor arrival rates for 266 English hotels between 1984 and 1985 (Jeffrey & Hubbard, 1988b). It is shown that overseas visitor flows, and the resulting economic benefits, are extremely localised in England. It is, thus, argued that there is a need for more effective marketing to attract overseas visitors to provincial hotels and areas, in order to reduce the inter-regional imbalances (Jeffrey & Hubbard, 1988b). Furthermore, a separate PCA is applied to time series measuring year-on-year changes in the monthly overseas visitor rates in each of the 266 hotels over the two-years study period 1984 to 1985. The results differentiate hotels on the basis of the direction, the extent and the timing of the changes in their overseas visitor arrival profiles (Jeffrey & Hubbard, 1988b).

Jeffrey and Hubbard (1994a) also developed a standardisation procedure, analogous to the shift-share analysis, which enables the analysis of hotel occupancy data at an individual hotel level without the distortions introduced by regional and local variations in the hotel type. Occupancy profiles of individual hotels are compared with 'expected' occupancy profiles, in order to highlight the strengths and weaknesses in individual hotel occupancy performance. The 'expected' profiles are derived from a national sample of similar hotels and are also referred to as 'industry wide occupancy norms'. The PCA is then performed on the monthly 'competitive components matrix', which is obtained by subtracting the expected monthly occupancy profiles from the actual profile for each hotel. The results allow for a precise identification of geographical patterns in the performance of the hotel and tourist industries (Jeffrey & Hubbard, 1994a). The importance of hotel occupancy data as a performance indicator for the industry is highlighted. Jeffrey and Hubbard (1994b) summarise the PCA approach used in the previous analyses and present a theoretical, conceptual and empirical basis for the more effective use of occupancy data in the monitoring of occupancy performance and the marketing of hotels.

Jeffrey and Barden (1999; 2000a; 2001) analyse monthly room occupancy rates for 279 English hotels over the period 1992 to 1994. The applied PCA resulted again in the structural components: occupancy performance, seasonality, long-term trend and length of season. Hotels are positioned in a so-called 'occupancy performance space' which monitors their observed occupancy performance against industry, regional and hotel-type norms. It is shown that the positioning of a hotel in the occupancy performance space can provide a precise and effective basis for hotel marketing (Jeffrey & Barden, 2000a). Out of the 279 hotels, 91 also participated in a questionnaire, giving such information as the location, markets served, nature of management and marketing, and aspects of internal operations. A stepwise multiple regression analysis is used to relate these characteristics of hotels to the structural components identified by PCA. The resulting models are able to predict the occupancy performance of a hotel. These models are, thus, used to compare the observed position of a hotel in the occupancy performance space against its own 'expected' rates. This again aids the development of more effective management and marketing strategies and contributes, at a more general level, to a deeper understanding of the factors which differentiate occupancy performance within the English hotel industry (Jeffrey & Barden, 2001). The nature, causes and marketing implications of seasonality in the occupancy performance of the 279 English hotels is the focus of the study by Jeffrey and Barden (1999). Two of the four structural components, identified by the PCA, relate to seasonality (i.e. nature and intensity of seasonality and length of season) and are analysed in detail. The regional patterns of seasonality for English hotels are presented and the hotels are positioned in the two dimensions of seasonality – nature and intensity of seasonality and length of season. Jeffrey and Barden (1999) also attempt to predict seasonality using the questionnaire data of the 91 hotels in a number of multivariate analyses. The results of the regression analysis are used to discuss marketing strategies to reduce seasonality and/or to extend seasons.

A PCA is applied to daily room occupancy rates of 91 English hotels for the period 1992 to 1994, in order to analyse within-week occupancy performance (Jeffrey & Barden, 2000b). Two major temporal patterns are revealed, one relating to a midweek peak and a Saturday trough, and the other to a broader weekend peak and a midweek trough. A regression analysis is used to identify relationships between the location and other hotel characteristics and the two temporal dimensions obtained by the PCA. According to their characteristics, hotels are positioned in the two-dimensional daily occupancy performance space. Marketing implications to improve the overall occupancy levels and the profitability of hotels are discussed.

Jeffrey, Barden, Buckley and Hubbard (2002) present a comprehensive summary of the 15-year research period, in which daily and monthly occupancy rates for different samples of hotels in England were analysed. They provide an overview of the methodology used, the consistently revealed temporal components of occupancy performance (i.e. overall occupancy levels, seasonality, length of season, trend and within-week variations), the relationships between the characteristics of hotels and the temporal dimensions, and the factors affecting occupancy performance of hotels. The policy implications resulting from the various analyses for successful hotel marketing and management are extracted and discussed. The results of the various studies show that seaside, remote or peripheral hotels generally have a pronounced or extreme seasonality. It is demonstrated that some hotels did better than others, depending principally on their target markets. Those oriented towards business travellers and conventions, or group tours, displayed significantly less seasonality. Yield management helped, but deep price discounts did not (Jeffrey *et al.*, 2002). Jeffrey, Barden, Buckley and Hubbard (2002) state that most hoteliers could extend their seasons through better marketing, but that some would find seasonal closures to be the most effective solution to pronounced seasonality.

The extensive studies by Jeffrey and his co-authors demonstrate that the application of PCA to hotel room occupancy rates reveals the structural components underlying the empirical observations. These can then be used to identify regional differences, and relationships between components of occupancy performance and hotel characteristics. The structural components identified by the PCA can also be utilised for benchmarking purposes, as they represent national thresholds, against which groups of hotels or individual enterprises can be compared. It is thus, for example, possible to identify clusters of hotels, with high and low seasonality, revealing regional or local differences. In contrast to studies at an aggregate national level, this kind of analysis allows the refinement of marketing strategies for particular groups of hotels, or even individual hotels, according to their occupancy performance. As the topic of this research is an examination of the temporal variations in tourism demand in Wales, with special focus on the serviced accommodation sector, a PCA is applied not only to the room occupancy data of Welsh hotels, but also to that of guesthouses, B&Bs and farmhouses. The method and the results of the analysis are presented in chapters 6 and 7/8, respectively.

2.5 Summary

The review of the relevant literature in the field of temporal demand variations and seasonality in tourism revealed that the number of available studies has rapidly increased over recent years. For example, causes and forms of seasonality of demand have been identified and the concepts, theory, and definitions as well as the impacts and perceptions of seasonality have been explored. A wide range of literature is concerned with links between demand fluctuations and visitor motivations. It became evident that most of the research has either been focused on particular destinations, with case studies involving questionnaires or longitudinal studies involving time series analysis, and seasonal modelling with the aim of obtaining seasonally adjusted data. It was shown that the number of in-depth studies dealing with general measures of seasonality and conceptual models, which can easily be applied by tourism managers in their destinations, is limited.

The available studies in the field of seasonality of the serviced accommodation sector were also examined, as this is the focus of this research. The importance of the analysis of temporal variations in the accommodation sector due to, for example, the high fixed costs and the decisive influence on the economy of a hotel is frequently stated in the academic literature. A number of authors have employed quantitative techniques to investigate seasonal demand variations in the accommodation sector using information on the number of hotel nights or occupancy rates. However, the majority of these studies only analyse seasonal variations at an aggregated level and at the most, differences are identified between regions. Only the various studies by Jeffrey and others (Jeffrey, 1983; Jeffrey *et al.*, 2002) attempted to identify relationships between the characteristics, the location of an establishment and its seasonality pattern. However, it was shown that these published studies, concerning seasonal variations in the accommodation sector, have dealt exclusively with England or Scotland and focused only on the hotel sector.

It was demonstrated that there are no general guidelines available of how seasonality or demand fluctuations in general can and should be measured and which available data sources should be used. It can, therefore, be concluded, that there is a lack of standards and quantification methods which, in turn, makes comparison between different regions or sectors relating to the acuteness of demand fluctuations particularly difficult.

CHAPTER 3

TOURISM TRENDS IN THE UK AND WALES

Tourism is globally and domestically an important source of revenue for the UK. This chapter gives an overview of annual tourism trends in the UK from 1994 to 2002, with a special focus on Wales. It is divided into four sections. The first section presents international tourism trends stating the importance of the UK in world tourism, whilst tourism trends in the UK are the topic in section 3.2. An overview of the different UK tourism data sources, used in the analysis, and their limitations is given. This is followed by a brief examination of the economic importance of tourism and the trends in overseas and domestic tourism volume for the UK overall. Section 3.3 analyses international and domestic tourism trends for Wales, and offers comparisons to England and Scotland. Different events in 2001, notably the FMD and the September 11th attacks, caused many tourist businesses in the UK to experience significant changes in demand volume. This chapter also examines the impacts of the FMD outbreak in the UK as a whole, and Wales, in particular, for tourism operators and visitors. An overview of the measures taken by the government is given and the resulting limitations, imposed on visitors, are presented. The last section provides an overview of the relative importance of different types of accommodation enterprises for domestic tourism demand. The Wales Serviced Accommodation Occupancy Survey (WSAOS) is also introduced and a summary of the general trends in the accommodation sector between 1998 and 2002 with a special focus on the changes in occupancy performance in 2001 and 2002 is presented.

3.1 International Tourism Trends

The tourism industry is of vital importance to the global economy, generating up to 10% of the world's GDP and employing approximately 100 million people both directly and indirectly (Richards, 2003). Worldwide international tourism receipts amounted to US$ 474 billion in 2002, the international travel fare component not included (WTO, 2003). In 1998, tourism had a 7.9% share of all worldwide export earnings and, therefore, was ahead of all other international trade categories. The automotive production, for example, accounted for only 7.8% (WTO, 2000). The WTO (2000) further states that tourism ranks in the top five export categories in 83% of all countries and is the leading source of foreign exchange in at least 38% of all countries. The number of international arrivals has more than tripled since 1971, from 179 million to 702.6 million worldwide in 2002 (WTO, 2000, 2003).

The WTO emphasises that 2000 and 2001 were two exceptional years for the tourism industry. Compared to 1999, international tourist arrivals grew by 45 million in 2000, to levels rarely seen before (WTO, 2002). The events of September 11th 2001 affected international tourism levels in a number of destinations and sectors. Worldwide tourism receipts decreased from US$ 473.4 billion in 2000 to US$ 459.5 billion in 2001 (-3%). International tourist arrivals declined by 0.5% to 684.1 million in 2001, the first year with a negative tourism growth since 1982 (WTO, 2002, 2003). America suffered the most, with a 6.1% decrease in international arrivals, followed by South Asia with a drop of 4.5%. In Europe, international tourist arrivals declined by 0.5% from 392.7 million in 2000 to 390.8 million in 2001. Especially Northern Europe experienced a rapid decline of 4.7% in international tourist arrivals between 2000 and 2001 (WTO, 2003). However, Europe still has a market share of 56.9% of the World's international tourist arrivals market, and therefore remains the World's most popular tourism region. Forecasts suggest a growth in international tourist arrivals to 1.56 billion worldwide by 2020, with 1.18 billion intra-regional and 377 million long-haul travellers (WTO, 2003).

In the European Union, tourism contributes an estimated 5% to both the GDP and the total employment market and also accounts for around 30% of Europe's service industry exports. As a destination, Europe receives approximately 60% of the world's tourist arrivals and the EU tourism industry generates an estimated 8 million jobs directly, a trend which is still moving upwards (Richards, 2003). An increase of 2 million jobs in the travel and tourism industry within the EU is expected during the next 10 years (European Commission, 2003). The WTO (2002) forecasts that in 2020 Europe will still be the top-receiving region, with 717 million tourists and a market share of 45.9%. It is estimated that the growth in arrivals will be higher in Central and Eastern Europe than in Western Europe. Even though the expected average growth rate of international tourist arrivals in Europe is, at 3%, lower than those expected for the Middle East (7.1%) and East Asia/Pacific (6.5%), it is still higher than the forecasted annual average growth rates for other industries (European Commission, 2003; WTO, 2003).

France is the World's top tourism destination, with a market share of 11% of all international tourist arrivals in 2002, followed by Spain (7.4%) and the United States (6.0%). The United Kingdom is ranked six in the World's most popular tourism destination list, with 24.2 million international tourist arrivals in 2002, accounting for a market share of 3.4% of the 2002 world tourist travel market (WTO, 2003). In the UK, not only the terrorist attacks of 11th September 2001 but also an outbreak of foot and mouth disease earlier in that year led to significant changes in tourism demand patterns. A more detailed analysis of the impacts of FMD on the tourism industry in the UK is given in section 3.2.2 of this chapter.

The UK experienced a 9.4% decrease in international tourist arrivals (from 25.2 million to 22.8 million) and a reduction of 16.7% in international tourism receipts in 2001 in comparison to 2000 (from US$ 19.5 billion to US$ 16.3 billion). The UK was placed in 7th position in the list of the top international tourism earners, 2002, behind the USA, Spain, France, Italy, China and Germany (WTO, 2003). This is down from the position held in 2000, when the UK ranked 5th in the league of the world's top tourism earners, with US$19.5 billion, behind the USA, Spain, France and Italy (WTO, 2002). It has to be borne in mind that these figures, collected by the WTO, do not show the complete picture, as they take only international tourism into account. The economic importance of the tourism industry is much higher, as it can be assumed that worldwide domestic tourism is worth ten times more than international tourism (WTB, 2000a).

3.2 UK Tourism Trends

3.2.1 UK Tourism Data Sources

Tourism is one of the largest industries in the UK, being worth approximately £76 billion in 2002 and accounting for around 4.9% of the GDP (including day trips) (Richards, 2003). In the UK, 2.1 million people are directly employed in tourism, accounting for 7% of all people in employment. Approximately 163,000 of these jobs are in self-employment. In 2002, 24.2 million overseas visitors came to the UK (a 6% increase compared to 2001), spending around £11.7 billion directly and £3.2 billion in fares to UK carriers (a 5% increase in comparison to 2001) (BTA, 2003a).

Expenditures on domestic tourism in 2002 were estimated to be nearly £61 billion, including an estimated £34.2 billion spent on day trips. UK residents took 101.7 million holiday trips of one or more nights (spending £17.4 billion), 23.3 million overnight business trips (spending £5.6 billion) and 39.6 million overnight trips to friends and relatives (spending £3.4 billion) (BTA, 2003a). In 2001, the turnover of the hotel industry was £10.5 billion, representing a 4% drop when compared with 2000. The average room occupancy rate for the serviced accommodation sector in the UK was 58% in 2002 and the average bedspace occupancy rate was 44% (BTA, 2003a).

There are a number of surveys collecting statistical data on UK tourism volumes and values, but only those surveys which are used in the following analysis are briefly introduced here. These include, for example, the International Passenger Survey (IPS) which focuses on overseas tourism. The United Kingdom Tourism Survey (UKTS) provides information on tourism trips undertaken by UK residents, both within and outside the UK. Information on the volume and value of day visits is collected in the 'UK Day Visits Survey', but not on a yearly basis. It was carried out in 1994, 1996 and 1998. The Accommodation Occupancy Survey collects information on room and bedspace occupancy rates for the serviced accommodation sector.

International Passenger Survey (IPS)

The IPS is carried out by the Office for National Statistics for a range of public and private sector organisations, collecting data on inbound tourism to the UK since 1961 (Office for National Statistics, 2002). The results of this large multi-purpose survey are based on face-to-face interviews with a random stratified sample of passengers as they enter or leave the UK via principal air, sea or tunnel routes. In 2002, 254,000 interviews took place representing 0.2% of all travellers (Office for National Statistics, 2002). Its aims are to provide detailed information on overseas visitors to the UK, to collect data to measure the travel expenditure and to provide data on international migration as well as on passenger routes. The IPS results are weighted to produce national estimates to and from the UK on a quarterly basis (Office for National Statistics, 2002). Due to changes in the IPS sampling methodology introduced in 1999, the results for 1999 to 2002 should therefore not be compared with those of earlier years.

United Kingdom Tourism Survey (UKTS)

The United Kingdom Tourism Survey (UKTS) collects monthly data on the number of trips, the number of nights and the spending on different types of overnight trips taken by UK residents both within and outside the UK. The aim of this survey, which is jointly funded by the statutory tourist boards for England, Scotland, Northern Ireland and Wales, is to measure the volume and value of tourism by United Kingdom residents in order to give an overview of the total UK tourism market (UKTS, 2003).

The survey is continuously conducted throughout the year with a representative sample of UK adults. Per year, between 50,000 (from 2000 onwards) and 70,000 (from 1989 to 1999) interviews are carried out. Furthermore the survey results are weighted to ensure that it is representative of the UK adult population (UKTS, 2003). From 1994 to 1999 the information was collected through Computer Assisted Personal Interviewing (CAPI), which involved face-to-face interviews, conducted every month in a representative sample of homes, using a two stage stratified probability sample or a random sample. Previously UKTS data had been produced on the basis of a somewhat different methodology, which make direct comparisons difficult between pre- and post-1994 statistics. In Northern Ireland the CAPI system was introduced only in 1997 and, whilst Northern Ireland data is included in parts of the analysis presented in chapter 5, any direct comparisons with other regions of the UK should only be made with due caution.

In 2000 telephone interviews using random digit-dialling replaced face-to-face interviews and, although the key principles of the survey design remained unchanged, it is thought that the change affected both tourism volume and value figures. There are good arguments to suggest that the new data are more accurate, as it is believed that frequent tourists are better reflected (UKTS, 2002a). But the difference in methodology means that year-to-year or month-to-month comparisons between the figures for 2000 to 2002 and those for earlier years are not appropriate. For this reason, the analysis presented in chapter 5 is based, first and foremost, on the data from 1994 to 1999, with data collected from 2000 to 2002 being analysed separately and quoted where important differences in trends or patterns are evident. Furthermore, from 2000 onwards the results for Northern Ireland are no longer published in the UKTS; this being the reason why Northern Ireland is excluded from the major analyses in chapter 5 of this dissertation. The results for the period 2000 to 2002 will also be different when compared to 1994 to 1999, as the events in 2001 affected the overall volume of tourism trips taken by UK residents.

UK Day Visits Survey

The 'UK Day Visits Survey' was carried out by the National Centre for Social Research and aimed to measure the volume and value of leisure day visits by adult residents in Great Britain. The survey was conducted by interviewing a random sample of UK residents, aged 15 or over, asking about the details of all trips taken over the two weeks prior to the interview. Of those approached 63% responded and overall 3,400 people in England and almost 2,000 people in each of Scotland and Wales participated in 1998 (National Centre for Social Research, 2000).

Serviced Accommodation Occupancy Survey

The Serviced Accommodation Occupancy Survey provides monthly information on occupancy for a large and representative panel across the UK and for each of its regions. The UK is required to submit monthly occupancy rates for serviced accommodation establishments to EUROSTAT (European Union Statistical Office), as part of the EU Directive on Tourism Statistics 1995. Since 1997 each of the four national tourist boards has been responsible for the implementation of an occupancy survey of serviced accommodation in its area. These surveys are carried out according to common specifications and standards, so that the resulting occupancy data are comparable for the whole of the UK (Centre for Leisure Research, 2000). The non-hotel sector was included in the monthly surveys only after the common format was adopted.

3.2.2 Impacts of the 2001 Foot and Mouth Disease on UK Tourism

In 2001 the outbreak of foot and mouth disease (FMD) in the spring, and the events of September 11th, had significant impacts on tourism in the UK. The distribution of tourism earnings across the UK shows that, in general, many overseas visitors spend the majority of their time and money in London. As a consequence of the events of September 11th the tourism industry in the London area was adversely affected, whilst the outbreak of the foot and mouth disease principally affected domestic rural tourism (CMSC, 2003). It is estimated that the combined effects of the two 2001 crises created a direct loss of £5 billion to UK tourism, and a further loss of £3 billion in terms of opportunity costs, as £81 billion in total expenditure from tourism was originally forecasted for 2001 when taking into account the growth trends evident before the crises (CMSC, 2003).

The first case of foot and mouth disease in the UK was diagnosed towards the end of February, near Brentwood in Essex. However, only during the second quarter of 2001, but before the main tourist season had started,

> "it became more apparent that the disease was taking a greater hold throughout the country and was not going to be short lived" (Office for National Statistics, 2002:132).

This is when the tourism industry noticed the first drop in the number of visitors (Office for National Statistics, 2002). The epidemic lasted for 32 weeks, with the last case being confirmed on 30th September 2001 near Appleby in Cumbria. Altogether 2,026 premises were infected and more than 6 million animals slaughtered (National Audit Office, 2002). The FMD crisis not only affected the market for domestic visitors but also the number of overseas visitors to the UK. The media reports of the crisis with shocking images of mass culling, heaps of decaying carcasses and the environmental concerns emerging over the burial pits, had an especially damaging effect on the willingness of overseas visitors to come to the UK (CMSC, 2001; Scott, Christie & Midmore, 2004).

Nationally, the closure of the rights of way network made it nearly impossible to visit the countryside in the usual way and had severe consequences for domestic tourism (Environment Food and Rural Affairs Committee, 2002). The UK has over 240,000 km public rights of way, which are particularly important in attracting visitors to rural areas (National Audit Office, 2002). With the FMD outbreak a number of measures were taken to ensure that visitors did not contribute to the spread of the disease (CMSC, 2001). At the end of February 2001 the local authorities were empowered, by statutory instrument, to close footpaths, bridleways and inland waterways where necessary, not only in affected areas but also outside them. This resulted in the closure of almost all footpaths by early May 2001, including some in towns, woodland and across arable land (National Audit Office, 2002). Many landowning organisations such as the Royal Society for the Protection of Birds, British Waterways and the Forestry Commission closed their land to prevent the spread of the disease (CMSC, 2001). In addition, in the small number of areas which remained open, the use of disinfectant mats on vehicles and footwear had discouraging effects on both potential and actual visitors (CMSC, 2001). Roberts (2001) states that the closure of the footpath network combined with the media coverage of the negative impacts of the disease on farming communities, gave the impression for the general public that it was in the best interest of the countryside as a whole to avoid visiting all rural areas. The precautionary closure of many rights of ways and the other measures taken meant that the impact on especially small rural B&B enterprises, guesthouses and farmhouses was severe. Furthermore sports, such as fishing and riding were suspended from the countryside, activities, such as walking, climbing and mountaineering were severely curtailed, rural and tourism events were cancelled and in addition to the footpaths many country houses, heritage sites and other tourist attractions were closed (National Audit Office, 2002). These measures produced the public impression of a 'closed' countryside (Scott, Christie & Midmore, 2004).

It is suggested that the impact of the FMD outbreak on the tourism sector has been more significant, at least in the short term, than the impact on agriculture and agriculture-related industries, even when tourism displacement effects to less affected areas and the indirect and induced effects associated with FMD are taken into account (Barclay, 2001; Roberts, 2001). The tourism industry suffered the largest financial impact from the FMD outbreak, with an estimated decrease between £4.5 and £5.4 billion. This included a loss between £2.7 and £3.2 billion for businesses directly affected by tourism and leisure expenditure, due to postponement and cancellation of trips, and a further drop between £1.8 and £2.2 billion for tourism supporting industries and services (Thompson *et al.*, 2003). A 15% drop in holiday visits to Britain by overseas residents was experienced between March and May 2001 and 30% of domestic visitors changed their travel plans as a direct result of the outbreak. Of the domestic visitors, 70% were planning a countryside trip and 30% a trip to urban areas (National Audit Office, 2002; Thompson *et al.*, 2003). In April and May 2001, domestic expenditures and international receipts were 15-25% lower when compared to the previous year (Blake, Sinclair & Sugiyarto, 2001).

The overall effect of the events of September 11th on UK tourism receipts was similar to the impact of the FMD crisis. Total tourism expenditure fell from £75.1 billion in 2000 to £74 billion in 2001. Spending by overseas residents decreased from £16.3 billion in 2000 (£12.8 billion in direct expenditure and £3.5 billion in fares to UK carriers) to only

£14.5 billion in 2001 (£11.3 billion in direct expenditure and £3.2 billion in fares to UK carriers). However, domestic tourism expenditure for overnight trips stagnated at £26.1 billion in 2000 and 2001 and expenditure from day trips increased in 2001 from £32.7 billion to £33.4 billion (BTA, 2003a). The increase in domestic tourism expenditure from September 2001 onwards could be caused by the terror attacks, as UK tourists favoured domestic destinations over foreign holidays (Blake, Sinclair & Sugiyarto, 2001). The more widespread and deeper loss in international tourism receipts following the September 11th attack was, therefore, possibly offset by an increase in domestic tourism trips.

The actions being undertaken by the Government, tourist boards and the tourism industry to address the impacts of FMD are primarily aimed at attracting visitors back to the countryside, increasing accessibility to the countryside, and supporting those businesses directly affected by the crisis (Sharpley & Craven, 2001). The policy responses can be related to the following five key elements:

- facts, information and reassurance,
- opening up attractions and footpaths,
- help for affected businesses,
- getting the message across overseas and at home that the countryside is open and safe to visit, and
- working together (DCMS, 2001).

For example, telephone hotlines, call centres, a variety of websites and a public information campaign were set up, in order to encourage visitors to return to the countryside. From late March onwards, the government encouraged local authorities to reopen public footpaths in areas free from FMD (National Audit Office, 2002). Although a number of specific sites and attractions had been reopened by mid-May, many footpaths and more general areas of the countryside remained closed to visitors, even in areas unaffected by foot and mouth (Sharpley & Craven, 2001). Only by the end of June were two thirds of the footpaths open again for the public. Nevertheless, the impact of the closure of the rights of way network lasted longer than necessary due to the slowness of some local authorities in reopening the paths. Furthermore, the perception that the countryside was closed continued long after the reopening and images of the disposal of carcasses were associated with the British countryside long after the FMD outbreak ended (National Audit Office, 2002).

3.2.3 Overseas Tourism Trends

The number of overseas visits to the UK has fallen continuously since the peak in 1998 when 25.7 million trips by overseas residents were recorded. As shown in the previous section, both the foot and mouth disease and the events of September 11th adversely affected the number of overseas visits to the UK. Whereas the effects of FMD became apparent in the second and third quarter of 2001, the greatest impact of the events of September 11th was experienced in the fourth quarter of 2001. The number of visits by by overseas residents fell by 3% in the first quarter, 7% in the second quarter, 11% in the third quarter and 17% in the final quarter of 2001 in comparison to 2000 (Office for National Statistics, 2002). It should be noted that the bad weather, with rain and flooding in the UK during the winter of 2000-2001 and falling stock markets might have also influenced travel decisions of holidaymakers especially. The winter figures for 1999-2000 were also slightly higher than those for other years, as the millennium celebrations affected travel patterns. Any changes in the overall trends for the first and fourth quarter between 2001 and 2000 might, therefore, be hidden or exacerbated (Office for National Statistics, 2002). Therefore, care should be taken when comparing the quarterly results for the number of overseas visits between 1999 and 2002.

Between 2000 and 2001 visits by overseas residents to the UK fell by 9% from 25.2 million to 22.8 million (Office for National Statistics, 2002). In 2002, 24.2 million overseas visits were recorded, which is a 6% increase compared to 2001, but is still below the 2000 figure (BTA, 2003a). A similar picture can be drawn in terms of spending. Spending on overseas trips decreased by 13% from £12.8 billion in 2000 to £11.3 billion in 2001, the greatest decline in the last 20 years (Office for National Statistics, 2002). Even though, spending by overseas visitors rose to £11.7 billion in 2002, it was still well below the 2000 figure (BTA, 2003a). In the fourth quarter of 2002, the number of overseas visits to the UK showed figures similar to these of the fourth quarter of 2000 (Office for National Statistics, 2002).

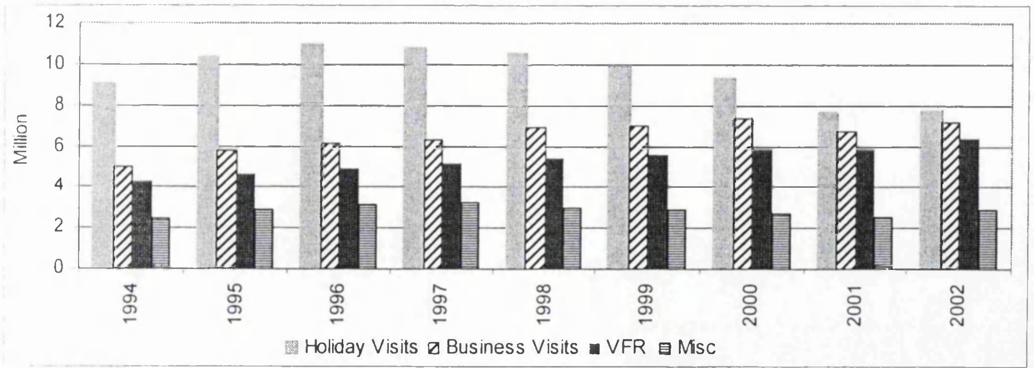


Figure 3-1: Trends of Overseas Visits by Purpose, 1994-2002
Source: (Office for National Statistics, 2003a)

Figure 3-1 shows the trend in the number of overseas visits to the UK by purpose from 1994 to 2002. It can be seen that holidays are the most popular reason for overseas residents to travel to the UK. In 2002 7.7 million holiday trips were taken with a spending of £3.7 billion (Office for National Statistics, 2003a). However, the number of holiday visits showed a continuous downward trend since 1996. Holiday trips were also adversely affected by the outbreak of FMD and the number of visits decreased by 18.5% from 9.3 million in 2000 to 7.6 million in 2001. Holiday visits by overseas residents fell particularly during the second and third quarter of 2001 (Office for National Statistics, 2002). Spending on holiday visits by overseas residents dropped, from £4.4 billion in 2000, to £3.5 billion in 2001.

In recent years the number of business trips and visits to friends and relatives (VFR) have increased significantly and have nearly reached the importance of holiday trips (Richards, 2003). Business trips are the second most important reason for overseas residents visiting the UK with 7.2 million trips and a spending of £3.6 billion in 2002 (Office for National Statistics, 2003a). Business visits by residents from all parts of the world decreased following the terror attacks of September 11th (Office for National Statistics, 2002). Between 2000 and 2001, the number of business visits to the UK showed a decrease of 8%, from 7.3 million in 2000 to 6.8 million in 2001. In terms of spending, a decline from £4.1 billion in 2000 to £3.6 billion in 2001 is exhibited.

A detailed analysis of the quarterly results for the number of overseas visits by purpose for 2000 and 2001 suggests that FMD affected, particularly, the number of holiday visits whilst having little effect on business trips. In contrast, the consequences of the terror attacks of September 11th were more widespread in affecting the number of business and holiday trips to the UK, from all over the world (Office for National Statistics, 2002). The VFR market is of growing importance to the UK, as 6.4 million VFR trips, with a spending of £2.5 billion, were taken in 2002. It is interesting to note that VFR trips were the only category of trips showing an increase between 2000 and 2001, from 5.8 million to 5.9 million. All other types of overseas trips declined.

Visits from EU residents to the UK, accounting for over half of all overseas visits, showed the greatest decrease in absolute terms from 14 million in 2000 to 12.9 million in 2001. Even though the decline was far greater between 2001 and 2000, visits by EU residents had been decreasing continuously since 1997. In 2002 the number of trips by EU residents to the UK returned to similar levels, as those in 2000, with 14.1 million trips undertaken (Office for National Statistics, 2003a).

The USA, followed by Germany, France, Japan, and Canada displayed the greatest decrease in the number of trips to the UK between 2000 and 2001. The number of visits by North American residents, for example, fell from 4.9 million in 2000 to 4.2 million in 2001. Before 2001, the number of trips to the UK by North American residents had been increasing steadily (Office for National Statistics, 2002). In 2002, North American residents took around 4.3 million trips to the UK, which was still well below the 2000 levels. The top five overseas markets for the UK remained unchanged in 2002, with USA as the major market (3.7 million), followed by France (3.0 million), Germany (2.5 million), Irish Republic (2.3 million) and the Netherlands (1.4 million) in terms of international tourist visits and USA, Germany, France, Irish Republic and Australia in terms of spending (BTA, 2003a).

Even though visits and spending decreased substantially between 2000 and 2001, the beginning of a slow recovery can be detected in 2002. In 2002, overseas residents made 24.2 million visits to the UK, an increase by 6% in comparison to 2001, but still 4% down when compared to 2000 (Office for National Statistics, 2003b). Overseas visitors spent £11.7 billion in 2002 in the UK, but the amount was still £1.1 billion lower than in 2000 (Office for National Statistics, 2003b).

3.2.4 Domestic Tourism Trends

The aim of this section is to provide a general overview of the structure of the domestic tourism demand and the annual changes experienced between 1994 and 2002. In chapter 5 of this dissertation the seasonal pattern of different types of tourism demand will be analysed in detail for the UK and its regions from 1994-2002.

In the UK overall the number of domestic tourism trips increased by 33% from 109.8 million in 1994 to 146.1 million in 1999. With the exception of 1998 an upward trend in tourism trips can be detected. Table 3-1 shows the development of the number, nights and spending of different types of domestic tourism trips in the UK from 1994-1999 and from 2000-2002. It has to be borne in mind, that the UKTS results for 2000-2002 are not directly comparable with the results for the years 1994-1999.

	Type of Trip	1994	1995	1996	1997	1998	1999	Change 1994-1999	2000	2001	2002	Change 2000-2001	Change 2001-2002	Change 2000-2002
Number of Trips (in Million)	Tourism Trips	109.8	121.0	127.0	133.6	122.3	146.1	**33.1%**	175.4	163.1	167.3	**-7.0%**	**2.6%**	**-4.6%**
	Short Holiday	31.7	33.3	32.8	37.4	34.8	41.3	**30.3%**	67.2	63.8	64.5	**-5.1%**	**1.1%**	**-4.0%**
	Long Holiday	31.1	32.9	32.0	33.4	30.3	34.0	**9.3%**	38.7	37.4	37.1	**-3.4%**	**-0.8%**	**-4.1%**
	VFR Trips	29.5	34.6	39.6	41.4	38.4	47.5	**61.0%**	40.6	36.5	39.6	**-10.1%**	**8.5%**	**-2.5%**
	Business Trips	12.5	14.8	16.4	15.4	13.7	17.3	**38.4%**	23.7	22.8	23.3	**-3.8%**	**2.2%**	**-1.7%**
Number of Nights (in Million)	Tourism Trips	416.5	449.8	454.6	473.6	437.6	495.3	**18.9%**	576.4	529.6	531.9	**-8.1%**	**0.4%**	**-7.7%**
	Short Holiday	64.7	67.0	65.8	74.7	59.8	81.6	**26.1%**	129.9	121.6	124.3	**-6.4%**	**2.2%**	**-4.3%**
	Long Holiday	225.1	235.1	229.9	238.6	214.5	238.0	**5.7%**	262.8	247.4	243.0	**-5.9%**	**-1.8%**	**-7.5%**
	VFR Trips	76.9	90.5	96.5	98.2	94.6	110.1	**43.2%**	104.5	89.3	99.1	**-14.5%**	**11.0%**	**-5.2%**
	Business Trips	33.0	36.7	41.2	39.5	39.2	44.9	**36.1%**	60.4	62.7	55.8	**3.8%**	**-11.0%**	**-7.6%**
Spending (in £ Billions)	Tourism Trips	14.5	12.8	13.9	15.1	14.0	16.3	**12.1%**	26.1	26.1	26.7	**-0.1%**	**2.3%**	**2.2%**
	Short Holiday	2.9	2.5	2.6	3.1	3.1	3.5	**22.7%**	7.9	8.1	8.7	**3.5%**	**7.2%**	**10.9%**
	Long Holiday	6.5	6.4	6.7	7.2	6.7	7.6	**17.0%**	8.6	8.9	8.6	**2.9%**	**-2.8%**	**n/c**
	VFR Trips	2.2	1.5	1.4	1.6	1.6	1.9	**-17.4%**	3.2	3.0	3.4	**-5.7%**	**14.3%**	**7.8%**
	Business Trips	2.2	2.0	2.5	2.5	2.2	2.7	**20.8%**	5.6	5.7	5.6	**0.5%**	**-2.1%**	**-1.6%**

Table 3-1: Trends for Different Types of Domestic Tourism Trips in the UK, 1994-2002
Source: (UKTS, 1995, 1996, 1997, 1998, 1999, 2000a, 2002a, 2002b, 2003)

In 2002, UK residents have taken an estimated 225.1 million overnight trips, of those 167.3 million were taken within the UK and 59.9 million to non-UK destinations (UKTS, 2003). As shown in the previous section, the outbreak of FMD in 2001 had a significant effect on tourism in the UK. Compared with 2000, the number of domestic tourism trips taken by UK residents in 2001 fell by 12 million from 175.4 million to 163.1 million. Even though the number of trips increased again by 3% to 167.3 million in 2002, there have not reached the 2000 levels. Approximately 531.9 million tourism nights were spent in the UK in 2002, which is similar to the 2001 figure of 529.6 million and 8% below the number of nights for 2000 (576.4 million).

The majority of domestic trips were taken for the purpose of holiday tourism. Holiday trips include all trips where the main reason for taking the trip is described by the respondent as 'holiday, leisure or pleasure', also including trips staying with friends and relatives which were mainly taken for a holiday purpose (UKTS, 2003). In the UK, short holiday trips, which are defined as holiday trips from 1 to 3 nights, in particular show a remarkable increase of 30% during the period 1994 to 1999, whereas long holiday trips, which include all those involving 4 nights and more, rose by only 9%.

VFR trips, defined by the UKTS as visits to friends and relatives for purposes other than holidays, show the biggest rise at 61%, from 29.5m trips in 1994 to 47.5m trips in 1999. There are also significant differences in the timing and lengths of VFR trips when compared to other types of tourism trips. The statistics show that such trips are shorter than holiday trips and do not usually involve use of commercial accommodation. They therefore account for a lower proportion of all nights and all spending than other trips. A study of domestic VFR trips, using UKTS data from 1989-1993, found that VFR trips are more evenly distributed throughout the year and generally peak in out-of-season or shoulder season months such as December and around spring time (Seaton & Palmer, 1997). Seaton and Palmer (1997) argue that the timing of VFR tourism acts as a major source of 'seasonal compensation' in offsetting the peaks and troughs found in the temporal demand patterns of other types of tourism trips. VFR tourism therefore plays an important role in achieving a more balanced tourism development which is less dependent on the peak season factors vital for holiday tourism, such as good weather (Seaton & Palmer, 1997).

Business trips have increased by 38.4% between 1994 and 1999. Even though business trips are less numerous than those for other purposes, they make a significant contribution to the tourism economy as a whole. Business tourism has grown strongly since the 1980's and is a major source of demand for hotel accommodation, particularly during the week (Wootton & Stevens, 1995). Whilst trips for business and work purposes are on average, shorter than, for example, holiday trips, spending is proportionately higher (UKTS, 1995). Furthermore, spending by business tourists has increased at a faster rate than for tourism as a whole and the demand is also less seasonal than for holiday tourism (Wootton & Stevens, 1995). Wootton and Stevens (1995) emphasise that the real size of the business tourism market is most likely to be underestimated, as the UKTS does not include same-day travel in the UK and business travellers are probably the most difficult group to contact at home for survey purposes.

In 2002 61% of all domestic trips were taken for holiday purpose, of those 39% were short holidays of up to 3 nights and 22% long holidays of four nights and more. Nearly a quarter of all trips were made to visit friends and relatives and 14% were taken for business and work purposes. The changes in the number of trips between 2001 and 2002 were greater for some types of trips than others. VFR trips, for example, showed an 8% increase from 36.5 million trips in 2001 to 39.5 million trips in 2002, but still remaining 2% below the 2000 level of 40.6 million. In terms of spending, VFR trips showed an increase of 14% from £3.0 billion in 2001 to £3.4 billion in 2002, which also means an increase of 8% compared to the spending of £3.2 billion in 2000. Long holiday trips dropped in 2002 by 1% when compared to the 2001 figures, and 4% when compared to the 2000 values. In contrast, the number of short holidays increased by 1% from 63.8 million in 2001 to 64.5 million in 2002, but was still 4% below the 2000 figure of 67.2 million. All types of tourism trips in the UK still show a net decline in volumes between 2002 and 2000 (UKTS, 2003).

It is interesting to note, that the 2001 decline in the numbers of trips was offset by an increase in the average amount spent on UK trips – from £149 per trip in 2000 to £160 in 2001 and 2002. Overall UK residents spent around £26.1 billion on domestic tourism trips in 2000 and in 2001. In 2002 the total value of UK tourism trips increased by 2% to £26.7 billion (UKTS, 2003). Of the £26.7 billion spent on all domestic trips by UK residents, £6.8 billion were spent on accommodation (26%), £5.7 billion on eating & drinking (21%) and £5.1 billion on travel (19%) (UKTS, 2003).

In terms of the destination, of the 167.3 million UK trips in 2002, 20% were made to the seaside, 36% to a large city, 21% to a small town and 22% to the countryside/village

(UKTS, 2003). A different picture can be drawn when only holiday trips are taken into account, as 27% of these trips were taken to the seaside, 29% to a large city, 19% to a small town, and 25% to the countryside/village. The majority of long holidays are located at the seaside (36% of all long holiday trips), followed by the countryside with 28%. Short holidays tend to be concentrated in large cities and towns, with 36% of all short holiday trips, followed by the countryside (23%) and the seaside (21%) (UKTS, 2003). Seaton and Palmer (1997) found in their study, that the destinations of VFR tourism differ significantly from those visited by all tourists, particularly from those visited by holiday tourists. VFR destinations are more likely to be urban conurbations with a high population density and other small towns, rather than seaside or rural destinations (Seaton & Palmer, 1997). In 2002, large cities/towns and small towns were also the main types of locations for VFR trips, with 41% and 28% of all VFR trips respectively, reflecting the large population centres (UKTS, 2003). Only 10% of VFR trips were made to the seaside. This shows that VFR trips counter the patterns found in holiday tourism and that VFR destinations are similar to business destinations, as they are both mainly urban (Seaton & Palmer, 1997).

Domestic tourism trips are of relatively short duration. Between 1994 and 1999, the average length of all tourism trips to the UK decreased slightly from 3.8 nights to 3.4 nights (UKTS, 2000b). The average duration of domestic tourism trips in 2002 is estimated to be 3.2 nights (UKTS, 2003). In 2002, 71% of all tourism trips lasted between two and four days, including 30% of trips with only one night away. If only holiday trips are taken into account a slightly different picture can be drawn (UKTS, 2003). The average length of holiday trips taken within the UK has fallen from 5.7 nights in 1994 to 4.3 nights in 1999 (UKTS, 2000b). In 2002, the average length of domestic holiday trips taken by UK residents is estimated to be 3.6 nights. Short trips of 1-3 nights were the most popular accounting for 63% of all holiday trips. 28% of all holiday trips lasted for 4-7 nights and 9% for 8 nights or more. In contrast, the average duration of a trip outside the UK was 9.1 nights (UKTS, 2003). This shows that the British tend to take their main annual holiday abroad, but more holidays of shorter duration are taken throughout the year within the UK. This could favour the spread of the benefits of tourism throughout the year and the extension of the tourism season.

In terms of accommodation used, the majority of the UK tourists stayed at friends' and relatives' homes (47% of all trips). Serviced rented accommodation accounted for 32% of all trips with hotels/motels/guesthouses used for 26% and Bed & Breakfasts for 6% of all trips. Self-catering rented accommodation accounted for 14% of all tourism trips in the UK. It is not surprising that serviced rented accommodation is used in over 70% of all business and work trips, predominantly hotels/motels/guesthouses which were used for 63% of all business trips (UKTS, 2003).

3.2.5 Day Visits

Day visits also play an important role in UK's tourism. According to the '1998 UK Day Visits Survey', there were almost six billion leisure day visits made during 1998 (National Centre for Social Research, 2000). Expenditure increased by 28% from £52 billion in 1996 to around £71 billion in 1998 and correspondingly, the average amount spent per trip rose from £9.10 to £12.10. The 'UK Day Visits Survey' defines 'leisure day visits' as round trips made from home within the same day for leisure purposes, to locations anywhere in the UK, with leisure visits from a work address (e.g. to play sport after work) also included. In contrast, 'tourism day visits' are defined as those trips lasting 3 or more hours which are not made on a regular basis; these are the focus of this section.

In 1998, 21% of all day trips taken were 'tourism day trips' (just under 1.3 billion). England recorded 1.1 billion tourism day trips, Scotland 93 million and Wales 48 million. The total expenditure on these tourism day trips was £31 billion. The average expenditure per tourism day trip is, at £24.80, higher than for other day trips and has increased in comparison to £18.30 in 1996. Of the £31 billion total expenditure on tourism day trips, people living in England spent more than £28 billion, people in Scotland spent just over £2 billion and residents in Wales spent almost £1 billion (National Centre for Social Research, 2000).

Most of the UK tourism day visits were made to a town or city accounting for 72% of all trips (902 million), 22% were made to the countryside (278 million) and only 6% were taken to the seaside or coast (81 million). The average amount spent on town/city tourism day trips was higher (£28.30) than the average amount spent on either seaside (£18.60) or countryside tourism day trips (£15.20). Tourism day visits lasted on average

5.5 hours. Trips to towns were generally the shortest with 5.2 hours, whilst trips to the seaside lasted for about 6.8 hours (National Centre for Social Research, 2000).

3.3 Wales Tourism Trends

3.3.1 Economic Importance of Tourism in Wales

In Wales tourism plays an even more important economic role, particularly in coastal and rural areas. The tourism industry is estimated to contribute 7% to the GDP of Wales and to generate around £2.5 billion in direct visitor spending from overnight and day visitors, with domestic visitors representing by far the most important component of demand (WTB, 2003c). The Wales Tourist Board (WTB) states that the economy in Wales is more dependent on overnight tourism than other parts of the UK and that tourism now contributes much more to the Welsh economy than agriculture (2.4% of the GDP) and the construction industry (5.3% of the GDP) (WTB, 2000a). Approximately 10% of Welsh jobs are directly or indirectly associated with tourism, with over 100,000 jobs in 10,000 businesses throughout Wales. It is estimated that tourism contributes over £6 million a day to the Welsh economy. The rural tourism industry in Wales is a major contributor to the economy of many rural areas. For example, 7% of all farms in Wales are involved in some kind of tourism activity (WTB, 2000a). Rural tourism generates around £1 billion (Newidiem, 1999), representing approximately 50% of the total tourism revenue (WTB, 2003c). It is estimated that tourism supports around 25,000 direct jobs in rural Wales (Youell, 2001). Furthermore, tourism generates income to a wide range of businesses, such as restaurants, shops and accommodation businesses as well as to other businesses through multiplier effects.

The domestic (UK) market is the biggest source of tourism business for Wales accounting for an estimated 93% of all overnight visits and about 85% of all overnight spending. In 2002, 11.9 million domestic tourism trips, generating around £1.5 billion, were taken in Wales. In contrast, only 861,000 trips from overseas residents, with a spending of £252 million, were recorded. This shows, that only around 3.6% of all visits by overseas residents to the UK were made to Wales and only 2.2% of the overall overseas spending in the UK in 2002 was generated in Wales (BTA, 2003d). A comparison between the UK regions England, Scotland and Wales shows profound differences in the volumes and values of tourism. England, for example, recorded 134.9 million overnight trips made by UK residents in 2002, generating £20.1 billion, and 20.5 million overnight trips by overseas residents with a spending of £10.3 billion. In Scotland in 2002, which is a similar seized region to Wales, 18.5 million UK residents took overnight trips, spending £3.7 billion and 1.6 million overseas residents had been on an overnight trip, generating £806 million (BTA, 2003c, 2003b, 2003d). These figures demonstrate, that especially for England, overseas tourism is of great importance with 34% of all tourism overnight spending being generated by overseas residents. In Scotland only 18% and in Wales only 14% of overnight spending is accumulated from overseas visits.

Figure 3-2 shows different types of trips for the three UK regions England, Scotland and Wales, in percentage of the overall absolute numbers of trips. Over 70% of all tourism trips made by UK residents to Wales in 2002 were holiday trips. In contrast, in England only 59% of all domestic tourism trips were taken for holiday purposes. Nearly 25% of all trips were made to visit friends and relatives, which was the second most popular type of trip, not only for England but also Scotland and Wales in 2002. A different picture can be drawn, when looking at overseas visits. Whilst in Scotland, over 50% of all overseas visits were for holiday purposes, in England and Wales holiday trips accounted for only one third of all visits by overseas residents. It is interesting to note, that the most popular reason for overseas residents to come to Wales in 2002 was to visit friends and relatives (36%), followed by holiday purposes (34%). In England, holiday trips accounted for 33% of all overseas trips (30% of all overseas spending) and business trips accounted for 27% (32% of all overseas spending) (BTA, 2003c, 2003b, 2003d).

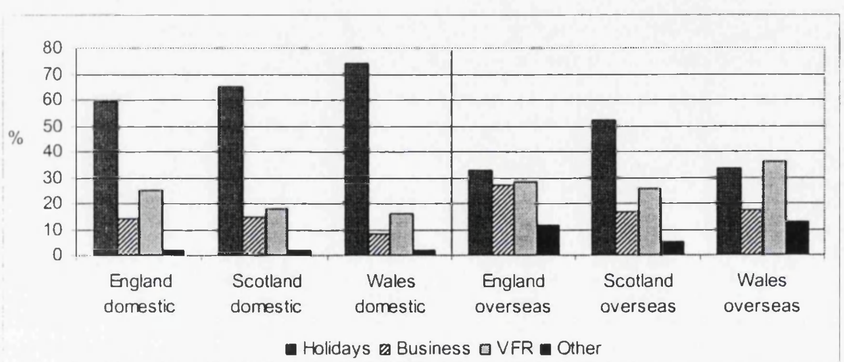


Figure 3-2: Purpose of Tourism Trips by UK Regions, 2002
Source: (BTA, 2003c, 2003b, 2003d; UKTS, 2003)

The average expenditure per trip differs, not only between different types of trips and domestic and overseas visitors, but also between the UK regions. Table 3-2 displays the average tourism spending per trip and per day in 2002 for different types of trips, for the UK and its regions. Whilst, for example, in Scotland £199 are spent on average on a tourism trip by UK residents (£57 per day), in Wales only £130 is spent on average (£39 a day). The average spending of overseas visitors is generally higher, as their trips tend to be longer. In Scotland, overseas residents spent on average £510 (£53 per day), whilst in Wales only £292 are spent on average on a trip by overseas visitors (£38 per day) (BTA, 2003c, 2003b, 2003d). The low amount of money spent on tourism trips in Wales could be the result of the high proportion of tourists staying with friends and relatives or in self-catering accommodation. It is interesting to note, that for almost all types of trips, the average spending in Wales is lower than that in other UK regions, with Scotland recording the highest average spending.

	England		Scotland		Wales	
	Spending per Trip	Spending per Night	Spending per Trip	Spending per Night	Spending per Trip	Spending per Night
Overseas Trip	502	58	510	53	292	38
Tourism Trip	154	50	199	57	130	39
Short Holiday	132	70	168	84	110	56
Long Holiday	226	35	265	40	175	28
VFR	83	34	100	36	87	35
Business Trips	231	99	300	112	166	66

Table 3-2: Average Tourism Spending in 2002 by Purpose and Region (in £)
Source: (BTA, 2003c, 2003b, 2003d; UKTS, 2003)

Table 3-2 also shows that the average spending per night for VFR trips is for all regions similar. VFR travellers spent only insignificant amounts on accommodation and package trip costs are usually absent. Expenditure on other items, such as eating and drinking, and shopping and travel, therefore, generally exceeds the proportions spent by, for example, holiday visitors (Seaton & Palmer, 1997). This suggests, that even though the overall average VFR spending is lower, travel carriers, food and beverage suppliers, service providers and certain kind of retailers might benefit more from VFR tourists than from other visitors, particularly long holiday makers (Seaton & Palmer, 1997).

According to the 'UK Day Visits Survey 1998', nearly 5.3 billion 'leisure day visits', generating £64 billion were made in England, whilst Scotland recorded 420 million and a spending of £5 billion. In Wales 233 million leisure day visits with a spending of £2 billion were taken in 1998. Tourism purposes accounted for around 21% of these trips (48 million) generating £776 million. Of all leisure day visits, 58% were made to a town/city (135 million), 33% to the countryside (76 million) and 9% to a seaside destination (22 million). The average amount spent on leisure day trips varies significantly according to the type of destination visited. Whereas, on average, £12.60 is spent on a day trip to a town/city, only £6.40 is spent on a leisure day visit to the seaside and £4.60 on countryside trips (National Centre for Social Research, 2000).

3.3.2 Impacts of the Foot and Mouth Disease on Welsh Tourism

In Wales the first case of FMD was diagnosed on the 25.2.2001 in Gaerwen, Anglesey and over the following six months Wales experienced a total of 118 confirmed cases covering Anglesey, Powys, the Welsh Border area and South Wales Valleys. The infected premises in Wales represented nearly 6% of the 2026 total cases confirmed in the UK during 2001. Over 1 million animals were slaughtered and disposed of in Wales (Scott, Christie & Midmore, 2004). Figure 3-3 shows an overview of all infected premises by FMD in 2001 in Wales. At its height the disease resulted in an infected area covering 35% of Wales – in comparison FMD affected only 10% of Scotland (National Assembly for Wales, 2002a).

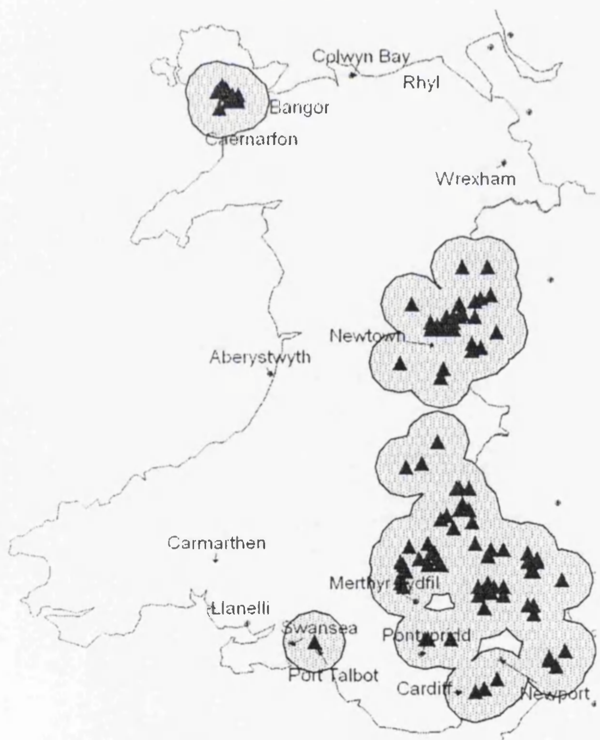


Figure 3-3: FMD Infected Premises in Wales 2001 with 10 km Buffer Zone
Source: (National Assembly for Wales, 2002b)

It has to be borne in mind, that even though tourism is highly seasonal in Wales, and February and March being relatively quiet months for the tourism industry, both months still account for 3% of the spending on total holiday trips, amounting to over £30 million per month, or over £7.5 million a week (Youell, 2001). The outbreak of the FMD epidemic in 2001 had thus a severe impact on domestic tourism. Wales experienced a proportionally greater decline in domestic tourism volume with 2 million tourism trips less taken in 2001 (–13%), than England (–6%) and Scotland (–7%). The number of VFR and short holiday trips fell considerably in 2001. However, the average trip in Wales in 2001 lasted with 3.8 nights per trip slightly longer than that in 2000 with 3.7 nights per trip. The average expenditure on each trip was also significantly higher with £143 per trip in 2001 compared to £124 per trip in 2000. The overall value of domestic tourism in Wales in 2001 was, therefore, similar to that in 2000, at around £1.7 billion (UKTS, 2002b). It is estimated that in terms of the relative impact on the GDP, the economic loss due to the FMD crisis in Wales 2001 amounted to 0.5-1% (Scott, Christie & Midmore, 2004). In contrast, at the UK level the overall net effect of the FMD outbreak was less than 0.2% of the GDP (Thompson *et al.*, 2003).

The unexpected reductions in demand, due to the outbreak of FMD in the spring 2001, had profound and, in some cases, damaging implications for business survivals and staff retention in the winter, especially in small rural and dominantly seasonal tourism enterprises (CMSC, 2001). Tourism in Wales displays considerable seasonal fluctuations in demand, which proves particularly strong in the case of rural tourism. Furthermore, rural tourism enterprises are not only dependent on a highly seasonal market, but are also generally small scale (Sharpley & Craven, 2001). Thus, in economic terms, these businesses were affected most severely by the FMD outbreak. Some of these enterprises were not able to survive the considerable drop in business, as some areas were completely closed to visitors. It is suggested that Welsh rural tourism enterprises lost £596 million between February and September 2001 representing on average 75% of their turnover (Youell, 2001). Farm tourism, as a special type of rural tourism activity, contributes significantly to Wales' image as a holiday destination and generated at least £10 million per annum to the income of 1600 farming families in Wales, typically presenting between 15% and 50% of their annual incomes (Scott, Christie & Midmore, 2004; Youell, 2001). Small farms depend on income from accommodation and other recreational activities in order to survive (The Countryside

Alliance, 2002). The farm tourism sector was therefore hit exceptionally hard by the FMD outbreak, as they had to deal not only with the restricted accessibility, and therefore a virtual instantaneous collapse of tourism, but also with the agricultural consequences (CMSC, 2001).

Not all types of tourism enterprises and areas were affected to the same extent by the FMD outbreak. The overall impacts have been variable, producing both winners who have hardly been affected or may have even experienced increased business, and losers who have been forced to close. Some enterprises were able to recover in the summer and autumn from the serious losses in the spring, whereas others may have not been able to improve business or were naturally seasonal (Thompson *et al.*, 2003). Reports have shown, that some of the domestic tourism expenditure was redirected to towns, cities and coastal resorts (National Audit Office, 2002; Roberts, 2001). In some cases, visitor numbers even increased due to displacement of visitors from the countryside (CMSC, 2001). A more detailed regional analysis, in addition to the aggregated results, is required to determine which areas or enterprises suffered the most. This is carried out in chapter 8 of this dissertation, for the Welsh serviced accommodation sector.

3.3.3 Overseas Tourism Trends in Wales

As already mentioned, in 2002 overseas visitors made 861,000 trips to Wales generating around £252 million. Since 1999, when 1 million trips were recorded, a downward trend in the volume of overseas tourism to Wales is evident. Between 2000 and 2001, the number of trips decreased by 7% from 980,000 to 916,000 and spending fell by nearly 8%, from £267 million in 2000 to only £248 million in 2001. This demonstrates that the number of trips in 2002 by overseas visitors is still lower than in 2001, although the spending increased slightly, the 2000 levels in spending have not yet been reached.

Over half of all trips by overseas residents were made to South East Wales (430,000) and nearly 30% of all trips had North Wales as a destination (220,000). The primary overseas markets for Wales in 2002 were the Republic of Ireland (23% of all overseas trips), USA (15%), Germany (10%) and France (7%). Trips by overseas residents tend to last longer (on average 7.6 nights in 2002) than domestic trips (on average 3.3 nights in 2002). It is interesting to note, that trips by German visitors were even longer with on average 11.3 nights per trip accounting for 14% of all nights. In contrast, American visitors stayed on average only 5.3 nights per trip accounting for 10% of all tourism nights (WTB, 2003b).

The serviced accommodation sector was used on nearly half of all visits by overseas residents in Wales, generating £108 million. Approximately 34% of all trips were spent in hotels, motels, guesthouses and 14% in B&Bs. Trips including these types of accommodation tended to be much shorter with only 3.7 nights per trip as only 23% of all overseas nights were spent there. In contrast, overseas trips to a friend's/family's house lasted on average 9.5 nights. A friend's/family's house accounted for 37% of all overseas trips, 46% of all overseas nights and 37% of all overseas spending (WTB, 2003b).

3.3.4 Domestic Tourism Trends in Wales

Wales, in contrast to the UK overall, experienced only an 11.2% increase in the number of domestic tourism trips between 1994 and 1999. In comparing Wales with the other home nations, it is also interesting to look at changes in the structure of demand which have occurred over the six-year period studied. Table 3-3 gives an overview for the volume of all different types of domestic demand in the UK home nations from 1994 to 1999.

Type of Trip	Region	1994	1995	1996	1997	1998	1999	Change 1994-1999
All Trips	UK	109.8	121.0	127.0	133.6	122.3	146.1	**33.1%**
	England	90.2	99.6	104.0	111.5	101.9	123.3	**36.7%**
	Scotland	8.5	9.7	10.5	11.1	9.8	10.5	**23.5%**
	Wales	9.8	10.4	11.0	10.0	9.8	10.9	**11.2%**
Short Holiday Trips (1-3 nts)	UK	31.7	33.3	32.8	37.4	34.8	41.3	**30.3%**
	England	25.5	27.7	26.2	30.6	28.4	34.7	**36.1%**
	Scotland	2.5	2.4	2.7	3.1	2.7	2.6	**4.0%**
	Wales	3.2	2.7	3.3	3.4	3.5	3.7	**15.6%**
Long Holiday Trips (+4 nts)	UK	31.1	32.9	32.0	33.4	30.3	34.0	**9.3%**
	England	23.9	25.0	23.9	25.3	23.4	26.5	**10.9%**
	Scotland	3.2	3.3	3.7	4.1	3.3	3.5	**9.4%**
	Wales	3.5	4.0	3.9	3.6	3.3	3.4	**-2.9%**
VFR Trips	UK	29.5	34.6	39.6	41.4	38.4	47.5	**61.0%**
	England	26.0	29.8	35.0	37.5	34.5	42.2	**62.3%**
	Scotland	1.4	2.1	2.0	1.8	1.6	2.5	**78.6%**
	Wales	2.0	2.5	2.5	2.0	2.1	2.6	**30.0%**
Business Trips	UK	12.5	14.8	16.4	15.4	13.7	17.3	**38.4%**
	England	10.6	12.6	13.9	13.1	11.4	15.1	**42.5%**
	Scotland	1.0	1.4	1.4	1.5	1.8	1.3	**30.0%**
	Wales	0.8	0.8	0.8	0.6	0.7	0.8	**n/c**

Table 3-3: Volume of Different Types of Tourism Trips by UK Regions, 1994-1999
(million unless otherwise stated)
Source: (UKTS, 1995, 1996, 1997, 1998, 1999, 2000a)

VFR trips, for instance, have increased between 1994 and 1999 by almost 78% in Scotland, but by only 30% in Wales – which has one of the lowest growth rates in this category. Short holiday trips, on the other hand, increased by 15.6% in Wales, compared with only 4% in Scotland. Such clear differences in the pattern and structure of tourism demand mean that tourism development policies, derived from an analysis of aggregate UK tourism statistics or data relating to other UK regions, cannot necessarily be transferred to the Welsh context. Whilst in other parts of the UK an increased promotion of business tourism, for example, may be an obvious and viable way of counteracting low leisure tourism demand in the spring and autumn, the pattern of business tourism in Wales (as will be shown in Chapter 5) is quite unusual, and raises the question as to whether a similar strategy would work here.

Wootton and Stevens (1995) argue that Wales under-performs in business travel terms, when compared to the rest of the UK. The UKTS results for 2002 show that business tourists spent £166 million in Wales, this being one fifth of the earnings of business tourism in Scotland (£840 million) and 4% of England's earnings from business visitors (£4,416 million). Wotton and Stevens (1995) state that the business tourism market can be segmented into three components. The main component of business tourism relates to the general business travel, accounting for about 85% of 'all' business tourism. This is followed by the incentive travel market, which is very difficult to quantify but is estimated to be worth £300 million and growing at a rate of 10-15% each year. The last component accounts for 12% of the total business market and refers to the meetings and conference travel market. The results from a survey of 74 hotels in Wales showed that the third segment of business tourism, the hotel based conference and meetings component, was worth £294 million in 1994 (Wootton & Stevens, 1995). This was nearly four times greater than the estimates for 'all' business tourism by the UKTS survey 1994. With the meetings and conference sector accounting for less than 15% of the business tourism market, the total business travel market to Wales was worth approximately £1,960 million (Wootton & Stevens, 1995). It can therefore be concluded, that the importance of business tourists, especially for hotels, is probably much greater than the data shows and that business tourism might have a much greater potential for further development and promotion than expected.

Even though holiday trips account for the majority of domestic tourism trips in Wales (on average 67% of all trips are taken for holiday purposes) the number of long holiday trips decreased by 3% to 3.4 million trips in 1999. In contrast, the number of short holiday trips increased by 15.6%, and since 1998 short holiday trips have outnumbered long holidays in Wales. This trend was experienced in all the UK regions, apart from Scotland. In Wales short holiday spending amounted to £285 million in 1999 and therefore played a significant economic role. As for most of the UK regions, the number of VFR trips in Wales showed a high increase with 30% to 2.6 million in 1999, but, in terms of spending, VFR trips, as well as business trips, were the least significant for Wales. Most of the spending is generated by long holidays, especially trips of 4-7 nights (UKTS, 1995). The increasing popularity of short holidays and the significant increase of VFR trips has some vital implications for the economy, as these trips are not generating as much spending as long holiday or business trips. The high importance of short holiday and VFR trips is also reflected in the results for 2000 to 2002.

As previously mentioned, due to the changes in the methodology of the UKTS survey, direct comparisons between the 1994-1999 and the 2000-2002 data should be avoided. The development in the volume of different types of tourism trips for the UK regions between 2000 and 2002 is therefore shown in the separate table 3-4. The results reflect clearly the slow recovery in tourism after the FMD epidemic in 2001 (UKTS, 2003). Whilst there was a 3% increase in the number of domestic tourism trips to Wales from 11.6 million in 2001 to 11.9 million on 2002, this was still 11% below the 2000 figure of 13.4 million. The average number of nights spent per trip decreased from 3.8 in 2001 to 3.3 in 2002 and the overall number of nights fell by 9% from 44.6 million in 2001 to 39.8 million in 2002. Not only was the average length of trip shorter in 2002 but the average amount spend per trip was down by 10%, from £143 in 2001 to £130 in 2002. As a result, the overall spending on domestic tourism trips in Wales in 2002 decreased from £1,664 million in 2001 to £1,543 million in 2002 (UKTS, 2003).

Type of Trip	Region	2000	2001	2002	Change 2000-2001	Change 2001-2002	Change 2000-2002
All Trips	UK	175.4	163.1	167.3	-7.0%	2.6%	-4.6%
	England	140.4	131.9	134.9	-6.1%	2.3%	-3.9%
	Scotland	19.0	17.5	18.5	-7.9%	5.7%	-2.6%
	Wales	13.4	11.6	11.9	-13.4%	2.6%	-11.2%
Short Holiday Trips (1-3 nts)	UK	67.2	63.8	64.5	-5.1%	1.1%	-4.0%
	England	53.7	51.6	51.2	-3.9%	-0.8%	-4.7%
	Scotland	7.1	6.6	7.0	-7.0%	6.1%	-1.4%
	Wales	5.5	4.6	5.3	-16.4%	15.2%	-3.6%
Long Holiday Trips (+4 nts)	UK	38.7	37.4	37.1	-3.4%	-0.8%	-4.1%
	England	29.1	28.5	28.6	-2.1%	0.4%	-1.7%
	Scotland	5.2	4.9	4.9	-5.8%	n/c	-5.8%
	Wales	4.0	3.8	3.5	-5.0%	-7.9%	-12.5%
VFR Trips	UK	40.6	36.5	39.6	-10.1%	8.5%	-2.5%
	England	34.4	31.2	33.7	-9.3%	8.0%	-2.0%
	Scotland	3.2	3.0	3.3	-6.3%	10.0%	3.1%
	Wales	2.4	1.8	1.9	-25.0%	5.6%	-20.8%
Business Trips	UK	23.7	22.8	23.3	-3.8%	2.2%	-1.7%
	England	19.1	18.4	19.1	-3.7%	3.8%	n/c
	Scotland	2.9	2.8	2.8	-3.4%	n/c	-3.4%
	Wales	1.3	1.3	1.0	n/c	-23.1%	-23.1%

Table 3-4: Volume of Different Types of Tourism Trips by UK Regions, 2000-2002
(million unless otherwise stated)
Source: (UKTS, 2002a, 2002b, 2003)

In terms of the types of domestic tourism demand in Wales, table 3-4 shows that short holidays increased by 15%, from 4.6 million in 2001 to 5.3 million in 2002, but the number of trips remains 4% below the 2000 level. The number of VFR trips also rose from 1.8 million in 2001 to 1.9 million in 2002. In contrast, both long holidays and business trips fell in 2002, by 8% and 23% respectively. In Scotland, the volume of all types of tourism trips increased in 2002. VFR trips and short holidays, especially, show the greatest change, with 10% and 6%, respectively more trips taken in 2002. It is interesting to note that the overall spending on domestic tourism trips in Scotland increased by 8% to £3.7 billion in 2002 and reached the same level of spending as in 2000. In England spending increased by 3% from £20.3 billion in 2001 to £20.8 billion in 2002. Whilst the number of VFR trips and business trips in England were up in 2002, by 8% and 4% respectively, short holiday trips declined for the second year running (UKTS, 2003).

In terms of the type of location visited in Wales, 38% of all tourism trips were made to a seaside destination, 17% to a city/large town, 20% to a small town and 25% to the countryside/village. Seaside destinations were the most popular destination for long holiday trips (with 49% of all long holiday trips) and for short holiday trips (with 39% of all short holiday trips). By contrast, large cities and towns were the least important type of destination for long holiday trips, with a share of only 8%. However, 19% of all short holiday trips were made to a large city or town (UKTS, 2003).

Previous research has shown that VFR destinations are most likely to be large cities and towns. This can be confirmed for the UK overall, as well as for England and Scotland separately in 2002, where on average around 40% of VFR trips were made to a large city/town. In Wales, a different picture can be seen, as only 23% of all VFR trips were to a large city/town. Around 28% of these trips were taken to a small town in Wales, which is a similar percentage to that in England. It is interesting to note that a high proportion of VFR trips in Wales were made to a rural or seaside destination (29% and 20%, respectively). Seaton and Palmer (1997) demonstrated that South Wales, with the two main conurbations Cardiff and Swansea, had a much higher proportion of VFR tourists, when compared to Mid Wales, a predominantly rural area with low-density population, and North Wales, the main holiday destination. In 2002, almost two thirds of all VFR trips were made to South Wales, with South East Wales accounting for almost 42% of all VFR trips and South West Wales for 21%. North Wales and Mid Wales both recorded a proportion of only 16% of all VFR trips, but these two regions have much a higher proportion of holiday trips than South Wales.

Welsh residents generated 14% of the spending, 18% of all the tourism trips and 15% of all the tourism nights in Wales in 2002. Visitors from England accounted for 82% of all overnight tourism spending, 80% of all tourism trips and 82% of all tourism nights in Wales (UKTS, 2003). The regions North West of England/Merseyside (19% of all tourism trips), the West Midlands (19%), the South East (10%) and the South West (8%) are particularly important regional markets for Wales, with 56% of all tourism trips being made by visitors from these areas. The holiday market shows a slightly different picture with the West Midlands accounting for 21% of all holiday trips, the North West/Merseyside for 20% and the South East for 9% (WTB, 2003a).

3.4 Accommodation Trends in Wales

3.4.1 Importance of Different Accommodation Types for Domestic Tourism

According to the UKTS, rented accommodation including serviced rented accommodation, such as hotels, motels, guesthouses, B&B or farmhouses and self-catering accommodation, such as cottages, caravans or campsites, were used on only half of all domestic tourism trips to Wales in 2002, but these trips accounted for 64% of the total tourism spending (UKTS, 2003).

Serviced rented accommodation was used on only 24% of all tourism trips but generated around 37% of all tourism spending in 2002. These trips tended to be shorter in duration, as only 19% of all tourism nights were spent in this type of accommodation. In contrast, Scottish serviced rented accommodation was used on 39% of all tourism trips in 2002. These trips were also longer (31% of all nights) and generated over half of all tourism spending (52%). In England, serviced rented accommodation accounted for 32% of all tourism trips, 24% of all nights and 48% of tourism spending. In the serviced accommodation category, hotels, motels and guesthouses were mainly used and accounted for 18% of all tourism trips and 29% of the spending in Wales 2002. B&Bs were used on only 6% of the trips and farmhouses on 1%. A slightly different picture appears when observing business trips. The serviced accommodation sector accounted for 62% of all business trips, 58% of business nights and 83% of the business spending in Wales 2002. A more detailed analysis of that sector shows that 52% of these trips were spent in an hotel, motel or guesthouse and 10% in a B&B (UKTS, 2003).

Self-catering accommodation plays a particularly important role in Wales in comparison to the other UK regions. This type of accommodation was used on 24% of trips accounting for 32% of all nights and 27% of the spending on tourism trips to Wales in 2002. In Scotland, only 11% of all trips were spent in self-catering establishments, generating 11% of tourism spending. These trips were also much shorter here with a proportion of only 16% of all nights. In England, self-catering accommodation accounted for 13% of trips, 21% of nights and 16% of the tourism spending in 2002. It is interesting to note that in all UK regions, the homes of friends and relatives are widely used on tourism trips, with 48% of all trips in England, 42% of trips in Scotland

and 35% of trips in Wales. Even though no money is spent on accommodation on such trips, these trips accounted for 24% of all tourism spending in Wales in 2002 (UKTS, 2003).

3.4.2 Wales Serviced Accommodation Occupancy Survey

The Wales Serviced Accommodation Occupancy Survey (WSAOS) is part of the UK wide Serviced Accommodation Occupancy Survey. It is a postal survey commissioned by the Wales Tourist Board and provides monthly information on occupancy for a large and representative panel across Wales (WTB, 1999, 2000c, 2001b). Until 2000 'Eres Research and Consultancy Ltd.' conducted this survey and since 2001 'NFO System Three' has been responsible for carrying out the survey in Wales. A representative sample of over 250 hotels and 230 guesthouses, B&Bs and farmhouses participate in the serviced accommodation occupancy survey.

It should be noted that, in England, Scotland and Wales, the manager of each accommodation establishment defines the type of accommodation itself via a self-completion questionnaire. As there are no objective criteria defined, the distinction between various types is not always clear and may vary slightly. Only Northern Ireland has a compulsory registration of tourist accommodation including a definition of the type in place (Centre for Leisure Research, 2000). There is no legal definition of the type of the establishment. However, it is generally accepted that a hotel is a commercially rated business providing accommodation, breakfast and at least one other main meal and services to non-residents. Hotels provide at least 6 guestrooms and will normally be licensed (WTB, 2003e). A guesthouse offers bed and breakfast in a commercially rated business with more than three bedrooms and guests have access to their accommodation at all times. An establishment is recognised as a B&B when bed and breakfast are offered to tourists in a private house and no evening meal is provided (BHO, 2003). Although the style of operation is broadly similar, B&Bs will often have fewer bedrooms than guesthouses. In addition, guesthouses may offer more facilities and services (WTB, 2003e). A farmhouse offers B&B or guesthouse style accommodation on a working farm where some form of income comes from agriculture, horticulture, or a related industry (BHO, 2003).

Due to the seasonality in business patterns, not all establishments contribute data on a monthly basis throughout the year and thus the number of establishments contributing data varies throughout the year (WTB, 2001b). For example, whilst only 120 hotels and 76 guesthouses and B&B contributed data in January 2002, in July 2002 144 hotels and 145 guesthouses and B&B establishments reported occupancy figures (NFO WorldGroup, 2003). The average occupancy rates calculated are therefore only based on the open establishments. Room/bed occupancy is defined as the percentage of available rooms/beds which were occupied. The WTB (2001b) calculates the annual average occupancy rate:

> "... by taking the number of bedspace/bedrooms occupied each month multiplied by the total available bedspaces/bedrooms each month, multiplied by the number of days in that particular month, this is repeated for each month and added together to give a yearly total. This total figure is then divided by the total figure of bedspaces/bedrooms available multiplied by the number of days in a particular month which is also added together for a yearly total" (2001:4).

The occupancy performance is generally higher for hotels than for guesthouses, B&Bs or farmhouses. The annual average room occupancy rate calculated for all establishments on the basis of the rooms occupied (cf. above citation by the WTB) is therefore biased towards the hotels in the sample. It will therefore be slightly higher than the annual rate calculated on the basis of average room occupancy rates for each establishment. For example, the annual room occupancy rate for 2002 for all establishments, calculated on the basis of rooms occupied was 53%. Table 3-5 shows that this figure is highly influenced by the hotels in the sample. The room occupancy rate for hotels was 54.8% in 2002 whilst guesthouses and B&Bs only recorded 40.6%. In contrast, the annual room occupancy rate for 2002 for all establishments calculated on the basis of average rates is only around 47%.

	Room Occupancy	Room Occupancy Hotels	Room Occupancy Non-Hotels
1998	48.08%	52.50%	35.42%
1999	48.00%	52.25%	36.25%
2000	48.25%	52.42%	35.08%
2001	48.58%	53.83%	30.58%
2002	53.33%	54.75%	40.58%
average 1998-2002	**49.25%**	**53.15%**	**35.58%**

Table 3-5: Occupancy Rates in Wales 1998-2002
Source: (Centre for Leisure Research, 2000, 2001, 2002; NFO WorldGroup, 2003; WTB, 1999, 2000c, 2001b)

It is interesting to note that whilst the FMD outbreak in 2001 resulted in much lower room occupancy rates for the non-hotel sector with a decrease from 35% in 2000 to only 31% in 2001, hotels in Wales experienced an increase from 52% in 2000 to 54% in 2001. The annual average room occupancy rate for all establishments calculated on the basis of rooms occupied disguises this fact as it shows a slight increase between 2000 and 2001.

The next section provides an overview of general accommodation trends in Wales in comparison to other UK regions from 1998 to 2002. The annual room occupancy figures used came from several reports published by the WTB and other organisations and are thus calculated on the basis of rooms occupied. Slight differences can therefore be expected between the results for Wales presented here and those obtained from the detailed analysis of occupancy performance displayed in chapters 7 and 8 of this dissertation. The annual and average figures in those chapters are likely to be much lower as they were calculated on the basis of average room occupancy rates instead of occupied rooms.

3.4.3 General Accommodation Trends in Wales

Occupancy figures in the first part of 2002 were influenced by the celebrations of the Queen's Golden Jubilee, which culminated in a special two-day bank holiday at the beginning of June when many events took place, instead of the usual one day Spring bank holiday at the end of May (NFO WorldGroup, 2003). In 2002, UK annual room occupancy increased by 1% from 57% in 2001 to 58% in 2002 returning to the 2000 level. In Wales, the annual room occupancy rate in 2002 was, at 53%, 4 percentage points higher than in the previous year. In comparison to the other UK regions Wales's room occupancy in 2002 was lower than the annual room occupancy rate in England and in Scotland with 60% and 56%, respectively (NFO WorldGroup, 2003).

Bedspace occupancy figures are slightly lower than room occupancy levels as single occupancy of a double/twin room results in 100% room occupancy but only 50% bedspace occupancy. Bedspace occupancy may therefore also rise with an increased family use of accommodation or a lower business use (NFO WorldGroup, 2003). In the UK the bedspace occupancy rate rose by 2% to 44% in 2002. The regional differences are not as marked, with a bedspace occupancy rate of 40% in Wales, 44% in England

and 42% in Scotland in 2002. On average, overseas visitors occupied around 9% of the available bedspaces and domestic visitors 34%. In 2002 overseas visitors accounted for almost 16% of all arrivals at serviced accommodation establishments in the UK. In Wales, only 7% of all arrivals came from overseas, whilst in England and Scotland 18% of all visitors had international origins. It should be pointed out that since 1998 the share of non-UK arrivals in Wales decreased steadily from 12% in 1998 to 7% in 2002 (NFO WorldGroup, 2003).

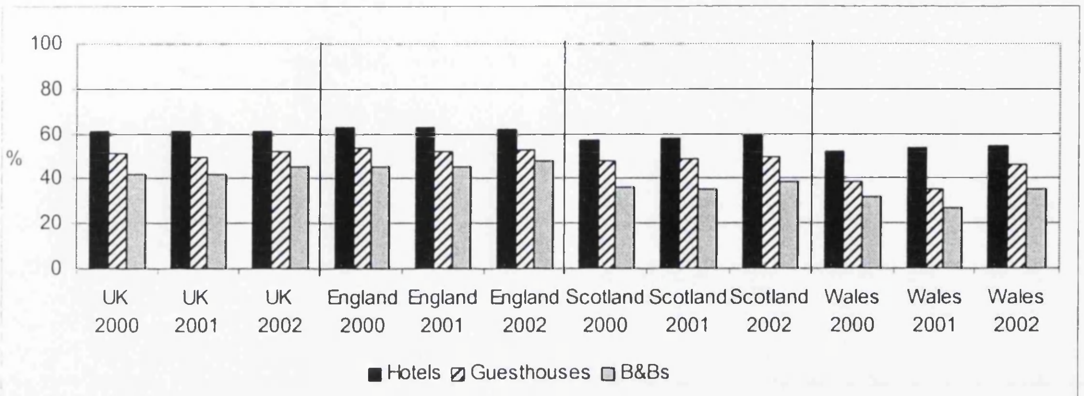


Figure 3-4: Annual Bedroom Occupancy by Type of Establishment, 2000-2002
Source: (Centre for Leisure Research, 2001, 2002; NFO WorldGroup, 2003)

Figure 3-4 shows the annual bedroom occupancy for different types of accommodation for the UK and the regions England, Scotland and Wales between 2000 and 2002. It can clearly be seen that the annual room occupancy for all types of establishments is lower in Wales than in the other two regions. The annual room occupancy for guesthouses in Wales increased from 35% in 2001 to 46% in 2002. In contrast, in England and Scotland guesthouses experienced a lower room occupancy rate in 2002 in comparison to 2001, but still display higher levels than in Wales. The room occupancy in B&Bs increased in all regions between 2001 and 2002, with the greatest rise in Wales from 27% in 2001 to 35% in 2002.

In 2001, the serviced accommodation sector in the UK was also severely affected by the foot and mouth disease and the terror attacks of September 11th. As the occupancy rates are net rates, relating only to open enterprises and not taking into account businesses which had to close due the FMD crisis, the effects are likely to be greater than recorded (Centre for Leisure Research, 2002). In England a drop by 1% to 59% was recorded and in Scotland the annual room occupancy level stayed the same with 53% in 2001. In Wales, the overall room occupancy rate for all establishments increased from 48% in

2000 to 49% in 2001. This is probably due to the fact that the average room occupancy is calculated on the basis of rooms rented out and is therefore biased towards the hotels in the sample. As has been shown in the previous section, room occupancy rates for hotels increased in 2001 from 52% in 2000 to 54%, whereas the non-hotel sector experienced a considerable loss in room occupancy rates in 2001. Room occupancy levels in guesthouses and B&Bs dropped by 4% and 5%, respectively.

From February 2001 onwards, data on the proportion of business guests have been collected in the WTB's Serviced Occupancy Survey. As expected, the percentage of business guests varies significantly between the regions in Wales, with South East Wales having the highest share of business visitors. The relative importance of business visitors to Wales overall is higher in the out of season months between February and April due to a lower number of holidaymakers (WTB, 2003d).

Not only serviced accommodation businesses but also self-catering establishments play an important role for the tourism industry in Wales. The survey of self-catering operators in Wales was extended to cover all 12 months of the year from 2001 onwards instead of just the main season from May to October. This survey includes a representative sample of verified independent self-catering operators offering self-catering cottages and apartments in Wales. Occupancy at the individual property level is expressed as the number of weeks let in each month as a proportion of the weeks and units available for rent (WTB, 2000b). The average occupancy rate for self-catering independents was 53% in 2002 and thus at the same level as the 2001 figure. The results for 2000 are only available for the period from May to October, where an average occupancy rate of 77% was recorded. In 2001 the May to October average was, at 73%, 4 percentage points lower than in 2000 (WTB, 2003d).

Occupancy figures for static caravan parks are measured in the peak and shoulder seasons and expressed as a percentage of available lets over the period reported. Available lets are defined as those facilities which are available to be let for holidays for at least 10 weeks of the year (WTB, 2003d). The average static caravan park occupancy rate from April to October 2002 was 63% which is 3% lower than in 2000. It is interesting to note that between 2000 and 2001 the average occupancy rate from May to October increased from 65% to 71%. The average touring pitch occupancy from April to May decreased from 28% in 2001 to 24% in 2002. Between 2000 and 2001 occupancy rates also showed a slight increase (WTB, 2003d).

The accommodation sector in Wales experiences a high degree of seasonality. Occupancy during the peak month August 2002, for example, averages at about 67% for hotel bedrooms, 77% for guesthouse rooms, 62% for B&B rooms, 88% for static caravan parks, 46% for touring pitches and 93% for self-catering accommodation in Wales. In contrast, in the out of season month January 2002 room occupancy averages at about 36% for hotels, 25% for guesthouses and 13% for B&Bs (NFO WorldGroup, 2003; WTB, 2003d). In chapters 7 and 8 of this dissertation the seasonal variations in the serviced accommodation sector in Wales are analysed in detail for different types of establishments and conclusions are drawn for different regions in Wales.

CHAPTER 4

MEASURES OF SEASONALITY

Chapter 4 provides an overview of a variety of different approaches to measure the phenomenon of seasonality. These range from simple tools for detecting or quantifying seasonality in time series, like Seasonal Plots and Concentration Indices, to considerably more elaborate methods, involving Decomposition Procedures and concepts such as Amplitude Ratios. This chapter seeks to illustrate the benefits and limitations of the various methodologies presented. The first section looks at measures analysing the differences between the observed seasonality in different years. Various scalar measures which evaluate the inequality of the distribution of tourism trips within a year are compared. Following this, the focus moves from measures comparing different years to methods which evaluate the relative importance of different parts of the year. A number of approaches to measure the stability of the seasonal pattern are introduced. After that the Time Series Decomposition approach is introduced and methods for the examination of changes in the seasonal behaviour of time series are presented. The subsequent section introduces two methods which use the results of the Seasonal Decomposition procedure to provide additional insights into differences in the seasonal swings. The chapter concludes with an overview of the different approaches measuring seasonality and an attempt to evaluate their relative importance for tourism research purposes.

4.1 Measuring the Degree of Seasonal Variation

As already mentioned in chapter 2, whilst there is an extensive body of literature on the phenomenon of seasonality in tourism, very few authors have focussed on ways of quantifying empirically observed patterns. Where such attempts have been made the tools used have often been very simple. Amongst the most commonly employed are the Coefficient of Variation, the Seasonality Ratio and the Gini Coefficient (Wanhill, 1980; Yacoumis, 1980).

The Coefficient of Variation (*CV*) measures the spread of each series around its annual mean as a percentage of that mean, i.e. if s is used to denote the standard deviation and $\bar{x}$ stands for the mean of the observations for a given year, then

$$CV = \frac{s}{\bar{x}}.$$

This is a particularly useful statistic for comparing the dispersion in data sets with different standard deviations and different means. Lundtorp (2001) argues that, even though this measurement describes the fluctuation of visitors during the year and is easy to calculate, it may be difficult to interpret appropriately.

The Seasonality Ratio is calculated by taking the highest number of visitors and dividing these by the average number of visitors (Yacoumis, 1980). This ratio increases with the degree of seasonal variation. It has a lower bound of one and an upper bound equal to the number of periods compared (i.e. 12 in the case of monthly data). This measure is highly influenced by extreme values. In this paper the inverse of the Seasonality Ratio is used, which is referred to as the Seasonality Indicator (*SI*). More precisely, *SI* is defined as

$$SI = \frac{\bar{x}}{x_{\max}},$$

with $\bar{x}$ denoting the average number of visitors and $x_{\max}$ representing the highest number of visitors. Lundtorp (2001) points out that the *SI* is virtually influenced by the month with the maximum number of visitors or trips. This indicator can take values from 1/12 up to 1, where unity indicates the absence of any fluctuations during the year (Lundtorp, 2001). *SI* is also exactly the same measure as the **M**aximal Annual **U**tilisation Factor Constrained by **S**easonality (*MUS*) introduced by BarOn (1975) with the only difference that BarOn uses seasonal indices, in which the annual average is normalised to a figure of 100. In other words, *MUS* is simply the ratio of 100 and the relative demand in the peak month. Both *SI* and *MUS* can also be interpreted as the relative capacity use in comparison to the peak month.

The Gini Coefficient (*GC*) is another numerical measure of the degree of inequality in the number of tourism trips across the months of the year (Grainger & Judge, 1996). It is derived from the Lorenz curve, which displays the cumulative frequency of the ranked observations starting with the lowest number (Lundtorp, 2001). The *GC* is equal to the area between the Lorenz curve and the 45-degree line divided by the whole area below the line. It can be expressed as follows:

$$GC = 1 + \left(\frac{1}{n}\right) - \left(\frac{2}{\left(n^2 \cdot \bar{x}\right)}\right) \cdot \left(x_1 + 2x_2 + 3x_3 + \ldots + nx_n\right)$$

where n is the number of observations (12 in the case of monthly data); $\bar{x}$ is the mean of observations (average number of trips); and $x_1, x_2, x_3, \ldots, x_n$ are the individual observations in decreasing order of magnitude (Weaver & Oppermann, 2000).

GC can take values between 0 and 1, with lower numbers representing a greater degree of equality and thus less seasonality. Wanhill (1980) suggested the use of the *GC*, as the *CV* and the *SI* have serious deficiencies when used as measures of inequality. He observes that these have different lower bounds, no finite upper bounds, do not take account of the skewness of distribution and are influenced by extreme values. Lundtorp (2001) also points out that the *GC* is less dependent on the highest fractile and is therefore more sensitive to variations outside the peak season. The *GC* shows great stability and is also suitable for demonstrating the importance of seasonal concentration and dispersion (Lundtorp, 2001). It is worth stressing however that, while a low *GC* stands for a better spread of tourism trips throughout the year, and therefore a lower degree of seasonal differences, it should not be interpreted as an indication of higher revenues or higher occupancy rates. Thus other measurements are needed in addition to the *GC* in order to get insights into the relationship between seasonality and profitability of tourism businesses.

Scalar measures such as the *GC* clearly do not provide a complete picture of the seasonality of a time series, as the values do not capture whether trips peak consistently every year or vary considerably from year to year. Lundtorp (2001) also states that these simple measures fail to take into account the developments over different months. Therefore, other measures have to be used when evaluating the stability of seasonality patterns.

4.2 Measuring the Stability of the Seasonal Pattern

A simple tool for examining the stability of a seasonal pattern over a period of several years is the Seasonal Plot, in which the observations relating to the same month of each year are compared graphically.

To arrive at a numerical measure of the stability of the demand distribution over the observed period, it is possible to use the concept of the *CV* introduced in the preceding section. All that is required is to calculate the *CVs* separately for each month – that is, to divide the standard deviation of the observations for each month of the observed time period by their average (Drakatos, 1987). The *CV* when applied in this way is a useful simple measure to analyse the monthly variation over a span of time (Lundtorp, 2001). In line with the terminology used by Drakatos this measure will be referred to here as the Coefficient of Variability to avoid any possible confusion.

If the analysis of the Seasonal Plots and the results for the Coefficients of Variability reveal, that the seasonal pattern is not stable for specific types of tourism demand or regions, different approaches are needed to take the analysis further. The traditional approach of a Seasonal Decomposition methodology would be clearly inappropriate. A potentially more useful approach for gaining insights into the behaviour of time series with changing seasonal patterns from year to year would seem to be an aggregation of the observations over several months displayed as a percentage of the annual number of trips. This simple idea is encapsulated in what has been referred to in the literature as Demand Concentration Indices (Drakatos, 1987). Concentration Indices can be calculated for a range of different combinations of months if the definition of seasons beforehand is not appropriate. Therefore extensive experimentation, with a variety of combinations of months, is sometimes needed in order to find a grouping which best captures the differences between the regions (or types of trips) and parts of the year.

4.3 Seasonal Decomposition

Time Series Decomposition is usually used as a basis for forecasting. In this research the method is applied in order to investigate further the differences in the demand pattern among the regions. The data has to exhibit a fairly stable seasonal pattern to make such an approach feasible. In particular, the 12-month moving average has to satisfactorily represent the trend-cycle component of the time series and the seasonal factors must not change over time (Donatos & Zairis, 1991).

Time Series Decomposition essentially isolates three factors in the data: the trend, the seasonal behaviour and random fluctuations. There are two basic models: the multiplicative one, in which the observations are assumed to be the product of trend, seasonality factor and random disturbances, and the additive one, in which the observations are assumed to be the sum of the three types of influences. BarOn (1975) argues that most tourism related time series are best modelled using the multiplicative approach and this is the model used for the analyses in this study. However, it should be pointed out that an additive model was also applied to the data in this research and led to very similar conclusions. The results for Wales and the other UK regions are presented in chapter 5 of this dissertation. The multiplicative model can be represented by the following formula:

$$Y_t = T_t \cdot S_t \cdot I_t$$

where Y_t = time series value for time period t,

T_t = trend component for time period t,

S_t = seasonal factor for time period t, and

I_t = irregular component for time period t.

The trend can be modelled in various different ways. The most commonly used approach is to apply linear regression to the deseasonalised data and this is the method employed in this research (see chapter 5). Because the focus of the analysis is on seasonal variations present in time series, no detailed results for the trend are presented in chapter 5. The seasonal factor for each month reflects the original value for that month as a proportion of the average month. Values above 100% indicate that the month is typically above the trend and values below 100% show months that are typically below the trend (Grainger & Judge, 1996).

The acute seasonality in all regions of long holidays (see chapter 5) raises the question of how variations in overall demand for long holidays are affecting the peak season. The Seasonal Decomposition approach does not provide an answer, nor do the Concentration Indices and Seasonal Plots introduced in the preceding sections. A measurement to link overall demand growth/reduction and seasonality was introduced by Lundtorp (2001) and can be calculated as follows:

$$PSS = \frac{\left(V_{p,T+1} - V_{p,T}\right)}{\left(V_{o,T+1} - V_{o,T}\right)} \cdot 100$$

where PSS stands for the Peak Season's Share (of growth/reduction),

$V_{p,T}$ denotes the volume of demand during the peak season in year T,

$V_{o,T}$ denotes the overall volume of demand in year T.

Positive values indicate that an increase/decrease for the total year usually is accompanied by an increase/decrease in the peak season (Lundtorp, 2001). In contrast, negative values occur when the growth in the total number of trips between one year to the next is accompanied by a decrease in the number of trips taken in the peak season or when an overall reduction in demand goes along with an increase in the peak season's share. If the figure is larger than 100% then the increase in the peak season is higher than the total growth for the whole year and this means a decline in the months outside the peak season (Lundtorp, 2001). The *PSS* results should be interpreted with care and as a rule should be read in conjunction with the overall demand figures. However, they provide a useful perspective on the data and a test of whether marketing policies aimed at a better spread of tourism trips over the year have been successful.

4.4 Amplitude Ratios and Indices of Similarity

Even though some types of tourism trips display a fairly stable seasonal pattern with the same peak every year, the amplitude between the peaks and troughs can change considerably from year to year. The higher these differences between peak and off-season are, the higher is the seasonal concentration in the summer months and the underutilisation of facilities during the winter. Therefore, it is important to measure the changes in the size of the seasonal swing over intervals shorter than those covered by the Seasonal Decomposition (Kuznets, 1933).

The Amplitude Ratio is a measure which reflects the irregular, year-to-year changes in the seasonal amplitude (Kuznets, 1932). The use of Amplitude Ratios to analyse the seasonal concentration of tourism trips was introduced by Drakatos (1987), whilst the ratio has its origins in Kuznets (1933) who analysed seasonal variations in time series data in various industries. This measure looks particularly at changes from year to year and summarises the intensity of seasonal fluctuations. It is defined as the coefficient of linear regression of the percentage deviations of the original data from the moving average on the deviations of the seasonal factors from 100 (Kuznets, 1933). As the ratio compares averages, it is not highly influenced by single extreme values.

To compute the Amplitude Ratio (*AR*), the average percentage deviation for a particular year of the original data from the 12-month moving average is calculated and compared with the spread of the seasonal factors derived by Seasonal Decomposition. If the average deviation from the moving average is smaller/larger than the average variation of the seasonal factors, then the seasonal amplitude in that year is considered to be narrower/wider than the amplitude for the period as a whole (Kuznets, 1933). The *AR* can thus be seen as a tool for testing the persistence of a seasonal pattern from year to year. Kuznets (1933) shows that the *AR* can also be regarded as the coefficient of linear regression through the origin (without a constant) of the percentage deviations of the original data from the moving average in relation to the deviations of the seasonal factors from 100. The *AR* is computed as follows (Kuznets, 1933):

$$AR = \frac{\sum_{i=1}^{12} p_i d_i}{\sum_{i=1}^{12} d_i^2}$$

where p_i = percentage deviation of original data from moving average in month i

d_i = deviation of seasonal factor (from 100) in month i.

The summation is carried out over the months of the year in question. If the *AR* is larger/lower than 1, then the seasonal amplitude in the year is higher/lower than the amplitude of the seasonal factors (Kuznets, 1932).

Even though the *AR* superficially resembles measures such as the *GC*, that it results in a single number which expresses the seasonal concentration of tourism trips, there are some important differences. The advantage of the *AR* lies in the nature of the measure, as it gives not only some indication of the existence of seasonality, but also provides an evaluation of how different the seasonal pattern for a particular year is in comparison to the average seasonal factors over a longer period. It can therefore detect changes in seasonal patterns, and this again is a very important aspect of tackling the seasonality problem efficiently.

However, the *AR* is not well suited to comparisons of the seasonal patterns between regions. One might argue that a correlation analysis could provide some answers in this respect, but, as pointed out by Gressens and Mouzon (1927), the conventional Pearson correlation coefficient should not be used on time series data. Drakatos (1987) proposed the Index of Similarity as a tool for comparing the seasonal patterns of tourism demand for different countries. The basic idea was first put forward by Kuznets (1933) in a different context.

The Index of Similarity (I_s) is defined as the percentage of total variations represented by variations common to both patterns. It can be formulated as follows:

$$I_s = 1 - \sum_{i=1}^{n} |\alpha_i - \beta_i|$$

where $\alpha_i = \dfrac{d_{i1}}{\sum_{j=1}^{n} |d_{j1}|}$ and $\beta_i = \dfrac{d_{i2}}{\sum_{j=1}^{n} |d_{j2}|}$

d_{i1} = deviation of seasonal factors (from 100) for month i in region 1,

d_{i2} = deviation of seasonal factors (from 100) for month i in region 2,

n = number of months or periods involved.

The definitions of the deviations d_i are identical to those used in the formula for the Amplitude Ratio, except that there are now two sets relating to different regions. These are distinguished by an additional subscript. The terms α_i and β_i simply represent the corresponding normalised values. By subtracting the sum of their absolute differences from 1 a result is obtained between –1 and +1, which can be interpreted in much the same way as a correlation coefficient without suffering from the drawbacks of a correlation analysis referred to above.

4.5 Evaluation of Seasonality Measures

This chapter has presented a wide variety of different approaches for measuring aspects of seasonal variations in tourism demand data. Table 4-1 provides an overview of these approaches and their relative merits and limitations. The order in which the measures are listed can be regarded as roughly hierarchical, as those at the top offer some general insights into the intensity of seasonal variations, whereas the later ones provide more complex information about a seasonal pattern.

Seasonality measure	Result	What does it measure?	Application	Limitation
Coefficient of Variation (*CV*) Seasonality Indicator (*SI*) Gini Coefficient (*GC*)	Single scalar measure	*CV*: spread of number of trips around annual mean. *SI:* relative capacity use in comparison to peak month. *GC*: degree of inequality of trips across months.	Detection of degree of seasonal variation; comparison of acuteness of seasonal variations between different regions, years or different types of tourism demand.	No complete picture about seasonal pattern or stability; no identification of seasons possible. *CV* and *SI* are influenced by extreme values and take no account of skewness.
Seasonal Plot	Graph	Displays number or proportion of trips in each month for several years.	Detection of stability of seasonal pattern for different regions and types of demand.	No single figure; no numerical comparisons; interpretation subjective.
Coefficient of Variability	Scalar measure for months	Measure of *CV* separately for each month.	Measure of stability of demand distribution over period.	No detection where and when changes in seasonal concentration occur.
Concentration Indices	Scalar measure for different periods	Aggregated proportions of trips over several months.	Identification of differences between years and regions.	Interpretation limited to aggregated periods; no information about seasonal pattern itself.
Seasonal Factors from Decomposition	Scalar measure for different months	Seasonal factors for every month.	Identification of general seasonal pattern of certain time period and seasonal concentration in each month.	Applicable only when seasonal factors reasonably constant over the study period; no information about pattern changes.
Peak Season's Share (*PSS*)	Single scalar measure for peak season	Influence of variations of overall demand on peak season.	Measuring importance of peak season and detecting changes.	Applicable only to data with strong peak season; interpretation requires care.
Amplitude Ratio (*AR*)	Scalar measure for every year	Measures changes in size of seasonal swing; summarises intensity of seasonal fluctuations.	More detailed analysis following the Seasonal Decomposition to test stability of seasonal factors.	Applicable only to types of tourism demand with stable seasonal patterns.
Similarity Index (I_s)	Single scalar measure	Similarity of seasonal pattern between different regions as percentage of variation.	More detailed analysis of similarity of seasonal patterns between regions	Interpretation difficult.

Table 4-1: Measures of Seasonality

The Coefficient of Variation (*CV*), the Seasonality Indicator (*SI*) and the Gini Coefficient (*GC*) provide a single scalar measure and are used to quantify the distribution of visitors/trips during the year. These simple measures give some indication regarding the degree of seasonal variation in the data set. They can therefore be used to compare the acuteness of seasonal variations between different regions, years or different types of tourism demand. The *CV* and *SI* are heavily influenced by extreme values and take no account of the skewness in the data. The use of the *GC*, the well-known tool in economics to measure inequalities, is therefore favoured over the other measures, as it takes account of the skewness in the distribution and is less influenced by extreme values. The drawback of all measures is that they fail to capture the developments over different months. They are not able to provide a complete picture about the seasonal pattern or the stability. Furthermore, an identification of different seasons is not possible with only one scalar measure obtained per year.

The Seasonal Plot is a graph displaying the number or proportions of trips taken in each month for several years. As a simple graphical tool, it can detect if the peak seasons are changing over the study period. It is very easy to calculate and an important first step in analysing the stability of seasonal patterns over the years. The interpretation is subjective, as it does not result in a numerical measure.

The Coefficient of Variability is a scalar measure calculated for every month, i.e. January to December, which indicates the stability of the demand distribution over the time period concerned. As it results in only one numerical measure for each month, it is not possible to detect where and when changes in the seasonal concentration occur, e.g. in which particular year.

Concentration Indices are scalar measures displaying aggregated proportions of trips over several months. They are especially important in analysing time series with changing seasonal patterns, as these indices are able to identify differences between years and regions. Even though they are easy to calculate, in the absence of any clear seasonal pattern, extensive experimentation with a range of different combinations of months might be needed to best capture the differences. The interpretation is furthermore limited to the aggregated time periods only and the Concentration Indices do not give information about the seasonal pattern itself.

The Seasonal Factors from the Time Series Decomposition approach are scalar measures calculated for every month of the year (e.g. January to December). They identify the general seasonal pattern evident in the observed time periods and the seasonal concentration of tourism demand in each month. Seasonal Factors are easy to compare as they reflect the original value for that month as a proportion of the average month. The drawback lies in the fact that the main assumption is a stable seasonal pattern over the time period concerned. Furthermore, any changes in the seasonal pattern cannot be detected.

The Peak Season's Share (*PSS*) measures the influence of overall demand variations in the peak season and results in a single scalar measure. As a link between the overall demand growth or reduction and the seasonality, the *PSS* measures the importance of the peak season and is able to detect changes between the years. It is only applicable to data displaying a strong peak season. A weakness of the *PSS* is that the interpretation of the values requires care and should be done only in conjunction with overall demand figures.

The Amplitude Ratio (*AR*) results in a scalar measure calculated for every year measuring the changes in the size of the seasonal swing. The *AR* values, therefore, summarise the intensity of the seasonal fluctuations. They provide a more detailed analysis following the Seasonal Decomposition approach as the *AR* values give an indication of the stability of the seasonal pattern. *AR* values should therefore only be computed for time series with a clear seasonal pattern.

The Similarity Index (I_s) is a single scalar measure indicating the degree of similarity in the seasonal pattern between different regions. It compares the patterns of the time series curves and provides a detailed numerical measure of similarity. The weaknesses are the complicated computation of the I_s values and the difficulties in interpretation. Even though, the Similarity Index is the last measure in the table, this does not mean that it is the ultimate measure of seasonality.

The measure, which can be considered the most appropriate, depends entirely upon the research question and the degree of detail required. Often, of course, using a combination of different approaches is the best way to conduct the analysis.

CHAPTER 5

SEASONALITY IN WALES – A COMPARATIVE ANALYSIS

Chapter 5 presents the results of the analyses carried out at an aggregated level for Wales and demonstrates how useful insights into patterns of seasonality can be gained by analysing the data from a variety of different perspectives, as presented in the preceding chapter. More specifically, seasonality patterns of different types of domestic tourism trips in the UK, over the period 1994 to 2002 using publicly available data collected in the United Kingdom Tourism Survey (UKTS), are analysed. It is examined how the seasonality pattern in Wales compares to that in the UK overall as well as that observed in Scotland, one of its main competitors in the crucially important domestic market. The analysis is concerned not only with the peaks and troughs of overall demand, but also with the patterns which its various components follow during the year. The first section considers differences between the observed seasonality in each of the nine years concerned, both from the viewpoint of aggregate demand and in terms of the various categories of tourism trips. The second section analyses the monthly data for 2000 to 2002 and looks in detail at the changes in the seasonal distribution of the different types of tourism demand following the events of 2001. After that the focus shifts from a comparison between years to an evaluation of the relative importance of different parts of the year. An attempt is made to identify and compare peak, shoulder and off-peak components of the demand pattern for Wales, Scotland and England separately, as well as the UK overall. This is followed by an examination of changes in the seasonal behaviour of the time series studied and an application of the Seasonal Decomposition methodology to the data. The subsequent section considers ways in which the results of the Seasonal Decomposition procedure can be used to provide additional insights into differences in seasonal swings between both regions and years. The chapter concludes with an attempt to distil from the analyses some implications for marketing and development strategies in the Welsh tourism sector.

5.1 Comparison of Seasonal Demand Patterns

This chapter focuses on the seasonality of domestic tourism demand, as the domestic UK market is the biggest source of tourism business for Wales, accounting for 93% of all overnight visits. As shown in chapter 3, only 3.6% of all overseas visits to the UK were made to Wales. Different types of tourism trips, particularly relating to holiday, business and VFR demand, display different seasonal variations throughout the year. Figure 5-1 gives an overview of the demand structure and the seasonal movement of domestic tourism in the UK from 1994 to 2002. The increasing popularity of short holiday and VFR trips have not only vital implications for the economy, but also influence the seasonal distribution of tourism trips over one year and thus the impacts of the concentration of tourism flows.

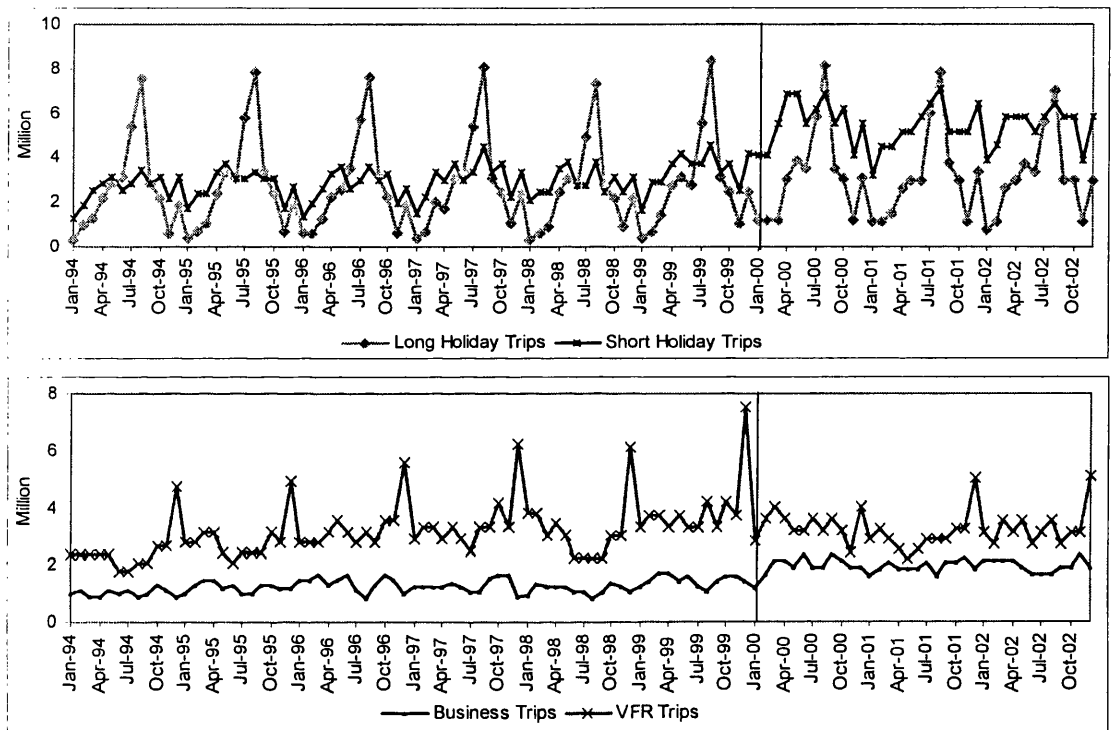


Figure 5-1: Seasonal Distribution of Domestic Tourism Trips to the UK, 1994-2002
Source: (UKTS, 1995, 1996, 1997, 1998, 1999, 2000a, 2002a, 2002b, 2003)

Observing the seasonal pattern of the different types of demand, it is clear that especially long holiday trips show a high peak season during the summer whilst short holiday trips show more than one peak during the course of a year. Business trips are the category which vary least over the year. The data for the years 2000 to 2002 exhibit a similar pattern, but the December peak for VFR trips is somewhat less pronounced. The exceptionally high number of VFR trips in December 1999 demonstrates the importance of the reuniting of friends and relatives for the millennium celebrations. It can clearly be noted that the changes in the UKTS methodology resulted in higher volumes of short holiday and business trips, and thus no direct comparisons between the 1994-1999 and the 2000-2002 data should be made. Between 2000 and 2002 a clear downward trend in the long holiday market can be seen, with the peak month remaining August. It is interesting to note that between 2000 and 20002 short holiday trips, reached nearly the same volume as long holiday trips during the summer peak.

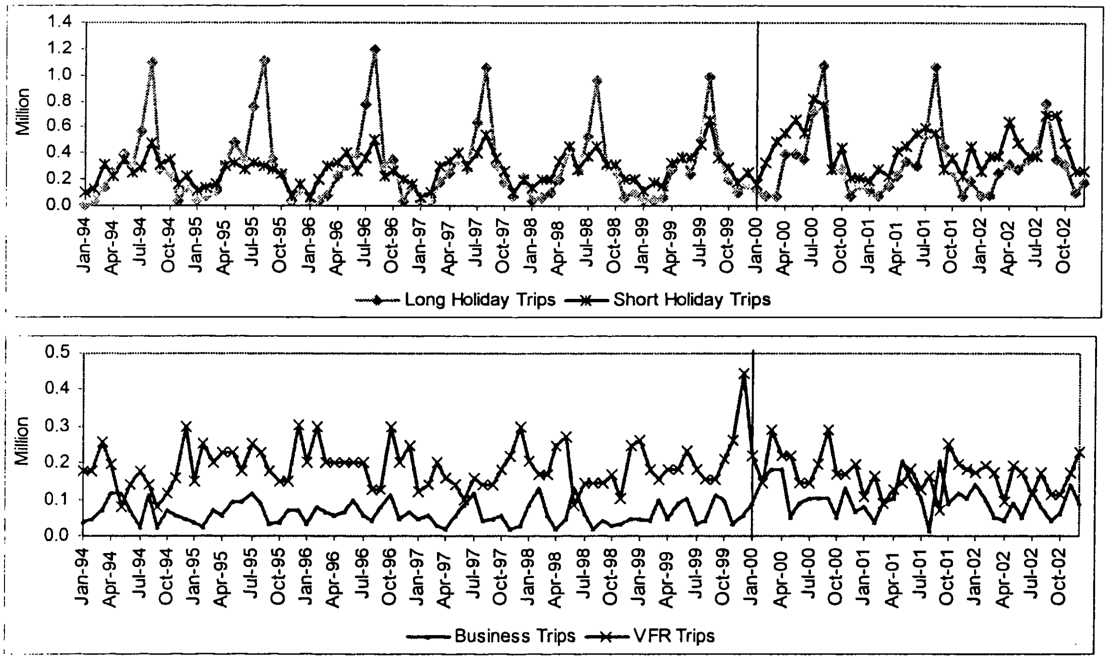


Figure 5-2: Seasonal Distribution of Domestic Tourism Trips to Wales, 1994-2002
Source: (UKTS, 1995, 1996, 1997, 1998, 1999, 2000a, 2002a, 2002b, 2003)

Figure 5-2 displays the seasonal distribution of different types of domestic tourism trips in Wales from 1994-2002. Even a fairly cursory inspection of the available data for the different UK regions show that there are not only pronounced differences between the volumes of tourism demand, as already summarised in chapter 3, but also in the demand patterns for Wales in comparison to those in the UK overall (cf. figure 5-1), England and Scotland (not shown here). For instance, Wales shows much larger seasonal variations than the other two regions, in both the short and long holiday market, and some 60% of all domestic holiday expenditure is typically generated in just the three months of July, August and September. Tackling the problems associated with the seasonality of demand is therefore a crucial issue for the tourism industry in Wales.

Graphical comparisons of seasonality patterns for different years, categories of demand or geographical regions are facilitated if the data are normalised, e.g. by defining the average annual demand as 100. Figure A-1, Appendix A, displays the resulting graphs for the period 1994 to 2002 for several different kinds of trips for the UK regions. The years 2000 to 2002 are included in figure A-1 but, as has already been stated, should not be directly compared with those of preceding years. From the different figures it can be seen that Northern Ireland shows the greatest variations in nearly all the different kinds of demand. Furthermore the data for this region show no regular seasonal pattern apart from the observations relating to long holiday trips. The difficulties in interpreting the Northern Ireland data have already been pointed out in chapter 3. Whilst the corresponding graphs are included in Appendix A for the sake of completeness, the remainder of the analysis in this chapter focuses exclusively on Wales, Scotland and England.

Long holiday trips show extreme variations with very high peaks in the summer and low troughs in the winter, whilst other categories such as short holidays and VFR trips have a much less pronounced degree of seasonality. The graphs in Appendix A show clearly the differences in the seasonal pattern between the UK regions. For example, Scotland displays the lowest seasonal variations in the long holiday market and Wales the highest. Short holiday trips to Wales are also highly concentrated during the summer months. Whilst business trips in England are evenly distributed over the year, the market for domestic business trips in Scotland and Wales is characterised by irregular variations. VFR trips in England show a clear peak in December, whereas in Scotland and Wales different seasonal patterns appear. With the shift in favour of short holiday and VFR trips, the overall seasonal concentration of tourism trips, therefore, might be expected to decline. Various different tools, i.e. the Gini Coefficient, the Coefficient of Variation and the Seasonality Indicator, for measuring the acuteness of seasonal variations in tourism throughout the year are employed to compare the UK regions.

Table A-1, Appendix A presents the associated values of *GC*s, *SI*s and *CV*s for the period 1994-1999 and table A-2, Appendix A displays their respective values for 2000-2002. It should be noted that a *GC* of 0, but a *SI* of 1 represent a total absence of seasonal variation. The *CV* increases with a higher degree of seasonal variations throughout the year. A comparison of the *GC* with the values for the other two measures reveals a high degree of similarity in terms of the relative ordering of the figures obtained. The results regarding the *SI*, in particular, give rise to a different ordering in only a few cases.

As expected, the largest seasonal variations in demand occur within the holiday time series (especially long holidays). In contrast, VFR trips in Wales and business trips in all the other regions of the UK show relatively small seasonal concentrations. Apart from VFR trips, Wales is the region with the highest seasonality in all of the different categories of demand between the years 1994 to 1999. For the period 2000-2002, Wales displays the highest seasonal variations in all demand categories.

As already noted in chapter 3, 2001 was an exceptional year for the tourism industry. The outbreak of FMD and the terrorist attacks of September 11th might therefore also have affected the seasonal pattern in some types of tourism demand. For example, VFR trips showed in all UK regions higher *GC* and *CV* values in 2001 and thus a higher seasonal concentration than that in 2000 and 2002. This is confirmed in the graphs in figure A-1, Appendix A which also shows that the VFR trips in all UK regions were concentrated towards the end of 2001.

As can be seen from table A-1, Appendix A, business trips have the most evenly balanced annual pattern in England with an average *GC* of 0.09 between 1994 and 1999 and 0.06 between 2000 and 2002, whereas in Wales the average *GC* for business trips shows a value of 0.26 between 1994-1999 and 0.25 between 2000-2002. The difference between the two patterns is also reflected in the other two measures, with average values for 1994-1999 of 0.17 for England and 0.49 for Wales for the *CV* and 0.82 and 0.53 for the *SI*. For 2000-2002, the *CV* values are 0.13 for England and 0.46 for Wales, and the *SI* values are 0.84 for England and 0.58 for Wales. Business trips in Scotland display a higher seasonal concentration with a *GC* of 0.18 for 1994-1999 and 0.13 for 2000-2002 than short holiday trips where the *GC* is only 0.13 for 1994-1999 and 0.12 for 2000-2002. In Wales, VFR trips show the least seasonal pattern with an average *GC* of 0.16 for 1994-1999 and 0.15 for 2000-2002.

At values of 0.48 (1994-1999) and 0.39 (2000-2002), Wales has the highest average *GC* for long holiday trips amongst the three regions. The corresponding values for Scotland, at 0.33 (1994-1999) and 0.28 (2000-2002), are the lowest. It should be noted that the seasonal concentration in the long holiday market in Wales has been decreasing from a *GC* of 0.43 in 2000 to a *GC* of 0.33 in 2002. A major factor might be that the number of long holiday trips in Wales dropped by 12.5% during that time period, thus also decreasing the concentration in the summer months. This is further investigated in Section 5.3 where the *PSS* values for long holidays are calculated. Overall, the degree of seasonality in the short holiday market is much lower than in the long holiday market. England, for instance, displays a fairly stable distribution of short holiday trips with several peaks during the course of the year. The average *GC* is only 0.12 for 1994-1999 and 0.09 for 2000-2002. By contrast, in Wales the distribution of short holiday trips shows acute seasonality with a *GC* of 0.23 between 1994 and 1999 and 0.22 between 2000 and 2002. Between 2000 and 2002 the seasonal concentration of short holiday trips decreased in all UK regions.

The above used scalar measures are clearly not a complete illustration of the seasonality of the tourism demand time series. For instance, the above quoted values for business trips do not show the fact that in England these trips peak consistently each year in spring and in autumn, whereas in Wales the peaks vary considerably from year to year. Thus other measures to examine the stability of the seasonal pattern are employed later in this chapter. As already shown, the events in 2001 led to significant changes in some types of tourism demand across the UK. The next section looks at the changes in the seasonal distribution of different types of trips in Wales and other UK regions between 2000 and 2002.

5.2 Changes in the Seasonality Pattern between 2000 and 2002

Figure 5-3 displays the absolute number of long holiday trips in Wales taken in each month during 2000-2002, whilst table 5-1 shows the corresponding percentage differences between the 2000 and 2001 figures for Wales, and also for England and Scotland for different types of tourism trips.

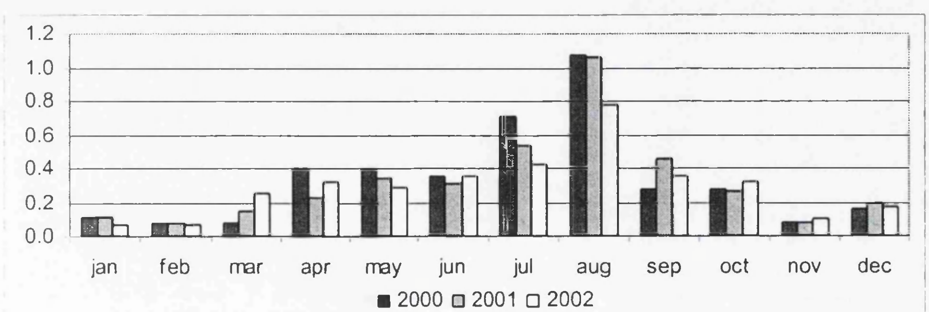


Figure 5-3: Number of Long Holiday Trips in Wales, 2000-2002 (in million)

In 2001, a drop of 200,000 long holiday trips was recorded for Wales – 5% less than in 2000. It can be clearly seen that fewer trips were taken between April and July 2001 (a loss between 14% and 42%), whilst in March and September 2001 a considerable increase in the number of long holidays, compared to 2000, is recorded, with increases of 90% and 60%, respectively. This might be a direct result of the events in 2001 which led to significant changes in the holiday behaviour of domestic tourists.

	Long Holiday Trips			Short Holiday Trips			VFR Trips			Business Trips		
	England	Scotland	Wales	England	Scotland	Wales	England	Scotland	Wales	England	Scotland	Wales
Jan	-3.0	-6.7	-4.1	-19.9	-24.9	11.5	4.7	27.6	-50.5	92.7	-35.6	-14.3
Feb	29.3	-6.7	-4.1	12.1	40.8	-16.4	-8.4	-17.5	11.4	10.1	-3.4	-75.0
Mar	29.3	16.6	91.9	-15.9	-6.1	-53.5	-18.6	-44.3	-69.1	-3.7	-3.4	-50.0
Apr	-15.1	-16.0	-42.4	-30.1	-24.9	-24.7	-28.7	32.6	-42.3	-14.4	-17.2	-42.9
May	-13.8	-45.6	-13.6	-23.1	-16.5	-30.3	-31.3	-57.8	-34.0	-14.4	-3.4	300.0
Jun	-22.4	-18.4	-14.7	-3.9	-24.9	0.4	-21.5	-17.5	23.8	-22.9	-35.6	71.4
Jul	10.8	13.3	-25.4	8.1	-13.9	-27.5	-18.6	4.4	-13.4	8.4	-31.0	0.0
Aug	-3.0	5.0	-0.5	5.7	-6.1	-28.3	-8.4	19.4	-16.5	-3.7	-29.8	-87.5
Sep	-3.0	-25.4	64.5	-3.9	-6.1	0.4	-18.6	-30.4	-75.3	-22.9	-3.4	100.0
Oct	9.1	-6.7	-4.1	-3.9	-27.0	-16.4	-8.4	6.1	48.5	-13.3	93.1	75.0
Nov	-27.3	-6.7	-4.1	44.1	5.6	4.5	22.2	72.4	16.7	20.4	20.7	-10.0
Dec	9.1	39.9	19.9	6.8	61.0	109.1	28.3	-16.5	-7.2	-14.4	54.5	60.0
Annual % Difference	***-2.1***	***-5.8***	***-5.0***	***-3.9***	***-7.0***	***-16.4***	***-9.3***	***-6.3***	***-25.0***	***-3.7***	***-3.4***	***0.0***

Table 5-1: Percentage Differences between 2000 (base) and 2001 for Tourism Trips for UK Regions

Even though England recorded a bigger loss in absolute terms in contrast to Scotland and Wales – 600,000 less long holiday trips were taken in 2001 in comparison to 2000 – in relative terms this amounts to a drop of only 2%. Fewer trips were taken between April and June and in November 2001 (a loss between 14% and 27%), although there was an increase of 10% in July 2001. Scotland recorded a slightly higher loss than Wales with 300,000 fewer long holiday trips in 2001, which is 5.8% less than in 2000. In Scotland, the biggest decrease in long holidays occurred in May and September, whilst in July and August 2001 slightly more trips than in 2000, were registered. It is interesting to note, that both Scotland and Wales experienced an increase of 40% and 20%, respectively, in the number of long holiday trips taken in December 2001, when compared with 2000.

Table 5-2 shows the percentage changes for different types of tourism trips between 2001 and 2002 for the three UK regions. In Wales in 2002, the downward trend of long holiday trips taken during the peak season of July and August continues. It can also be seen that in all UK regions more long holiday trips were taken, especially in the period March to June 2002 in comparison to 2001 (an exception to this is the figure for Wales in May 2002). However, in the months from July to October 2002 fewer trips took place in all regions with the exception of those in Wales in October 2002.

	Long Holiday Trips			Short Holiday Trips			VFR Trips			Business Trips		
	England	Scotland	Wales	England	Scotland	Wales	England	Scotland	Wales	England	Scotland	Wales
Jan	-31.8	0.0	-38.0	17.9	57.5	45.5	5.9	-59.6	58.3	17.9	36.0	81.3
Feb	-23.2	0.0	-7.0	-15.8	40.0	35.8	-17.7	-2.8	17.3	17.9	-10.7	159.0
Mar	79.1	60.0	62.8	26.3	31.3	62.9	19.1	103.7	90.0	4.8	-18.4	-44.5
Apr	2.4	0.0	39.6	10.5	5.0	55.2	21.0	11.1	-24.6	17.9	53.0	-61.2
May	27.9	85.7	-17.3	10.5	5.0	4.7	76.5	33.3	31.9	4.8	45.7	-56.3
Jun	15.2	14.3	16.3	-1.8	5.0	-32.1	23.5	-2.8	-5.0	4.8	-23.5	-67.6
Jul	-4.0	-29.4	-20.3	-1.8	-23.6	-37.3	-7.4	-13.6	-9.5	-18.5	22.4	16.5
Aug	-7.4	-11.1	-26.9	-10.7	40.0	26.1	19.1	23.4	5.6	-8.3	-10.7	521.5
Sep	-7.9	-12.5	-22.5	10.5	-6.7	152.2	-7.4	66.6	58.3	4.8	36.0	-80.6
Oct	-9.0	-12.5	19.6	-1.8	5.0	30.9	-5.9	38.9	-54.8	-6.8	-49.0	-33.4
Nov	2.4	0.0	39.6	-34.5	-30.0	16.4	5.9	-40.2	-13.6	4.8	2.0	20.9
Dec	-9.0	-8.3	-7.0	-1.8	-3.8	-41.8	-1.7	60.5	26.7	4.8	2.0	-12.6
Annual % Difference	***0.4***	***0.0***	***-7.9***	***-0.8***	***6.1***	***15.2***	***8.0***	***10.0***	***5.6***	***3.8***	***0.0***	***-23.1***

Table 5-2: Percentage Differences between 2001 (base) and 2002 for Tourism Trips for UK Regions

The short holiday market in Wales was hit harder by the events in 2001, with 16% less short holiday trips being taken in 2001 than in 2000. The number of short holidays in Wales decreased by 900,000 between 2000 and 2001, increasing again by 700,000 between 2001 and 2002. In contrast, England recorded a loss of only 4% and in Scotland 7% fewer short holiday trips were taken in 2001. Figure 5-4 shows clearly a decrease in the number of short holidays taken in Wales in 2001 when compared to 2000, especially during the first 8 months of 2001. For example, over 50% fewer short holiday trips were recorded in March 2001 than in March 2000. December 2001 was the only month which showed a significant increase when compared to 2000, with more than double the number of trips taken in 2001 than in 2000.

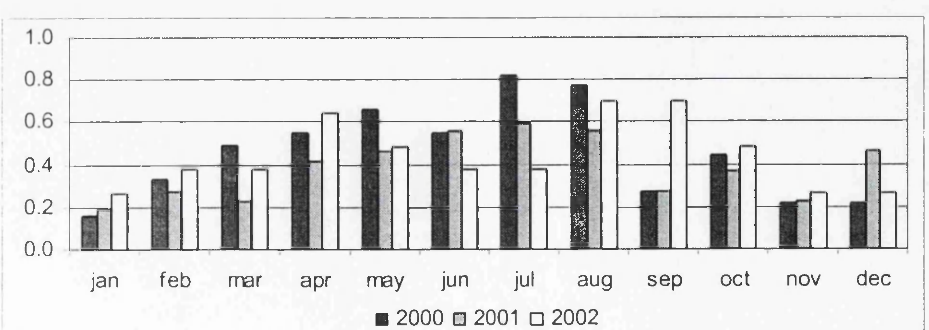


Figure 5-4: Number of Short Holiday Trips in Wales, 2000-2002 (in million)

Figure 5-4 also demonstrates that in 2002, the number of short holidays taken in Wales recovered for the spring months and a considerable increase was recorded for September 2002. It is not clear, yet, if this indicates a change in the seasonal pattern from the summer months to the autumn, or simply an irregular pattern for the year 2002.

England and Scotland also recorded losses in the number of short holiday trips, especially for the period March to June 2001. Whilst England displayed an increase in short holidays during the summer months July and August 2001 (8% and 6% more trips than in 2000), Scotland's experience was similar to that in Wales – a decrease from March until October 2001. It is also interesting to note, that in November 2001 England saw an increase of 44% and in December 2001 Scotland saw a 61% increase in the number of short holiday trips compared to 2000. This suggests a displacement effect with more trips being taken towards the end of the year in 2001 in comparison to the preceding year. In 2002, Scotland displays in the first three months and in August an increase of between 30% and 60% in the number of short holidays taken, when compared to 2001. For England the changes between 2001 and 2002 were not as pronounced for each month as those in Wales and Scotland.

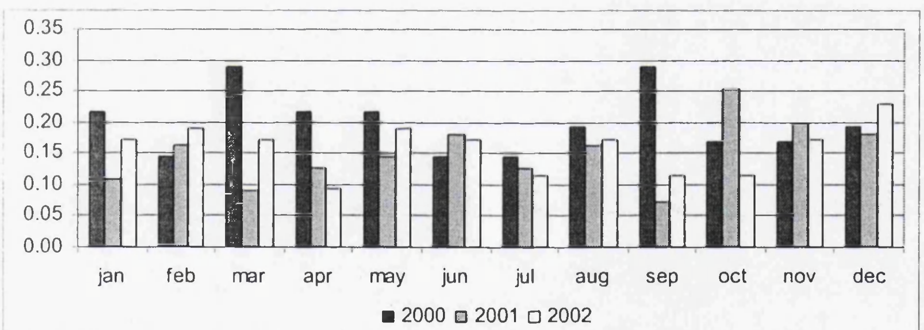


Figure 5-5: Number of VFR Trips in Wales, 2000-2002 (in million)

The number of VFR trips decreased by 600,000 in Wales between 2000 and 2001, a decrease of 25%. Figure 5-5 displays the seasonal pattern for VFR trips between 2000 and 2002. It can be seen that the months March to May 2001, as well as September 2001, show the biggest decrease (between 40% and 75%), whilst in October 2001 a significant increase of 50% was recorded. In England 9% less VFR trips were taken in 2001 than in 2000, with a decrease between February and October 2001. Only November and December showed an increase in comparison to 2000, with on average 25% more trips being taken in 2001. The data for Scotland show a 6% drop in the number of VFR trips in 2001. Whilst in England and Scotland the VFR market returns in 2002 to the 2000 volume, in Wales only a slight increase can be seen. In 2002, 6% more VFR trips were taken in Wales than in 2001, with significant increases in January, March and September 2002. These were also the months in which the number of VFR trips decreased the most in 2001. This might indicate that the seasonal pattern of VFR trips in Wales is returning to the 2000 pattern. Scotland's VFR trips increased in 2002 especially in March, September and December. In England the changes in VFR trips were not as pronounced in most months as in the other UK regions, apart from May 2002 when 77% more VFR trips were taken when compared to 2001.

Business trips in Wales display a completely different pattern of change between 2000 and 2002 than that shown in England and Scotland. Between 2000 and 2001 Wales did not experience any annual changes in the number of business trips taken, whilst between 2001 and 2002 these trips decreased by 23%. There are, however, some considerable changes in the number of business trips taken evident, when monthly data is analysed. The data in the tables 5-1 and 5-2 confirm the aforementioned erratic nature of business trips in Wales, with no common pattern shown in the changes. For example, whilst in 2001 significant more trips were made in the early summer and autumn (an increase of between 70% and 300%) when compared to 2000, in 2002 January, February and August recorded a considerable increase (between 80% and 520%) when compared to the preceding year. In England and Scotland, the business market showed a slight decrease between 2000 and 2001 and signs of recovery in 2002. Apart from January 2001, when there was an increase of 92%, England experienced only slight changes in the number of business trips during 2001 and 2002, when compared to the previous year. In Scotland, more business trips were taken at the end of 2001 in comparison to 2000 with nearly twice as many business trips in October 2001 as in October 2000. In 2002 in Scotland, a large increase in the number of business trips in comparison to 2001 was recorded for April and May.

The analysis shows that the effects of the FMD crisis and the terrorist attacks of September 11th 2001 did not only differ between the regions, but also between the different types of tourism demand. Whilst short holiday and VFR trips experienced the greatest annual decrease in the number of trips between 2000 and 2001 in all regions, all types of demand saw a decrease, particularly during the first six months of 2001.

Compared to the other two UK regions, Wales displayed more extreme changes in relative terms regarding the number of trips taken in each month between 2000 and 2002, particularly in the business trip category, which does not show any common pattern. In 2002 a significantly higher number of trips were taken in almost all regions and types of demand, between March and May, which might indicate a sign of recovery. At this time the data are available up to only 2002, so no conclusions can be drawn yet as to whether tourism trips will return to their seasonal pattern of 2000 and before, or whether the trends, such as less trips taken during July and August will continue in 2003 and the following years establishing new seasonal patterns. The next section looks at the stability of the seasonal pattern, first and foremost between 1994 and 1999, with the 2000 to 2002 data being only presented to indicate any significant changes.

5.3 Stability of the Seasonality Pattern in the UK Regions

The stability of a seasonal pattern over a period of several years can be easily examined with a Seasonal Plot, in which the observations relating to the same month of each year are compared graphically. The plots for domestic tourism in Wales show a well-established seasonal pattern for tourism trips overall, long holiday trips and to some extent short holiday trips.

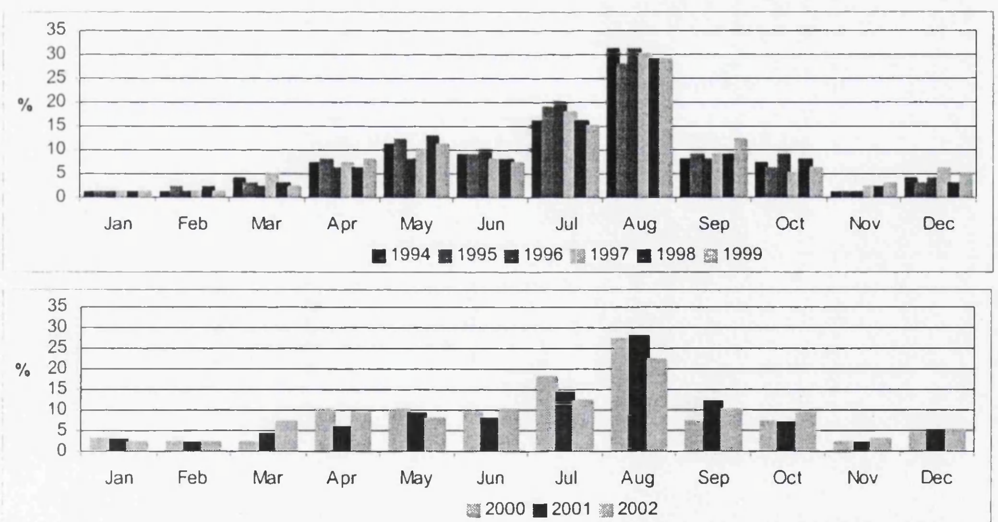


Figure 5-6: Seasonal Plot for Long Holiday Trips in Wales, 1994-2002

Figure 5-6 shows, as a percentage of the annual figure, the proportion of long holiday trips taken in each month during 1994-1999 and during 2000-2002 in Wales. These proportions display a very stable seasonal pattern, with only minor changes in the importance of each month. The plot shows a clear peak season in July and August, with approximately 20% of all trips started in July and 30% in August. Spring and autumn can be regarded as the shoulder seasons, with around 10% of all trips taken in each month from April to June and September to October. The concentration during the peak months, July and August, is slightly lower for the period 2000 to 2002.

The Seasonal Plots for long holidays in England and Scotland, which are not shown here, exhibit a similar seasonal distribution of trips but the peak seasons are not as pronounced, with August accounting for only 24% of long holiday trips in England and 19% in Scotland between 1994 and 1999. Between 2000 and 2002, on average, 20% of all long holiday trips in England and 17% of all long holiday trips in Scotland were taken in August. It is interesting to note, that in Scotland the importance of July for long holiday trips is similar to that of August (an average figure of 17% for 1994-1999 and 14% for 2000-2002 is calculated). Furthermore, the importance of the off-season November to March is higher in England and Scotland, than that for Wales. December especially, is of higher importance, with an average proportion of 8% of all long holiday trips taken in England and 10% in Scotland, between 2000 and 2002. It should be noted, that the long holiday market in Scotland displays a less stable seasonal pattern than that in Wales, with a significant reduction in the August share over the period analysed.

Figure 5-7 illustrates the point made earlier: in contrast to long holidays, business trips in Wales do not show any seasonal pattern and the peak month changes almost every year. In 1999 September and October, as well as March, May and June, were the most important months for business travel, whereas in 1998 most of the business trips were taken in the first half of the year. The 2000-2002 data confirms these results. For example, in 2000 the months February to April were most important for business trips, whilst in 2002 the highest proportion of business trips were taken in January, July and November. In the Scottish data a significant, albeit lesser, degree of variation from year to year is also evident. In 2001, an exceptionally high concentration of business trips can be seen in October, with 16% of all business trips being taken. England shows a much more stable pattern of business trips with an even distribution throughout the year, with some 8-10% of all trips started in each month – except for July and August, when only 6% of the total were taken between 1994 and 1999. July to August can thus be seen as England's off-season for this kind of demand for the years 1994 to 1999. With the introduction of the new UKTS methodology in 2000, the 2000-2002 data show a more evenly distribution of business trips, with 8-9% of all trips taken in each month of the year in England.

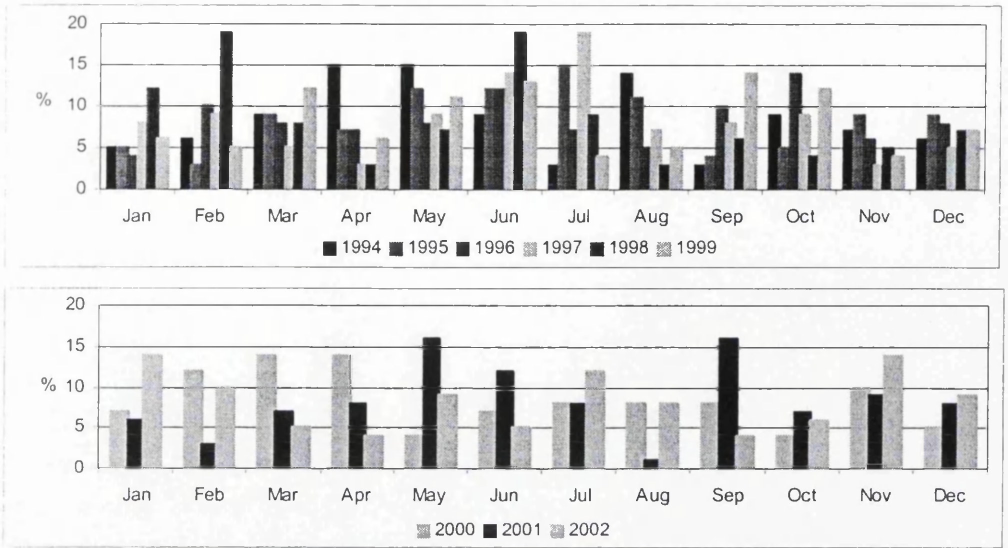


Figure 5-7: Seasonal Plot for Business Trips in Wales, 1994-2002

Figures A-2 and A-3, Appendix A, display the seasonal plots for short holiday trips and VFR trips in Wales, for the periods 1994-1999 and 2000-2002. Short holiday trips show a more or less stable seasonal pattern over the period 1994-1999, with peaks in April to May and July to August. Between 2000-2002 short holiday trips still tended to peak around the spring and during the summer months of July and August, even though great variations occur in July and September. In 2001 a lower concentration of trips are seen in March and April which might indicate changes in travel plans due to the FMD outbreak.

VFR trips tend to peak in all regions during December between 1994 and 1999 (cf. Figure A-1, Appendix A), emphasising the importance of Christmas in renewing links between families (and friends). However, there are considerable year-to-year changes in the other months in both Scotland and Wales during that period. Only England shows a very stable pattern, with VFR trips fairly evenly distributed over the year with the exception for December. The lowest concentration of VFR trips is found in the months July to September in all regions between 1994 and 1999. It should be noted that the peak of VFR trips in the spring, as found by Seaton and Palmer (1997) in their study of UKTS data for 1989-1993, could not be confirmed by the 1994-2002 data. The 2000-2002 data are somewhat different, as they reveal that VFR trips are spread evenly throughout the year, with no strong seasonal peak in 2000 and only a slight peak for

Christmas in 2001 and 2002 in England (UKTS, 2002a, 2003). The 2000-2002 data for VFR trips in Scotland and Wales vary to some extent throughout the year, with no clear peak season.

As mentioned in chapter 4, the Coefficient of Variability can be employed to test the stability of an established seasonal pattern over a certain time period. The coefficients are calculated for each month and indicate whether the peak months change considerably from year to year. Table A-3, Appendix A, lists the Coefficients of Variability for all different types of demand and regions, computed for the period 1994-1999 and table A-4 presents the respective values for the period 2000-2002. The values were calculated on the basis of the percentage figures used in the Seasonal Plots above, rather than the absolute numbers of trips. Trends in terms of overall increases or reductions in demand, therefore, have been removed.

It is not surprising that England, in comparison to the other two regions, tends to have the lowest Coefficients of Variability and therefore the greatest stability of seasonal patterns throughout the periods 1994-1999 and 2000-2002. A more interesting comparison is between the results for Wales and Scotland. For long holiday trips the demand pattern during the 6-month period from April to September can be seen to be fairly stable in both regions, indicating a well-established summer season. However, the figures also show some significant differences in the stability of demand for long holidays in July and August, with Scotland having a much lower coefficient for July than for August and Wales showing the reverse for the period 1994-1999. This indicates that in Scotland the proportion of long holiday trips taken varies more in August than in July, whilst in Wales more variations are displayed in July between 1994-1999. The greatest variations in both regions occur in the off-season November to March, which indicates that the importance of these months has changed throughout the years. For the period 2000-2002 a different picture emerges with Scotland displaying the lowest Coefficients of Variability for long holiday trips, with an average coefficient of 0.126, followed by England with an average Coefficient of Variability of 0.136. It is interesting to note, that in all regions the greatest variations occur in the month of March for the period 2000 to 2002, which might be a direct result of the FMD outbreak in 2001.

For short holiday trips the picture is less clear-cut. Wales shows relatively low variations during the period May to July and also in December, but Scotland displays the lowest value in September between the years 1994-1999. For the years 2000 to 2002, Wales displays much higher variations in the short holiday market, with an average Coefficient of Variability of 0.239, the highest values occurring in September and December. In contrast, in Scotland, the average Coefficient of Variability is only 0.172 and the greatest values are displayed in February as well as in December, even though these are on a lower scale. England shows relatively low Coefficients of Variability for both time periods indicating a well-established seasonal pattern in the short holiday market.

The values for VFR trips indicate a fair degree of variation in every month, with little evidence as to what could be called a peak, or low season. Between 1994 and 1999, Scotland displays, with 0.250, a higher average Coefficient of Variability than Wales which has one of 0.239, indicating more rapidly changing seasonal patterns in Scotland between the years. For the period 2000 to 2002 Wales shows the highest Coefficients of Variability in the months of March, September and October, with an overall average of 0.263. In contrast, Scotland has an average coefficient of 0.241, with the highest variations occurring in January and May. For business trips the figures confirm the erratic nature of this type of demand, particularly in Wales, for both time periods.

Because of these differences in the degree of seasonal stability between long and short holidays on the one hand and VFR and business trips on the other, it has already been stated in chapter 4 that different approaches are needed to take the analysis further. Section 5.4 applies a Seasonal Decomposition methodology to the former, but any such analysis is clearly inappropriate for the latter. A potentially more useful approach for gaining insights into the behaviour of VFR and business trips is the use of Demand Concentration Indices.

Table 5-3 presents a set of Concentration Indices for business trips. The four aggregated periods shown are the result of extensive experimentation with a range of different combinations of months and were found to capture the differences between the regions and parts of the year most effectively. It is again evident that Wales displays the highest variation between the years. However, during May and June for the period of 1994 to

1999, demand appears to be quite stable in all regions, and this period accounts for almost a quarter of the annual number of business trips in Wales. In contrast, in Scotland only around 14% of all business trips were taken in these spring months. The highest fluctuation in the number of business trips taken in Wales between 1994 and 1999 occurs in July–August and September–October, with shares varying between 9% and 26%. In November–April, Wales has the lowest share of business trips with approximately 43%, whereas in Scotland more than half of all business trips were taken during those six months during 1994-1999. Between 2000 and 2002 business trips in Wales still display the highest variation between the years, with 2001 showing a completely different pattern to the other two years. Whilst in 2001 nearly 30% of all business trips were taken during May/June and over 20% during September/October, in 2000 and 2002 the majority of trips were taken in July/August and a higher concentration of trips can be noted during the months of November to April. Scotland displays the lowest concentration of trips during July/August and the highest during September/October.

	May/Jun			Jul/Aug			Sep/Oct			Nov-Apr		
	Wales	Scotland	England	Wales	Scotland	England	Wales	Scotland	England	Wales	Scotland	England
1994	23.8	15.0	18.2	16.8	19.0	15.2	11.9	17.0	18.2	47.5	49.0	48.5
1995	23.8	14.9	16.8	25.7	16.8	13.9	8.9	14.9	18.8	41.6	53.5	50.5
1996	20.2	15.0	19.2	12.1	16.0	11.1	24.2	18.0	17.2	43.4	51.0	52.5
1997	23.2	10.0	16.8	26.3	9.0	13.9	17.2	24.0	20.8	33.3	57.0	48.5
1998	25.5	13.1	16.8	11.8	14.1	12.9	9.8	12.1	18.8	52.9	60.6	51.5
1999	24.2	16.7	17.0	9.1	10.8	13.0	26.3	18.6	17.0	40.4	53.9	53.0
mean 1994-1999	***23.4***	***14.1***	***17.5***	***17.0***	***14.3***	***13.3***	***16.4***	***17.4***	***18.5***	***43.2***	***54.2***	***50.8***
2000	10.9	18.8	18.8	15.8	17.8	15.8	11.9	16.8	19.8	61.4	46.5	45.5
2001	27.7	14.9	15.8	8.9	12.9	16.8	22.8	24.8	16.8	40.6	47.5	50.5
2002	14.0	16.2	16.0	20.0	13.1	14.0	10.0	20.2	16.0	56.0	50.5	54.0
mean 2000-2002	***17.5***	***16.6***	***16.9***	***14.9***	***14.6***	***15.6***	***14.9***	***20.6***	***17.5***	***52.7***	***48.2***	***50.0***

Table 5-3: Concentration Indices for Business Trips as Percentage of Annual Figure for Business Trips, 1994-2002

The Concentration Indices for VFR trips (cf. table A-5, Appendix A) reveal that there are no pronounced differences between the three regions during 1994-1999. For the period 2000-2002, it is interesting to note that Wales shows, with 17.4%, a higher average concentration of VFR trips during May/June than Scotland (15.1%) and England (14.7%). In 2002, only 12% of all VFR trips were taken during September/October in Wales, which shows a big drop when compared to previous years.

Tables A-6 and A-7, Appendix A display the Concentration Indices for short and long holiday trips and are included to detect any changes in the seasonal pattern due to the FMD outbreak and the terrorist attacks of September 11th in 2001. Between 1994 and 2002 long and short holiday trips show a more or less stable pattern between the years. In Wales nearly a quarter of all short holiday trips were usually taken during July and August and around 20% were taken during May and June. In comparison to the other two regions, the off-season months of November to April had the lowest concentration of short holiday trips in Wales. In 2002 short holiday trips display a somewhat different pattern for Wales. Only 20% of all short holiday trips were taken between July and August and only 16% during May and June, whereas 22% took place during September and October (nearly 10% more than in 2000 and 2001). In regard to long holiday trips, it is not surprising that Wales displayed the highest concentration of trips during the summer months of July and August and the lowest during the off-season months of November to April.

5.4 Seasonal Decomposition for Tourism Trips in UK Regions

A Seasonal Decomposition analysis, using the multiplicative model, was applied to the time series of long and short holiday trips for all UK regions for the periods 1994-1999 and 2000-2002. The seasonal factors computed for the period 2000-2002 have to be interpreted with great caution, as they conceal the changes due to the catastrophic events in 2001. The values are included in this section to identify any differences between the UK regions during that time period. Figure 5-8 shows the seasonal factors obtained from an analysis of long holiday trips for the time period 1994-1999.

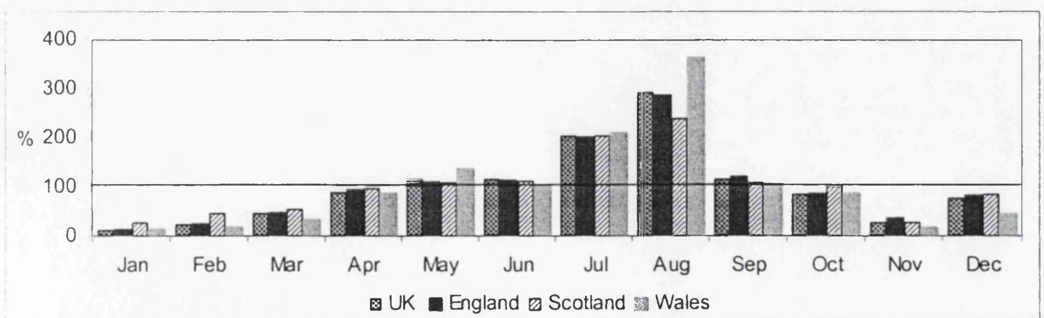


Figure 5-8: Seasonal Factors for Long Holiday Trips calculated for 1994-1999

The figures obtained show a pronounced difference between Scotland and Wales in August and in the off-season, from November to March. In Wales the seasonal factor for August is 361% and thus in August the number of long holiday trips is 3.6 times the average number of these trips. In Scotland the equivalent figure is 238%. In the off-season the results for December are particularly interesting. Whilst both England and Scotland achieve near average performance in this month, the seasonal factor for Wales is only 44%.

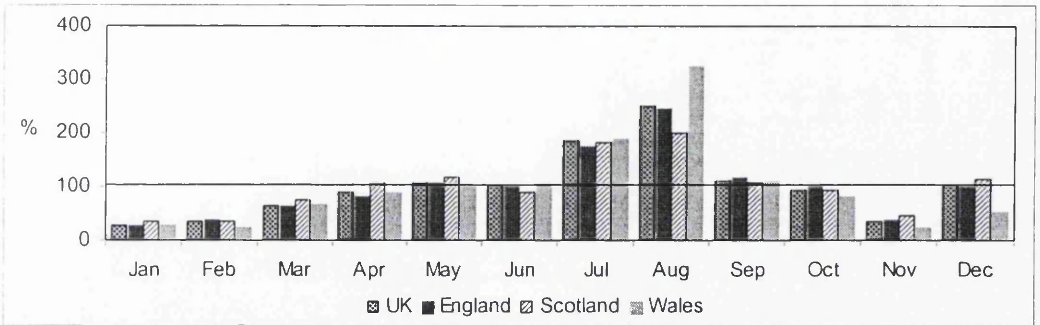


Figure 5-9: Seasonal Factors for Long Holiday Trips calculated for 2000-2002

Figure 5-9 displays the results calculated for the period 2000-2002. As data for only three years are included in this analysis, the results should be interpreted with caution and are displayed here only to reveal any profound differences between the regions, in comparison to the period 1994-1999. The seasonal factors obtained for 2000-2002 are similar to those computed for the years 1994 to 1999. The number of long holidays in August is in Wales 3.3 times the average number of these trips, whilst in Scotland it is only twice the average number. Again, Wales under-performs in November and especially in December, in comparison to the other two regions.

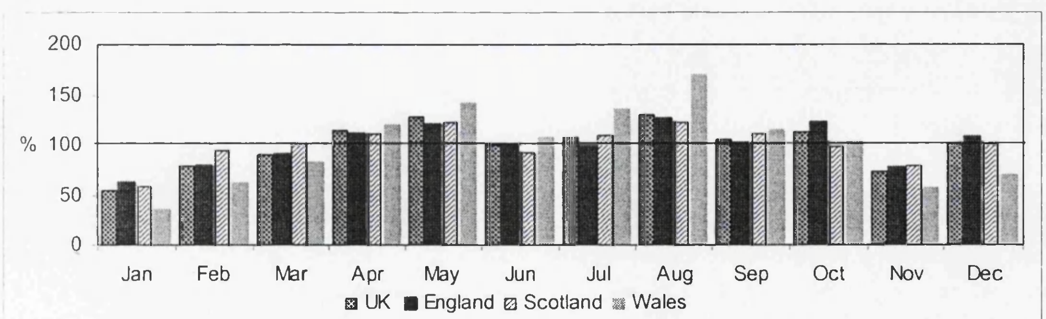


Figure 5-10: Seasonal Factors for Short Holiday Trips calculated for 1994-1999

The results for short holidays, shown in Figure 5-10, reveal a less pronounced difference between the months, with average seasonal factors between 50% and 150%. As for long holidays, short holiday trips in Wales peak in July and especially in August (seasonal factors of 137% and 171%, respectively). However, the results also highlight a second season in April and May, for which seasonal factors of 120% and 142% were obtained. Overall, there is much less variation in the seasonal factors for England and Scotland. In addition, the values for November to March are considerably closer to the average than those for Wales. The relatively low December figure obtained for Wales mirrors the picture observed for long holidays.

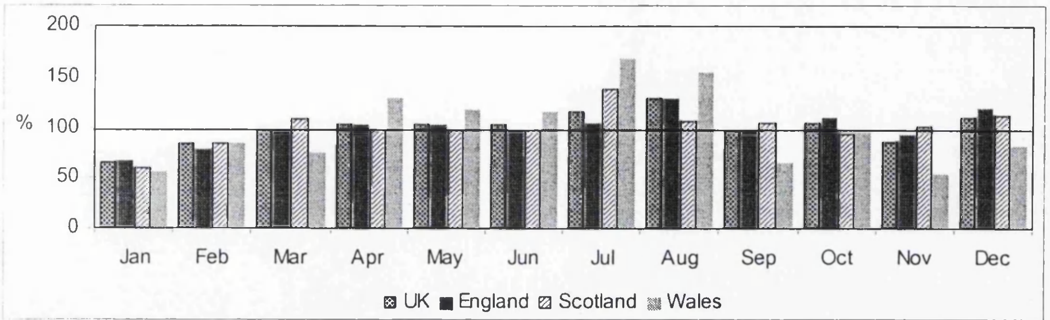


Figure 5-11: Seasonal Factors for Short Holiday Trips calculated for 2000-2002

Figure 5-11 displays the seasonal factors for short holiday trips computed for 2000-2002. July and August are the months with the highest seasonal factors for Wales (169% and 155%, respectively). The second peak for short holiday trips in Wales is displayed around spring, with the months April (129%), May and June (both 117%). Wales also displays exceptionally low seasonal factors for September (66%), November (54%) and March (76%) in comparison to the other two UK regions. The seasonal factors for England and Scotland are close to 100%, apart from January, which shows values around 60%, and a slight peak in July for Scotland (138%) and in August for England (129%).

The results so far have shown that long holidays display an acute seasonality in all regions throughout the study period. From the viewpoint of a tourism manager, it would be interesting to identify how variations in overall demand for long holidays affect the peak season. As the preceding sections have shown, the Seasonal Decomposition approach, the Concentration Indices and Seasonal Plots are not able to provide an answer. As stated in chapter 4, the *PSS* values calculated for long holidays provide information about any changes in the peak season relative to the overall annual increase or decrease in the number of long holiday trips. Table 5-4 presents the *PSS* values for long holiday trips calculated for the periods 1994-1999 and 2000-2002. The value for 1999-2000 was not included in the table, as the UKTS data for 1994-1999 and 2000-2002 are not directly comparable. The figures in Table 5-4 are mainly positive for the period 1994-1999, indicating that an increase in the overall number of trips for the total year goes along with an increase in the number of visitors during the peak season, and vice versa. For instance, between 1996 and 1997 the decrease in the absolute numbers of long holiday trips in Wales in July and August accounts for 92% of the total decrease. While this amounted to 300,000 trips, the decrease in the peak season was 275,000 trips.

For England, and the whole of the UK, all *PSS* values are positive for the period 1994-1999, indicating that an increase in the total number of long holidays taken, consistently leads to a rise in the peak months and, conversely, a decrease in the total number of trips is always reflected in a reduction in July and August. The situation in Wales and Scotland, however, is different. Scotland, in particular, shows a remarkable development: the average *PSS* values are relatively small and in some years an increase in overall demand was even accompanied by a decrease in the summer months. Between 1998 and 1999, for example, the total number of long holiday trips increased by 200,000, whilst the number of trips taken in July and August decreased by 183,000. Therefore the number of long holiday trips taken outside the peak season months increased, leading to a less severe concentration of visitors in the summer months. However, a negative value for *PSS* in itself does not indicate such a desirable development. In Wales, for instance, a decrease between 1995 and 1996 of 10,000 in the total number of trips went alongside an increase of 10,800 in the number of long holiday trips during the two peak months.

	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	2000-2001	2001-2002
UK overall	38.18	28.90	13.43	40.40	44.19	7.23	408.00
England	57.79	27.46	22.93	29.95	43.89	-42.35	-614.24
Scotland	-49.33	59.83	13.85	28.51	-91.67	-46.01	n/c
Wales	39.95	-107.92	91.73	69.71	11.00	93.09	131.33

Table 5-4: Peak Season's Share (*PSS* values) of Total Increase/Decrease in Long Holiday Trips (%)

The *PSS* values calculated, for the period 2000 and 2002, are all negative for England and Scotland and positive for Wales. Between 2000 and 2002 the total number of long holiday trips decreased continuously in Wales. The *PSS* value for 2001-2002 was calculated at 131.33. The data show that between 2001 and 2002, 300,000 less long holiday trips were taken in Wales, resulting in an even higher decrease during the peak season July/August, with 394,000 fewer long holiday trips taken. This indicates that at some other point during 2002, more long holiday trips were taken than in 2001. In England, the *PSS* value of –614.24 points towards a shift in the seasonal concentration. Whilst in 2002, 100,000 more long holiday trips were taken than in 2001, during July and August 614,000 fewer long holiday trips took place. A closer look at the England data for long holidays reveals that the decrease in the peak season was accompanied by an increase in March 2002, with 884,000, and in May, with 625,000 more long holiday trips taken when compared to 2001.

It is interesting to note that in Wales a positive *PSS* value of 93.09 was calculated for 2000/2001. Whilst all regions had to record losses in the overall number of long holiday trips between 2000 and 2001, the peak season in England and Scotland was not affected by the overall reductions. These two regions managed to achieve a higher number of long holiday trips during July and August 2001 in comparison with 2000. This could be an indication for a shift in the holiday behaviour from spring to the summer in 2001, caused by the FMD crisis. In contrast, in Wales, the overall loss of 200,000 long holiday trips in 2001 resulted in a decrease of 186,000 long holiday trips during July and August. A closer look at the Wales data shows that, in nearly all months, less long holiday trips were taken in 2001 than in 2000. Only in September an additional 179,000 long holiday trips and in December an additional 32,000 long holiday trips were recorded. This might indicate that, in Wales, the long holiday market took until the autumn of 2001 to display any displacement effects caused by the FMD crisis. The *PSS* value for Scotland for the period 2001/2002 could not be calculated, as the same number of long holiday trips was recorded for 2001 as in 2002.

5.5 Amplitude Ratios and Indices of Similarity for Tourism Trips in UK Regions

It was shown earlier that the events of 2001 led to considerable changes not only in the volume of different types of demand, but also in the seasonal pattern for the period 2000-2002. As this section analyses changes in the seasonal swing and compares the seasonal pattern between the UK regions in detail on the basis of the results for the Seasonal Decomposition procedure, the 2000-2002 data were excluded from the analysis. The results presented below refer, therefore, only to the period 1994-1999.

Even though tourism trips overall, as well as long and short holiday trips, display a fairly stable seasonal pattern, the amplitude between the peaks and troughs changes significantly between years. As already mentioned in chapter 4, the Amplitude Ratio indicates any changes in the size of the seasonal swing between the years. Table 5-5 displays the values of the *AR*s for tourism trips and long and short holiday trips. A centred 12-month moving average was used for the calculation, and therefore the results start with the year 1995 and end with 1998.

Amplitude Ratios									
	Tourism Trips			Long Holiday Trips			Short Holiday Trips		
	Wales	Scotland	England	Wales	Scotland	England	Wales	Scotland	England
1995	1.071	1.027	1.065	0.953	0.966	0.995	0.956	1.207	1.139
1996	0.995	1.295	0.900	1.043	1.021	1.004	0.975	1.559	1.045
1997	1.059	0.709	0.970	0.949	0.893	0.969	1.189	0.844	1.100
1998	0.886	0.896	0.920	0.953	0.982	1.022	0.848	0.913	0.839

Table 5-5: Amplitude Ratios for Different Types of Demand and Regions, 1995-1999

The majority of the values in the table are fairly close to 1. There are few exceptions and these all relate to Scotland. In 1996 the seasonal amplitude for Scotland's short holidays is much higher than the amplitude of the seasonal factors. This, as can be seen from Appendix A, is due to a lower than usual off-season and a higher than usual peak season, especially when compared to the following two years. Since 1997 the Scottish *AR*s for long and short holiday trips have remained below 1, suggesting that seasonal concentration is decreasing and a better spread of tourism trips is achieved. The results for Wales display no discernable trend and indicate a more stable seasonal pattern than is the case in Scotland.

Indices of Similarity				
	Tourism Trips	Holiday Trips	Long Holiday Trips	Short Holiday Trips
England	0.523	0.802	0.776	0.498
Scotland	0.537	0.722	0.680	0.436

Table 5-6: Indices of Similarity Comparing Wales with other UK Regions, 1994-1999

As stated in chapter 4, the *AR* is not a suitable tool to compare seasonal patterns between regions and the I_S was therefore suggested for that purpose. In Table 5-6 the Indices of Similarity, which compare Wales to the other two regions are displayed. The seasonal pattern of holiday trips in Wales closely resembles that of holiday trips in

England, and to a lesser extent Scotland. The I_S between the English and the Welsh data is 0.802 which means that of the total deviations from the mean 80% were common to the seasonal factors in both time series. Long holiday trips in Wales, in particular, show a very similar seasonal pattern to those in England, whereas the seasonal pattern of short holidays in Wales is quite different to that in both England and Scotland. This confirms the results of the earlier analyses.

5.6 Marketing Implications for Tackling Seasonality in Wales

This chapter presented the application of a wide variety of approaches for measuring aspects of seasonal variations in tourism demand data, to the UK regions. The starting point of this chapter was the contention that the seasonal pattern of tourism demand in Wales is significantly different from that observed in other parts of the UK. The analyses presented have clearly identified a number of crucial differences. One of these is the seasonal pattern for short holidays, which are generally perceived as an obvious and effective way of increasing demand in the off-peak times of the year. It has been shown that in Wales short holidays are highly seasonal, with sharp peaks in July/August and April/May, whereas in Scotland, for example, there is a much lower variation throughout the year. Several of the methods employed provide quantitative measures of this difference - the average *GC*s over the period 1994-1999, for instance, are 0.229 and 0.132, respectively, and the average seasonal factors for July/August work out at 153.7% and 116.4%. These results were also confirmed for the 2000-2002 period, where the average *GC* took values of 0.219 for Wales and 0.125 for Scotland, and the average seasonal factors for July/August for Wales and Scotland were computed at 162% and 122.5%, respectively.

Whilst Wales is outperforming Scotland in terms of the overall number of trips/nights in the short holiday category and has also achieved a very significant and steady increase in these numbers over the period 1994-1999, the analysis conducted demonstrates clearly that Scotland has been much more successful in attracting short holiday trips in the off-season months of November to March. England's seasonal pattern for short holidays is also considerably more even than that in Wales. It stands to reason, therefore, that there is an untapped potential for Wales in the off-season short holiday market and that lessons might well be learned in this respect from the marketing strategies employed in the other home nations. Whilst it is always difficult to attribute an observed change in a demand pattern to particular marketing instruments, there is substantial evidence that Scotland has achieved a shift in the concentration of short holidays away from the peak season of July and August by specifically focussing its marketing efforts on the message that 'Scotland is open throughout the year'. Tourism value statistics, for example, show that, following the start of the 'Autumn Gold' campaign, an additional £8 million of expenditure was generated in the period from October to November 1996 (Scottish Tourist Board, 1998). Moreover, the concentration indices for short holidays in Scotland during July and August have steadily decreased since then, from 22% in 1996 to 15% in 1999. The Scottish success certainly proves that weather-related factors or institutional influences, such as school or bank holidays, do not represent insurmountable obstacles in attracting domestic tourists outside the main season.

The 2000-2002 data show that, in absolute terms, more short holiday trips were taken in Scotland than in Wales during that period. It can be seen that the short holiday market in Wales was hit much harder by the events in 2001, with 17% less short holidays taken in 2001 in comparison to 2000, than Scotland and England, where decreases of 7% and 4% respectively, were recorded. Wales also experienced more greatly pronounced changes, in relative terms, in each month during the period 2000-2002, than those in England and Scotland. Even though short holiday trips in Wales increased again by 15% in 2002 when compared to 2001, the numbers have not yet reached the levels of 2000, particularly between May and July. It is interesting to note, that even with the considerable changes in the number of trips taken during 2000-2002, the general results relating to seasonality, calculated for the period 1994-1999, could be confirmed. A comparison between the seasonal distributions of short holiday trips in the UK regions shows clearly that in Wales still less short holiday trips were taken during the off-season months of November to March, with an average of only 27% of all short holidays. In contrast, in Scotland this value amounted to 35%. The 2002 data also show some desirable positive developments in Wales, with an increasing number of short holidays taken between September and April. At present, it is impossible to say whether this positive development is the result of a seasonal redistribution of demand or part of the recovering process of the tourism market following the 2001 crises, or simply a result of the changes in the UKTS methodology. Only an analysis of the data for the following years will show if this positive trend is going to continue. Nevertheless, it can be concluded that, in Wales, lessons might still well be learned in respect to off-season development, from the marketing strategies employed in other UK regions.

In all the home nations the long holiday category displays the most acute seasonality as well as the highest degree of stability in the seasonal pattern. Wales again shows a more extreme pattern than in England or Scotland, with average July/August seasonal factors, calculated for the period 1994-1999, of 285% compared to 222% and 243% respectively, in the other two nations. This was confirmed by the results for 2000-2002, which showed average seasonal factors of 257% for Wales, 212% for England and 191% for Scotland. These values, coupled with the stability of the pattern over the years, suggest that the demand for long holidays in Wales is still governed, to a large extent, by institutional aspects, such as the timing of school holidays, weather-related factors and tradition and/or inertia. Overall, between 1994-1999, there has been a steady decline in the number of long holidays taken in Wales, whereas in Scotland there has been an upward trend in this market and, as shown earlier, the region succeeded in combining this increased demand with a reduced concentration in the peak months of July and August. Spending on long holiday trips is also significantly higher in Scotland in comparison to Wales.

Between 2000-2002 the number of long holiday trips decreased steadily in Wales, whilst England experienced a slight increase in this category of demand in 2002. In Scotland the same number of trips were taken in 2002 as in 2001. The biggest loss in the long holiday market in 2001, in relative terms, occurred in Scotland with 6% fewer long holiday trips taken, followed by Wales with minus 5%. In 2001, fewer long holiday trips were recorded, especially during the period April to June in all the UK regions. It is interesting to note that there does not appear to be any pattern in the changes between 2000 and 2002 common between the three UK regions analysed. In terms of the seasonal variation, it should be noted that the concentration of long holiday trips in the peak season has decreased steadily in Wales during the period 2000-2002. Whilst in 2000, 45% of all long holidays were taken during July and August, in 2002 only 34% of all long holidays took place during these two months. This confirms the trend already identified in the 1994-1999 data. Whilst the concentration in the peak season remains higher in Wales than in England and especially in Scotland, it is still much lower between November and April, in comparison to the other two UK regions. Therefore, marketing efforts following the recovery from the FMD crisis should be directed away from the peak season and towards the shoulder and off-peak seasons. Whether the marketing strategies, employed in Scotland in recent years, might work in a similar way in Wales is debatable, but the results obtained suggest that they may well provide useful pointers.

Even though VFR trips are still only of minor economic importance for Wales, their number has steadily increased between 1994 and 1999. Visits to friends and relatives are the least seasonal type of demand in Wales, with average *GC*s of only 0.159 for the period 1994-1999 and 0.147 for the period 2000-2002. The seasonality measures show that, in contrast to England, no stable seasonal pattern for this type of demand can be found in either Scotland or Wales, apart from a repeating peak in December. However, the size of this peak varies considerably and does not even appear to be present in the 2000 and 2001 data – in any of the three regions. Only the data for 2002 show a slight peak in VFR trips during December in all of the three UK regions analysed. The lowest concentration of VFR trips occurred during the summer months July to September in all three UK regions between 1994-1999.

In Wales, the number of VFR trips showed the greatest decline of all types of tourism trips in 2001, with a drop of 25%, in comparison to 2000. Wales also experienced the greatest decline in the VFR tourism market in contrast to Scotland and England. In particular, fewer VFR trips were recorded between March and May 2001 and July to September 2001. Whilst in England and Scotland in 2002 the VFR market nearly fully recovered, in Wales around only 6% more VFR trips were taken, when compared to 2001. The number of VFR trips remained below the 2000 levels in nearly all months. Even though the overall spending is lower in the VFR market than for other types of tourism demand, the considerable drop in the number of VFR trips in Wales had significant consequences for food and beverage suppliers, service providers, travel brokers, carriers and some retailers. As VFR tourists tend to spend proportionally more on eating, drinking, shopping and travel than holiday tourists, the VFR market is increasingly important for these retailers and service providers generating revenues, particularly in the months with traditionally low general tourism volumes (Seaton & Palmer, 1997). Seaton and Palmer (1997) suggest that large cities and smaller towns, without unique tourist attractions or scenic advantages, might gain more from prioritising the VFR market, "rather than flogging dead horses in trying to create significant recreational markets" (1997:354). In Wales not only large cities and small towns but also some rural and seaside destinations, particularly in South East Wales, are successful in attracting large number of VFR tourists. For some of these destinations, it might well be useful to consider a concentration of marketing efforts into the VFR tourism market. As in Wales VFR and business tourism seems to be concentrated in the South, destinations catering for mainly business and VFR tourists might benefit from combining the marketing efforts of both markets. As VFR trips place fewer demands on the tourist infrastructure their seasonal pattern is less important from a planning perspective – at least at a macro level – and the fact that the pattern in Wales varies considerably from year to year does not have profound implications from the viewpoint of resource utilisation.

The analysis raises interesting questions about business tourism. Whilst the pattern in England is very stable, with little variation over the year, and the Scottish pattern, whilst exhibiting a higher degree of variation, is also relatively stable, Wales shows extreme variations with different peaks nearly every year. In some years the peak for business trips in Wales coincides with the peak season for holidays, so business and holiday trips compete for many of the same resources. The reasons for this profound difference between Wales and the rest of the UK remain unclear. One possible interpretation is that the relatively low number of business trips in Wales is influenced significantly by the timing of certain important events. If this proves correct, it is clearly possible to use appropriate marketing strategies to direct business tourism demand away from the main holiday season. Strengthening the importance of September and October as well as the off-season November–April period are obviously desirable alternatives.

The analyses presented were conducted at the aggregate level of the region. It is clear that within these regions different localities may, and do, experience seasonal patterns that bear little resemblance to the overall pattern. However, as the intention of the chapter was to provide a basis on which macro-level policies for extending the tourism season can be evaluated, the regional perspective is clearly appropriate. Even so, in order to tackle the seasonality problem effectively, it is important to complement the results presented in this chapter with further analyses on a sub-regional, local or sectoral level. This will be the focus of chapters 7 and 8 of this dissertation, which take a closer look at the seasonality pattern evident in the serviced accommodation sector in Wales between 1998 and 2002. The following chapter 6 outlines the PCA method applied in this research to analyse room occupancy data.

CHAPTER 6

DATA SOURCE AND STATISTICAL METHODS

Following the detailed analysis of seasonal variations at a national level for Wales, the focus of the research shifts at this point to investigate demand fluctuations in the Welsh serviced accommodation sector. The aim of this chapter is to provide an overview of the data source with its limitations as well as a detailed outline and discussion of the methods used in this research for analysing temporal demand variations in the accommodation sector. First a detailed description of how the research sample was derived from the raw WSAOS (Wales Serviced Accommodation Occupancy Survey) sample is given. The ability of the research sample to represent the WSAOS sample is demonstrated. The main method used for this part of the research is adapted from the principal components approach. Section 6.2 of this chapter looks, therefore, at the origins of PCA and presents the theoretical background of the PCA model. It also examines the influence of the scaling of the variables on the PCA results. This is followed by an overview of PCA on time series data and the differences to the standard PCA are shown. Section 6.3 deals with the special case of using room occupancy data as input for PCA and describes the different approaches used in the literature. Since the present study focuses specifically on the role of seasonality and also investigates changes in occupancy patterns, there are a number of differences in the PCA method used in this research. The advantages of performing the PCA on a correlation matrix are demonstrated. Furthermore, the ideas of the application of PCA to a modified data set (i.e. 'annual mean corrected' data) and to 'occupancy change' data are introduced. The obvious question which follows is how the performance indicators obtained from the PCA are linked to various characteristics of the accommodation businesses involved. The method of performance-based segmentation including cluster analysis, crosstabulation and ANOVA are presented for that purpose.

6.1 Data Requirements and Data Source

The WSAOS provides monthly data on bed and room occupancy for a random sample of hotels, guesthouses, B&Bs and farmhouses across Wales. In this research, room occupancy rates rather than bed occupancy figures are used. Even though room occupancy rates tend to disguise the type of customer booking, i.e. single let to individual businessman or multiple let to family, it is a more useful measure for the performance of an establishment, as a room is no longer available for sale once it is occupied, whether it is let to a family of four or to a single businessman (Jeffrey & Barden, 2000a). The approach to separate the common regular patterns of variation, which define the structure of seasonality in a sample, from sources of variability, which are attributable to individual establishments, is based on PCA. The basic data requirement of the method is a complete time series of occupancy figures, obtained at regular intervals (e.g. on a daily, weekly or monthly basis) for a given sample of establishments. As the main focus of the study was the role and structure of seasonality, it was desirable to get comparable data on as many years as possible.

The raw room occupancy data of the WSAOS for the period January 1998 to December 2000 were available in a uniform electronic format at the beginning of the research and these are the data on which the core analysis were performed. A total of 484 hotels, guesthouses, B&Bs and farmhouses supplied information during this time. However, the sample fluctuates in its composition every year and not every participating accommodation provider consistently reported occupancy figures every month. A missing value analysis of the data set showed that of the 484 establishments included in the raw data set only 32 supplied the relevant information continuously throughout the 36-month study period. As it was therefore not possible to exclude all units containing missing values entirely from the analysis, the missing values were replaced by suitable numerical entries (Krzanowski, 1988). Jolliffe (2002) refers to this process as imputation. In order to obtain a larger sample for the analysis, those establishments providing data for at least 30 months of the study period were also included. This increased the size of the sample to 229. However, 19 of these had to be deleted due to evident inconsistencies in their returns. For the resulting 210 establishments some of the missing values could simply be replaced by zeros because additional information indicated that the establishment regularly closes during the months in question. Where gaps in the data remained, rather than replacing the missing values by the mean value, a cubic spline interpolation procedure was applied to estimate the missing values. The advantage of this procedure over other approaches is that it yields a smooth curve through the data points, much like physically fitting a 'flexicurve'. Various alternative ways of generating a usable subset of data from the original sample were explored, but were found not to have any substantial effect on the results obtained.

Figure 6-1 displays the room occupancy rates for the resulting 210 establishments of the research sample and the WSAOS sample separately for the hotel and the non-hotel sectors. Between 1998 and 2000 the WSAOS sample comprised around 250 hotels and 208 guesthouses and B&Bs. Even though only a subset of 210 establishments is included in the research sample it can clearly be seen that the occupancy levels and the general seasonal patterns are very similar to those of the official WSAOS sample. It has to be borne in mind that the number of enterprises reporting data for the WSAOS differed from month to month. It is not surprising therefore that the room occupancy rates in the out of season months November to March are slightly higher for the WSAOS sample, as these figures only include the enterprises which remained open. In contrast, the research sample of 210 establishments used for the subsequent analyses also includes all those establishments which close during the off season and therefore have room occupancy rates of zero in these months.

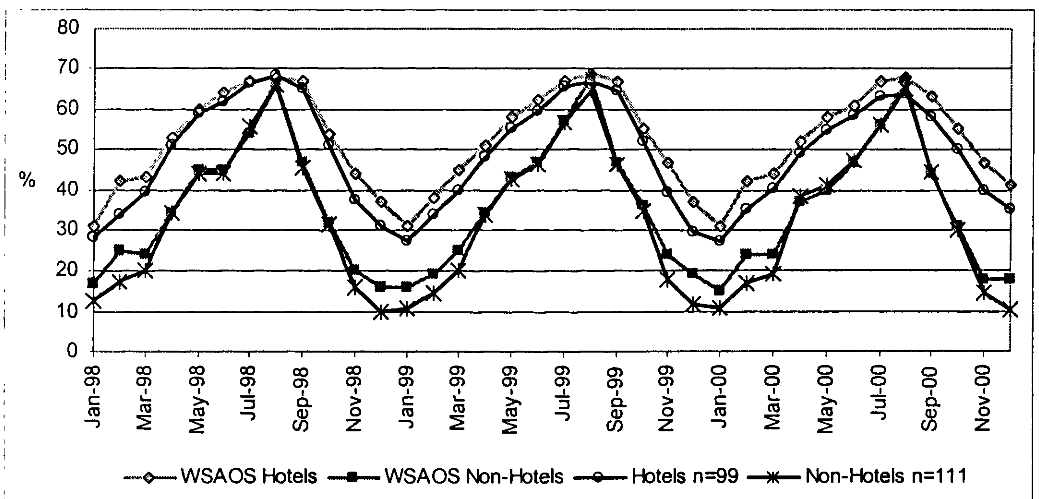


Figure 6-1: Room Occupancy Rates for WSAOS Sample and Research Sample, *n*=210 by Kind of Establishment, 1998-2000
Source: WSAOS Sample (WTB, 1999, 2000c, 2001b)

The data provided by the Wales Tourist Board not only comprised the raw data for room occupancy rates for each individual enterprise but also 'profile lists' categorising each participating enterprise according to their attributes. A unique profile number is also allocated to each establishment. The following categories were included in the 'profile lists':

- type of establishment (i.e. hotel, guesthouse, B&B or farmhouse),
- postcode,
- number of rooms and beds,

- tariff category,
- WTB star grading,
- district (i.e. North, Mid, South East or South West Wales),
- Unitary Authority, and
- location (i.e. seaside, small town, city/large town or countryside).

This information was derived from a self-completion questionnaire sent by the WTB to each participating establishment of the WSAOS panel and is used to ensure that all regions and categories are covered representatively. Table B-1, Appendix B displays the frequencies in which some of these attributes describing establishments occur in the WSAOS sample and the research sample. It illustrates that the hotels in the research sample are slightly bigger with on average of 30 rooms and 62 beds per hotel, whilst the hotels in the WSAOS sample only have on average 26 rooms and 54 beds. The regional distribution of the research sample by Unitary Authorities is very similar to that of the WSAOS sample. However, there are considerable differences according to the star grading, as ungraded and 2-star hotels are under-represented in the research sample and 3-, 4- and 5-star hotels are over-represented. A similar picture can be drawn for the non-hotel sector. Only 38% of all non-hotels are located in South Wales whilst around 45% of the non-hotels in the WSAOS sample are situated there. The distribution of the research sample by Unitary Authorities is similar to that of the WSAOS sample. However, 1- and especially 2-star guesthouses, B&Bs and farmhouses are underrepresented in the research sample, whilst 3- and 4-star non-hotels are overrepresented.

Tables B-2 and B-3, Appendix B display the average annual room occupancy rates for hotels and non-hotels in the WSAOS sample and the research sample for different attributes over the period 1998 to 2002. It should be noted that the annual figures presented there were calculated on the basis of monthly average room occupancy rates to ensure comparability between the two samples. Both tables show that the annual average room occupancy rates for the hotels and non-hotels were slightly lower for the research sample than for the WSAOS sample. As has already been pointed out, this might be caused by the fact that the number of establishments in the WSAOS sample reporting data each month fluctuates during the year and only those establishments were included which remained open. Nevertheless the average annual room occupancy rates for different categories of hotels and non-hotels demonstrate a high resemblance between the research sample and the WSAOS sample.

To locate each enterprise on a map of Wales, the information from the postcodes provided was used to define the X- and Y-coordinates according to the British Coordinate System from the British National Grid for each of the 210 establishments of the final research sample. Figure 6-2 displays the regional distribution of the enterprises in the research sample. It shows that Anglesey, in North West Wales is the only region which is underrepresented in the research sample. Despite that, the enterprises are generally well distributed geographically. Figure B-1, Appendix B displays the regional distribution of enterprises in the research sample by type of establishment. It can clearly be seen that all types are fairly evenly distributed across Wales. It can therefore be concluded that the research sample of 210 establishments will reliably reflect the Welsh serviced accommodation sector as recorded in the WSAOS panel.

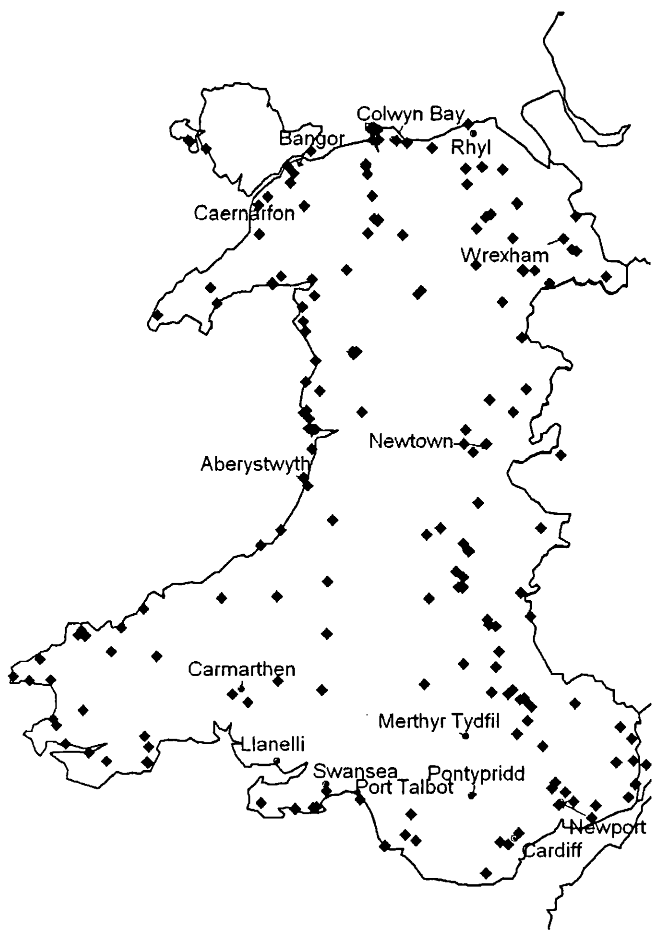


Figure 6-2: Regional Distribution of Establishments in the Research Sample, *n*=210

To provide a more comprehensive picture, additional information was acquired from web pages and brochures regarding facilities and special offers available at the establishments. These include whether establishments provided or advertised:

- information on websites or in WTB brochures,
- conference or meeting facilities,
- gym, pool, sauna, solarium or beauty salons,
- licensed to hold weddings,
- activities nearby or local, such as golf, walking etc.,
- special breaks, such as golf weekends, 'escape packages' or romantic specials,
- bargain breaks or special out of season prices, such as 'Welsh winter warmer breaks' or 'autumn champagne breaks',
- special prices for longer stays or weekend breaks, such as 3 nights for the price of 2 or 7 nights for the price of 4, or
- Christmas, New Year's Eve or Easter specials.

Even though some of this information is subject to frequent change, it still provides a useful snap-shot. The information as collected by the WTB in the profile lists was also checked and if needed updated. For example, more detailed information was acquired on the location of the establishments according to the holiday areas as defined by the WTB. Figure B-2, Appendix B displays the regional distribution of the accommodation establishments by the 12 holiday areas. For the statistical analyses presented in chapters 7 and 8 of this research these 12 holiday regions were aggregated into 5 with a more or less equal number of establishments. These are displayed in figure B-3, Appendix B. The use of holiday areas in contrast to for example Unitary Authorities to determine the regional location of an establishment has the advantage that these areas have their own distinct character and appeal from the perspective of the visitor.

The type of location was also further refined. The WTB only distinguishes between seaside, countryside, large town/city and small town locations. In Wales only a small number of large towns and cities exist. Therefore, large town/city locations were combined with small town locations in the research sample. The regional distribution of the establishments in the research sample by location is displayed in figure B-4, Appendix B. It can clearly be seen that a large number of establishments are either categorised as countryside or seaside establishments. It is therefore suggested to refine these two location variables further by creating additional categories. Seaside establishments were differentiated into 'pure' seaside and 'seaside and town' locations. Countryside establishments were divided into 'pure' countryside, countryside near town and countryside near seaside enterprises. The regional distribution of the establishments by these new types of location is displayed in figure B-5, Appendix B. These new location variables give a more detailed picture about the nature of the location of the enterprise and will be particularly useful for the analysis of occupancy performance and seasonality.

During the research period the data for 2001 and 2002 also became available. In order to be able to compare the results, only those establishments were included which also reported sufficient data during 1998-2000. Out of the subset of 210 establishments from the research sample 1998-2000, only 135 establishments reported data for each month in 2001. In order to increase the sample size the missing values were replaced by suitable numerical entries for all those establishments which did not have more than 8 missing values over the whole time period 1998-2001. For these 35 establishments the missing values were replaced by zeros if additional information indicated that the establishment regularly closes during the months in question or a cubic spline interpolation procedure was applied to estimate the missing values. This increased the sample size to 170. The same procedure was applied to the 2002 data set and resulted in a subset of 145 establishments which were included in the analysis. Various analyses, not presented here, showed that all regions, categories and types of establishments of the WSAOS sample were also equally represented in these two subsets.

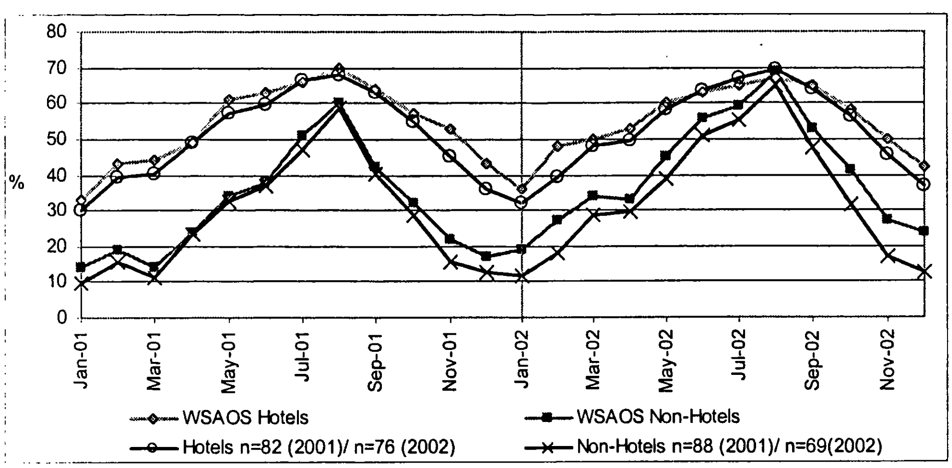


Figure 6-3: Room Occupancy Rates for WSAOS Sample and Research Sample by Kind of Establishment, 2001-2002
Source: WSAOS Sample (Centre for Leisure Research, 2002; NFO WorldGroup, 2003)

Figure 6-3 shows the average room occupancy rates for the WSAOS sample and the research sample separately for hotels and non-hotels for 2001 and 2002. It has to be noted that the 2001 data relate to the research sample of *n*=170 with *n*=82 hotels and *n*=88 non-hotels, whilst the 2002 data relate to the research sample of *n*=145 establishments with *n*=76 hotels and *n*=69 non-hotels. It can be seen from figure 6-3 that the room occupancy rates for the samples are at similar levels and have comparable shapes. The only differences are in the off-peak season where the research sample displays lower rates. This is again not surprising as the research sample also includes those establishments which were closed during the winter months. It can therefore be concluded that the research samples for 2001 and 2002 also provide a fairly reliable reflection of the Welsh serviced accommodation sector as recorded in the WSAOS panel.

6.2 Summary of PCA Methodology

6.2.1 Basic Concepts of PCA

PCA as Multivariate Technique

The method of principal components analysis (PCA) is based upon the early work of Pearson (1901) and was adapted and developed independently by Hotelling (1933) (Harmann, 1976). Duntemann (1994) defines PCA as a data-analytic technique, that

> "linearly transforms an original set of variables into a substantially smaller set of uncorrelated variables that represents most of the information in the original set of variables" (1994:157).

PCA thus aims to reduce the dimensionality of the original data set in order to ease the understanding of the structure of the data (Duntemann, 1994). It should be noted that it is only worth carrying out a PCA if the original variables are correlated (Chatfield & Collins, 1980). PCA is an orthogonal transformation of the original variables wherein each of the p original variables is describable in terms of p new principal components or linear combinations (Harmann, 1976). As the transformation is a rotation or reflection of original points, no essential statistical information is lost. The principal components (PCs) obtained account for decreasing proportions of variance in the data and are uncorrelated (Jackson, 1991). As the method depends on the total variance of the original variables it is most suitable when all variables are measured in the same units (Harmann, 1976).

The goal of PCA is similar to that of factor analysis, as both techniques try to explain part of the variation in a set of observed variables on the basis of the underlying dimensions. However, there are some significant differences relating to the amount of variance analysed (Duntemann, 1994). Factor analysis has an underlying statistical model that separates the total variance into common and unique variance. It focuses on only explaining the common variance, rather than the total variance, in the observed variables on the basis of relatively few underlying factors (Duntemann, 1994). PCA in contrast has no underlying statistical model (Chatfield & Collins, 1980). PCA obtains a least squares solution with each successive PC maximising the total explained variance and minimising the sum of squares of the elements in the residual matrix (Harmann & Jones, 1966; Keller, 1962). In other words, it analyses the total variance in the observed variables. Whilst the PCs from PCA can be expressed in terms of the observed variables, approximation procedures are required for the measurement of factors for the factor analysis results (Harmann, 1976).

The PCA approach is similar to other multivariate methods, such as discriminant analysis and canonical correlation analysis. All approaches involve linear combinations of correlated variables and the variable weights are derived on the basis of maximising some statistical property (Duntemann, 1994). Linear discriminant analysis focuses on differences among groups and determines one or more linear combinations that maximise between-group variance relative to within-group variance on the derived linear combination (Duntemann, 1994). The basic idea behind the canonical correlation analysis is to measure the relationship between two sets of random vectors by maximising the correlation between a linear combination of the first set of vectors and a linear combination of the second set of vectors (Leurgans, Moyeed & Silvermann, 1993).

Deviation of Principal Components

As mentioned above the goal of PCA is to find linear combinations of the variables. PCA extracts the eigenvalues and eigenvectors generally from a correlation or a covariance matrix (see next subsection for further details on influences of the scaling of the data). The eigenvalues represent the respective variances of the different PCs as the sum of the variances of the original variables and the sum of the eigenvalues of their principal components are the same (Duntemann, 1994).

The largest eigenvalue of the matrix employed stands for the variance of the first or largest PC. Its associated eigenvector $a_1' = [a_{11}, a_{12}, \ldots, a_{1p}]$ is the set of weights for the first PC that maximises the variance of $\sum_{i=1}^{p} a_{1i}x_i$ where x_i are the standardised or the mean-corrected variables depending on which matrix is employed (Duntemann, 1994). The subsequent eigenvectors are sets of weights for the PCs which maximise the rest of the variance in decreasing order. It is quite common to present scaled eigenvectors where the sum of squares of the elements is equal to the corresponding eigenvalues rather than unity (Chatfield & Collins, 1980).

The elements of the eigenvectors are called component loadings and are used to interpret the meaning of the resulting PCs. The component loadings for the scaled eigenvectors where the sum of squares equals the corresponding eigenvalue will be referred to as 'raw component loadings'. When the 'raw component loadings' are divided by the standard deviation of the corresponding mean-corrected or standardised variable depending on the matrix employed, then the so-called 'rescaled component loadings' are derived. These are nothing more than the correlation coefficients between the original and the new variables and give an indication of the extent to which the original variables are influential or important in forming the new variables (Sharma, 1996). Even though the 'rescaled component loadings' are sometimes easier to interpret as they can only take values between –1 and +1, the 'raw component loadings' have the benefit that they are in the same units as the original variables and thus can be directly related to the original data matrix. The component loadings are used to calculate the principal component scores which act as a set of weighting factors relating each individual observation to the PCs. Generally these component scores are standardised to a mean of zero and standard deviation of one. This makes the comparison between individual observations according to the obtained PCs easier.

Since the PCs are uncorrelated, each one makes an independent contribution explaining the variance of the original variables (Duntemann, 1994). Hence, there are k linear transformations of the p original variables: $y_k = \sum_{i=1}^{p} a_{ki}x_i$. As already pointed out, the major benefit of PCA is the fact that it assesses the effective dimensionality of a set of data and can therefore also be used as a dimensional reduction technique (Chatfield &

Collins, 1980). If a few PCs account for a high proportion of the variance in the original data then it is possible to represent the data of the p variables in a lower k-dimensional space with $k<p$ without losing substantial information (Sharma, 1996). It is therefore possible to use just a few component scores for subsequent analyses such as cluster analysis, regression, and discriminant analysis. Furthermore, the advantage of using principal component scores for subsequent analysis is that the new variables are not correlated and the problem of multicollinearity is avoided (Sharma, 1996). Duntemann (1994) refers to multicollinearity as when:

> "one or more independent variables are essentially linear combinations of other independent variables" (1994:215).

Number of Principal Components

The number of PCs retained for interpretational purposes or subsequent analyses is entirely dependent on the goals of the analysis. Nevertheless there are a number of criteria and 'rules of thumb' available designed to support the decision process of how many PCs to retain. The Kaiser criterion or 'eigenvalue greater than one' rule, for example, suggests dropping all those PCs of a correlation matrix with eigenvalues less than one. The Kaiser rule refers to the fact that the PCs with eigenvalues less than one contain less information than a single standardised variable (Duntemann, 1994). This rule might result in discarding small but important PCs. Another criteria is Catell's 'scree graph' which plots the eigenvalues of each PC and tries to identify the point k (the number of PCs to retain) where the line joining the points is steep to the left of k, and not steep to the right of k (Duntemann, 1994). The problem with that approach is that in some cases such lines are not evident. Another possibility is to retain enough PCs that at least a given percentage, e.g. 80%, is explained. As all these rules and criteria are arbitrary they should be applied with great caution (Duntemann, 1994). It should however be pointed out that in general the smaller PCs are harder to interpret (Duntemann, 1994) and thus the aim of the analysis determines the number of PCs to be retained.

Influence of Scaling of Data

One drawback of PCA as a general methodology is that the results are not scale invariant. In other words, the variances of the original input variables have an effect on the principal components and undue weight might thus be given to certain variables

(Jackson, 1991; Mardia, Kent & Bibby, 1979). If the variances differ widely, then those variables with largest variances will tend to dominate the first few PCs whilst variables with small variances have only negligible weights (Duntemann, 1994). The scaling of the data therefore has an effect on the results of the PCA. Jackson (1991) emphasises that the main effect of the different methods of scaling will be on the matrix from which the characteristic vectors are obtained. Three methods of scaling are introduced below. These are PCA based on a crossproduct matrix, a covariance matrix and a correlation matrix.

Normally the PCA is based on the correlation or the covariance matrix but in some special cases the sum-of-squares and crossproduct matrix is used. Performing a PCA on a crossproduct matrix implies that the data are not adjusted in any way, either with regard to the mean or with regard to the variance (Jackson, 1991). This means that the level and the scatter of the original observations are retained. This method is also often referred to as using a covariance matrix around the origin as the mean of the variables is not removed from the data. It is a well established technique for applying PCA in the field of ecology, geology and meteorology (Jolliffe, 2002; Preisendorfer, 1988). The PCA on crossproduct matrices is also often used in the field of chemistry when analysing the results of spectrophotometers (Jackson, 1991). The first principal component (PC) usually resembles the overall mean of the data, reflecting the position of the centroid, whilst the remaining PCs represent differences in the variability (Jolliffe, 2002). One major disadvantage of this application is that the first PC often accounts for over 99% of the total variability whilst other relevant components may only account for a fraction of 1% (Jackson, 1991). Another drawback of using a crossproduct matrix is that the PCs present the general shape of the data curves, as the mean has not been removed. The resulting PCs obtained from a PCA applied to a crossproduct matrix are sometimes referred to as non-centred PCs (Jolliffe, 2002). It has to be borne in mind that these linear combinations no longer maximise the variance, and are therefore not PCs according to the usual definition (Jolliffe, 2002). Jackson (1991) points out that

> "these PCs are principal components in name only, they do not have the same statistical properties of PCs obtained by operating about the mean" (1991:74).

For example, the sum of the eigenvalues is greater than the sum of the variance in the original data set. The PCs are not completely uncorrelated with each other, as the mean was not removed from the data set. Furthermore, as the principal component scores relate directly to the original data set their mean is not zero and the variance is not one, and therefore they are not easily comparable.

The use of the covariance matrix implies that the differences between the dispersion of the original observations are preserved but the differences between the means are lost. This application is therefore often referred to as PCA on covariance matrix around the mean, as the resulting PCs relate to the mean-corrected data. In other words, the variable column means have been subtracted from the data matrix before the PCA is carried out. This is also sometimes referred to as performing the PCA on a single-centred data set (Jackson, 1991). The covariance matrix is generally employed when all variables are measured in the same units.

However, even if all the variables are measured in the same units, the variances may differ considerably and in these cases the correlation matrix is used frequently to avoid problems of scaling (Ali, Clarke & Trustrum, 1985). Krzanowski (1988) also suggests that where the measured variables are not comparable in terms of the magnitude of their variances or their units of measurement, the PCA should be performed on a correlation matrix. This means that the data are intrinsically standardised by setting the mean to zero (subtracting the variable column mean from the data matrix) and the variance to one. Applying the PCA in this way implies that all variables are treated as 'equally important' (Chatfield & Collins, 1980). In other words, the level and scatter of the original observations, and with that some information, will be lost (Sheth, 1969). However, there are also a number of important advantages associated with the use of the correlation matrix. As the PCs are not influenced by the variance of individual variables, interpretation of the dimensions can be easier. This is especially valid for those cases where the variances differ randomly. Furthermore, the patterns of the reference curves for different subsets of variables are more directly comparable (Jolliffe, 2002).

The main reason for using a correlation matrix, however, is that it tends to make the PCs independent from the order of magnitude and the scale of measurement of the variables (Jolicoeur, 1963). It should be borne in mind that the eigenvalues and eigenvectors of the correlation matrix are generally not the same as those from the covariance matrix

(Chatfield & Collins, 1980). Another major advantage of using standardised instead of mean-corrected data is that the results of the analysis, e.g. the component loadings for different sets of random variables, are more directly comparable (Duntemann, 1994; Jolliffe, 2002). The sizes of the explained variances of the PCs, for instance, have the same implications for different correlation matrices, but not for different covariance matrices (Jolliffe, 2002). Jolliffe (2002) argues further that the application of a PCA using mean-corrected data when all the variables are measured in the same units will not provide very informative PCs if the variables have widely differing variances. It has to be noted that the PCs depend not on the absolute value of the correlations, but only on their ratios (Jolliffe, 2002).

One major disadvantage is that the coefficients for the PCs are given in standardised variables, which are less easy to interpret directly. But the component loadings of the PCs can be re-expressed in terms of the original variables by multiplying these coefficients by the standard deviations of the original variables (Jackson, 1991). Nevertheless, the PCs are still linear functions maximising the variance with respect to the standardised variables and not with respect to the original variables (Jolliffe, 2002). It should be noted that the PCs of the correlation matrix will not be orthogonal if the variables (i.e. component scores) are transformed back to their original co-ordinates (Chatfield & Collins, 1980). Jolliffe (2002) also argues that standardising the data, if all variables are measured in the same units, is equivalent to making an arbitrary choice of the measurement unit.

It can be concluded that the fact that the variances of the variables are not homogeneous has implications for the PCA. As was shown, performing the PCA on the correlation or the covariance matrix has a number of advantages and disadvantages. There are no criteria of how to scale the data when all variables are measured in the same units but their variances differ to some extent. For this type of situation Jackson (1991) recommended the test for homogeneity of variance of correlated variables by Harris (1985) to decide whether or not a covariance matrix may be employed. However, if the variables are not thought to be of equal importance, then the analysis of the correlation matrix is not recommended (Chatfield & Collins, 1980).

6.2.2 PCA on Time Series Data

The idea of using PCA on time series data can be traced back to Rao (1958) and Tucker (1958). Rao (1958) studied physical growth curves and attempted

> "to obtain an adequate representation of a growth curve with the minimum possible number of factors on the basis of which significant differences could be established between differently treated groups of individuals" (1958:2).

The PCA is performed on the uncorrected sum of squares and products matrix which does not involve any scaling of the data. Tucker (1958) demonstrated the use of factor analysis techniques to determine parameters of non-linear functional relations in experimental problems such as learning curves, work decrement curves or dark adaptation curves. He analysed observations made of performances on learning tasks for each individual at different times/trials using the sum of products matrix. Ross (1964) examined differences in the factor structure when correlation, covariance and crossproduct matrices are employed for the analyses. He also recommends the use of the crossproduct matrix for the analysis of learning data.

PCA may also be used to examine seasonality in a time series. Craddock (1965) analysed monthly temperatures of central England from 1680 to 1963 and performed a PCA using the months as variables and the years as cases/observations. By employing a PCA, he attempted to find characteristic patterns which represent the major modes in which the annual pattern deviates from the long-term mean pattern. Rather than employing a covariance matrix of the original months, Craddock (1965) subtracted the overall mean from all the data, and analysed the covariance matrix of these departures. This was done to allow for the fact that the annual variation accounts for a very high percentage of the total variance. The first PC obtained explains over 90% of the total variance and represents the average seasonal effect. The second PC accounted for the year-to-year differences while the next two PCs represented different patterns in the winter temperature (Craddock, 1965). This analysis was repeated by taking the data as departures from the monthly means instead of from the general mean. Thus the annual component was removed and the data were scaled to equalise the interannual variances for all months. One has to bear in mind that as the annual component is removed in advance, the eigenvectors are not constrained to be orthogonal to it (Craddock, 1965).

Sheth (1969) used the approach to analyse marketing data and comments that PCA

> "can be used in all instances where the independent variable is some function of time and the dependent variable is observed at discrete time intervals" (1969:808).

He furthermore points out that the use of factor analysis in the analysis of functional relationships is similar to curve-fitting techniques. He follows Tucker (1966) and calls the new linear components 'reference curves' (RC). The first RC generally represents the overall mean curve whilst the subsequent RCs show the deviation from the average tendency and are thus called 'correction terms' (Sheth, 1969). Sheth (1969) also stresses the fact that by using the correlation matrix where the data are standardised, two vital pieces of information will be lost in the process – the level and the scatter of the original observations which are both crucial in a functional analysis. He therefore analyses the sum-of-squares and crossproduct matrix which preserves both types of information. Varimax rotation of the axes is commonly performed in factor analysis and attempts to ease interpretation of the factors by imposing rules of simple structure (Sheth, 1969). Sheth (1969) points out that such an approach is inappropriate for the analysis of learning curves, and thus time series in general, as it attempts to replace as many component loadings as possible by zeros.

PCA has been used to examine patterns of employment growth. For example, Jeffrey (1974) analyses regional cyclical patterns in urban unemployment for different cities. The analysis was performed on a covariance matrix. In a study examining the spatial-sectoral patterns of employment growth in Yorkshire and Humberside 1963-1975, Jeffrey and Adams (1980) applied a PCA to 960 standardised growth curves deviating from an initial value of zero for the subregional industries. For that study the PCA was performed on the matrix of sums of squares and crossproducts.

PCA is also commonly used to detect changes in time series. Jassby and Powell (1990), for example, analyse changing seasonal patterns in the data for monthly births from 1948-1978 in the United States. In order to remove the 'baby boom' peaking around 1960, a 12-month moving average was calculated. The seasonal pattern is estimated by subtracting the long-term behaviour of the data (i.e. the smoothed series) from the original data. The PCA is applied to a covariance matrix of these 12 extracted monthly variables from 1949-1977 (Jassby & Powell, 1990). Jassby and Powell (1990) emphasise that the resulting PCs are easily interpretable because the variables in the multidimensional time series were similar in nature and measured in the same units.

6.3 PCA on Room Occupancy Data

6.3.1 Standard PCA on Room Occupancy Data

This research investigates the seasonal variations in the Welsh serviced accommodation sector on the basis of monthly room occupancy rates. A detailed overview of the PCA approach for this type of data is therefore presented below. The application of this technique to tourism data, particularly with respect to room or bed occupancy, respectively, was pioneered by Jeffrey in the early 1980s (Jeffrey, 1983). It has become a well established tool for investigating patterns in occupancy performance. An outline of the different studies by Jeffrey and his colleagues was presented in chapter 2. Jeffrey, Barden, Buckley and Hubbard (2002) provide an excellent summary of the approach as well as a comprehensive overview of published work in this area.

As a dimensional reduction technique, PCA seeks to discover whether the observed data can be explained largely or entirely in terms of a much smaller number of variables called components. Performed on occupancy time series, valuable insight can be gained into the structure and mechanism of occupancy variations, as the technique identifies major underlying dimensions of common variance present in the occupancy levels. If there are such patterns, then a small number of independent dimensions will account for most of the variance in the individual series and the first few dimensions will be intuitively meaningful for a better understanding of the original room occupancy data (Chatfield & Collins, 1980). As already mentioned, the new variables (dimensions) are linear combinations of the original variables and are derived in decreasing order of importance. The first RC accounts therefore for the maximum variance in the data set, whereas the second and later ones identify further distinct patterns of variation (Sheth, 1969). In other words, the method separates the common factors of variability in the data from those which are attributable to individual subjects.

As time periods are used as variables, the resulting dimensions of variability can be viewed simply as time series of component loadings and, therefore, can be represented by a curve in time. An individual establishment's occupancy time series can be related to these RCs by computing a set of weighting factors, called component scores, with similar scores indicating similar occupancy patterns. Therefore, they can be regarded as performance indicators and provide a basis for comparing establishments. They can also be used as input variables for further analyses using other multivariate techniques, the advantage being that the RCs are not correlated (Sharma, 1996). The component scores represent one of the main advantages of PCA over other common approaches to analysing demand variations, such as time series decomposition, because they allow the performance of a particular hotel or guesthouse to be assessed against the identified common dimensions derived from the entire sample.

Jeffrey (1983), who pioneered the application of PCA in tourism by analysing occupancy time series, generally performs PCA on a covariance matrix around the mean to preserve differences in the variances of the variables. But in their study of monthly overseas visitor arrivals in 266 hotels in England for 1984-1985, Jeffrey and Hubbard (1988b) performed the PCA on a covariance around the origin matrix, which is effectively the sum-of-squares and crossproduct matrix, to retain differences in both the means and variances between the variables. The effects of the different scaling of the variables were discussed in section 6.2.1.

Even though employing the covariance matrix preserves the differences in the means and variances, for this research the advantages of using a correlation matrix instead of a covariance matrix outweigh the disadvantages. An analysis of the variances of the variables in the data set of Welsh room occupancy rates (e.g. January 1998 to December 2000) shows that even though all variables are measured in the same units (i.e. room occupancy rates in %) the variances not only differ, but also are without any structure. As there is no compelling reason to believe that one month should receive an artificially higher weight due to the variations in its rates, a correlation matrix was used to treat all variables (i.e. months) on an equal footing, even though it implies a certain loss of information. In other words, the pattern of the correlation matrix can be detected without possible domination by the months with the largest variances. The test for homogeneity of variances of correlated variables (Harris, 1985) was applied to the original variables of the data set and revealed that the variances of the months differ significantly. The test statistic values of W_{R1}=149.73 (for n=210, 1998-2000), W_{R2}=159.994 (n=170, 1998-2001) rejects strongly the hypothesis of equal variances ($p \leq 0.001$). Furthermore, standardised data were used, to enable comparisons between the results for the different research periods. The detailed results of the PCA applied to the correlation matrix for the Welsh room occupancy data for different study periods are presented in chapters 7 and 8 of this dissertation.

It should be noted, that for this research, in addition to the PCA on a correlation matrix, the PCA was also performed on a covariance around the mean matrix, analogous to Jeffrey's approach. The RCs obtained for the standard PCA analyses for the different samples and research periods (210 establishment for 1998-2000, 170 establishments for 1998-2001 and 145 establishments for 1998-2002) were very similar to the results of the correlation matrix. In fact, the RCs explained approximately the same proportions of the variance and the rescaled component loadings for the RCs traced exactly the same pattern. The PCA was also performed on a sum-of-squares and crossproducts matrix for the research sample. Not surprisingly, the first RC of these analyses explains in all cases just over 90% of the total variance and represents, therefore, the mean deviation from the origin (i.e. traces the same pattern as the mean occupancy curve). The component loadings of the subsequent RCs display similar patterns to those of the other two analyses. It can therefore be concluded that for the samples used in this research the general principal dimensions obtained by the standard PCA do not change considerably with the scaling of the data.

6.3.2 PCA on 'Annual Mean Corrected' Data

In order to focus more clearly on the seasonal variations, the PCA was also applied to a modified data set of room occupancy data similar to the idea of doubly-centred PCA. The idea of removing the mean of the data set before applying a PCA is based on the work of Jolicoeur and Mosimann (1960). They studied the applicability of PCA to investigate size and shape variation in the painted turtle. Jolicoeur and Mosimann (1960) state that the first PC of the PCA applied to the covariance or correlation matrix can be viewed as a growth trend and, thus, generally used as a size measure as all coefficients have similar values which are all positive. The remaining eigenvectors are then interpreted as shape variation as their coefficients differ in sign and values. Sundberg (1989) emphasises that 'orthogonality' is imposed by the PCA which means that all vectors are independent. Therefore, if the first vector is interpreted as size, then the remaining vectors solely explain variations in the shape and can be called 'size-free' shape (Sundberg, 1989).

Even though researchers generally assume that the first component represents the overall size, since all variables are positively correlated with this component, it is also argued that both size and shape are incorporated into the first PC (Somers, 1986). The size describes the magnitude of a given character, whilst the shape implies a relationship between two or more variables. Somers (1986) demonstrates that the standard PCA incompletely separates size and shape, but also shows that the PCA on the covariance matrix incorporates more shape into the first component than the PCA on the correlation matrix which more efficiently separates size and shape. He therefore proposes a size-constrained PCA which extracts a first PC that summarises isometric size alone. The manipulations used to extract an isometric vector (size) are equivalent to subtracting a constant from each value in the correlation matrix (Somers, 1986).

Doubly-centred PCA is another related approach of removing an isometric size vector. This idea was originally proposed by Buckland and Anderson (1985) for analysing data of different species counts at various sites, as the 'size' component measuring the relative abundance of the various species would dominate the results of a standard PCA (Jolliffe, 2002). The technique suggested involves the application of the PCA on either a correlation or a covariance matrix where the data matrix is 'doubly-centred' by subtracting both the row and column means (Somers, 1989). In other words, each observation in the data matrix has been corrected for its own variable mean and observation mean, so that sums of rows as well as sums of columns are zero (Jackson, 1991; Jolliffe, 2002). In contrast to the traditional PCA or the size-constrained PCA, the last eigenvalue from the doubly-centred PCA equals zero (Somers, 1989). Somers (1989) shows that the vector of row means which is subtracted from the original data is highly correlated with the first component from a size-constrained approach.

Various other ways have been suggested in the literature to improve the PCA to deal better with the size correction, such as the studies by Jolicoeur (1963), Somers (1986; 1989) and Cadima and Jolliffe (1996). Cadima and Jolliffe (1996), for example, discuss different ways of removing the mean before applying a PCA in their study of the relationship between size and shape during the growth of an organism and argue that it may be of greater interest for the researcher to examine the main source of variation after removing the isometric size. Sundberg (1989) emphasises that the correction for the size effect is particularly of interest when comparing samples that vary in size such as studies concerned with the patterns of covariations among variables. Cadima and Jolliffe (1996) point out that by double-centering the means, the uncorrelatedness of the components when rescaled to the original variables (i.e. incorporating the mean again) will be lost. This is due to the fact that the PCs maximise the variance with respect to the doubly-centred data matrix and no longer with respect to the original variables. However, Jolliffe (2002) stresses that

> "doubly centred PCA performs eigenanalyses on matrices whose elements are not covariances or correlations but which can still be viewed as measures of similarity or association between pairs of variables" (2002:391).

For this research the data were modified as follows. From the data set of the original room occupancy rate the yearly mean occupancy rate for each individual establishment was subtracted from its monthly figures. This modification has the effect of removing from the occupancy data the mean and any trend for each establishment, leaving only the fluctuations – which are now expressed as deviations from the establishment's annual mean. Obviously, this process reduces the variability in the data set (the sum of variances for the 36 months goes down from 17584 to 6112 for the sample of 210 establishments). The modified set is referred to below as the 'annual mean corrected' (AMC) data set. The formula used is given below:

$$y_{ij}^{k} = x_{ij}^{k} - \bar{x}_{i}^{k}$$

where y_{ij}^{k} = annual mean corrected room occupancy rate for establishment i in month j of year k

x_{ij}^{k} = room occupancy rate for establishment i in month j of year k

$\bar{x}_{i}^{k}$ = mean room occupancy rate for establishment i in year k (annual mean)

i = establishment index (i=1,..., 210)

k = year index (k=1998, 1999, 2000).

The relative differences between the variance of the variables (months) do not change with the modification from the original room occupancy data to the AMC room occupancy data. The test for homogeneity of variances of correlated variables (Harris, 1985) applied to the AMC data yielded therefore the same results as before and the hypothesis of equal variances can be strongly rejected. The PCA was therefore again performed on the correlation matrix.

To test the stability of the results obtained for the AMC data, the PCA was also performed on a covariance and a sum-of-squares/crossproducts matrix. The proportions of variance explained and the shape of the RCs obtained from the PCA on the covariance matrix are very similar to the RCs of the correlation matrix. It can thus be concluded that the temporal dimensions obtained from the covariance and the correlation matrices can be interpreted in the same way. In contrast, the results for the crossproduct matrix are dominated by the first RC which represents the mean of the AMC data (i.e. variations around zero). This first RC explains in all cases around 70% of the total variance whilst the subsequent RCs only account for less than 3% of the variance. It is thus not surprising that the shapes of the second and the third RCs are not easily distinguishable from each other and can only be interpreted with great difficulty. Therefore only the results obtained from the PCA on the correlation matrix are presented in chapters 7 and 8 of this dissertation.

6.3.3 PCA on Room Occupancy Change Data

The outbreak of FMD and the terrorist attacks on September 11^{th} in 2001 caused many accommodation enterprises to experience significant changes in room occupancy rates. However, the average occupancy rate for the 170 establishments in the sample fell by only 2.85% from 41.52% between 1998-2000 to 38.68% in 2001. This shows clearly that the average figures conceal considerable variability in the performance of establishments. A separate PCA, therefore, was performed on the differences in the monthly occupancy rates of the individual establishments in 2001 and the average of the three preceding years. These occupancy-change time series measure the increase or decrease in the monthly occupancy rate in a particular establishment between 2001 and the average of the three years before. Similar approaches were used to analyse the 2002 data. For example, detailed a PCA was performed on the differences between occupancy rates in 2002 in comparison to 2001 and on the changes between 2002 and the period 1998-2000. The results are presented in chapter 8 of this dissertation.

This idea is based on studies by Jeffrey and Hubbard (1985; 1988b) who analysed year-on-year changes in room occupancy rates and overseas visitor arrival rates for a sample of hotels. The PCA was applied to a change data set which effectively removed the differences between hotels in the magnitude and seasonality of their room occupancy rates and overseas visitor arrival rates. Rather than the covariance around the mean matrix as in their previous studies, they performed the analysis on a covariance around the origin matrix or sums-of-squares and crossproducts matrix. The resulting RCs therefore define dimensions of change around the origin, the 'no change' situation, rather than around the mean profile (Jeffrey & Hubbard, 1985, 1988b). However, the results are dominated by the first RC which effectively represents the mean change between the two years.

In this research, the PCA for the occupancy change data was performed on the correlation matrix. This approach treats all occupancy change variables as equal. This is desirable as the Harris test (Harris, 1985) confirmed the non-homogeneity of the variances in the occupancy change rates between the months in the sample. The test statistic value of W_{R3}=45.25 (for n=170, occupancy change data) rejects strongly the hypothesis of equal variances ($p \leq 0.001$). The resulting RCs define therefore the dimensions of change around the average room occupancy change profile. This approach however loses some information regarding the differences in the means and variances between the variables as the PCA maximises the variance of the standardised occupancy change time series. The PCA was also applied to the covariance around the mean and the covariance around the origin matrix of the change data, but the results showed that the RCs obtained from the correlation matrix were far more distinguishable and thus easier to interpret.

This research attempts to group accommodation establishments with similar occupancy profiles or change patterns and to pinpoint relationships between characteristics of establishments and a range of typical performance profiles. The focal point of the analyses is therefore not the individual enterprise itself. It is far more important to identify interpretable dimensions with distinguishable patterns than to represent the original data without any loss of information by a few new variables which cannot be easily interpreted.

6.4 Association between Key Characteristics and Occupancy Performance

As previously stated, the aim of this research is to identify some of the associations between supply-side factors and the seasonal variations in the performance of serviced accommodation establishments in Wales. For this purpose a detailed analysis of the component scores obtained for each individual establishment on the various RCs is employed. The first step includes the preliminary screening of the whole data set for outliers, as these influence the results of most statistical analyses. In this research outliers are characterised by extreme values on one or more component scores and are identified by using boxplots. These are summary plots where 50% of the data is represented by the box with the median in the middle and where the whiskers are lines extending from the box to the highest and lowest values, excluding genuine outliers. The identified outliers were then excluded from the subsequent statistical analyses.

In a second step, the component scores were tested for their normal distribution in order to establish whether parametric tests or non-parametric statistical tests were the more suitable. There are numerous tests for assessing univariate normality with the normal probability plot being one of the most popular graphical tests (Stevens, 1996). Probability plots are generally used to determine whether the distribution of a variable matches a given distribution, e.g. normal distribution. They arrange the observations in increasing order of magnitude and plot them against their expected distribution values (Stevens, 1996). The selected variable matches the normal distribution when the points cluster around a straight line. The Kolmogorov–Smirnov test, a nongraphical test for normality, was also applied to each of the obtained component scores from the PCA analyses. In all cases normal distribution was confirmed and it was therefore possible to apply parametric tests such as the t-test and ANOVA.

The next step examines the association between key attributes of establishments and each of the dimensions identified by the PCA. ANOVA is generally used to determine the probability that the means across several groups of observations are equal and observed differences are due solely to sampling error (Hair *et al.*, 1995). As the one-way ANOVA assumes that the variances of the groups are all equal, Levene's test for homogeneity of variances was applied to test whether this assumption was violated. If the significance value of the Levene's test exceeds 0.05, it is suggested that the variances for the groups analysed are equal and the assumption is justified. The post-hoc test Tukey HSD was applied, if the ANOVA revealed significant differences and the variances were assumed to be equal, to identify further where such differences reside. It should be noted, that the ANOVA is generally considered robust against the violation of equal variances, but a different post-hoc test is suggested (Stevens, 1996). For the variables where the results for Levene's test for homogeneity of variances were significant and the assumption of equal variances therefore violated, the post-hoc comparisons were based on Dunnett's C test from the ANOVA procedure. When the independent variable had only two groups then t-tests were used. In general, t-tests are applied to analyse the statistical significance of the difference between two independent sample means and are thus a special case of ANOVA. Levene's test for homogeneity of variances was therefore also applied. In this research the t-test was used to investigate whether significant differences in the performance scores of those categorical variables which have no more than two categories, such as type of establishment (Hotel vs. Non-Hotel) or availability of conference facilities or special offers (Yes/No) exist. A complete ANOVA including post-hoc comparisons identifying significant patterns of differences between different types of establishments was conducted on the component scores for all performance dimensions and is presented in chapter 7.

6.5 Performance-Based Segmentation

The reverse perspective to the investigation of the effects of key characteristics on the RCs involves attempting to identify the attributes of establishments whose performance profiles differ substantially from the sample average. Such an approach has obvious advantages in terms of providing insight into the interaction between the various variables involved. It also, of course, has the important practical benefit of readily producing pointers for guiding development and marketing policies. In this research, at a conceptual level, two stages are required for the analysis. In the first step groups of establishments with similar performance characteristics, i.e. similar component scores on the RCs, need to be identified. The second step involves an examination of the relationships between the establishments' attributes and membership of one of the groups.

Cluster analysis suggests itself as an obvious methodology for accomplishing the first phase of the analysis. Cluster analysis identifies groups of observations or cases with similar characteristics, so that the resulting clusters display high between-cluster heterogeneity and high internal homogeneity (Everitt, 1974). Component scores on the different occupancy performance dimensions obtained by the PCA are used to group the establishments in this research. Instead of examining the various component scores for each of the establishments separately, the clustering technique reduces the information about the whole set of n observations to information about k groups ($k<n$) with the aim of giving a more concise and understandable description of the observations under consideration (Everitt, 1974). It is therefore a data reduction technique or simplification with minimal loss of information. As the component scores are obtained from the PCA they are standardised with a mean of 0 and a variance of 1 and usually take values between –3 and +3. Cluster analysis is very sensitive to outliers in the data as they tend to distort the functioning of many clustering algorithms, especially those used in K-means clustering methods, and make the derived clusters unrepresentative of the true population structure (Anderberg, 1973). In this research, outliers and extreme cases, which were already identified for the ANOVA analysis using boxplots, were therefore again excluded from the analysis to obtain fairly stable and robust clusters.

In principle, there are two alternatives which could be used: a hierarchical (tree-based) method or a non-hierarchical cluster approach. Hierarchical clustering techniques identify groups of observations by joining or dividing these. The agglomerative method is used in most common statistical packages and begins with each observation representing a single cluster. A treelike construction process is used to determine the relationship among entities by arranging homogenous data into clusters until all items are formed into one single cluster at the end (Hair *et al.*, 1995). Hierarchical techniques can be used to identify a suitable number of groups by observing the coefficients presented in the agglomeration schedule (large values between consecutive values indicate separate clusters). The disadvantage with hierarchical algorithms is the broad range of techniques available such as single linkage (nearest neighbour), complete linkage (furthest neighbour), average linkage, Ward's method and Centroid's method, and the range of similarity coefficients such as Pearson correlation, Minkowski distance, Euclidean distance or squared Euclidean distance. Therefore a somewhat arbitrary choice has to be made by the researcher of both the method and the similarity coefficient (Everitt, 1974). Different techniques are also likely to give different solutions and the validity of any clusters found has to be tested. Everitt (1974) suggests different methods to test the stability of the groups produced such as using several clustering techniques on the same set of data. He also points out that hierarchical clustering methods do not allow for the relocation of observations which may have been poorly classified at an early stage in the analysis (Everitt, 1974).

As non-hierarchical procedures require the number of clusters to be specified a priori, it often represents the method of choice in situations involving a large number of objects, as is the case in this research. These techniques are often referred to as K-means clustering. There are several approaches for selecting cluster seeds and assigning objects. The method applied in this research is a special kind of K-means clustering involving the parallel threshold method (e.g. Quick Cluster in the SPSS package). Once the number of clusters is specified (either by subjective choice or the use of other cluster techniques to suggest such a number), the same number of cluster seeds as the initial cluster centres are selected simultaneously in the beginning. The initial seed points are either user-supplied or selected randomly from all observations (Hair *et al.*, 1995). All objects within a pre-specified distance to these centres are assigned to clusters and then the cluster centres are re-computed. The advantage of K-means clustering over hierarchical methods is the fact that objects may also be re-assigned if they are closer to another cluster than the one they were originally assigned to, when all objects are allocated to clusters. The centroids are updated with each re-assignment of objects to other clusters until all observations are assigned to their final clusters. The disadvantage of K-means clustering methods is that the number of clusters has to be specified a priori and that the initial cluster seeds, when selected randomly, are likely to be influenced by the order of the observations in the data set (Hair *et al.*, 1995).

To avoid the disadvantages stated above, hierarchical and non-hierarchical clustering algorithms can both be used to complement each other, with the hierarchical method generally used to specify the optimum number of clusters and initial cluster centres, and the non-hierarchical method used to refine the solution (Sharma, 1996). In this research Ward's method is used to find the optimum number of clusters and the initial cluster centroids. Ward's technique attempts to maximise within-cluster homogeneity by minimising the within-group sum of squares. It is commonly used as a hierarchical clustering method and tends to find clusters that are compact and equal in size (Sharma, 1996). For Ward's method, the squared Euclidean distance measure is recommended (Hair *et al.*, 1995). The observations are then grouped using the non-hierarchical K-means technique (e.g. Quick Cluster) with the cluster centres obtained from Ward's method as the initial seed points to find the final cluster compositions and the final cluster centres. Hair *et al.* (1995) state that:

> "In this way the advantages of the hierarchical methods are complemented by the ability of the non-hierarchical methods to 'fine-tune' the results by allowing the switching of cluster membership" (1995:442).

The combination of Ward's and the K-means methods is especially useful if no information about the likely final cluster composition is available beforehand. However, if the policy maker or the tourist board official already has some indication about the desired number of clusters and the initial cluster centres, then the initial cluster seeds should be determined artificially before the K-means method is applied. In this research no information about the likely outcome of the composition of the clusters existed beforehand and the cluster approach was applied primarily to explore the data set. Artificially set initial cluster centres were therefore only used in two cases. First, when similar clusters were desired for comparison (e.g. for a different sample size or different research period) and, second, where the research question indicated certain cluster seeds.

As to the second stage of the analysis in this research, a crosstabulation approach is applied to determine the significance of the association of attributes of establishments and the clusters. Crosstabulation tables, often referred to as contingency tables, are frequently used to summarise categorical data and to demonstrate the presence or absence and the pattern of a relationship between two categorical variables (Bryman & Cramer, 1997). Throughout the analysis of the contingency tables in this research, the original number of cells was not changed, i.e. the original number of clusters was always tested against each of the attribute groups. In other words, adjacent rows and/or columns were not combined. In order to establish whether an observed relationship between the two variables is significant, the Pearson's chi-square test is widely used in conjunction with contingency tables. Pearson's chi-square is a more robust test of independence for small samples than the likelihood ratio statistic (Howell, 1997). The chi-square statistic is calculated by comparing the observed frequencies in each cell with the frequencies expected if the row and column variables are statistically independent (Bryman & Cramer, 1997). One of the most important requirements for using the chi-square test relates to the size of the expected frequencies. A common rule of thumb is that the expected frequency of each cell in a contingency table should be at least 5. However, research has shown, that if the sample size is reasonably large, one or two expected frequencies less than 5 are not too serious (i.e. tests produce Type I errors of less than 0.06), particularly if the row and/or column total are reasonably similar (Howell, 1997). It is generally accepted that for tables with more than 1 degree of freedom the validity of the chi-square test will not be threatened if no more than 20% of the cells have expected frequencies of less than 5 (Daniel & Terrell, 1992).

If the chi-square statistic indicates a significant statistical association between the two categorical variables, then the standardised residuals are examined further. The standardised residuals represent the discrepancies between the observed and expected values for each cell and are standardised to a mean of 0 and a standard deviation of 1. They reflect which cells contribute most towards the significant chi-square statistic and can, thus, be helpful in the interpretation of significance patterns.

Standardised Residual	Significance Level
≤ -1.6 or ≥ +1.6	p≤0.1 (*)
≤ -2.0 or ≥ +2.0	p≤0.05 (**)
≤ -2.6 or ≥ +2.6	p≤0.01 (***)
≤ -3.3 or ≥ +3.3	p≤0.001 (****)

Table 6-1: Significance Levels for Standardised Residuals

Table 6-1 displays the significance levels for the standardised residuals. If the value of the standardised residual is greater than 2 or less than –2, then this indicates a cell where the observed and expected frequencies differ significantly at the 0.05 level. It should be noted that the significance level is usually set at a probability or p-level of at least 0.05 (Bryman & Cramer, 1997). In this research, however, the results for the significance level of $p \leq 0.1$ indicating weaker evidence are also included, as they will add to the understanding of the composition of the clusters, especially from the point of view of a policy maker.

It can be concluded that both the crosstabulation and the ANOVA procedures have advantages and disadvantages. Chapter 7 presents, therefore, the results for both approaches. For example, the ANOVA analysis examines each attribute separately and the results have the ability to quantify the differences between these attributes relating to occupancy performance by calculating their average component scores. The cluster/crosstabulation approach takes full account of the distribution of the attributes across the sample. In contrast to the ANOVA and t-test results, groups with only a small number of establishments, therefore, are less likely to influence the results.

CHAPTER 7

SEASONALITY IN WELSH ROOM OCCUPANCY DATA, 1998-2000

This chapter analyses the seasonal variations in occupancy rates for the serviced accommodation sector in Wales over the period 1998 to 2000. A PCA is applied to the sample of 210 room occupancy time series and it is shown that useful insights into the seasonal variations can be gained by performing this type of analysis also on AMC data. The chapter is divided into six sections. The first section presents the results for the basic PCA and the further refined PCA investigating seasonal variations. The following four components are obtained – occupancy levels, seasonality, length of season, and importance of spring season. The next section gives an overview of the t-test and ANOVA results which examine the association between different accommodation attributes and the occupancy and seasonality performance. Location, price and star rating are three of the main factors taken into consideration. The third section aims to identify different groups of establishments with similar characteristics in terms of their seasonal variations in occupancy. A cluster analysis is used for this purpose. The cluster analysis is firstly performed on the different dimensions separately and secondly on all dimensions simultaneously. In the subsequent section, a summary of the ANOVA and cluster/crosstabulation analysis results is presented, before in section 7.5, attempts are made to interpret the results from a planning and marketing perspective. The final section demonstrates the application of the above identified performance indicators for benchmarking purposes using spider plots as a graphical tool to monitor and assess multiple criteria which relate to the observed demand patterns. All statistical analyses were carried out using the statistical package SPSS.

7.1 The Dimensions of Occupancy Performance

Figure 7-1 shows the overall mean curve for all serviced accommodation establishments in the sample. The curve displays pronounced seasonal variations with room occupancy rates rising each year from a winter trough to a summer high in August, before declining again. The average room rates vary from 20% in the off-peak season to nearly 70% in the peak season. The annual mean is 40.34%.

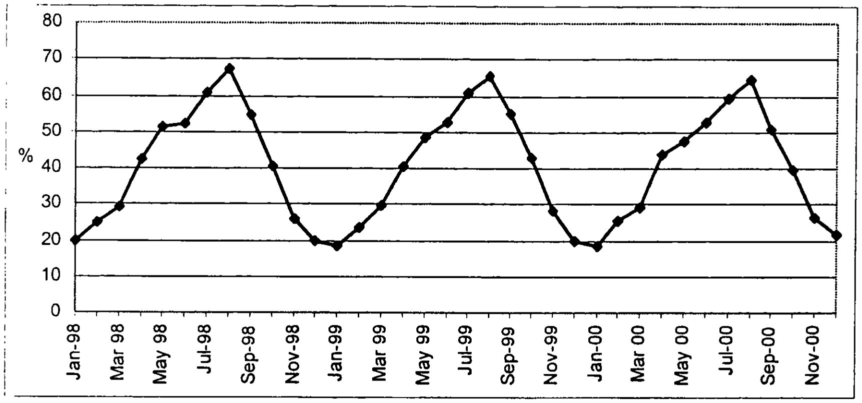


Figure 7-1: Average Room Occupancy for Serviced Accommodation Establishments, *n*=210

The Harris test for homogeneity of variances of correlated variables revealed that the variances of the months differ significantly and thus the correlation matrix was employed for the PCA (W_{RI}=149.73, $p \leq 0.001$). The general accepted convention for rejecting the null-hypothesis is a probability level (*p*-value) of less or equal to 0.05. However, in this research, as most calculation have been carried out using SPSS, the exact probability of a Type I error with three decimal places are reported. The results are significant if the actual probability values are less or equal to 0.05. Prior to performing the PCA, the suitability of the data for the analysis was evaluated. An inspection of the correlation matrix for the 36 variables (months) revealed that most correlation coefficients display a value of 0.4 and above. This means that relationships between the variables exist. The Kaiser-Meyer-Olkin measure exceeds, at 0.965, the recommended value of 0.6 (Kaiser & Rice, 1974) and Bartlett's Test of Sphericity also reached statistical significance ($p \leq 0.001$) (Buehl & Zoefel, 2000). These results indicated that the data set was suitable for the application of a PCA (see table C-2, Appendix C).

The PCA, conducted on a correlation matrix using the raw room occupancy data, revealed two distinct general dimensions, which together explain 74.9% of the overall variance present in the sample of the accommodation establishments. As already mentioned in chapter 6, there are a number of criteria and 'rules of thumb' available which ease the decision process of how many components to retain for subsequent analyses. The first two components obtained by the PCA have an eigenvalue of over 1. The Kaiser criterion therefore suggests that two RCs should be retained. Catell's scree test (Catell, 1966), which effectively identifies a threshold where the information value of further components decreases sharply, also shows a clear break after the second component, and a gradual levelling from component three onwards (see figure C-1, Appendix C). It was therefore decided to keep only the first two components for further investigations.

They can be interpreted as the overall occupancy level and seasonality. Similar components have been consistently identified in the previous studies of hotel occupancy performance referred to earlier. The 25% 'unexplained' variance accounts for any random effects and factors which are unique to individual establishments. Although the 'unexplained' variance might be useful for interpreting an individual establishment's circumstances, it cannot be used as a basis for comparing accommodation occupancy performance of establishments across the sector (Jeffrey & Barden, 2000a).

Figure 7-2 displays the component loadings for the two extracted RCs. The component loadings are represented on the original scale of the variables, i.e. the raw loadings have been multiplied by the associated standard deviations to aid their interpretation (Jackson, 1991). The original component loadings together with the other detailed PCA results are shown in tables C-1 to C-4, Appendix C.

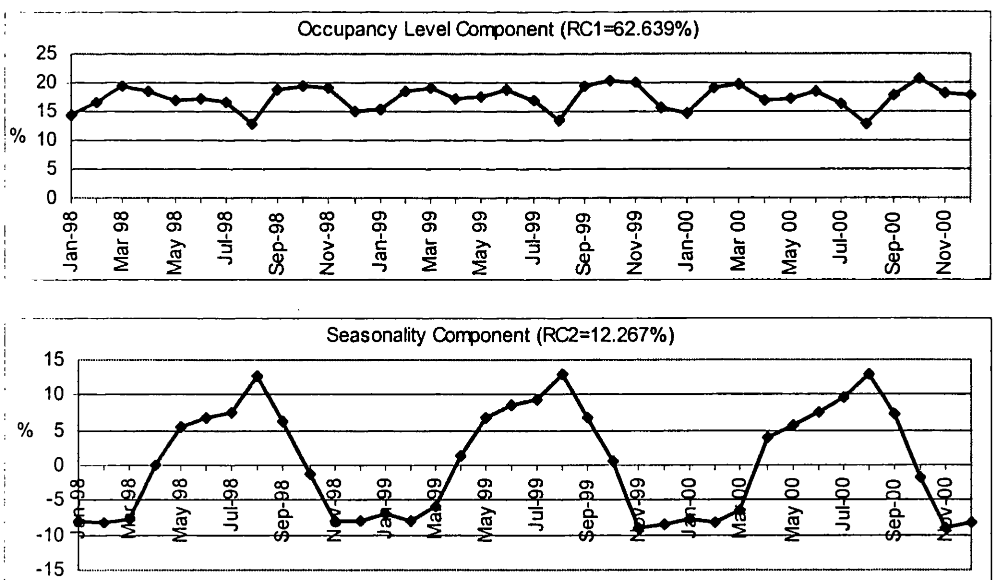


Figure 7-2: Component Loadings for Principal Components Derived from Standard PCA, *n*=210, 1998-2000

The first reference curve (RC1) represents the most common underlying dimension of variability. It accounts for almost 63% of the overall variance and displays only positive component loadings with little variation across the study period. This temporal pattern, as shown in figure 7-2, gives rise to an obvious interpretation as a measure of overall occupancy levels. Individual establishments can be related to this reference curve by calculating their component scores and these can be used to assess their core performance relative to the norm for the sample. Positive component scores indicate a better than standard occupancy level, while negative ones indicate the opposite, and the absolute value of the score reflects the magnitude of the deviation from the norm. A component score of 1, for instance, indicates an average occupancy rate of 57.75%, which is 17.41% higher than the mean. In contrast, an establishment with a component score close to zero, would exhibit an average occupancy rate close to that of the whole sample.

The second component (RC2) explains 12% of the variance and the loadings reflect the pattern of seasonal variations in demand. It effectively shows the differences in occupancy rates between peak and off-peak seasons and, therefore, serves to correct for the seasonal variations present in the sample. The size and sign of the associated component score of an establishment can again be interpreted as a measure of the deviation of its own performance from what is typical for the sample. Positive scores indicate a more pronounced seasonal pattern, whereas negative scores represent a reduced variation in occupancy rates or even a counter-seasonal pattern. A component score of 1 on RC2, for instance, stands for a difference between January and August occupancy rates which is 20.43% higher than the average difference of 46.76%. It should be borne in mind that the RCs are independent. A high negative component score, which would indicate low seasonal variation, might therefore not in itself be desirable from a manager's point of view, as it does not necessarily imply high occupancy.

In order to focus more clearly on the seasonal variations, the PCA was also applied to the AMC data set (annual mean corrected data). This modification to the data will amplify the monthly fluctuations present in the observations and it is, therefore, not surprising that when a PCA is applied to the adjusted data it leads to a large number of separate components (see tables C-5 to C-7, Appendix C). The Kaiser criterion or the 'eigenvalue greater than one rule' would suggest retaining eight RCs. However, a detailed analysis of the results reveals that most of the components do not contribute significantly to the explanation of the variance. Catell's scree graph indicates clearly that only the first three dimensions are of significance. In other words, the subsequent components fail to reveal any marked annual patterns of common variance (see figure C-2, Appendix C).

The three dimensions retained explain 45.2% of the variation in the AMC data, and the component loadings re-expressed in terms of their original variables are shown in figure 7-3. It should be borne in mind that RC1 from the basic PCA analysis accounts for almost 63% of the variation in the raw data and that this difference between the establishments has already been removed from the data. The three dimensions identified can be used to distinguish establishments according to their seasonal variation, length of season and occupancy level in the spring.

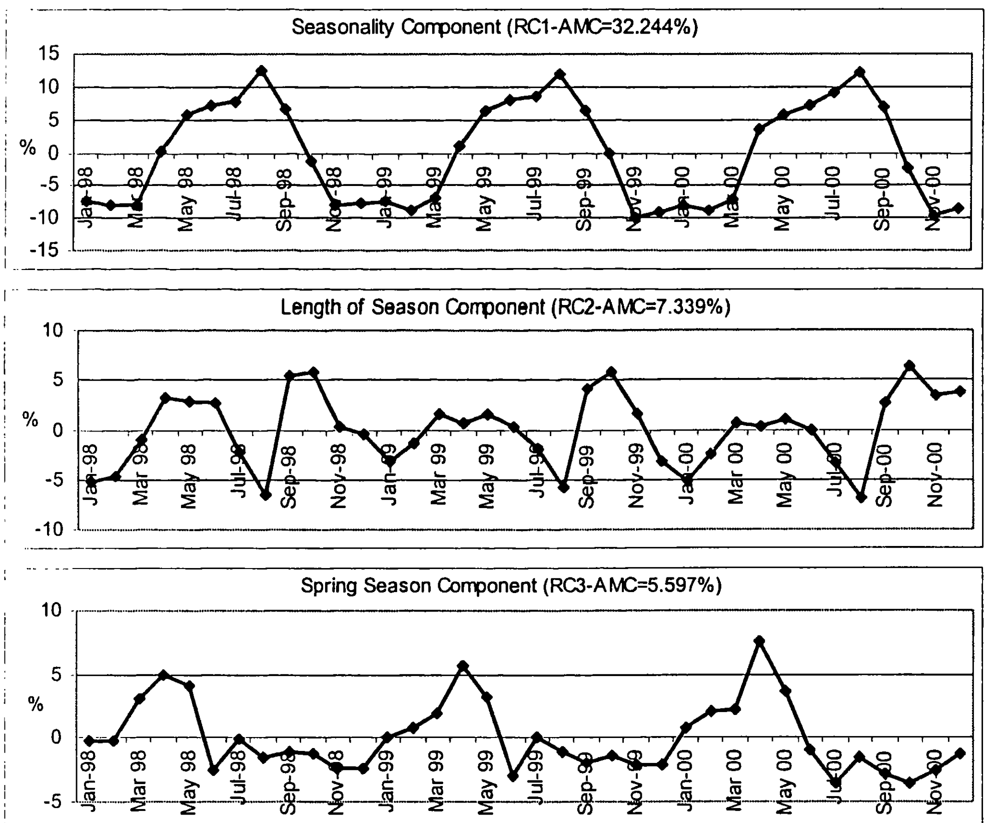


Figure 7-3: Component Loadings for Principal Components Derived from AMC Data, *n*=210, 1998-2000

The first reference curve derived from the annual mean corrected data (RC1-AMC), accounts for 33% of the variation between establishments. It is characterised by high positive loadings from May to September, with a pronounced peak in August, and negative loadings from November to March. The loadings trace much the same pattern as the second RC of the basic analysis and reflect the intensity and characteristics of fluctuations between the peak season in the summer months and the off-peak season in the winter. It should be noted that the original component loadings derived from the PCA on AMC data as shown in table C-7, Appendix C display reverse signs with positive loadings in the off-peak season and negative loadings in the peak season. As the sign of any RC is completely arbitrary, it is possible to reverse the sign of the component loadings, and hence the component scores for each establishment. This will not change the variance of the RC or its orthogonality with the other extracted RCs and, thus, the interpretation of the dimensions remains the same (Jolliffe, 2002). This is applied here to RC1-AMC to ease the interpretation of the results and to make comparisons with RC2 of the standard PCA easier. As both RC2 from the basic analysis and RC1-AMC contain essentially the same information, only the latter will be used in the subsequent analyses. It should, however, be pointed out that the reference curve only relates to deviations from the mean and that the mean curve itself (cf. figure 7-1) displays a considerable degree of variation. It cannot be concluded, therefore, that a component score of 0 implies the complete absence of seasonality. A closer examination of the relative magnitude of the different effects reveals that this is the case only for establishments with a very high negative score (of around –2.0). A high positive component score, on the other hand, indicates a much larger than average difference between low and high season figures. A component score of 1 on RC1-AMC, for example, reflects a difference in occupancy rates of 66.5% between January and August, which is 19.74% higher than the average difference between peak and off-peak seasons of 46.76%.

The second reference curve (RC2-AMC) explains around 7% of the total variance in the AMC data. It is characterised by two peaks, one in the spring and one in the autumn, but the importance of the spring peak diminishes during the study period. RC2-AMC can therefore be interpreted as an indicator of the length of the summer peak season. For accommodation establishments with a high positive component score on this dimension, the spring and, more particularly, the autumn shoulder months have a higher than average significance. Negative scores indicate a shorter and more intense summer peak. For an establishment with a component score of 1, the average difference from the mean in May/June (50.78%) is 1.37% and from the mean in September/October (47.23%) is 5.01%.

The final significant component (RC3-AMC) accounts for almost 6% of the total variance. It complements the information which can be gained from the second RC in that it reflects the importance of the spring season as a separate factor. Establishments with a component score of 1 on RC3-AMC had a 4.84% higher average occupancy rate for April/May, for instance, than the average rate of the whole sample in these two months, which is 45.54%. The graph suggests that there is an increasing trend in the loadings, i.e. that for establishments with a positive score on this curve the significance of the spring season has increased over the three years concerned. However, the higher value for April 2000 may also be explained by straightforward calendar effects, as Easter and the first May bank holiday were unusually close together in that year. Equally, the high January 2000 figure may be largely due to the Year 2000 celebrations. In what follows the apparent trend is, therefore, not used as a basis for the interpretation of component scores.

It should be noted that the PCA was also performed on a covariance matrix for the data set of 210 establishments and the three-year period 1998-2000. All components obtained from the basic PCA (RC1 to RC2) and the PCA on the AMC data (RC1-AMC and RC3-AMC) are very similar in their shape and the amounts of variance explained. The results are displayed in tables C-11 to C-15 and figures C-9 and C-10, Appendix C. The component scores of the individual establishments obtained for each RC also show only slight variations compared with those obtained from the PCA results on the correlation matrix. The results from the subsequent t-test/ANOVA and cluster/crosstabulation analyses led consequently to the same conclusions. Therefore only the results for the component scores obtained from the PCA on the correlation matrix are presented in this chapter.

The RCs identified above reflect most of the common variance on which direct comparisons between establishments can be based. As has already been pointed out, component scores on each of the RCs can be looked upon as performance indicators for individual establishments. More importantly, they measure precisely the kind of performance dimensions which policy makers at the level of a tourist board or a trade association are likely to be interested in. They allow not only for a qualitative comparison between establishments or groups of establishments, but also permit a full quantification of the differences in the various performance patterns. Also, of course, since they compare performance to the overall average, these measures – unlike their own profit and cost information – are not available to individual establishments.

Before these component scores or performance indicators can be used to examine the association between particular attributes and the overall occupancy performance or to group establishments with similar demand patterns, they have to be examined for possible outliers and tested for normal distribution. A closer inspection of the obtained component scores revealed a number of outliers or extreme cases in the data set. Boxplots are used to identify the individual establishments with extreme positive or negative scores on either of the RCs (see figures C-3 and C-4, Appendix C). For the first dimension, the 'occupancy level', no businesses were found to have extreme component scores. The boxplot for the 'seasonality component' revealed 2 establishments with component scores well above the average and thus severe seasonality. For the 'length of season' dimension 9 establishments and for the 'spring season' component 8 establishments were identified as outliers. The average component scores for these outliers are displayed in tables C-8 and C-9, Appendix C. These businesses are excluded from the subsequent ANOVA and cluster analyses but are examined separately where appropriate. To test whether the obtained component scores on the different dimensions are distributed normally within the data set, P-P plots were analysed and the Kolmogorov-Smirnov test was applied (see figures C-5 to C-8, table C-10, Appendix C). The P-P plots show clearly that the component scores for all dimensions are normally distributed. The Kolmogorov-Smirnov test displays for all component scores large p values ($p>0.05$) which indicate that the observed distribution corresponds to the theoretical normal distribution. Thus, procedures which assume normality can be employed for analysing the component scores on all obtained dimensions.

7.2 Association between Attributes and Occupancy Performance - ANOVA

The obvious question is how these performance indicators are linked to various characteristics of the businesses involved. A straightforward way of exploring such links is to investigate the effects of key attributes of establishments on each of the dimensions identified by the PCA. In other words, it is possible to look at the association between the type of establishment – e.g. hotels vs. B&Bs or guesthouses vs. farmhouses – and the intensity of seasonal fluctuations or the length of the season. A complete ANOVA analysis and t-tests along these lines were conducted but only the significant results are presented here.

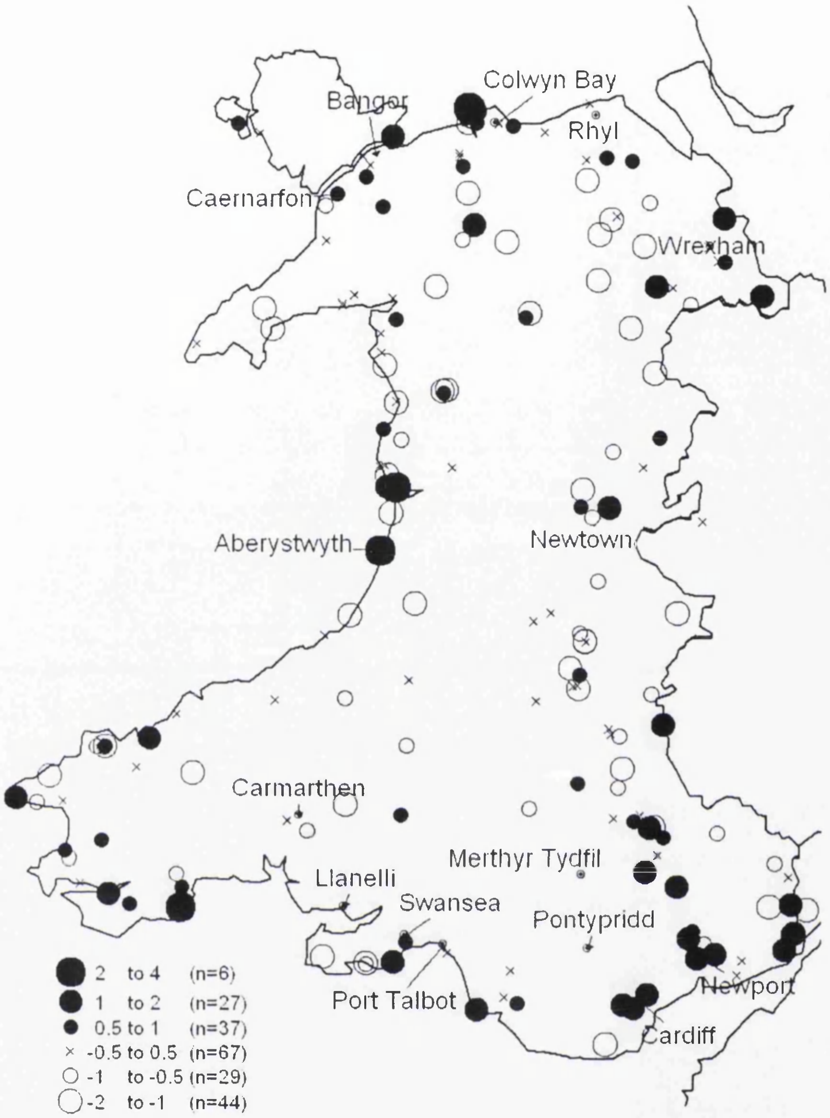


Figure 7-4: Geographical Distribution of RC1 Component Scores for Occupancy Performance

Figure 7-4 shows the geographical distribution of the RC1 component scores. For ease of presentation, the establishments are grouped into six categories as indicated in the legend. (The ranges chosen correspond to those used by Jeffrey and Barden (2000a) and, therefore, allow for a direct comparison with the diagrams presented there.) Whilst a third of all businesses involved have component scores close to zero, there are sizeable groups at both ends of the scale. An accumulation of establishments with high positive scores can be detected in the South East of Wales in areas around Cardiff and

Newport. Whilst there are a number of notable exceptions, the majority of establishments with negative component scores, and therefore an occupancy performance below the national mean, are located in Mid and North Wales.

The WTB divides the country into 12 holiday regions. As mentioned in chapter 6, for this research these 12 holiday regions have been aggregated to five to ease the interpretation (see figures B-4 and B-5, Appendix B). The ANOVA of RC1 scores confirms that there is a reasonably significant difference between the occupancy performance in different holiday regions – especially between Mid Wales/Brecon Beacons with an average occupancy rate of 36% and the region including Swansea, the Valleys, Cardiff and the Wye Valley with a mean of 47% (p=0.08). The latter region, of course, has a considerably higher concentration of large conurbations. The ANOVA results show also a significant difference between countryside locations, with lower than average occupancy rates, and businesses located in a city/small town or at the seaside ($p \leq 0.001$). The analysis of the further refined location variable with 7 groups revealed a significant difference especially between establishments located at a seaside town with an average occupancy rate of 47% and establishments in the countryside close to the sea with an average occupancy rate of only 34% (p=0.003).

The 210 establishments in the sample comprise 99 hotels, 47 guesthouses, 33 B&Bs and 31 farmhouses. RC1 scores effectively represent a refined mean occupancy level and an analysis by type of establishment reveals a considerable – and statistically highly significant – disparity between the 99 hotels, with an average occupancy of nearly 50%, and the remaining 111 non-hotel establishments, with an average figure of 33% (t-test, $p \leq 0.001$). Whilst the existence of this gap might not in itself be surprising, the size of the difference perhaps is. However, there are considerable differences between the various types of establishments within the non-hotel sector. B&Bs, for instance, achieve average occupancy rates of only 29%, whereas guesthouses have an average occupancy rate of 38%, i.e. a value much closer to the overall national mean. The ANOVA shows this difference to be significant at the 99.999% level ($p \leq 0.001$). Farmhouses lie in between these extremes, operating at an average occupancy rate of 30%. It is interesting to note that there are significant differences between the regions in some of the categories. Guesthouses located in the South East of Wales, for example, have occupancy rates of around 50%, and therefore come close to those of hotels, but those in the North only record occupancy rates at around 29% (ANOVA, p=0.039). An analysis of the association between the location and the occupancy level in the hotel sector shows that the average rates in the four regions are very similar and any differences are not statistically significant.

As mentioned above location can, of course, also be categorised with respect to other attributes, e.g. whether the establishment is situated at the seaside, in a city/town or in the countryside. Again, the differences for hotels are relatively small and not significant, but for the non-hotel sector a different picture emerges. Table 7-1 shows the Average Component Scores (ACS) on RC1 and the equivalent occupancy means for the different categories. It should be noted that the average occupancy rates in table 7-1 were calculated on the basis of the ACS. A comparison with the original average occupancy rates shows that the results are very similar. At only 30%, countryside guesthouses/B&Bs have the lowest occupancy mean.

	Hotel Sector			Non-Hotel Sector		
Location	Seaside	City/Town	Countryside	Seaside	City/Town	Countryside
n	45	16	38	24	14	73
ACS on RC1	0.440	0.717	0.374	–0.105	–0.168	–0.588
Occupancy Mean	48.0%	52.8%	46.8%	40.2%	37.4%	30.1%

Table 7-1: Average Occupancy Rates and ACS for Different Types of Establishments and Location

Other characteristics of an establishment such as price per night, number of rooms and its star grading are also linked to occupancy rates. The Pearson correlation coefficient between price, defined as the rack rate per person in a double room, and occupancy performance points towards a positive relationship – the value is 0.438 (p=0.01). The ANOVA revealed significant differences between establishments in the tariff group with prices of up to £24 (average room occupancy rate of 30%) and establishments in all other tariff groups. It is not surprising that the average occupancy rates are highest for the establishments in the tariff groups £45-£54 and over £55 (average room occupancy rates are over 50%).

The WTB grading system rates serviced accommodation according to the quality and the condition of facilities and services provided. The emphasis is on the atmosphere, ambience, guest care and the attention to detail (WTB, 2003e). The number of rooms and the WTB star grading are also important factors for the occupancy performance of establishments. The respective Pearson correlation coefficients are 0.42 and 0.23. Both values are significant at the 99% level. This indicates to a positive linear relationship with higher average occupancy rates the bigger the establishment is or the more stars the establishment is awarded. The ANOVA post-hoc test Tukey HSD reveals a significant difference between establishments with up to 10 rooms and those which have more than 11 rooms ($p \leq 0.001$). This indicates that B&Bs, guesthouses and farmhouses, but also small hotels display considerably lower average occupancy rates compared with medium-sized or large hotels. In terms of the association between the star rating and the occupancy performance, a significant difference can be observed between establishments with 4 or 5 stars and all other establishments. The former achieve an average rate of 50.3%, against a figure, for example, of only 39.9% for 3-star establishments.

To provide a more comprehensive picture, the additional variables acquired from web pages and brochures regarding facilities and special offers available at the establishments were also tested relating to differences in occupancy performance. It is interesting to note that establishments which do not provide any information on web pages or in one of the WTB brochures have significantly lower occupancy means than those establishments which use these media to advertise (t-test, $p \leq 0.001$ for web information and $p=0.021$ for WTB brochure). The t-test also confirmed significant differences between establishments with conference facilities, licensed to hold weddings, gym/pool/sauna, tennis/croquet or golf/putting green facilities which display higher occupancy rates than those which do not have such facilities. The average occupancy performance was also significantly higher for establishments which offer special breaks, such as champagne breaks, special out of season prices, Christmas or Easter specials and advertise activities nearby, such as walking or golf.

The geographical distribution of component scores on RC2 (not shown here) reveals a striking dichotomy between east and west. The majority of seaside establishments located in the western half of Wales have high positive scores on RC2 – and therefore experience pronounced seasonality – whereas accommodation businesses with high negative scores on RC2 can be found mostly in city/towns on the South East coast around Cardiff, Newport, Bridgend and along the English border. Component scores on RC2 provide only a very broad indication of the existence and intensity of seasonal variations. With only a single value it is difficult to differentiate in a meaningful way between the range of qualitatively quite different patterns which exist in the data. In particular, the relative importance of the spring and autumn shoulder seasons for the various categories of establishments cannot be determined. Moreover, with only one component score it is not possible to assess changes in seasonal patterns which might have occurred for some establishments during the study period. As the success of marketing instruments for extending the season is highly dependent on the 'right' identification of 'seasonality problems' for certain regions, areas or businesses, the analysis for the AMC data provide more detailed results of fluctuations over the year and are therefore primarily used in this research.

The geographical distribution of component scores on RC1-AMC is presented in figure 7-5. It should be noted that the component scores for all 210 establishments are displayed in figure 7-5 but that for the ANOVA and t-test analyses the outliers on RC1-AMC were excluded. Consequently, only 208 establishments were included in the following analyses. Figure 7-5 shows a significant difference between establishments located in the eastern part of Wales, which have mostly negative component scores, and those on the west coast with high positive scores. These results are fully in line with those obtained from RC2 in the earlier basic analysis. The WTB divides the country into the four regions North, Mid, South East and South West. An ANOVA reveals that there are particularly pronounced differences between the South East and the South West, with the ACS of –0.51 and 0.58, respectively ($p \leq 0.001$). The ANOVA also confirmed a significant difference between establishments in the holiday regions Anglesey/ Snowdonia (ACS=0.49) and Ceredigion/Pembrokeshire/Carmarthenshire (ACS=0.43) which display much higher seasonal variations than all other holiday regions. The lowest seasonal fluctuations can be found in the holiday region Swansea/Valleys/ Cardiff/Wye Valley with an ACS of –0.64 ($p \leq 0.001$).

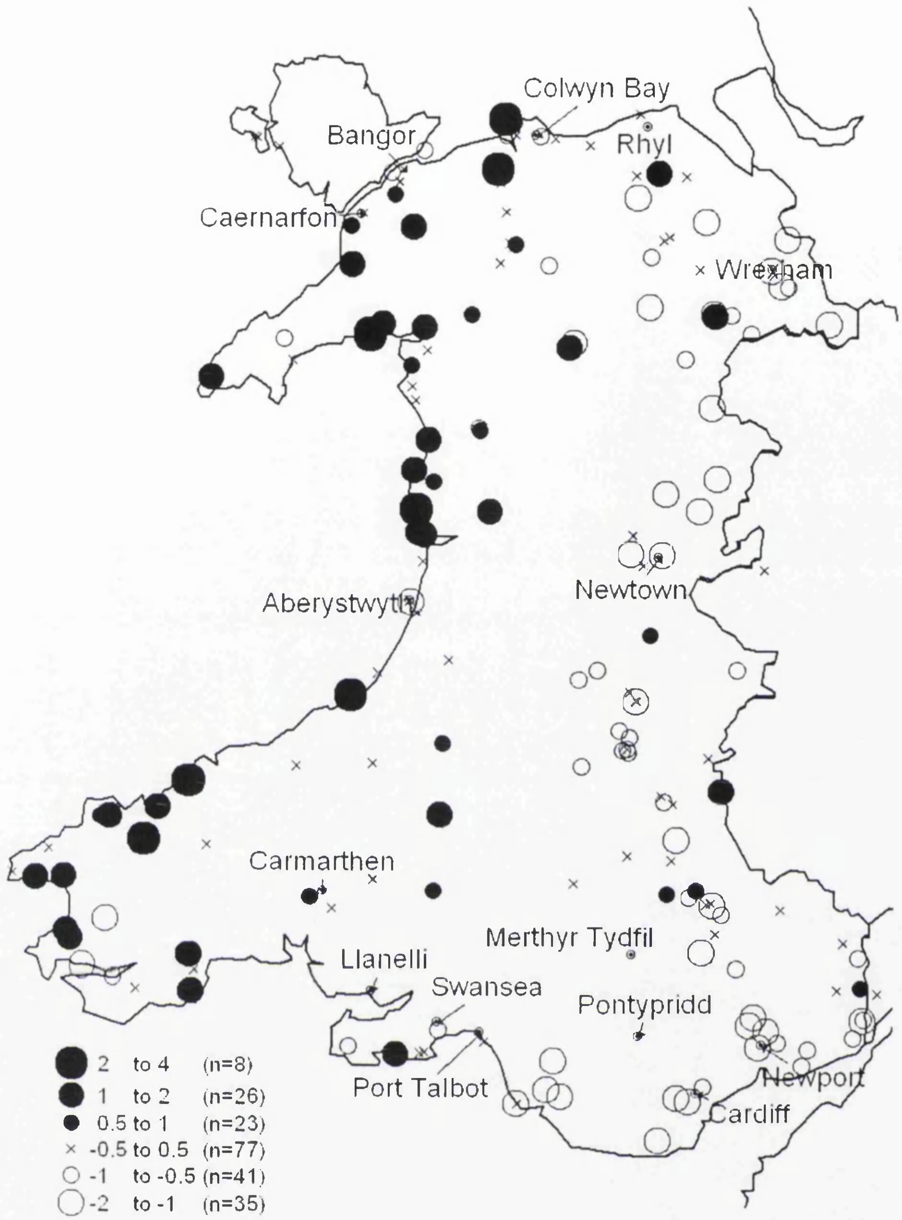


Figure 7-5: Geographical Distribution of RC1-AMC Component Scores for Seasonality

A comparison between seaside, city/town and countryside locations shows considerably different seasonal patterns (ANOVA, $p \leq 0.001$). Accommodation businesses situated in a city or small town have the largest negative score (ACS=–0.57) and are therefore the least seasonal. Seaside establishments experience the highest degree of seasonal variation with an ACS of 0.29, whilst for countryside locations the ACS is close to zero with an ACS of –0.08. These findings are not surprising, as they, at least partly, reflect the west-east split already referred to above. The majority of establishments in seaside locations can, of course, be found in the western half of the country, whilst most cities and small towns are located in the eastern half. What is more interesting is the fact that establishments in city/town locations, on average, have the largest negative scores irrespective of the region in which they are situated. Whilst, as has been pointed out, the South West overall experiences large seasonal fluctuations in demand, city/town locations in this region still produce negative average scores. A more detailed analysis of the location for all enterprises revealed that establishments situated in a 'pure' seaside location exhibit the highest seasonality with an ACS of 0.65, whilst establishments in a town at the seaside have an ACS of only 0.06. The ANOVA confirmed a significant difference between 'pure' town locations with an ACS of –0.57 and the above mentioned 'pure' seaside location and also the countryside near the sea locations with an ACS of 0.22 ($p \leq 0.001$).

One might expect hotels to experience a less pronounced seasonal variation in occupancy rates than other categories of establishments. The t-test confirms a significant difference between the seasonality in the hotel and non-hotel sectors, with the former displaying an ACS of –0.268 and the latter an ACS of 0.188 ($p \leq 0.001$). A further breakdown of the non-hotel category reveals that farmhouses and guesthouses have the highest seasonal variation – the ACS on RC1-AMC are 0.377 and 0.234, respectively – while for B&Bs, with an ACS of –0.051, the pattern is considerably less seasonal. The ANOVA also confirmed significant differences between city/town hotels with an ACS of –0.73 and countryside hotels with an ACS of –0.46 in comparison to seaside non-hotels, in particular, with an ACS of 0.78 ($p \leq 0.001$). It is also worth noting that city/town hotels display a similar average component score on RC1-AMC as city/town B&Bs (ACS=–0.73 and –0.65, respectively), whereas city/town guesthouses show a much higher score (ACS=–0.25) and therefore a more pronounced seasonal concentration.

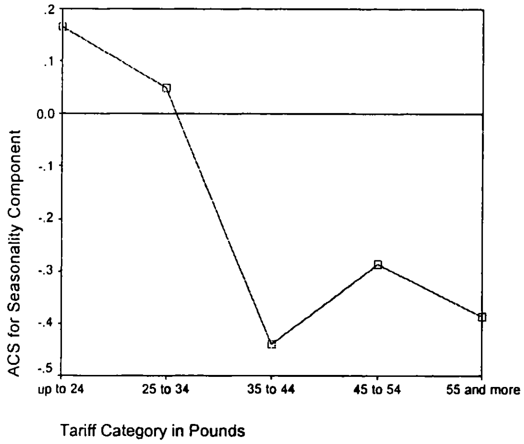


Figure 7-6: ACS on Seasonality Component (RC1-AMC) by Tariff Group

There are pronounced differences between establishments charging different prices per person per night for a double room. Figure 7-6 displays the ACS on the seasonality component for different tariff categories. It can clearly be seen that establishments in the lower tariff categories with prices of up to £24 display the highest seasonality in comparison to the other categories. It is particularly interesting to note that it is not the most expensive establishments but those charging prices between £35 and £44 which experience the lowest seasonal variations (ACS=–0.44). The graph also suggests that there is a qualitative difference between businesses which charge prices up to £24 and those which charge between £35 and £44. An ANOVA confirmed the differences to be highly significant (p=0.01).

The size of the establishments also is significantly linked with the intensity of seasonal variations. As most establishments in the non-hotel sector are, of course, relatively small, it is more appropriate to examine the effects of size only in the hotel sector. An ANOVA (p=0.009) revealed considerable differences between hotels with 4 to 10 rooms (ACS=0.23) and those with 11 to 25 rooms (ACS=–0.52). It should be pointed out that hotels with more than 50 rooms experience a slightly higher degree of seasonality (ACS=–0.29). With respect to the WTB star grading, it is particularly interesting to note that the ANOVA confirmed a significant difference between 3-star non-hotels, with an ACS of 0.39 and thus a higher seasonality, than ungraded and 1-star non-hotels, with an ACS of –0.38 and thus lower seasonal variations (p=0.01). The t-test also revealed significant differences between establishments that have conference facilities ($p \leq 0.001$), are licensed to hold weddings ($p \leq 0.001$), have gym/pool/sauna facilities (p=0.003) or golf facilities (p=0.021), which display significant lower seasonal fluctuations than those which do not. It should be noted that businesses offering special breaks also experience slightly lower seasonality (p=0.007).

Complete analyses were also carried out for the component scores on the other two RCs of figure 7-3. Only the most interesting results are quoted here. It has to be borne in mind that only 201 establishments are included in the analysis of the component scores on the length of season dimension, as nine outliers were excluded. The geographical distribution of scores on RC2-AMC shows groups with high positive scores in the North East, on the coast near Aberystwyth and in the Cardiff/Newport area. Establishments in these regions, therefore, have been most successful in the shoulder seasons. Those with large negative component scores, and thus an intense and sharp summer peak, are concentrated mainly in the South West. The ANOVA confirmed significant differences between establishments located in the South West with an ACS of –0.47 and those in the North with an ACS of 0.24 (p=0.004). An analysis by aggregated holiday areas shows that businesses in the area of Ceredigion/Pembrokeshire/Carmarthenshire have sharp summer peaks (ACS=–0.45) whilst establishments in Llandudno/North Wales Borderland and in Anglesey/Snowdonia exhibit a slightly longer season (ACS=0.256 and 0.150 respectively; ANOVA, p=0.004). The ANOVA also confirmed significant differences between establishments in different locations (p=0.041). Businesses at 'pure' seaside locations display a sharp summer season (ACS=–0.32) whilst establishments in seaside towns have a longer season (ACS=0.26).

Hotels are generally more successful in lengthening their season into the shoulder months than guesthouses and B&Bs. The ACS values are 0.36 for hotels and –0.32 for the non-hotel sector (t-test, $p \leq 0.001$). Within the latter category farmhouses and B&Bs have the highest negative scores with an ACS of –0.50 and –0.43, respectively. Amongst the hotels there is a profound difference between those located in the South West (ACS=–0.16) with no extended season, and the rest of Wales (ANOVA, p=0.025). It is interesting to note that hotels in the North have the highest ACS (at 0.56). Price is an important factor in as far as establishments which charge up to £24 (ACS=–0.41) experience a pronounced summer peak and those which charge between £45 and £55 (ACS=0.72) are most successful in generating business outside the summer season (ANOVA, $p \leq 0.001$). As to the size of establishments, hotels with 11 to 25 rooms

(ACS=0.38) and hotels with over 50 rooms are doing particularly well in the shoulder months (ACS=0.88). An ANOVA confirmed that differences between those establishments and businesses with up to 10 rooms are significant ($p \leq 0.001$). An interesting finding with respect to the WTB star grading is the fact that it is not the 4- or 5-star hotels which have the highest occupancy rates in the shoulder seasons, but those with 3 stars (the ACS values are 0.45 and 0.59, respectively). The ANOVA also confirmed a significant difference between ungraded and 1-star hotels (ACS=–0.39) and the above mentioned hotels with 3 stars and more ($p=0.004$). The t-test results show that establishments with conference facilities (ACS=0.41), which are licensed to hold weddings (ACS=0.35) or have gym/pool/sauna facilities (ACS=0.39) have significantly higher component scores and thus a longer season than businesses that do not provide these facilities ($p \leq 0.05$). Furthermore, accommodation establishments which do not advertise on the Internet have a sharper summer season (ACS=–0.45, $p=0.003$). It is not surprising that businesses offering special breaks (ACS=0.27), special prices for longer stays (ACS=0.35), out of season prices (ACS=0.36) or Christmas/New Year/Easter specials (ACS=0.35) display an extended summer season ($p \leq 0.05$).

As has already been discussed, the component scores on the third RC provide information about the importance of the spring season. In the following analyses 202 establishments were included as 8 outliers had to be excluded due to extreme scores on the spring component. It has to be borne in mind, however, that the scores on RC3-AMC cannot *per se* be interpreted as an indication of occupancy figures in the spring, but must be looked at in conjunction with scores on the other RCs. More precisely, high scores on RC3-AMC equate to relatively high occupancy rates in the spring, whereas low scores mean low spring occupancy figures *only* if the score on RC2-AMC is also low. In terms of the geographical distribution, the only apparent accumulation of establishments with high scores is located east of Merthyr Tydfil. For hotels the geographical region is not a significant factor, but for the non-hotel sector it is of some importance. The ACS for non-hotels in the South East, for instance, is 0.29, whereas for those in the South West it is only –0.43 (ANOVA, $p=0.06$). Whether the accommodation business is situated at the seaside, in a city/town or the countryside is also significantly related to the importance of the spring season. The ANOVA confirmed a significant difference between establishments located in the 'pure' countryside with an ACS of 0.2 and thus a pronounced spring season and businesses located in a 'pure' city or town with an ACS of –0.36 (ANOVA for location variable with 7 groups, p=0.04).

Furthermore, there are no significant differences between hotels and non-hotels, or between B&Bs, guesthouses and farmhouses relating to the importance of the spring season. As far as price is concerned, businesses charging £25-£34 reach the highest ACS (of 0.26) whilst establishments charging £55 and more display the lowest ACS (of –0.41). This difference was confirmed to be significant by ANOVA (p=0.024). The link between the size is similar to that of price in that medium-sized establishments with 11 to 25 rooms have the highest scores and thus a pronounced spring season (ACS=0.21) whilst businesses with 26 to 50 rooms (ACS=–0.29) and businesses with 51 rooms and more (ACS=–0.75) display much lower scores ($p\leq0.001$). Virtually all of these are, of course, hotels. The t-test results indicate that establishments with conference facilities (ACS=–0.26), licensed to hold weddings (ACS=–0.37) or gym/pool/sauna facilities (ACS=–0.35) display significantly lower scores than the other businesses in the sample ($p\leq0.05$). It is also interesting to note that businesses offering special out of season prices (ACS=–0.26) or Christmas/New Year/Easter specials (ACS=–0.44) have lower scores ($p\leq0.05$). A detailed analysis showed that these establishments already reached higher scores on RC2-AMC. This points towards the fact that the spring season alone is not of importance for these businesses, but that the autumn is also important.

7.3 Performance-Based Segmentation

7.3.1 Separate Consideration of Performance Dimensions

The analysis presented so far has considered the effects of several attributes of establishments on each of the major dimensions of performance identified by the PCA. Another possible approach is to reverse the perspective, i.e. in a first step, to group establishments with similar performance profiles, for example, in relation to their seasonal variations, and in a second step, to attempt to identify significant differences in the key attributes of the establishments for those groups. As mentioned in chapter 6, cluster analysis and the examination of crosstables can be used for accomplishing this task. This approach has the advantage that by identifying groups of establishments and their attributes whose performance profiles differ substantially from the sample average, pointers are produced for guiding development and marketing policies aimed at tackling seasonality. It should be noted, that in the contingency-table analyses presented throughout this research adjacent rows and/or columns were not combined and thus the original number of clusters was always tested against each of the attribute groups.

Four separate analyses were carried out: one in relation to the component scores on RC1 and one for each of the three reference curves obtained from the AMC data, i.e. RC1-AMC, RC2-AMC and RC3-AMC. The initial clustering technique applied was Ward's method to set the number of clusters and to identify the initial cluster seeds. These cluster seeds were then used as input for the K-means technique. Ward's method suggested a two, three or four cluster solution for the analyses carried out on each performance dimension separately, with the agglomeration coefficients showing the largest increases in going from a two to one cluster solution. The number of clusters was set at three, the rationale being that this was likely to lead to clusters with scores above, below and close to the national average. In this way it was possible to identify differences between the establishments scoring higher and lower than the average. As was expected, for each performance dimension, clusters of establishments with high positive and high negative scores as well as a cluster with scores close to zero were obtained. The latter is not explicitly considered below in the subsequent crosstabulation analyses and, generally, only results found to be statistically significant (at levels of p=0.001, p=0.01, p=0.05 or p=0.1) are referred to. To check the validity of the cluster solutions for all separate analyses, a second non-hierarchical cluster analysis (K-means) was applied but this time using randomly selected initial seed points instead of the cluster seeds obtained from the Ward's method used before as input for the K-means approach (Hair *et al.*, 1995). The results confirmed the consistency of the cluster solutions obtained from the first analyses, as the cluster sizes and the cluster centroids were very similar. According to Hair *et al.* (1995), it can therefore be concluded that 'true' differences do exist between accommodation establishments in terms of their occupancy performance.

Occupancy Level Clusters

The cluster analysis applied to the performance indicators on RC1 groups establishments with similar overall occupancy levels. The analysis includes all 210 establishments as no outliers were identified. Figure 7-7 displays the average room occupancy rates for each of the obtained clusters as well as the mean for the whole sample. The 'high occupancy' cluster consists of 70 establishments. They have an average rate of 60.09%, which is 19.75% higher than the average for the whole sample. The majority of this cluster are hotels (n=51, $p \le 0.01$). More specifically, of all city/town hotels in the sample a significant accumulation can be found in the 'high occupancy' cluster ($p \le 0.05$). It is interesting to note that 12 guesthouses are also part of the cluster. Nearly 30% of all establishments in this cluster are located in a seaside town, the majority being hotels ($p \le 0.1$).

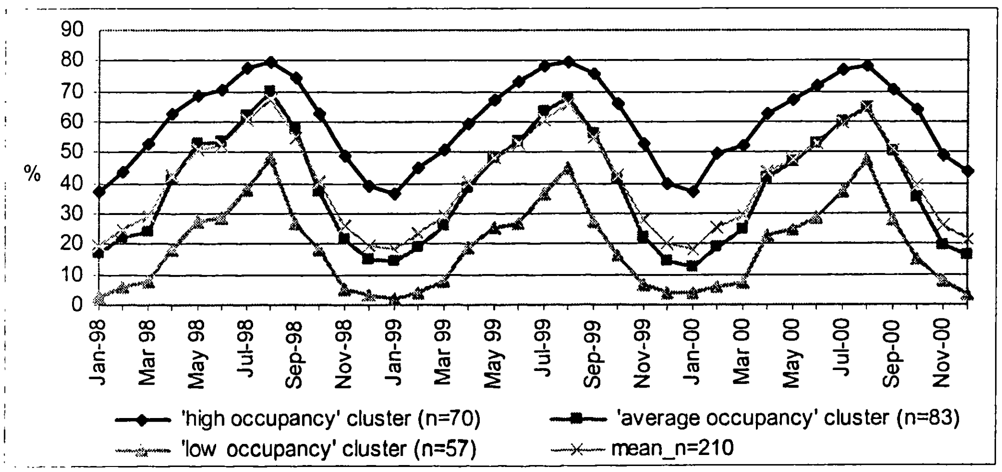


Figure 7-7: Average Occupancy Rates of Occupancy Level Clusters

Figure 7-8 shows the geographical distribution of the occupancy clusters. The Wales Tourist Board (WTB) divides the country into four regions: North, Mid, South East and South West. An accumulation of establishments with high occupancy levels can be detected in the South East of Wales, particularly in the aggregated holiday region around Swansea/Valleys/Cardiff/Wye Valley ($p \le 0.1$). Nearly 20% of the 'high occupancy' hotels have more than 50 rooms ($p \le 0.01$) and a quarter of the 'high occupancy' hotels are smaller with 11-25 rooms ($p \le 0.05$). Over 20% of the cluster have 4 or 5 WTB stars ($p \le 0.1$). Several tests confirmed that there is a positive relationship between the price, defined as the rack rate per person in a double room, and occupancy levels. A significant proportion of establishments charging prices between £35 and £44 ($p \le 0.05$) and £45 and £54 ($p \le 0.01$) can thus be found in the 'high occupancy' cluster.

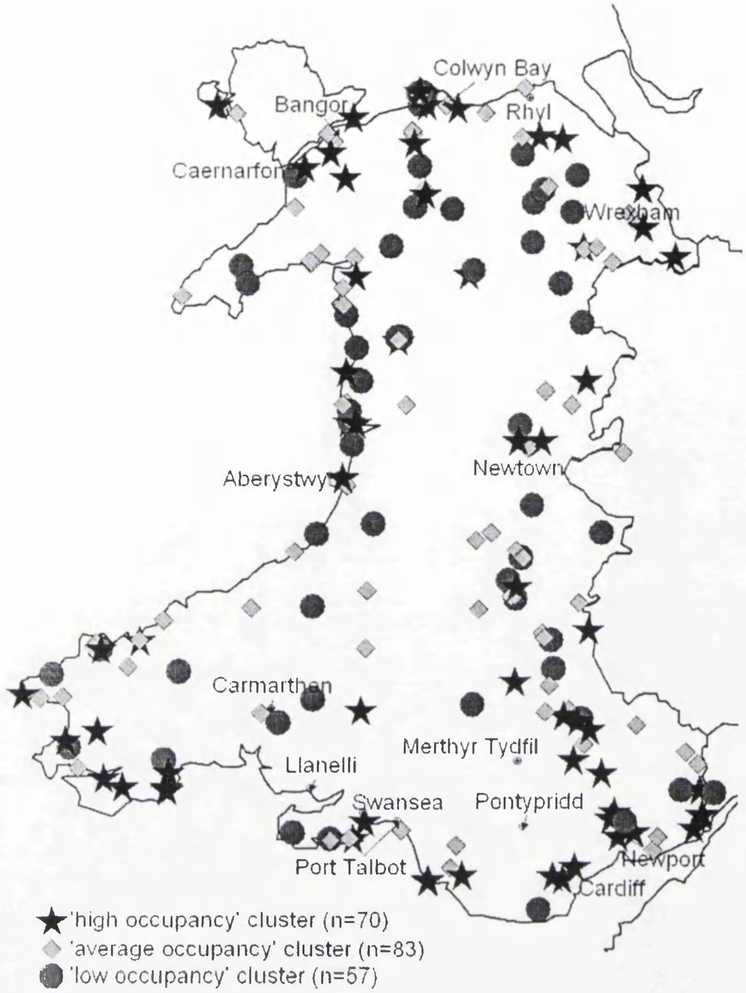


Figure 7-8: Geographical Distribution of Occupancy Clusters

As mentioned in chapter 6, additional information was acquired from web pages and brochures regarding facilities and special offers available at the establishments to provide a more comprehensive picture. The majority of the establishments in the 'high occupancy' cluster provide conference facilities ($p \leq 0.001$) and a significant number offer leisure facilities, such as a gym, pool, sauna, or solarium ($p \leq 0.01$). Nearly a third of the hotels in the cluster have a license to hold weddings ($p \leq 0.01$), which might be useful for additional business outside the main holiday season. Over half of all 'high occupancy' establishments offer some kind of special short break, such as golf weekends, theatre breaks, theme breaks, escape packages, romantic specials etc. ($p \leq 0.01$). Special out of season prices – such as for bargain breaks, Welsh winter warmer breaks, autumn champagne breaks, or other seasonal discounts – are advertised by 44% of the establishments in this group ($p \leq 0.01$). Furthermore, 60% of the 'high occupancy' cluster offer special prices for longer stays, such as three nights for the price of two or seven nights for the price of four ($p \leq 0.1$) and nearly 20% have specials at Christmas/New Year or Easter ($p \leq 0.01$). Even though only a small number of establishments (just above 10% of the sample) were not represented on the internet with either their own web site or on more general accommodation web pages, it is interesting to note that 97.1% of the 'high occupancy' establishments did provide information on the internet.

The 'low occupancy' cluster consists of 57 establishments. They reach an average rate of only 18.96%, which is 21.38% lower than the sample mean. Over 80% of the businesses in this cluster belong to the non-hotel sector, with a significant proportion accounted for by B&Bs ($p \leq 0.01$) and farmhouses ($p \leq 0.05$). Figure 7-8 shows that, whilst there are a number of notable exceptions, the majority of establishments with levels below the national mean are located in Mid and North Wales. The 'low occupancy' establishments are mainly countryside non-hotels ($p \leq 0.001$) and typically have only up to 3 rooms ($p \leq 0.001$). Most can be found at the lower end of the price scale, with a significant number of establishments charging only £24 or less ($p \leq 0.001$). Just over 50% of the establishments of the 'low occupancy' cluster do not advertise in any of the WTB brochures covering the whole of Wales or their holiday region ($p \leq 0.1$). It is also worth noting that over half of the members of this group did not advertise any attractions or activities nearby, such as golf, walking, etc. ($p \leq 0.05$).

Seasonality Clusters

The analysis of the component scores for RC1-AMC identifies clusters according to the acuteness of seasonal variations in the time series as can clearly be seen from Figure 7-9 which displays the average room occupancy rates for the clusters identified. The results of the cluster analysis are based on n=208 establishments. As already mentioned, 2 establishments were identified as outliers and excluded because of their extreme positive component scores on RC1-AMC and thus extreme seasonality.

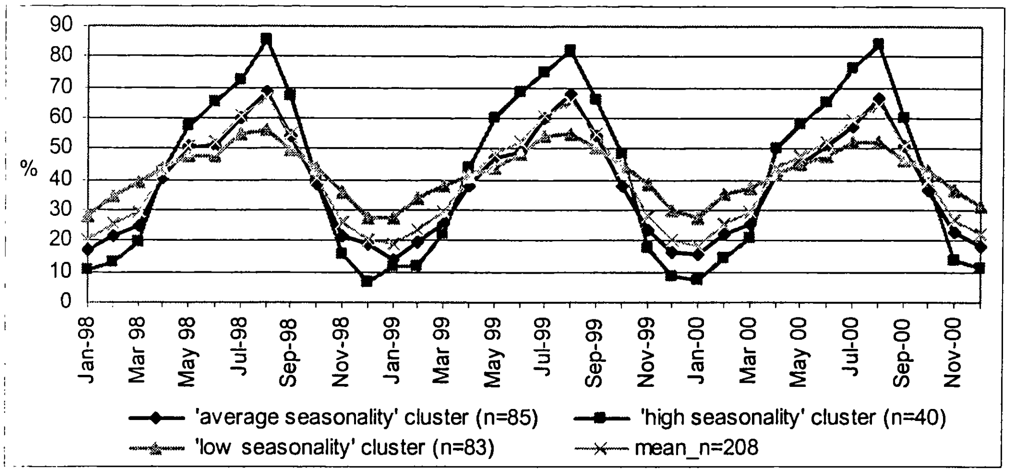


Figure 7-9: Average Occupancy Rates of Seasonality Clusters

The 'low seasonality' group consists of 83 accommodation enterprises. They display an average difference between January and August occupancy rates of only 26.93%, which is 20% lower than the average difference for the whole sample. The geographical distribution of the seasonality clusters as well as the two identified outliers is presented in figure 7-10. It shows a significant difference between establishments located in the eastern part of Wales, which have mostly negative component scores and therefore low seasonality ($p \leq 0.1$), and those on the west coast with high variations ($p \leq 0.05$). An analysis relating to the holiday regions revealed a significant proportion of 'low seasonality' establishments in the region North Wales Borderland ($p \leq 0.05$) and the aggregated region including Swansea/Valleys/Cardiff/Wye Valley ($p \leq 0.05$).

Not surprisingly, nearly 60% of the 'low seasonality' cluster are hotels, as they are more likely to be open for business all year round. A significant proportion of these hotels are located in the countryside ($p \leq 0.05$) or in a small town/city ($p \leq 0.1$). Even though it is not significant as such, it should be noted that over a quarter of the 'low seasonality' businesses are B&Bs, guesthouses and farmhouses located in the countryside. The majority of the hotels in the price range between £45 and £54 belong to this group ($p \leq 0.1$). It is interesting to note that not only big establishments but also a number of small accommodation businesses belong to this cluster. For example, a quarter of the 'low seasonality' establishment are small hotels with 11 to 25 rooms ($p \leq 0.05$). Over 60% of the ungraded and 1-star establishments in the sample belong to this cluster and the analysis showed that these are mostly guesthouses and farmhouses. The fact that a significant proportion of the cluster offers conference facilities ($p \leq 0.05$) and are licensed to hold weddings ($p \leq 0.05$) shows that the establishments concerned do not only cater for leisure tourists.

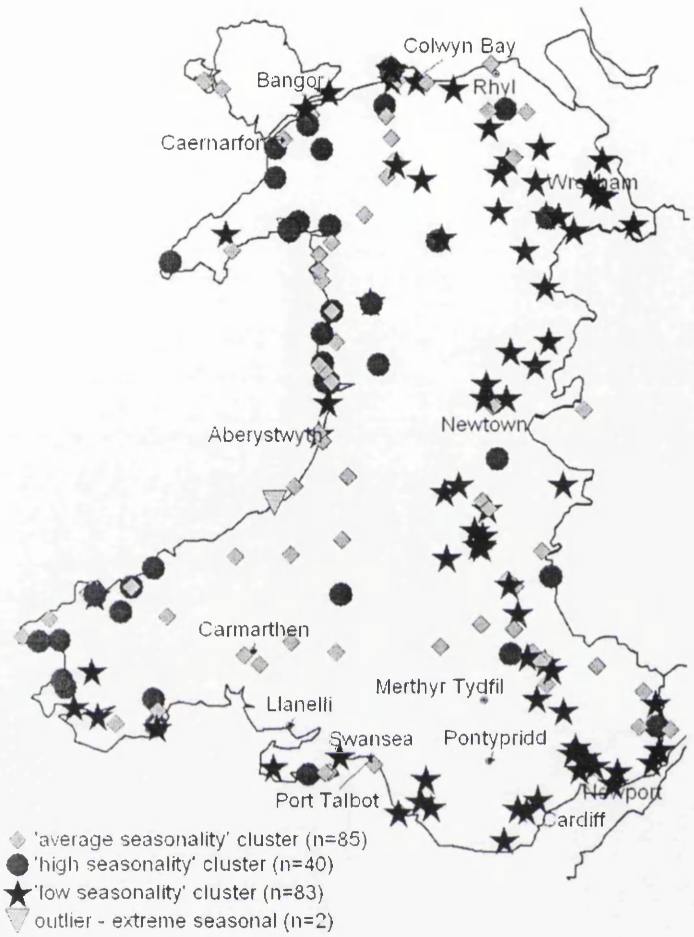


Figure 7-10: Geographical Distribution of Seasonality Clusters and Outliers

The 'high seasonality' cluster, by contrast, exhibits an average difference between peak and off-peak season of 74.22%, which is 27.91% higher than the average difference in the sample overall. It is interesting to note that these establishments reach high occupancy rates not only in August (with over 80%), but display rates of over 60% for the whole period between May and September. An analysis of the geographical location of the establishments revealed that 45% of the 'high seasonality' businesses are situated in the aggregated holiday region Snowdonia/Anglesey ($p \leq 0.01$) and 25% are located in the holiday region Pembrokeshire ($p \leq 0.05$). Of the 40 establishments in this cluster, 27 belong to the non-hotel sector. Moreover, it is not B&Bs, but particularly guesthouses and farmhouses ($p \leq 0.1$), which display such acute variations. Not surprisingly, though, a significant number of the establishments located at the 'pure' seaside ($p \leq 0.001$) belong to this cluster. They typically have 4 to 10 rooms ($p \leq 0.1$) and 50% charge prices between £21 and £25 per night and per person ($p \leq 0.05$).

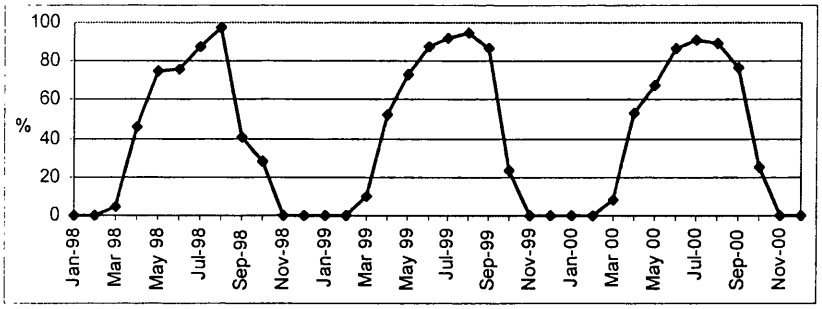


Figure 7-11: Average Room Occupancy Rates for Seasonality Outliers (*n*=2)

Figure 7-11 displays the average room occupancy rates for the two outliers identified. A separate analysis of the two outliers with extreme seasonality, i.e. on average a 93-percentage points difference between January and August figures, revealed that their attributes are very similar to the characteristics of the 'high seasonality' cluster. The analysis is only descriptive and should not be interpreted as significant results. One establishment is located in Anglesey/Snowdonia and the other one in Ceredigion/Pembrokeshire/Carmarthenshire. They are both guesthouses located at the seaside charging prices up to £24 and between £25 and £34. They are small businesses with 1-3 rooms and 4-10 rooms. One is a 3-star and the other a 4-star establishment. Neither of them offers any special breaks, out-of-season prices or special prices for longer stays.

Length of Season Clusters

Performed in relation to RC2-AMC, the cluster analysis identifies establishments which have succeeded in extending their summer peak into the shoulder seasons and those which display a sharp peak in the summer. Figure 7-12 displays the average room occupancy rates for the three obtained clusters and the mean of the sample. The cluster analysis is based on 201 establishments as 9 businesses were excluded due to extreme component scores. The geographical distribution of the 'length of season' clusters and the excluded outliers is shown in figure 7-13.

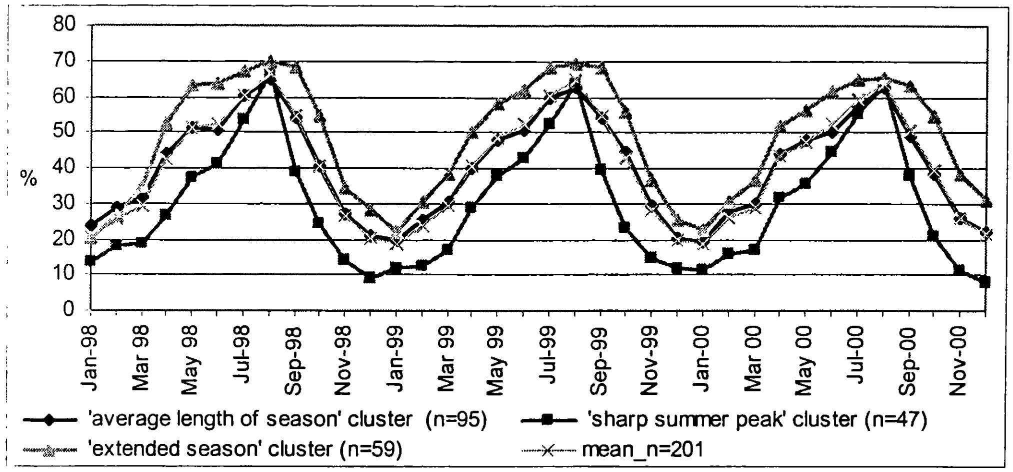


Figure 7-12: Average Occupancy Rates of Length of Season Clusters

The 'extended season' cluster comprises 59 establishments. They display average rates of nearly 70% from July to September. The results show that they also reach higher than average occupancy levels overall and display similar characteristics to those of the 'high occupancy' cluster. As can be seen from figure 7-13, nearly half of them are located in the northern part of Wales ($p \leq 0.1$) with a significant accumulation in the aggregated holiday region Llandudno/North Wales Borderland ($p \leq 0.1$). The majority are hotels (n=40, $p \leq 0.05$), particularly countryside hotels ($p \leq 0.1$) in the middle and upper price range. A significant number of the establishments in this cluster provide conference facilities ($p \leq 0.05$), offer special breaks ($p \leq 0.05$) or special out-of-season prices ($p \leq 0.1$). It should be noted that a significant proportion also advertise special prices for longer stays (n=39, $p \leq 0.05$) and at Christmas/New Year or Easter ($p \leq 0.1$).

The 'sharp summer peak' cluster comprises 47 establishments, mainly B&Bs ($p \leq 0.05$) and farmhouses ($p \leq 0.1$). In contrast to the 'high seasonality' cluster, these establishments only reach high occupancy rates during July and especially August before a rapid decline in September. In fact, from September to June average levels are mostly below 40%. Figure 7-13 shows that establishments with such a pattern can be found particularly in the South West of Wales ($p \leq 0.05$) in the aggregated holiday region Ceredigion/Pembrokeshire/Carmarthenshire (n=18, $p \leq 0.05$). A significant proportion of the seaside non-hotels (n=10, $p \leq 0.05$) and countryside non-hotels (n=24, $p \leq 0.05$) belong to this cluster. Over half of this group are small properties with only up to three rooms ($p \leq 0.01$) and in the lower price range with prices up to £24 ($p \leq 0.001$). From the

23 establishments in the sample which do not provide any information on the internet, 12 belong to this 'sharp summer peak' cluster ($p \leq 0.01$).

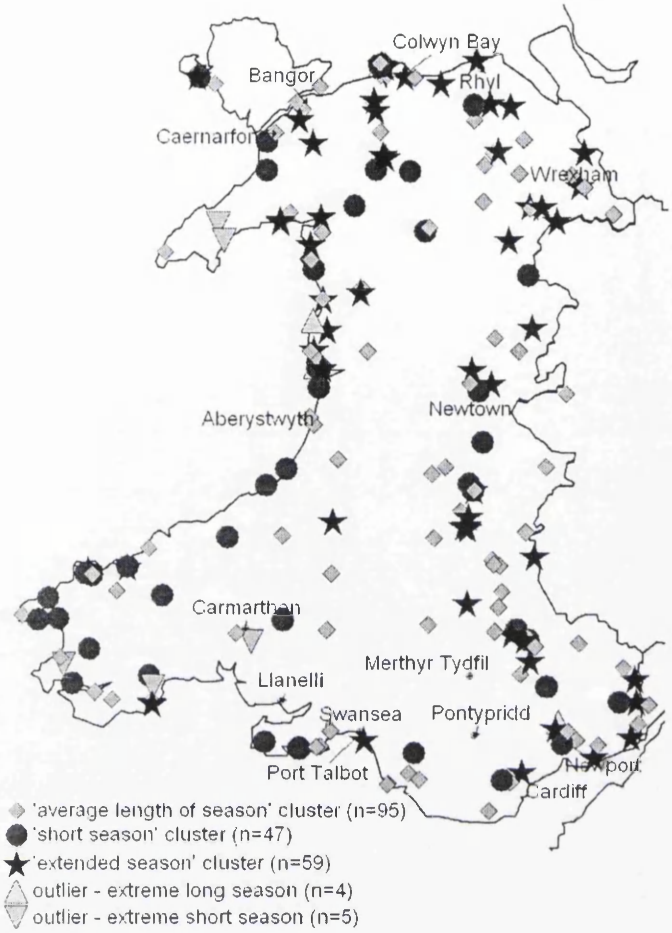


Figure 7-13: Geographical Distribution of Length of Season Clusters and Outliers

Figure 7-14 displays the average room occupancy rates for the 9 identified outliers identified for the 'length of season' dimension. The descriptive analysis of the 4 outliers with extreme positive scores on RC2-AMC and thus an extreme extended season shows that they are primarily located in the North of Wales in Anglesey/Snowdonia and Llandudno/North Wales Borderland. They are mostly hotels located at the seaside. Two of them have over 50 rooms and charge £55 and more per person and per night. Nearly all of the businesses have 4 or 5 WTB stars, provide conference facilities, offer special breaks, special prices for longer stays, and special out of season prices. The five establishments with an extreme short summer season are located in Ceredigion/ Pembrokeshire/Carmarthenshire and Anglesey/Snowdonia. Most of them are farmhouses situated in the countryside. The majority have only 1-3 rooms, charge prices of up to £24 and have 3 WTB stars. It is not surprising that none of them is offers any special breaks, special prices for longer stays or out of season breaks.

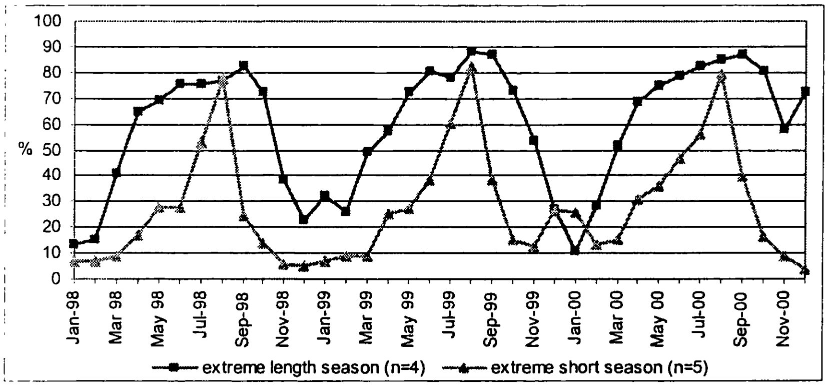


Figure 7-14: Average Room Occupancy Rates for Outliers on Length of Season Component

Spring Season Clusters

As has already been discussed, the component scores on the third reference curve provide information about the importance of the spring season. A cluster analysis for the component scores on RC3-AMC identifies those establishments which exhibit higher than average rates in the spring season.

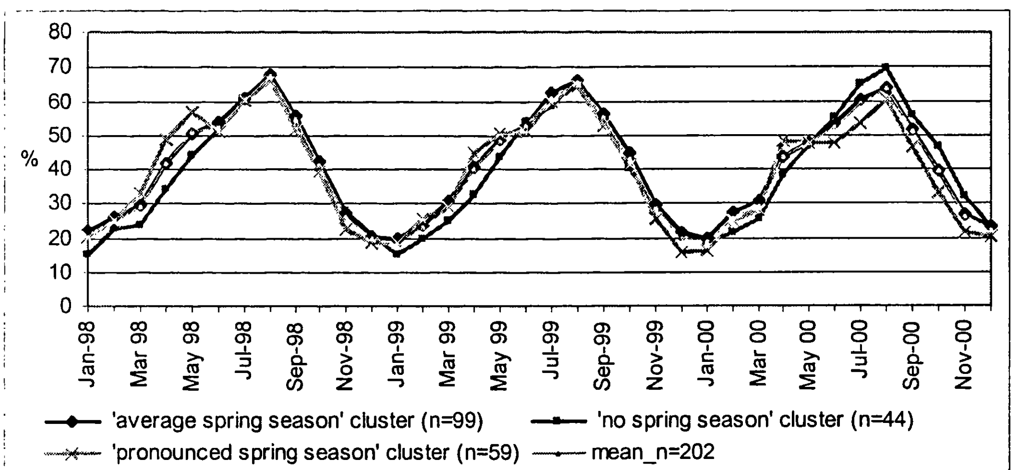


Figure 7-15: Average Occupancy Rates of Spring Season Clusters

The 'pronounced spring season' cluster consists of 59 establishments of which 34 belong to the non-hotel sector. As shown in figure 7-15 they display average rates between April and May of 49.34%, which is 4.02% higher than the average in these months for the whole sample. In contrast to the extended season cluster, the 'spring season' establishments display only a pronounced spring season with high occupancy levels between April and May. Occupancy rates drop in June before increasing again for the summer season.

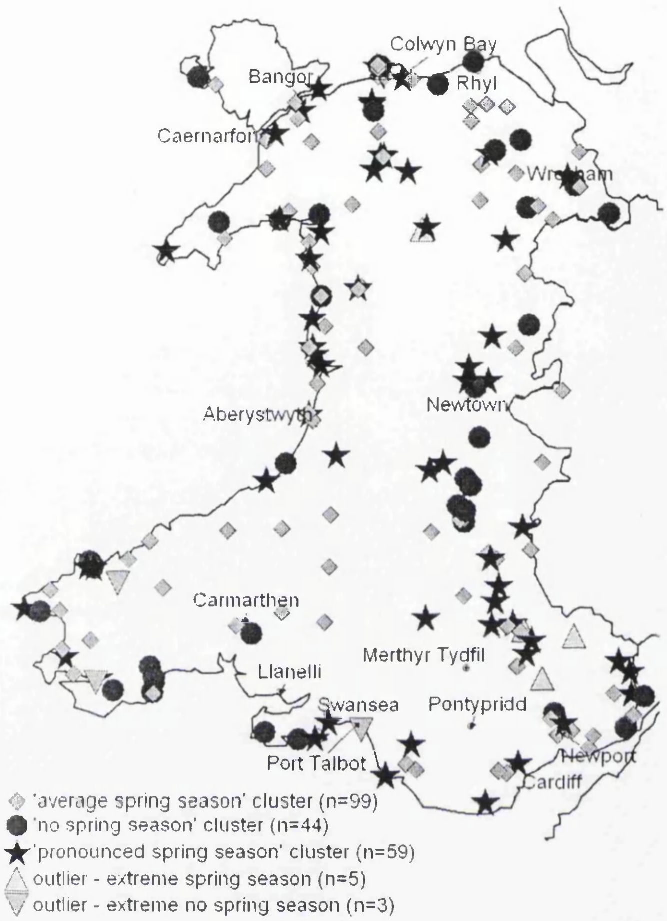


Figure 7-16: Geographical Distribution of Spring Season Clusters and Outliers

As can be seen from figure 7-16 nearly one third of the establishments are located in the South East of Wales ($p \leq 0.1$). The majority of that cluster are small and medium-sized establishments with up to 25 rooms with a significant accumulation of businesses with 11-25 rooms ($p \leq 0.1$). A significant proportion of that cluster charge prices between £25 and £34 ($p \leq 0.01$). The 'no spring season' cluster consists of 44 establishments. None of the attributes available were found to be statistically significant in this respect.

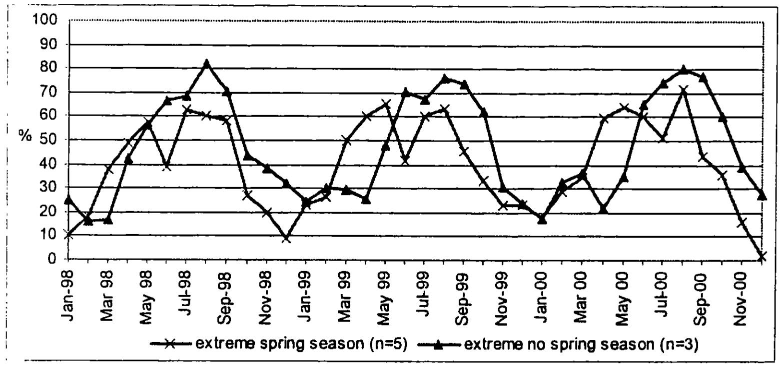


Figure 7-17: Average Room Occupancy Rates for Outliers on Spring Season Component

The average room occupancy rates of the outliers of the 'spring season' component are shown in figure 7-17. It is interesting to note that nearly all of the 5 establishments with an extreme spring season belong to the non-hotel sector and are located in the South East of Wales. Furthermore, 4 of them have only 1 to 3 rooms, charge prices between £25 and £34 per night and per person and have 3 WTB stars.

7.3.2 Simultaneous Consideration of all Performance Dimensions

Even though the overall occupancy level is a key factor for distinguishing between establishments, the other RCs add vital information to the performance profile. From a marketing perspective, a simultaneous consideration of the different performance indicators identified – i.e. occupancy level, seasonality, length of season and importance of spring season – is particularly useful. More specifically, by considering the component scores for all four RCs concurrently, a complete profile is obtained for each establishment and a cluster analysis can again be used to divide the sample into groups with distinct performance patterns. Of the 210 establishments in the sample, 19 had to be excluded for the cluster/crosstabulation analysis as they were identified as outliers. Ward's method suggests solutions of at least three clusters and up to seven clusters. The largest changes in the agglomeration coefficients were detected in the jumps from three to two clusters and from two to one cluster. There is an obvious trade-off between the number of clusters used and the information content of the results. Various analyses with different numbers of clusters, applying the K-means clustering technique with the initial cluster seeds set by Ward's method, have shown that the most informative results were obtained with four clusters. Figure 7-18 shows the average occupancy rates for each of these and figure 7-19 the geographical distribution. The occupancy profiles obtained suggest four simple labels for the clusters: 'top performer', 'seasonal performer', 'spring performer' and 'poor performer'.

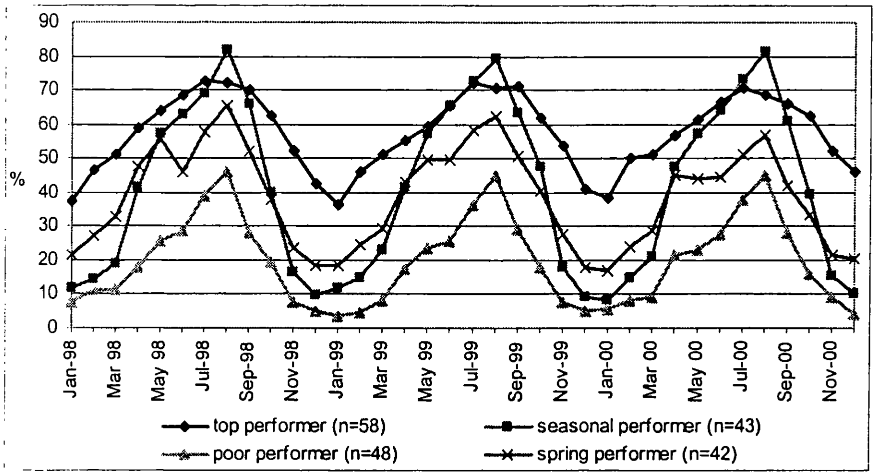


Figure 7-18: Average Room Occupancy Rates for Clusters

The 'top performers' display the best profile in Wales from a managerial point of view, with an average occupancy rate of 57.53%, low seasonal fluctuations and high shoulder season levels. It is worth noting that these establishments also succeeded in reaching similar rates in July, August and September, whereas all other clusters are characterised by a sharp summer peak in just one month. A significant proportion of the 58 establishments in this cluster are hotels (n=50, $p \leq 0.001$), located in a city or town ($p \leq 0.01$). It is interesting to note also that a significant number of countryside hotels belong to this cluster (n=20, $p \leq 0.01$). As can be seen from figure 7-19, nearly one third of the 'top performer' businesses are located in the South East of Wales, particularly in the aggregated holiday region Swansea/Valleys/Cardiff/Wye Valley (n=16, $p \leq 0.05$). A second accumulation with just over 30% of the 'top performer' cluster can be found in the North of Wales in the aggregated holiday region Llandudno/North Wales Borderland (n=18, $p \leq 0.1$). Two thirds of the establishments charge prices of £35 or more per person and night ($p \leq 0.05$). Nearly half of all 4- and 5-star establishments in the sample belong to this group (n=12). Only 14% are guesthouses (n=6) and B&Bs (n=2), virtually all located in a city or town in Mid and South East Wales. Nearly 70% of the 'top performers' offer conference facilities ($p \leq 0.001$), nearly 50% are licensed to hold weddings ($p \leq 0.001$), and 30% have gym/pool/sauna facilities ($p \leq 0.001$). A very high proportion of the 'top performer' cluster advertise special breaks (n=35, $p \leq 0.001$), have special prices for longer stays (n=37, $p \leq 0.05$), special out of season prices (n=27, $p \leq 0.01$) or offer specials at Christmas/New Year or Easter (n=13, $p \leq 0.001$).

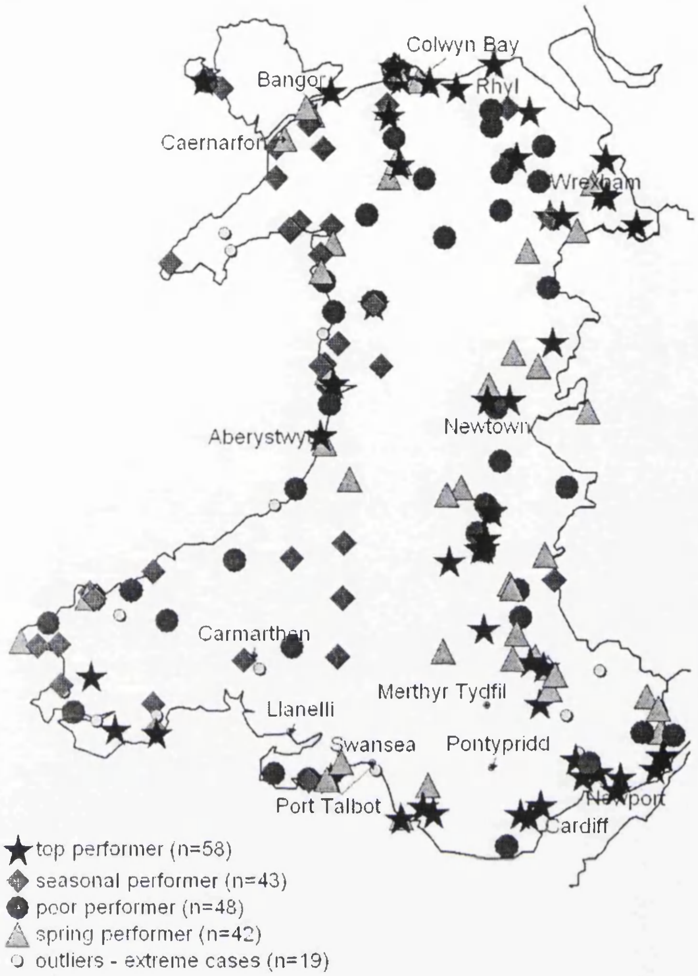


Figure 7-19: Geographical Distribution of Performer Cluster and Outliers

The 'seasonal performer' cluster consists of 43 establishments and shows a high discrepancy between rates in the summer peak and the winter off-peak, with a 70% difference, therefore characterised by a high positive score on the seasonality factor. The average occupancy of these establishments is 41.22%. The 'seasonal performers' can be found especially in the South West ($p \leq 0.01$) and at seaside locations ($p \leq 0.05$). An analysis of the differences between the aggregated holiday areas revealed a significant proportion of 'seasonal performers' in Anglesey/Snowdonia (n=18, $p \leq 0.01$) and in Ceredigion/Pembrokeshire/Carmarthenshire (n=15, $p \leq 0.05$). Over half of the establishments have 4 to 10 rooms ($p \leq 0.05$). It is interesting to note that nearly 40% of this cluster are hotels, particularly small hotels at the seaside, and around 30% are guesthouses. Over 50% of the 'seasonal performers' charge prices of only up to £24.

The 'spring performers' have an average occupancy of 38.52% and succeeded in reaching average rates in the summer but also higher than average rates in the spring. A significant proportion of this cluster is located in the countryside (n=31, $p \leq 0.1$). Around 60% of the establishments belong to the non-hotel sector (n=31), especially countryside non-hotels (n=21, $p \leq 0.1$). Of particular interest is the fact that a significant proportion of the 'spring performers' are situated in the aggregated holiday region Mid Wales/Brecon Beacons (n=15, $p \leq 0.05$). Approximately 80% of the establishments in this cluster charge prices up to £34 per person and per night. A significant proportion of the 'seasonal performers' have 2 WTB stars (n=16, $p \leq 0.1$).

The 48 establishments in the last cluster display the least desirable profile in Wales, with an average occupancy level of only 19.67% and a sharp summer peak with no extended season. These 'poor performers' are mostly establishments in the non-hotel sector (n=37), more particularly B&Bs ($p \leq 0.05$) and farmhouses ($p \leq 0.05$). They are typically located in the countryside (countryside non-hotel, n=27, $p \leq 0.01$) and have only 1-3 rooms ($p \leq 0.01$). A significant proportion of all ungraded and 1-star establishments of the sample belong to this cluster (n=9, $p \leq 0.1$). Most can be found at the lower end of the price scale with prices of up to £24 ($p \leq 0.001$). It should be pointed out, however, that hotels account for just over 20% of the group. Out of 23 establishments in the sample which do not have any web presence, 10 are members of this cluster ($p \leq 0.1$). It is not surprising that a significant proportion of the 'poor performers' do not offer any special out of season prices (n=46, $p \leq 0.1$), special prices for longer stays (n=34, $p \leq 0.1$) or advertise activities nearby (n=25, $p \leq 0.05$).

7.4 Summary of ANOVA and Cluster Results

This section gives a summary of the manifold results obtained from the various t-test/ANOVA and cluster/crosstabulation analyses presented above. Table D-1, Appendix D relates to the t-test/ANOVA results and thus provides an overview at a glance of the association between different attributes of accommodation establishments and the occupancy and seasonality performance. The characteristics of the accommodation establishments where significant differences were observed together with the ACS on the RCs are displayed. It can clearly be seen that some of the differences between the characteristics are more pronounced than others as shown by the ACS values. The advantage of the ANOVA and t-test results over the cluster results is the ability to quantify the differences between the attributes by comparing the ACS values. The disadvantage is the fact that the t-test/ANOVA analyses examines attributes separately and thus some of the results obtained might be caused by interdependencies of these attributes, i.e. hotels are generally larger and more expensive than guesthouses or B&Bs.

Table D-2, Appendix D displays the results obtained from the various analyses for each dimension separately and table D-3, Appendix D presents the results for the cluster/crosstabulation analysis where all identified RCs were considered simultaneously. The top section refers in both tables to the results of the cluster analyses. The column headed 'occupancy level' in table D-2 relates to the first RC of the basic PCA and the other columns refer to the components identified in the analysis of the AMC data. As was expected, for each RC the analysis produced clusters of establishments with high positive and high negative scores as well as one with scores close to zero. Only the first two clusters are referred to in table D-2. The bottom sections of tables D-2 and D-3 show the results of the second phase of the analysis. For each of the attributes listed, a crosstabulation analysis was carried out to determine the significance of its association with the clusters produced. More specifically, standardised residuals were calculated to examine differences between the expected and observed counts of the number of cases in each cell of the crosstabulation tables. Primarily only the results found to be statistically significant are shown in tables D-2 and D-3. However, the cases where statistically significant results were reported but the expected frequency of that cell was below five are also presented in the tables but the attributes are displayed in parentheses. For these attributes the associated significance levels should be interpreted with caution. Also included are some attributes where a much higher than expected count in that cell of the contingency table was recorded but not at a statistically significant level. These results were added in order to get a better understanding of the composition of each cluster.

The findings are fully in line with the conclusions drawn from the previous ANOVA and t-test analyses. For instance, the table shows the split between the South East and the South West, as well as that between hotels and other types of establishments, in terms of the severity of seasonal variations. It also captures the points made earlier in relation to the association between, for example, the size and type of location and the overall occupancy performance and the importance of price with respect to the length of the season. What differentiates the results presented in tables D-2 and D-3 from those discussed in section 7.2 and displayed in table D-1 is the fact that the cluster/crosstabulation analysis takes full account of the distribution of the attributes across the sample. In other words, the frequency with which certain characteristics occur in the sample – such as the number of establishments with particular star ratings – is directly reflected in the significance levels. Attributes occurring only with a small frequency in a cluster, therefore, are less likely to influence the results. Moreover, the cluster/crosstabulation analysis provides, at a glance, a comprehensive overview of all the main points and its interpretation from a managerial perspective is more straightforward.

It should noted that the above t-test/ANOVA and cluster/crosstabulation analyses were also performed for the whole data set of n=210 including the outliers. The results are very similar when examining each dimension separately. However, there are differences in the composition of the clusters derived when all dimensions simultaneously are taken into consideration. The best results are obtained here with a five-cluster solution. The differences relate especially to the influence of the 'length of season' and the 'spring season' components on the cluster composition. This is not surprising as for those two RCs a number of establishments with extreme component scores were identified. In addition to the 'top performer', 'poor performer', 'seasonal performer' and 'spring performer', a fifth cluster is identified which is referred to as 'extended seasonal performer'. The latter virtually further distinguishes the 'seasonal performer' group identified for the analysis excluding outliers. It should be noted that the qualitative conclusions relating to the significance of attributes of the establishments in each cluster are very similar to the results without the outliers presented in this chapter.

7.5 Policy Implications

The results obtained show that the various clusters generated do not neatly align with any of the conventional categories used to describe different market segments in the accommodation business. Simply distinguishing between marketing strategies for the hotel and the non-hotel sectors, for instance, is clearly inadequate. The 'top performers' identified in section 7.3.2, for example, include not only hotels but also some guesthouses and even B&Bs. They are not only located in towns or in the countryside, but can also be found at the seaside. Virtually every price category is represented in this cluster. Similarly, the 'poor performers' include 11 hotels and a few establishments with high WTB star ratings. Looked upon from the opposite perspective, seaside hotels can be found in each of the four groups and those in the 'top performers' cluster have an average occupancy mean of 62.70% and an average difference between peak and off-peak seasons of 42.77%, as opposed to a mean of 42.17% and an average difference between August and January of 62.10% for those in the 'seasonal performers' cluster. Equally, it is insufficient to take only a regional perspective. Whilst the South East has the lion's share of 'top performers', it does not have the monopoly on these.

It is argued, therefore, that the clusters produced from the four performance indicators resulting from the PCA provide a better guide for targeting marketing strategies and development policies than the conventional categories. Whilst seaside establishments, for instance, might be regarded as a natural target for marketing campaigns aimed at extending the tourist season, a broad-brush approach is likely to be ineffective. On the one hand, there clearly is a significant number of seaside establishments which have already succeeded in creating demand in the shoulder seasons and, on the other hand, there are many non-seaside establishments, e.g. in some of the large towns, which experience pronounced seasonal variations in demand. Focusing such marketing and development policies on the 'seasonal performers' cluster would appear to be a more appropriate approach. Similarly, simply distinguishing between hotels and non-hotels or between high-priced and low-priced establishments will not lead to a segmentation which adequately addresses the current performance gaps in the market. Any such simplistic groupings will produce inappropriate targets, and miss many of those which should be included. It is clear that different marketing strategies are needed for the various clusters identified. For the 'seasonal performers', for example, the emphasis obviously must be placed on spreading the demand over a longer period, whereas for the 'poor performers' concentrating the marketing efforts on the summer peak might be a step in the right direction. Establishments in the 'top performers' group serve both the leisure and business markets and, again, their marketing needs will be different for this reason alone. The winter period clearly represents a problem for all establishments outside this cluster.

There are also several specific results which are likely to be of interest to policymakers. The research provides strong support for the contention that web-presence represents an essential marketing tool for accommodation businesses. The 'poor performers' cluster shows a statistically highly significant link with a lack of internet presence, but this does not exist for any of the other groups identified. The study also demonstrates that attracting business tourists, as a way of alleviating the problems associated with seasonality, is a feasible goal for the Welsh tourism industry. The 'top performers' cluster, for instance, contains a very high proportion of hotels with facilities aimed at business tourists. The fact that these establishments were particularly successful in extending the peak into the autumn suggests that there might also be potential for attracting additional custom from these markets in the spring. Finally, the work shows that initiatives such as offering special breaks and out-of-season discounts are of significant importance in reaching high occupancy rates and extending the season. From a development perspective this is perhaps an area where training programmes and enhanced mechanisms for information exchange between players in the industry are going to provide a competitive advantage for Wales.

The performance-based segmentation of establishments presented in this chapter can also be used to classify accommodation businesses in order to select establishments for further investigations, pre-select businesses for funding and development policies, target marketing initiatives more effectively and thus improve the overall service offered in a particular destination. Furthermore, the performance indicators can be used to quantify the degree of similarity or dissimilarity between individual businesses, or groups of establishments, and the average performance of the enterprises in the sample. The results obtained, therefore, provide an ideal platform for benchmarking.

7.6 Performance Indicators for Benchmarking Purposes

Kozak (2002) highlights the practical implications of benchmarking and states that

> "the basic idea behind the benchmarking concept is to identify gaps in performance and close them by monitoring other organisations to get ideas about how they perform and achieve their targets" (2002:516).

Research has shown that benchmarking activities still have only limited applications in small and medium-sized enterprises (Sundgaard, Rosenberg & Johns, 1998; Wöber, 2002). A similar picture emerges for the tourism industry where benchmarking applications are growing substantially in large organisations but are not generally used among small hospitality businesses (Kozak & Rimmington, 1998). Kozak and Rimmington (1998) also point out that up until now only little research has been carried out measuring performance levels of small hospitality businesses either as individual organisations or as components of a tourist destination. This is not surprising, as these businesses have only limited financial resources. Ogden (1998) identifies, in addition to limited resources, distance, lack of time, lack of knowledge, and fears about commercial confidentiality, as barriers to exchanging information among small hotels. Furthermore individual owner managers of family businesses generally prefer to focus on the individual features of their hotels rather than being interested in industry norms (Sundgaard, Rosenberg & Johns, 1998). They thus have no inclination to carry out benchmarking studies even though these businesses would benefit most (Kozak & Rimmington, 1998). The role of third parties or external agencies in providing benchmarking studies is therefore especially emphasised in the literature (Kozak & Rimmington, 1998; Ogden, 1998).

It is usually differentiated between internal and external benchmarking studies. Internal benchmarking is most commonly practised and focused on the business itself. It examines differences between different branches, departments or units with the aim to improve the economic efficiency of the company (Wöber, 2002). External benchmarking studies which are mostly undertaken by strategic consultants compare businesses with their competitors, companies in another industry, businesses operating in the same industry/sector or industry norms (Wöber, 2002). External studies indicate, therefore, how businesses perform against various standards. Kozak and Rimmington (1998), for example, demonstrate how benchmarking linked to star ratings or other external awards can increase competitiveness of small hospitality enterprises or destinations. However, research has also shown that due to the diversity in the accommodation sector, grading schemes have often been unable to address the qualities of all small hospitality businesses on an equitable basis, and it is concluded that new classification schemes are needed for benchmarking activities (Sundgaard, Rosenberg & Johns, 1998). In order to be beneficial, external benchmarking studies have to match the destination's planned strategic development and thus need to be directed by local authorities and external bodies such as tourist boards, professional bodies and organisations such as the British Hospitality Association (Kozak & Rimmington, 1998). Ogden (1998), for example, suggests that tourist boards facilitate benchmarking via the setting up of pilot benchmarking circles.

The comparison of the performance of an individual establishment with its competitor or the industry average can reveal essential insights into the strengths and weaknesses and, thus, provide important pointers for marketing and development policies. In addition to indicators such as returns on investment, profit margins, average room rates etc., the assessment of the performance indicators identified by the PCA can provide a comprehensive overview of how well an establishment is doing. These performance indicators can thus be of great value, especially for small hospitality businesses, for assessing their occupancy performance and seasonal pattern relative to the average or to competitors. As these measures are derived from the sample itself they are, unlike profit and cost information, not available to individual businesses. Therefore the provision of a database containing these performance indicators for each business can act as an incentive for accommodation establishments to take part in occupancy surveys and to report occupancy data conscientiously. Furthermore the identification of groups of establishments with similar occupancy profiles presented in this chapter can thus be used to grade or benchmark businesses more effectively and improve the service offered within a destination.

For the purpose of benchmarking, the performance indicators – occupancy level, seasonality, length of season, and spring season – can be presented in spider plots. Harris and Mongiello (2001) emphasise that spider plots are adequate graphical tools for the assessment and the permanent monitoring of multiple criteria. Each leg of the spider plot corresponds to a performance dimension and the value represents the performance of an individual business relative to the average of the sample, competitors or groups with similar occupancy profiles. The centre of the plot represents the lowest value and the outer diameter the maximum value, whilst the broken line displays the average of the whole sample (Wöber, 2002). Wöber (2002) stresses, that differences and similarities between individual businesses or groups of enterprises can be easily emphasised by presenting spider plots simultaneously or by displaying more than one enterprise per plot.

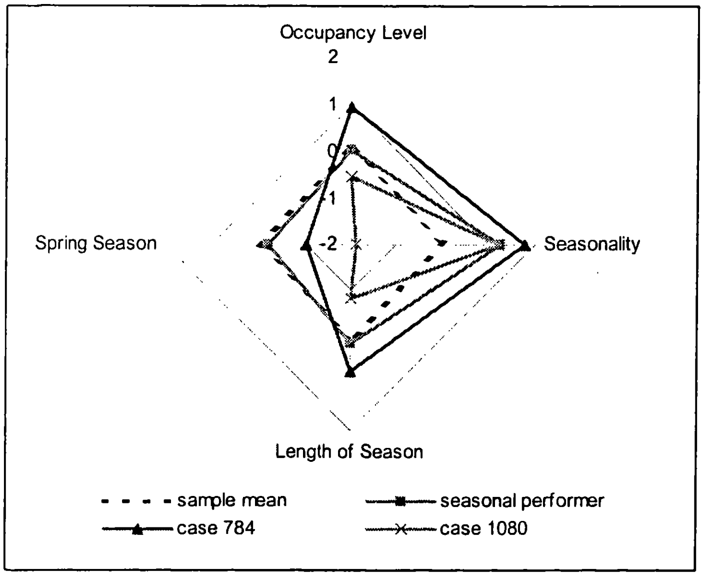


Figure 7-20: Spider Plot for 'Seasonal Performer' Cluster, Case 784 and Case 1080

The spider plot displayed in figure 7-20 represents the occupancy performance of the 'seasonal performers' cluster and two selected establishments out of this group. This plot provides an overview of the performance of these enterprises relating to overall occupancy level, seasonality, length of season and the importance of the spring season relative to the sample average and the 'seasonal performers' group. It can clearly be seen that the overall occupancy rates of establishment 784 are well above those of the 'seasonal performers' group and business 1080. The component score of 1 on this dimension for establishment 784 indicates that the average room occupancy rate is 17.41% higher than that for the whole sample and thus around 57%. In contrast, the score of –0.5 on that criterion for establishment 1080 shows that the average room occupancy rate of this enterprise is only around 32%. The occupancy performance of the latter is thus lower than that of the 'seasonal performers' group and the average for the whole sample. In terms of seasonality, the two businesses display much higher seasonal variations than the sample average. The component score of nearly 2 on the seasonality dimension for establishment 784 indicates that the average difference in occupancy rates between January and August exceeds 80%. It can also be seen that establishment 784 has succeeded in reaching higher occupancy levels in the shoulder seasons as shown by the values on the 'length of season' criterion. The spider plot reveals that there is a need for action especially for establishment 1080 as seasonality is not the only concern for this particular business. Case 1080 shows, in addition to considerable seasonal variation, a lower than average overall occupancy level and no sign of success in extending the season.

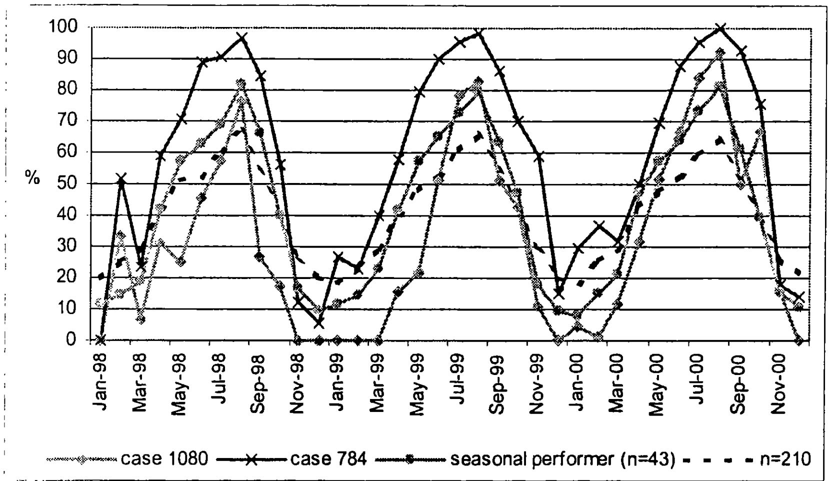


Figure 7-21: Room Occupancy Rates for 'Seasonal Performer' Cluster, Case 784, Case 1080 and Sample Mean

These results are confirmed by figure 7-21 which displays the room occupancy rates for the two businesses, the 'seasonal performers' cluster and the mean for the sample from 1998 to 2000. The graph demonstrates that due to the erratic nature of individual occupancy time series, in particular, comparisons between detailed demand patterns of establishments or groups of establishments prove to be more difficult than with spider plots. It is, therefore, suggested to use spider plots for that purpose as they essentially represent the same information as the room occupancy time series. The insights given by spider plots are of great value for the formulation of marketing and development policies at an individual, sectoral or regional level. For example, the spider plot shows that establishment 784 has already succeeded in extending the season and thus marketing efforts could now be more focused on improving occupancy levels in the off-peak season months. For this particular business, it might also be useful to focus efforts on redistributing visitors from the peak season to the rest of the year, as saturation point is nearly reached in the summer months. In contrast, for establishment 1080, it will be more important to focus marketing campaigns on extending the season in order to improve the overall occupancy performance.

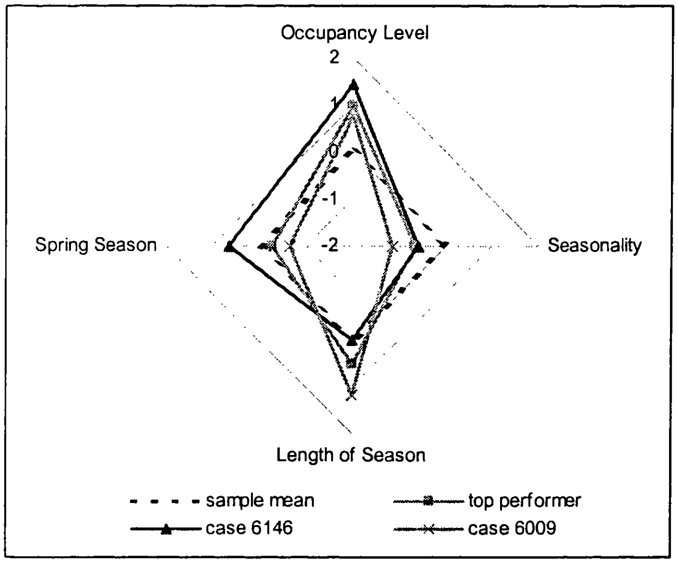


Figure 7-22: Spider Plot for 'Top Performer' Cluster, Case 6146 and Case 6009

Figure 7-22 displays a spider plot for the 'top performers' group and two selected establishments out of this cluster. It illustrates at a glance that these businesses display completely different demand patterns to those shown in figure 7-20. It can clearly be seen that establishment 6009 shows only very little seasonal variation between peak and off-peak months which is well below the seasonality displayed by the whole sample and the 'top performers' group. The average differences between January and August derived from the component scores on the seasonality dimension are around 30% for establishment 6146 and 20% for case 6009 and are thus well below the average difference for the sample which was 46%. The spider plot also shows that the overall occupancy levels of establishment 6009 are slightly lower than those of case 6146. The average occupancy rates derived from the score on that dimension are 54% for business 6009 and 65% for business 6146.

The values for the two enterprises on the 'length of season' dimension indicate that the shoulder season plays a slightly more important role for establishment 6009 than for business 6146. However, it has to be noted here that, even though the dimensions are independent of each other, only the simultaneous consideration of all dimensions will give a complete picture of the demand pattern of a particular establishment or group of establishments. This means, for this example, that the absolute occupancy rates for establishment 6009 will not necessarily be higher in the shoulder seasons than those for establishment 6146 as the latter displays higher overall occupancy levels. But in relative terms – independently of the overall occupancy levels – the shoulder seasons are more pronounced for case 6009. This is confirmed by figure 7-22 which displays the room occupancy time series for these two businesses, the 'top performers' cluster and the sample. The spider plot also indicates that establishment 6146 is doing better in the spring than the average sample and the 'top performers' group.

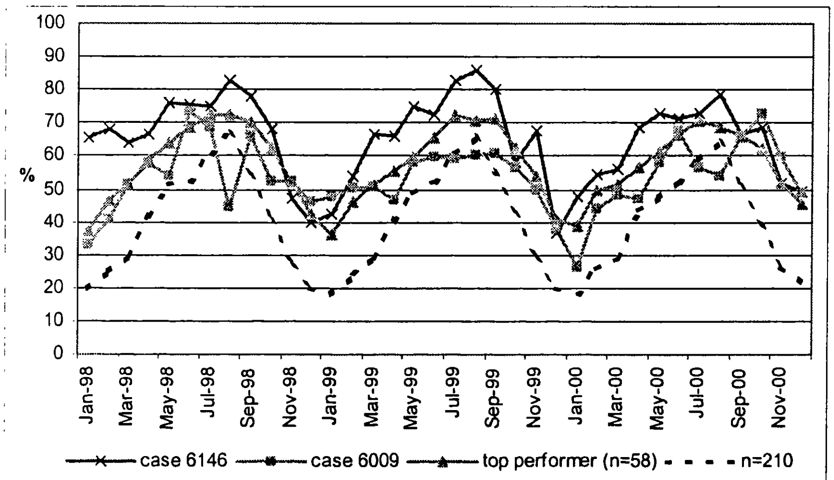


Figure 7-23: Room Occupancy Rates for 'Top Performer' Cluster, Case 6146, Case 6009 and Sample Mean

Useful pointers for marketing and development policies can thus be derived from the information given by the spider plot. For example, the fact that business 6146 successfully established an important spring season indicates that there might also be potential for attracting customers in the autumn and winter months. Thus concentrating marketing efforts into those markets might well improve the overall performance of this business. In contrast, for establishment 6009 a different approach is needed. It was shown that the shoulder seasons were already successfully penetrated and the difference between peak and off-peak seasons was also minimised. That might be the result of extensive special offers or packages outside the peak season attracting a number of customers but failing to penetrate the summer peak. It can thus be concluded that this establishment would benefit from marketing efforts directed at the peak season in order to improve the overall occupancy levels.

The examples presented above demonstrate that the comparison of monthly room occupancy rates for different establishments or groups on the basis of occupancy time series can be quite time consuming, especially when long time periods are analysed and the demand patterns are complex. The spider plots have the great advantage that they display 'only' a limited number of performance indicators but reveal the bulk of the information included in the individual occupancy time series. It is therefore much easier to distil the results for the formulation of marketing strategies and development policies.

CHAPTER 8

TOURISM DEMAND PATTERNS IN TURBULENT TIMES 2001 AND 2002

This chapter examines the extent to which the events of 2001 affected the occupancy performance of hotels and other accommodation establishments in Wales and attempts to identify the factors which have allowed some to continue to perform well – or even to improve their occupancy rates – whilst others suffered badly. The major focus is on differences in the demand patterns between 2002, 2001 and the three-year period before this, not only in terms of the overall occupancy levels but also, and more particularly, with respect to the relative performance of different types of establishments and regions. Section 8.1 presents the results for the basic PCA and the PCA based on AMC data for the research period 1998 to 2001. The second section analyses differences in occupancy performance between 2001 and the preceding period 1998-2000. The results are used to identify the '2001 change' clusters and several concrete implications for marketing and development policies are discussed. Section 8.3 looks at the changes in occupancy performance in 2002. The results for the complete PCA for the period 1998 to 2002 are presented, a detailed analysis of the occupancy changes between 2002 and 2001 is performed and groups of establishments with similar change profiles are identified. The '2001 change' clusters, identified in section 8.2, are revisited in 2002 to examine to what extent establishments were able to recover fully from the effects of the events in 2001. A summary of the main findings relating to the changes in tourism demand patterns in the turbulent years 2001 and 2002 concludes the third section. The final section shows how spider plots relating to the identified change indicators can be used to provide useful insights into the demand changes experienced by an individual establishment in comparison to its competitor or the average.

8.1 Analysing Welsh Room Occupancy Data from 1998 to 2001

8.1.1 The Dimensions of Occupancy Performance for 1998-2001

During the research period, the data for 2001 and 2002 also became available. As already mentioned, the year 2001 was somewhat different to the preceding years 1998 to 2000. The FMD outbreak and the terrorist attacks of 11th September 2001 caused substantial deviations from the established tourism demand patterns and many tourist businesses experienced significant changes in demand volumes in 2001. These changes in tourism demand will be reflected in room occupancy rates. Therefore, understanding the underlying components of occupancy patterns and changes is clearly an important issue from various perspectives. As already mentioned in chapter 6, a subset of 170 establishments was included in the analysis relating to the 2001 data. Figure 8-1 shows the overall room occupancy mean curve for these 170 accommodation businesses from January 1998 to December 2001. The curve exhibits pronounced seasonal variations with occupancy rates of only 20% in the winter and nearly 70% in the summer. The average annual room occupancy rate is 40.82%. Between 2000 and 2001 the rate decreased by 3%, with a particularly low occupancy performance between March and June.

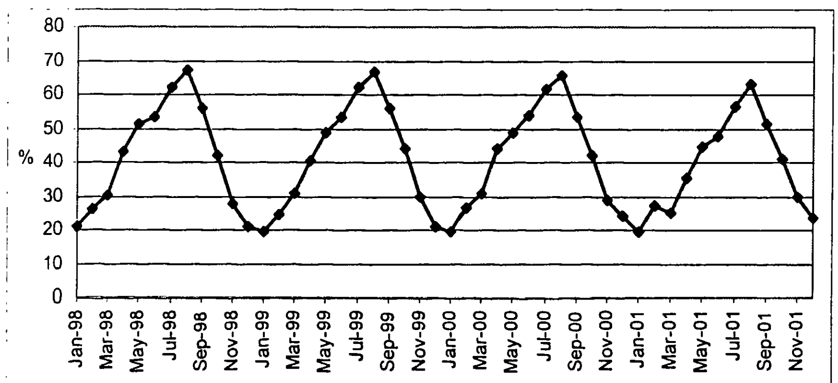


Figure 8-1: Average Room Occupancy for Serviced Accommodation Establishments from 1998-2001, *n*=170

As mentioned before, the structural components obtained from the PCA are derived from the data themselves, rather than being predetermined or restricted by the applied model. Therefore, slight differences in the amounts of variance explained by the RCs, as well as in the shape of the RCs, are expected when a different data set is used. The original data set of 210 establishments was reduced to 170. Before a PCA was applied to the period 1998 to 2001, a complete PCA was conducted on this reduced sample for the period 1998 to 2000, in order to test the comparability with the results presented in chapter 7. The general components derived were very similar in the amounts of variance explained as well as their shape. The cluster and crosstabulation analyses also yielded similar groups and similar qualitative conclusions relating to the key attributes in the clusters.

After confirming the resemblance to the results in chapter 7 for 1998-2000, a PCA was again applied to the data set but this time relating to the four-year research period 1998-2001. Similar to the approach in chapter 7, the PCA was performed on a correlation matrix, as the Harris test confirmed the statistical significance of the differences between the variances of the variables for the data set of n=170 (W_R=159.99, $p \leq 0.001$). An examination of the correlation matrix showed many coefficients of 0.6 or more and thus the correlation matrix is appropriate for a PCA. The KMO value as well as the Bartlett's test of Sphericity confirmed that the data were suitable for a PCA.

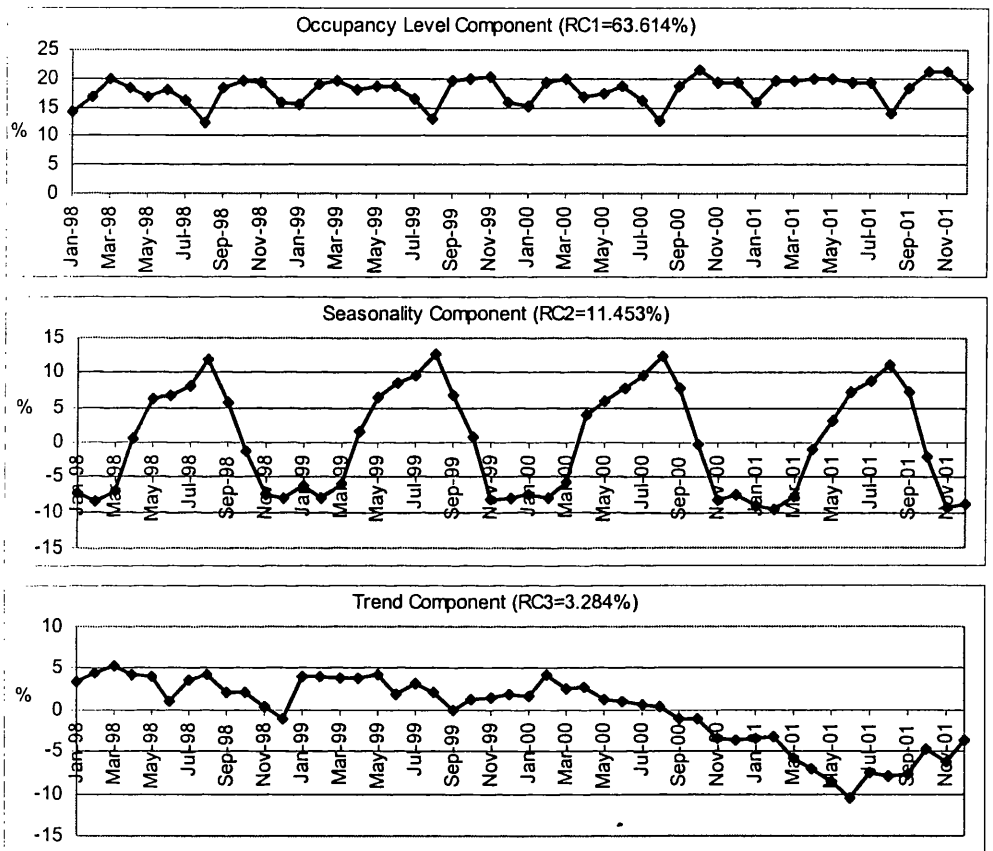


Figure 8-2: Component Loadings for Principal Components Derived from Standard PCA, n=170, 1998-2001

Three distinct dimensions were revealed by the PCA and are displayed in Figure 8-2. Together they explain 78% of the overall variance present in the data. They can be interpreted as the overall occupancy level, the seasonality element and the 2001 trend. The first two dimensions virtually replicate the RCs obtained from the analysis presented in chapter 7. RC1, which accounts for 63.6% of the overall variance, displays little variation across the study period and can, thus, again be used as a measure of the overall magnitude of occupancy levels. A component score of 1, for instance, indicates an average room occupancy rate of 58.79%, which is 17.97% higher than the mean. RC2 explains 11.5% of the variance and reflects the seasonality in demand. A component score of 1 on RC2 indicates an average difference between January and August occupancy rates of 65.39%. RC3 reflects a change in occupancy rates, especially with respect to 2001, and accounts for 3.3% of the total variance. The component loadings are mainly positive up to August 2000 and display a sharp downward trend from September 2000 onwards, with the lowest point in June 2001 at –10%. Therefore, establishments with a positive score on RC3 show a drop in occupancy rates, which is most pronounced between March and September 2001. This dimension is able to distinguish between the establishments according to the change in occupancy rates in that year. A component score of 1 for RC3 indicates that an establishment's average occupancy rate in 2001 is 32.32% which is 6.36% lower than the average for the whole sample of 38.68%.

The PCA was also applied to the AMC data set and the first three components are shown in Figure 8-3. Together these explain 43.7% of the variation in the AMC data set. RC1-AMC accounts for 32.32% of the variation and can be used to distinguish between establishments according to their seasonal variations. RC1-AMC and RC2 from the basic analysis contain virtually the same information and only RC1-AMC will be used in the subsequent analyses as a seasonality indicator. A component score of 1 on RC1-AMC stands for a difference in occupancy rates of 64.86% between January and August. In contrast, the average peak–off–peak difference for the whole sample is 45.85%. RC2-AMC explains 6.92% of the total variance and reflects the length of the season. A component score of 1 indicates an average difference from the mean in May/June (50.19%) of 1.98% and from the mean in September/October (48.18%) of 4.10%. RC3-AMC accounts for 4.45% of the variation between the establishments and relates to the importance of the spring season. The change in 2001 can be clearly seen in the graph. FMD was first detected in Wales at the end of February 2001 and local authorities quickly moved to close public footpaths in many areas. Establishments with a component score of 1 on RC3-AMC had a 5.8% higher average occupancy rate in April for 1998-2001 than the average occupancy rate of the whole sample in that month (42.44%).

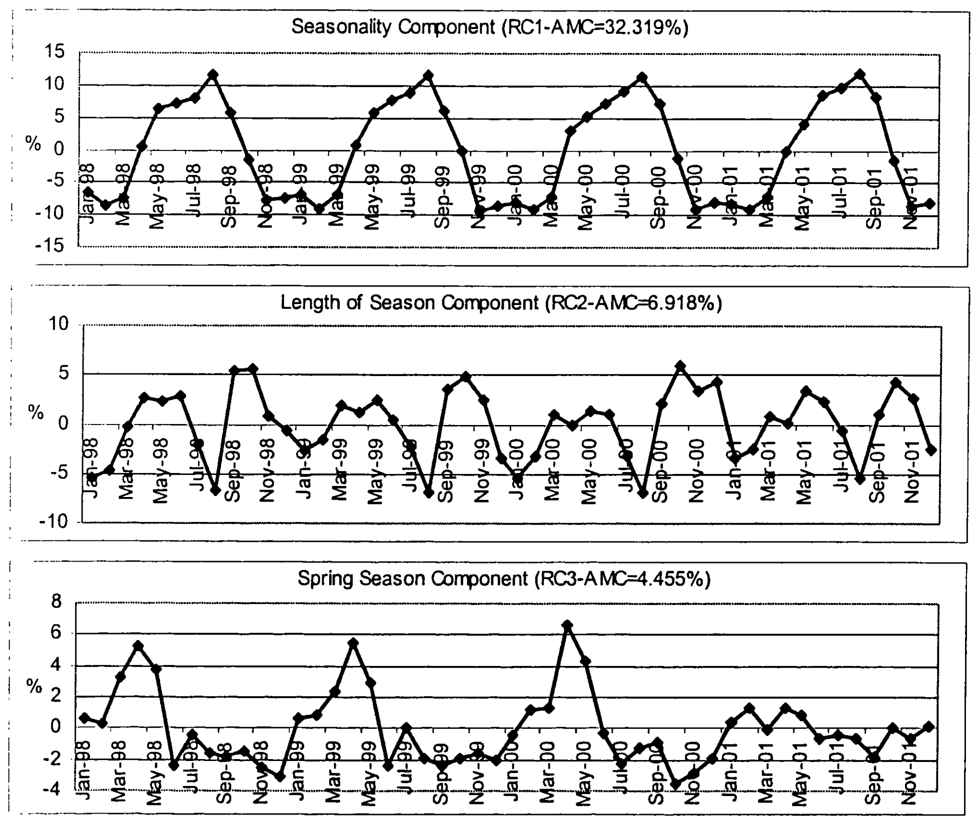


Figure 8-3: Component Loadings for Principal Components derived from AMC Data, *n*=170, 1998-2001

The components of occupancy performance obtained for *n*=170, 1998-2001 are very similar to those attained from the PCA for *n*=210, 1998-2000 (see chapter 7). The exceptions are that for the four-year period RC3, the '2001 trend component', now plays a significant role and RC3-AMC, the 'spring season' component, does not show any high positive loadings in the spring 2001. These facts reflect the changes in the occupancy performance which occurred in 2001. The similarity of the other RCs shows clearly that the general patterns underlying the variability in the data set are consistent over different samples and study periods.

Similar to the approach in chapter 7, the PCA was also performed on a covariance matrix for this data set of *n*=170 and the four-year period 1998-2001. All components from the basic PCA (RC1 to RC3) as well as the first two components obtained from the PCA on the AMC data (RC1-AMC and RC2-AMC) were very similar in their shape and the amounts of variance explained. Only RC3-AMC displayed a slightly different shape with positive values not only in the spring, but also in some other months during the study period but without a unique pattern. The spring season is not as clearly distinguishable when a covariance matrix is employed. An analysis of the variance in the data set shows a significant increase in the variance in 2001. As the PCA performed on the correlation matrix uses standardised values, these increases in the variance have no influence on the results as all variables (i.e. months) have equal weightings. The PCA on the correlation matrix is therefore able to filter the 'spring season' component, as identified for 1998-2000, even though the 2001 data show a different pattern.

8.1.2 Performance-Based Segmentation for 1998-2001

As already mentioned in chapter 7, component scores on each of the RCs identified above can be looked upon as performance indicators for individual establishments. This section considers the question of how these performance indicators are linked to various attributes of the establishments. First, the obtained component scores were tested for normal distribution. It was found that the scores for the establishments relating to the performance dimensions are normally distributed and thus procedures that assume normality could be employed. Second, the component scores for each of the five dimensions were screened for possible outliers or extreme cases using boxplots. Altogether 20 establishments were identified as outliers and were excluded from the subsequent analyses presented in this section.

Cluster/crosstabulation analyses were performed for all five dimensions separately, in each case obtaining three clusters. Table D-4, Appendix D displays the attributes characterising the accommodation establishments of the two extreme clusters for each dimension. The qualitative results from the contingency tables are very similar to those obtained from the 1998-2000 analysis presented in chapter 7. The most useful grouping for the simultaneous consideration of the different performance indicators identified, i.e. occupancy level, 2001 trend, seasonality, length of season and importance of spring season was obtained with four clusters. This solution also allows for comparisons with the results obtained for the three-year period 1998-2000. Figure 8-4 shows the average occupancy rates for each of the clusters which were labelled as 'top performer', 'extended seasonal performer', 'seasonal/spring performer & 2001 loser' and 'poor performer'. The regional distribution of the four clusters is shown in figure 8-5. The component scores on the RCs for the four groups, together with a summary of the attributes characterising the four clusters, are displayed in table D-5, Appendix D.

As in chapter 7, the various cluster analyses were also performed for the whole data set of *n*=170 including the outliers to detect any differences in the cluster compositions. The most useful grouping here was obtained with five clusters. However, one of the clusters consists of only one establishment with extremely high component scores. This highlights the influence of outliers on the resulting groups obtained. The remaining four clusters were similar in shape and were labelled 'top performer'. 'poor performer', 'extended seasonal performer' and 'seasonal performer'. The qualitative results relating to the significant attributes characterising the establishments in each cluster differ only slightly. This shows that the overall outcome of the analysis is consistent and does not significantly change with the inclusion of all establishments in the sample. However, in this chapter, only the results of the approach without the outliers for *n*=150 are presented.

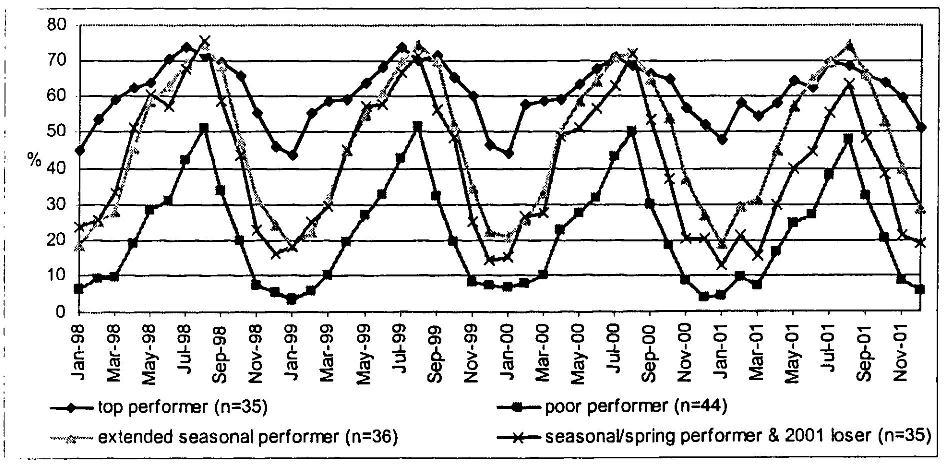


Figure 8-4: Average Occupancy Rates for four Clusters of 'Performers', 1998-2001

The seasonal pattern for the 'top performers' and the 'poor performers' clusters, identified for the two research periods 1998-2000 and 1998-2001, display virtually the same demand pattern. It is therefore not surprising that the qualitative results relating to the influence of the various attributes of accommodation establishments in the 'top performers' and the 'poor performers' clusters are very similar to the results presented in chapter 7 for the period 1998-2000 (cf. tables D-3 and D-5, Appendix D). Therefore, only the 'extended seasonal performer' and the 'seasonal/spring performer & 2001 loser' clusters are described in detail in this section.

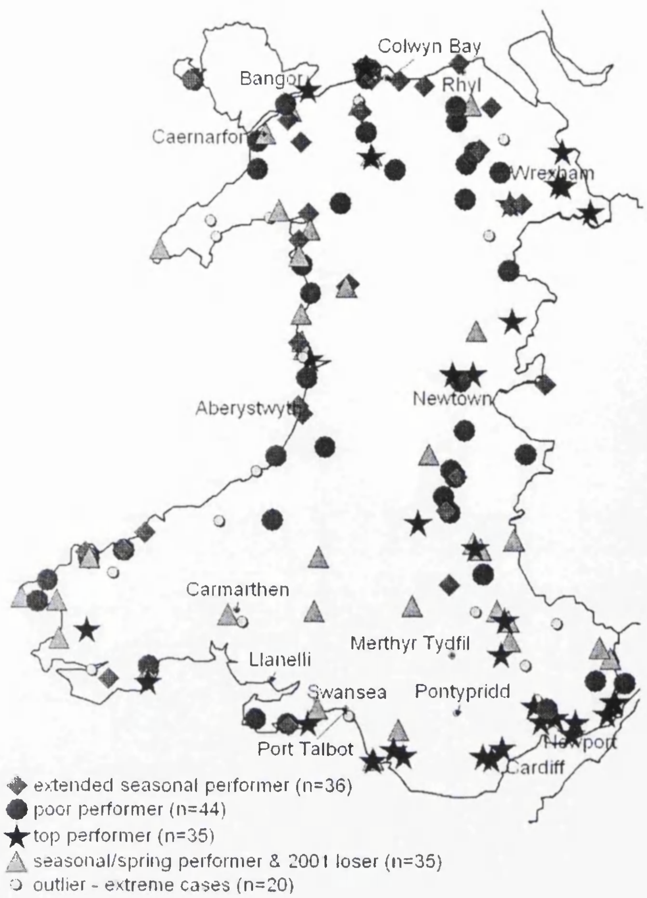


Figure 8-5: Regional Distribution of Occupancy 'Performer' Clusters and Outliers, *n*=170, 1998-2001

The 'extended seasonal performers' succeeded in reaching higher than average occupancy rates not only in the summer, but also in the adjacent shoulder seasons, particularly in the autumn. However, they display a 54-percentage point average difference between occupancy rates in August and January and are therefore highly seasonal. They also show a slight increase in occupancy in 2001. An analysis of the location of the establishments in this cluster reveals that over a third of the businesses are situated in the aggregated holiday region Llandudno/North Wales Borderland ($p \leq 0.1$). Just over three quarters are hotels ($p \leq 0.05$), especially seaside hotels ($n=16$, $p \leq 0.01$). A further refinement of the location information available reveals that nearly 40% of the establishments involved are located in a seaside town ($p \leq 0.05$). It is interesting to note that many of the hotels with more than 50 rooms are part of this cluster, representing around a quarter of its membership. Nearly 25% charge prices of £55 and more per night and per person and over 50% offer conference facilities ($p \leq 0.05$). A significant number of businesses in that group are licensed to hold weddings ($p \leq 0.05$) and 28% have leisure facilities ($p \leq 0.05$). Just over 60% of all 'extended seasonal performers' offer some kind of special short breaks ($p \leq 0.05$). Special out of season prices are advertised by 53% of the establishments in this group ($p \leq 0.01$). Furthermore, over 70% offer special prices for longer stays ($p \leq 0.1$). A significant number of all establishments offering specials at Christmas, New Year's Eve or Easter are found in the 'extended seasonal performers' cluster ($p \leq 0.01$).

The 'seasonal/spring performers & 2001 losers' also display a large difference between occupancy rates in the summer peak and the winter off-peak, with a 53-percentage point difference between August and January occupancy rates. They are characterised by a substantial decrease in room occupancy rates from 41% in 2000 to 34.2% in 2001 and a pronounced spring season (except for 2001) can also be seen. Over one third of the 'seasonal/spring performers & 2001 losers' can be found in the holiday region Snowdonia Mountains ($p \leq 0.1$). Nearly 60% are non-hotels located in the countryside ($p \leq 0.01$) and 20% are seaside non-hotels. Some 28% of the cluster are farmhouses ($p \leq 0.001$) and 34% are guesthouses. Therefore, it is not surprising that the majority are small establishments with 4 to 10 rooms ($p \leq 0.1$). It is interesting to note, that 20% of the 'seasonal/spring performers & 2001 losers' are either ungraded or have 1 WTB star.

The general marketing and policy implications aimed at tackling seasonality for the clusters derived, for the period 1998-2001, are very similar to those presented in chapter 7, as no significant differences between the cluster compositions were established. In relation to the demand changes in 2001, it can be concluded that some seaside hotels, typically those offering conferences and leisure facilities as well as a number of special offers during the year, have succeeded in retaining and even increasing their occupancy levels in 2001, whereas some countryside non-hotels, especially farmhouses and guesthouses experienced a considerable drop in occupancy rates after the FMD outbreak. The results also show that applying a PCA to the four-year data of occupancy rates does not produce sufficient information about the changes in 2001. In order to get a better understanding of these changes in tourism demand patterns experienced by the accommodation establishments in 2001, a PCA is applied to an occupancy change data set and the results are presented in the next section.

8.2 Analysing Changes in Room Occupancy Rates in 2001

8.2.1 PCA on Occupancy Change Data between 2001 and 1998-2000

The outbreak of FMD at the end of February in 2001 caused a number of accommodation establishments to suffer unexpected significant reductions in occupancy rates. However, as already pointed out in the previous section, not all establishments experienced lower occupancy levels throughout 2001. Figure 8-6 shows the average occupancy rates for 2001 in comparison to the average occupancy rates for 1998-2000. There is a clear drop between March and October with rates around 5% lower in 2001. The average occupancy rate in 2001 fell by 2.85% from 41.52% for 1998-2000 to 38.68% in 2001. These average figures, however, conceal the considerable variability in the performance of individual establishments.

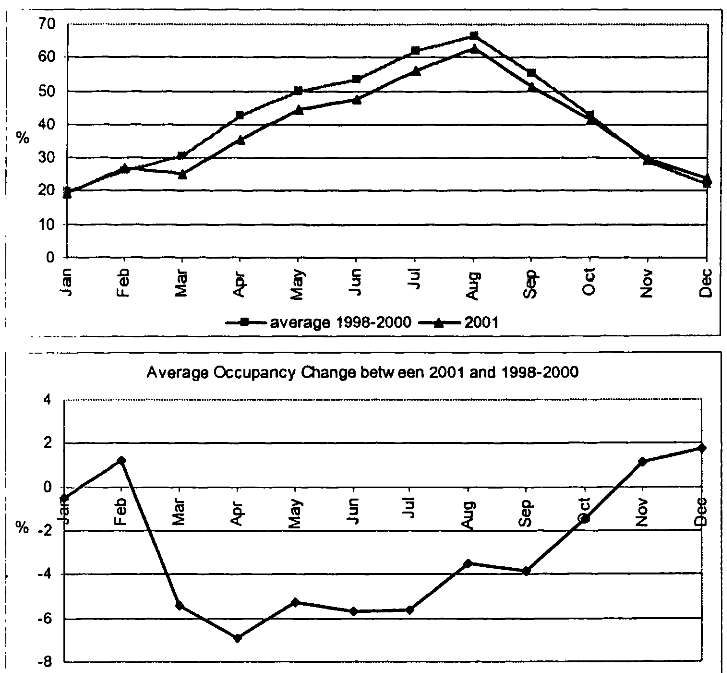


Figure 8-6: Changes in the Average Room Occupancy Rates between 2001 and 1998-2000, *n*=170

Therefore, a more detailed PCA was performed on the differences in the monthly occupancy rates of the individual establishments in 2001 and the average of the three preceding years. Again, an approach based on the correlation matrix was used as the Harris test confirmed the statistical significance of the differences between the variances for the occupancy change data for the 170 establishments (W_R=45.25, $p \leq 0.001$). The complete PCA results including the KMO values, the Bartlett test, the eigenvalues, the scree plot as well as the component loadings are shown in tables E-1 to E-4 and figure E-1, Appendix E. Three principal components were derived which together explain 60% of the total variance present in the sample. The component coefficients are displayed in Figure 8-7 and are represented on the original scale of the variables, i.e. the raw loadings have been multiplied by the associated standard deviations.

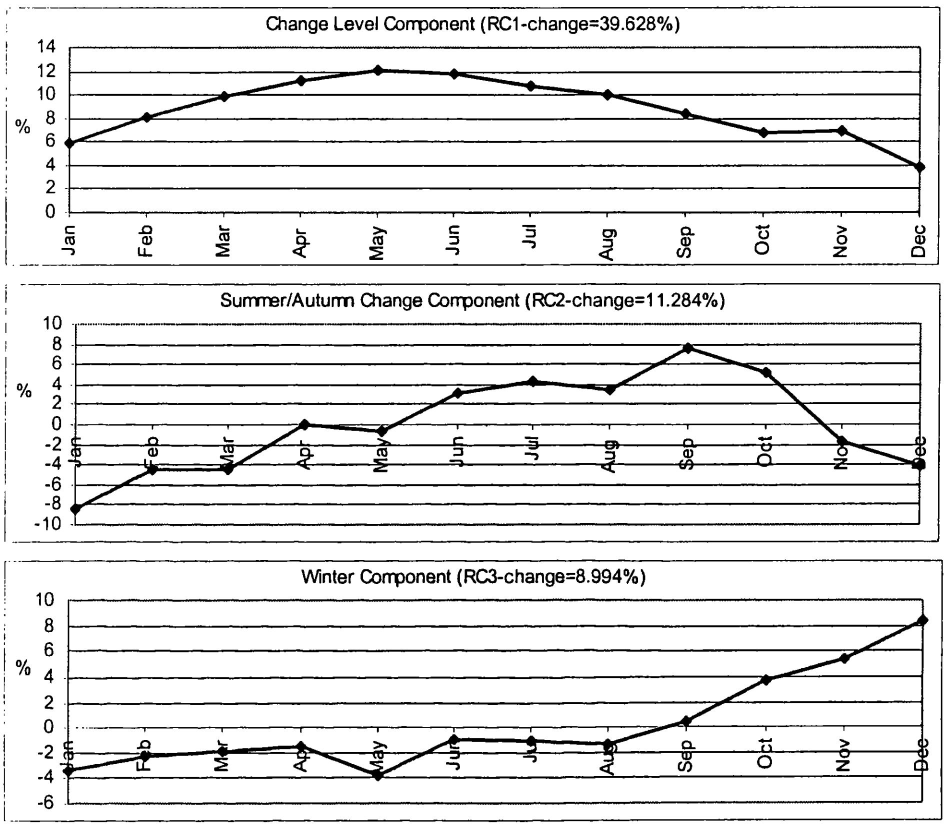


Figure 8-7: Component Loadings for Principal Components of Occupancy Change between 2001 and 1998-2000

The first reference curve (RC1-change) explains nearly 40% of the variance and can be interpreted as an indicator of the overall size of occupancy change. A component score of 1 on this RC would indicate an increase in the average occupancy rate in 2001 of 5.9% in comparison to 1998-2000. In contrast, a score of –1 would mean a loss of 11.65% in occupancy rates. The second reference curve (RC2-change) is characterised by negative loadings from January to March and November to December and positive loadings between June and October. It explains 11.28% of the variance and can be interpreted as the summer/autumn change. Establishments with positive component scores on this dimension show lower occupancy rates until March but higher rates from June to October in 2001. A negative component score indicates the reverse. The third reference curve (RC3-change), explaining 8.99%, shows positive component loadings from October to December and distinguishes between establishments according to their change in occupancy rates during the winter months. High positive component scores would therefore indicate a slight loss in the first three quarters of 2001 and a gain in occupancy rates from October to December.

8.2.2 Segmentation based on Occupancy Changes in 2001

Establishments with similar occupancy change patterns can be identified by analysing their component scores on the different occupancy change dimensions obtained by the PCA. The P-P plots and the Kolmogorov-Smirnov test confirmed that the component scores for all three RCs are normally distributed (cf. table E-7, figures E-3 to E-5, Appendix E). The three dimensions were also tested for outliers and 14 cases were identified as having extreme scores on either of the components. The boxplots and the average component scores for the identified outliers are presented in figure E-2 and tables E-5 and E-6, Appendix E.

Cluster and crosstabulation analyses were carried out for each of the identified dimensions of occupancy change separately. A summary of the significant results is presented in table F-1, Appendix F. The outcome demonstrates that not many attributes of the establishments show a significant association with RC2- and RC3-change. This indicates that the conventional classifications used to segment accommodation establishments are not suitable to explain the demand changes which occurred in 2001. Thus, from a marketing and policy viewpoint the simultaneous consideration of all RCs in the forming of the clusters is again particularly useful. Various cluster analyses resulting in different numbers of clusters were performed for the sample of 156 establishments and the association between the attributes of the establishments and each cluster was tested using contingency tables. The most useful results were achieved with four and five clusters. This is also suggested by the analysis of the agglomeration coefficients of the Ward cluster method. The five-cluster solution has the drawback that the number of establishments in each group is relatively small and therefore the majority of the results relating to the attributes of the establishments in each cluster are not as informative as when fewer clusters are formed.

The results for the four-cluster solution are displayed in table F-2, Appendix F. The regional distribution and the attributes characterising the establishments in each group are also presented in Appendix F (see figure F-3 and table F-3). The four clusters can be labelled as '2001 winner & winter recoverer', '2001 loser', 'summer/autumn recoverer' and 'winter loser'. The average room occupancy rates for each of the groups show clearly that only three of the four groups are clearly distinguishable from each other (see figures F-2 and F-3, Appendix F). The 'winter loser' cluster shows only slight average changes in room occupancy rates between 2001 and 1998-2000. Furthermore, the temporal demand pattern for the 'winter loser' cluster and the 'summer/autumn recoverer' cluster are very similar and thus not easy to distinguish. The analysis also demonstrates that the '2001 winner & winter recoverer' establishments score highly on both RC1-change and RC3-change. The crosstabulation results revealed that the majority of these establishments are hotels located at the seaside and in the countryside. From the perspective of a policy maker or tourist board, it would therefore be of particular interest to break down this cluster in order to get some in-depth information on which businesses actually gained occupancy rates throughout the whole year and which ones experienced higher rates only in the winter of 2001. It would also give an indication of whether there were any significant differences between countryside and seaside establishments relating to occupancy changes in 2001.

The cluster analysis considering all dimensions of change concurrently for the sample of 156 establishments was therefore repeated. This time the initial cluster centres were not taken from the Ward method but were set artificially to get four clearly distinguishable clusters relating to the three change dimensions RC1-change to RC3-change. The initial as well as the final cluster centres are displayed in table F-4, Appendix F.

Several tests have shown that the final cluster centres as well as the composition of the four groups do not change if the values for the initial cluster centres are set at any absolute value greater or equal to 0.1. The results for the K-means cluster approach using initial absolute values of 0.1 as well as 1 are both shown in table F-4, Appendix F. The occupancy change patterns for the four groups are clearly distinguishable from each other, in contrast to the results using Ward's cluster centres. The cluster approach with the artificial initial cluster seeds suggested one cluster for the '2001 winner' establishments and one cluster relating solely to the winter change which can be labelled as the 'winter recoverer'. The remaining two groups are again described as '2001 loser' and 'summer/autumn recoverer'. The four groups are referred to here as the

'2001 change' clusters. It should be noted that, in addition to the analyses discussed above, a cluster analysis was also carried out for the whole sample of 170 establishments including the outliers. This approach also identified four groups along those lines. It is therefore not surprising that the results for the crosstabulation analysis examining the significance of the various attributes of the establishments in each cluster are very similar to those presented in this section.

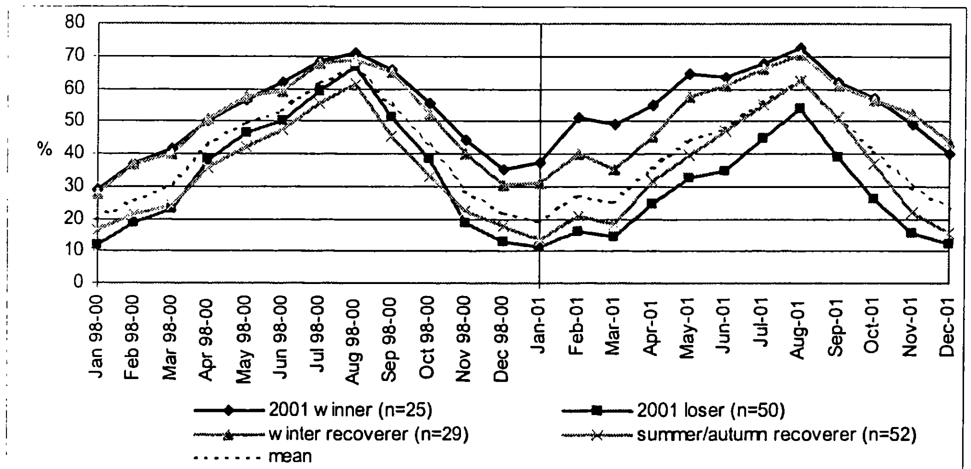


Figure 8-8: Average Occupancy Rates for '2001 Change' Clusters

In what follows, the results for the cluster analysis based on the simultaneous consideration of all three RCs with the initial cluster centres set artificially are presented for the sample without outliers (*n*=156). Figure 8-8 shows the average monthly occupancy rates for each cluster, and the sample as a whole, over the period 1998-2000 and for the year 2001. The changes in room occupancy rates between 2001 and 1998-2000 for each of the clusters are presented in figure F-4, Appendix F.

Component Scores	2001 winner	2001 loser	winter recoverer	summer/autumn recoverer
n	25	50	29	52
Number of Hotels	21	14	22	19
Number of Non-Hotels	4	36	7	33
RC1-change: 2001 change level	**0.839**	**-0.707**	0.516	0.221
RC2-change: summer/autumn change	-0.678	-0.498	-0.289	**0.756**
RC3-change: winter change	-0.362	-0.205	**1.058**	-0.217

Table 8-1: Component Scores for four '2001 Change' Clusters

Table 8-1 shows the cluster compositions and the corresponding ACS on each of the change indicators identified by the PCA. It can be seen that the '2001 winners' are characterised by high positive component scores on the first RC. The average occupancy rate in 2001 for these establishments is thus 4.5% higher than in the previous years, which is 7.4% higher than the average difference for the whole sample. The scores on the subsequent RCs give information about the pattern of change in occupancy rates. The negative average component score on RC2-change reflects up to 15% higher monthly occupancy rates between January and May 2001 in comparison to 1998-2000. Between June and October the gain in occupancy rates diminishes, but increases again at the end of the year. Even though the negative score on RC3-change would point to a loss between October and December, the high scores on the other two reference curves outweigh the deficit in these months. In fact, the '2001 winners' show up to 5% higher occupancy rates between October and December 2001. The majority of the establishments in the cluster are located at the seaside ($p \leq 0.05$), with a significant proportion in seaside towns ($p \leq 0.01$, $n=11$). They are mainly hotels ($p \leq 0.05$), with more than 26 rooms and almost 30% have more than 50 rooms. Nearly 30% of the establishments charge prices of £55 and more and 32% have prices between £35 and £44 per person per night for a double room. It is not surprising that a significant number of the enterprises in this cluster have conference facilities ($p \leq 0.01$, $n=17$) and nearly 30% have leisure facilities, such as gym, pool, sauna or beauty salon. Exactly 80% of the '2001 winners' offer some kind of special breaks ($p \leq 0.01$) and nearly 60% advertise bargain breaks or special out of season prices ($p \leq 0.01$) to attract customers. Almost 50% are licensed to hold weddings ($p \leq 0.01$). It can be concluded that this cluster has very similar characteristics to the 'top performer' group from the previous analysis.

The '2001 losers', on the contrary, are characterised by a considerable loss in occupancy rates in almost every month in 2001, which is shown by a high negative score on RC1-change. The negative score in RC2-change indicates that the loss is particularly pronounced in the months from June to October, but decreases at the end of the year. The average occupancy rate in 2001 of the '2001 losers' is 27.12% compared to a figure of 36.25% for 1998-2000. The regional distribution in Figure 8-9 shows an accumulation of these establishments in the extreme South East of Wales. This corresponds with the region in which most FMD cases in 2001 were reported and the majority of the countryside area here was closed off to visitors (cf. figure 3-3, chapter 3). Over 70% of this cluster are establishments of the non-hotel sector ($p \leq 0.05$). Farmhouses are significantly represented in this group, accounting for nearly 30% of its membership ($p \leq 0.01$). Two thirds of the enterprises are located in the countryside ($p \leq 0.1$). They are typically small establishments with only up to 3 rooms ($n=21$) or 4 to 10 rooms ($n=22$, $p \leq 0.1$), charge prices of £21-£25 ($p \leq 0.01$) and 70% of the establishments have 3 stars in the WTB grading system. It is particularly interesting to note that of the small number of establishments not providing any web information (n=13), most belong to the '2001 losers' cluster (n=8). Furthermore, nearly 80% of the establishments in this cluster do not offer any special breaks ($p \leq 0.1$).

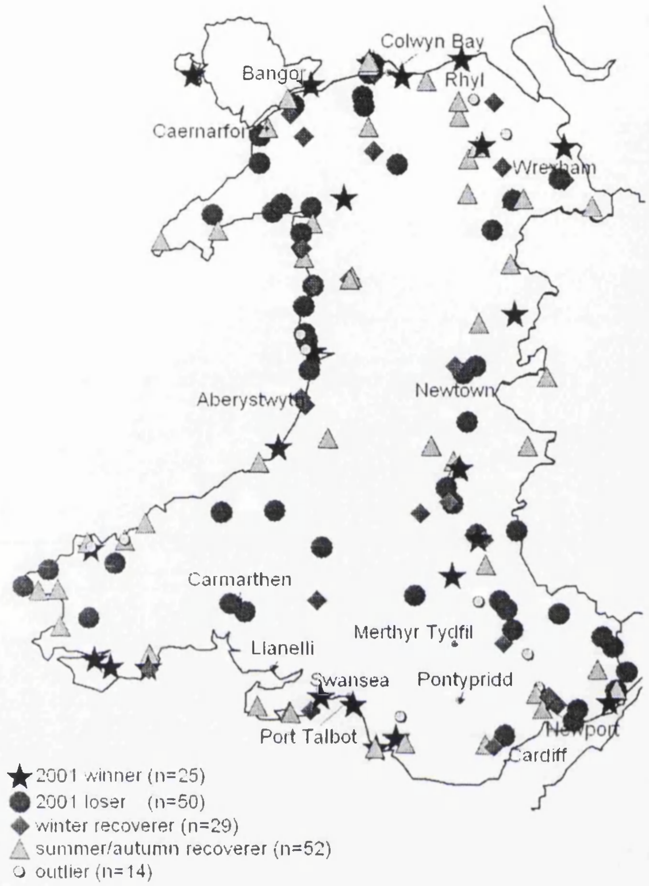


Figure 8-9: Regional Distribution of '2001 Change' Clusters and Outliers

The 'winter recoverers' lost up to 5% in average monthly occupancy rates in March and April, but later in the year gained up to 13% per month in November and December. This is reflected in the high positive score for RC3-change and suggests that a temporal displacement effect occurred which shifted business for these establishments to a later date in the year. Another factor, of course, may have been a general increase in domestic tourism after the terrorist attacks on September 11th. Over three quarters of the cluster are hotels ($p \leq 0.05$), particularly countryside hotels ($p \leq 0.05$, n=11). Most charge more than £26 per person per night ($p \leq 0.05$) with nearly 40% asking prices between £25 and £34. Just over 30% of the 'winter recoverer' establishments have 11 to 25 rooms and thus are mid-sized hotels ($p \leq 0.1$). Especially interesting is the fact that there is a significant concentration of 4- and 5-star hotels in this cluster ($p \leq 0.1$, n=8). Over half of the hotels in this group have conference facilities ($p \leq 0.05$), 32% have leisure facilities and 35% can hold weddings ($p \leq 0.1$). Exactly 50% of the establishments offer some kind of special break.

The 'summer/autumn recoverers' display an average loss of around 5% between March and May 2001. They recovered business between June and October, with a particularly successful September and October in which they gained around 5% in room occupancy rates in comparison to the previous years. This is signalled by the high negative component score on RC2-change. Over 60% of the establishments of the cluster are in the non-hotel sector, with B&Bs representing 23% of the group and guesthouses accounting for 29%. As Figure 8-9 shows, nearly 37% of the 'summer/autumn recoverer' enterprises are located at the seaside. Over half of the establishments can be found in the lower price segment, with prices of up to £24 (n=29), and 30% charge prices lower than £20 per night and per person ($p \leq 0.05$). It should be noted that most attributes characterising accommodation establishments do not show any significant relation with this particular cluster. This suggests that the clusters identified on basis of the occupancy change indicators provide a better framework for further investigations than the conventional approach. An overview of the cluster/crosstabulation results for the four groups identified is presented in table F-5, Appendix F.

8.2.3 Policy and Marketing Implications for '2001 Change' Clusters

It can be concluded that similar to the results presented in chapter 7, the clusters obtained do not align well with simple conventional categories such as a division into hotel and non-hotel establishments, expensive versus cheap accommodation or sea–side versus in–land locations. Given the complexities of the events in 2001, such simple conclusions would probably not be expected in any case. Again, the RCs produced by the PCA provide highly relevant performance indicators from a policymaking perspective: one dimension measures the overall change in occupancy rates, the other two reflect temporal shifts in demand. As the clusters were derived by considering all three dimensions concurrently, they provide a more comprehensive picture of the demand changes in 2001 than any analysis based on only one of the RCs. In terms of concrete pointers for marketing strategies – and for the allocation of funding for development purposes – the following conclusions would appear to be especially important.

Firstly, the results obtained clearly show that the '2001 losers' have lost out in every respect. Not only did they lose business during the height of the FMD crisis, but they continued to attract fewer customers than usual for the rest of the year. This finding supports the view that the FMD disaster resulted in changes in the perception of Wales as a tourist destination which went well beyond the actual problems caused by limited accessibility. Especially small farmhouses might have gained from active marketing efforts and particularly from up-to-date information on the internet during the FMD outbreak. Since for many of the businesses involved the resources available for marketing will be rather small, there is an argument in favour of providers acting together to promote farmhouse holidays after FMD in Wales, e.g. by offering tour packages around Wales, walking holidays, special breaks or special out of season prices.

The second point concerns the '2001 winners'. Clearly, these were winners in every sense of the word, managing to increase occupancy rates throughout the year and especially during the first six months of 2001. These providers generally cater not only for leisure but also for business tourists, as a diverse range of facilities are available. By and large, coastal resorts benefited from increased visitor numbers during the height of the FMD crisis. However, it is interesting to note that there are a number of '2001 winners' in in–land locations and some even directly in areas in close proximity to farm premises which had reported FMD cases. Typically, these are 4- or 5-star countryside or town hotels with conference facilities – highlighting the importance to the Welsh tourist industry of developing this sector.

The results for the 'summer/autumn recoverers' also provide interesting insights from a marketing viewpoint. After a loss in the early part of the year these businesses managed to increase occupancy rates especially from August to October. The cluster is characterised by a high proportion of non-hotel establishments at the lower end of the price range, many of which are located by the seaside or in towns. The recovery of occupancy figures in the summer/autumn would appear to be the result of a combination of temporal and geographical shifts of demand and the important implication is that this elasticity in demand actually exists and might be exploited in the future.

Finally, the 'winter recoverers' show that there is a significant market for Welsh destinations, even at times of the year which have traditionally been regarded as a natural off-peak season with little potential in terms of attracting tourism business. During the final quarter of 2001 this cluster virtually matched the occupancy figures of the '2001 winners'. In particular, a high proportion of the large 4- and 5-star countryside hotels with a number of additional facilities benefited from a boost in business during this period. This demonstrates that establishments in Wales are able to attract visitors outside the main summer and shoulder seasons. Therefore, expanding marketing efforts on the winter season in addition to other seasons might benefit those enterprises in future years.

The results confirm that the demand changes in 2001 were by no means uniform across Wales with some businesses experiencing lower occupancy rates throughout the year 2001, whilst others were able to increase their occupancy levels towards the end of 2001. Furthermore, a number of establishments even recorded higher rates for every month in 2001. The results show that a segmentation of accommodation establishments on the basis of performance change indicators enables tourist boards or other policy makers to identify and to target those establishments which suffered the most during the FMD outbreak, or those which were able to increase their performance in 2001.

8.3 Analysing the 2002 Changes in Welsh Room Occupancy Data

8.3.1 The Dimensions of Occupancy Performance for 1998-2002

At the last stage of the research the data for 2002 became available. This section analyses to what extent accommodation establishments in Wales were able to reverse the negative changes or to maintain the positive changes in occupancy rates identified in the previous section. Before analysing in detail the changes in tourism demand between 2002 and 2001, a PCA was conducted on the whole data set of room occupancy rates for the five-year research period from January 1998 to December 2002. This was done first to test whether the previously obtained general patterns underlying the variability in the data set were consistent, and second to identify any alterations in tourism demand patterns in 2002. As already mentioned in chapter 6, only 145 establishments provided sufficient information on room occupancy rates for the five-year period and only this subset was included in the subsequent analyses.

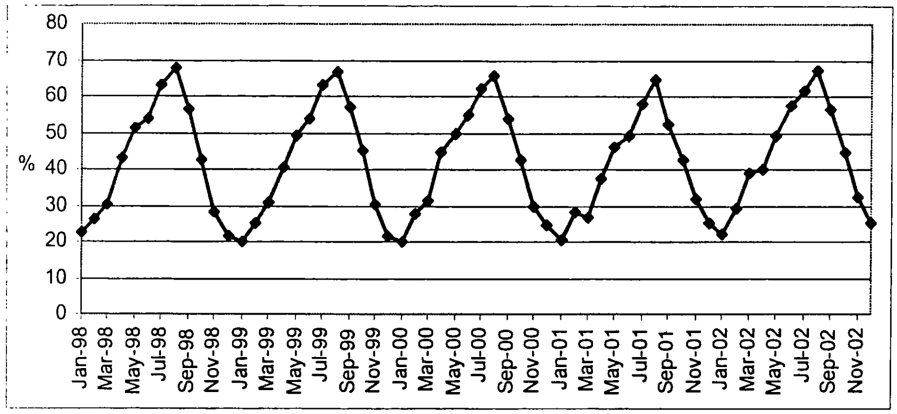


Figure 8-10: Average Room Occupancy for Serviced Accommodation Establishments from 1998-2002, *n*=145

Figure 8-10 shows the average room occupancy rates for the 145 accommodation establishments from January 1998 to December 2002. The general seasonal pattern in 2002 is very similar to that of previous years and thus it is expected that similar RCs will be identified by the PCA. The average room occupancy rate for the sample is 42.04%. Between 2002 and 2001 the annual room occupancy rate increased by 3.35%. It is particularly interesting to note that March 2002 displays higher average occupancy rates (38.8%) not only in comparison to 2001 (26.8%), but also in comparison to all other years (around 30.9%). This might have been caused by the timing of Easter, which fell on the last weekend of March (March 29 to April 1 2002) instead of the usual timing of Easter in April. The year 2002 was also different in that the spring bank holiday was moved from the usual last Monday of May to the 3rd of June and an extra bank holiday was scheduled for the 4th of June for the Queen's Golden Jubilee celebrations. It is therefore not surprising that slightly higher average room occupancy rates were recorded for June 2002. These changes are also likely to affect the shape of the RCs explaining the variability in the data set.

Before analysing the data for 1998 to 2002, a standard PCA and a PCA on AMC data were performed on the room occupancy rates for the reduced sample of 145 establishments, for both the previous research periods 1998 to 2000 and 1998 to 2001. This was done in order to investigate to what extent the results of chapter 7 and section 8.1 are comparable with the outcome of the subsequent analyses. The RCs obtained from these PCA approaches trace virtually the same general patterns and explain similar amounts of variance in the sample. When all RCs are taken into consideration simultaneously, the cluster compositions are slightly different to previous results. However, the attributes characterising each cluster are very similar to the results stated in the previous chapters and sections. The differences in the number of establishments in each cluster are not surprising as the groups are derived from the sample itself, which is overall composed slightly differently and contains fewer establishments. Nevertheless the majority of the enterprises were assigned to similar clusters, as before, and it can be concluded that the results from the previous chapters are fully comparable with the results drawn for the reduced sample of 145 establishments used for the subsequent analyses.

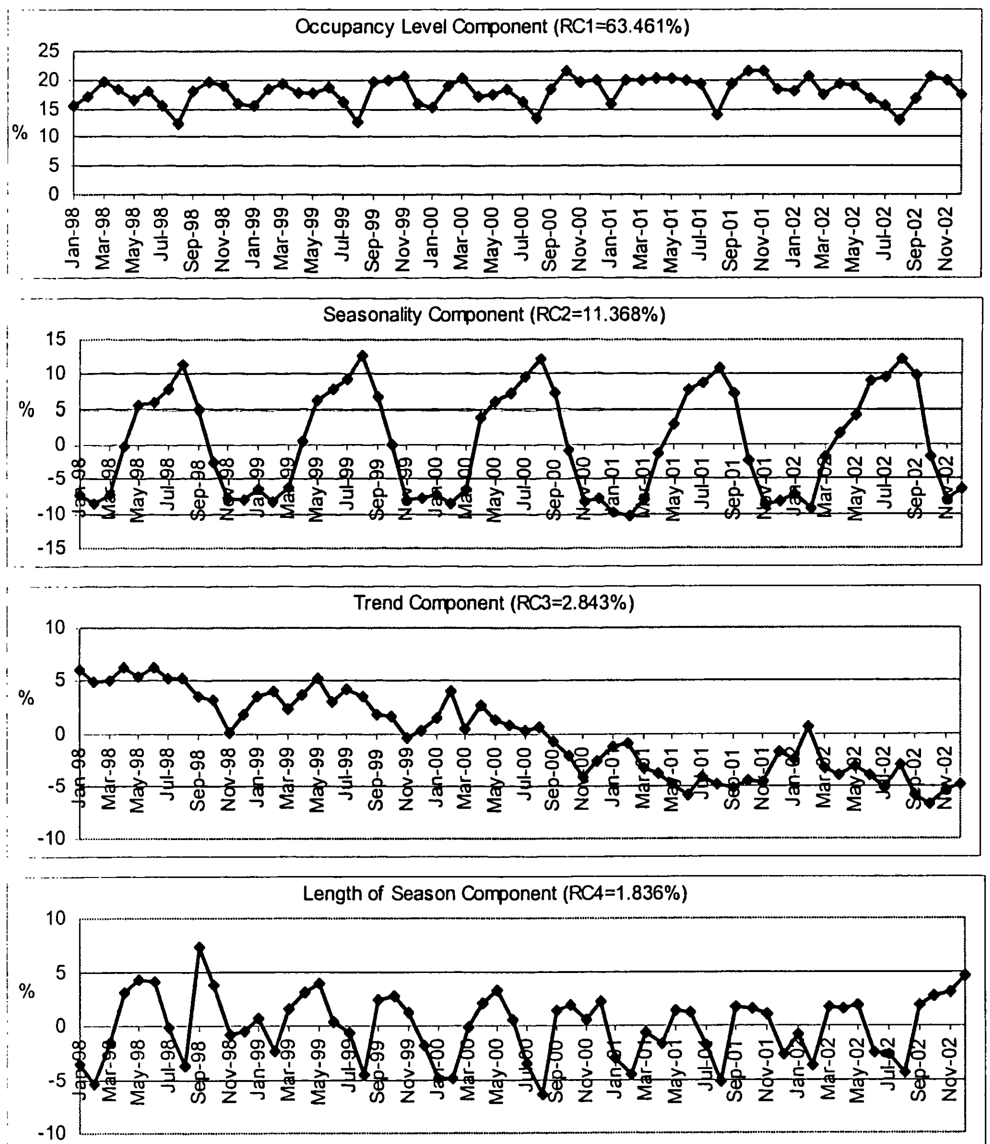


Figure 8-11: Component Loadings for Principal Components Derived from Standard PCA, *n*=145, 1998-2002

A PCA was applied to the room occupancy rates of the 145 establishments for the five-year research period from January 1998 to December 2002. Similar to the approaches used so far and to enable comparisons, the PCA was conducted on a correlation matrix. An examination of the correlation matrix prior to the PCA confirmed the suitability of the data set for such an approach. The detailed results for the complete PCA are presented in tables G-1 to G-7 and figures G-1 to G-2, Appendix G.

The standard PCA revealed four distinct dimensions, explaining altogether 79.51% of the total variance in the data set. Figure 8-11 displays the component loadings of these four RCs in the original scale of the variables. Similar to the results of section 8.1, the first three RCs can be interpreted: as the overall occupancy level, the seasonality element and the trend element. It is interesting to note that the trend component, RC3, also plays a distinct role for the five-year period. It follows the pattern of a downward trend in occupancy rates, especially between 2000 and 2001. In 2002, the majority of the component loadings are still negative but overall are similar to those in 2001. It should be noted that each RC explains part of the variance around the mean and thus the average occupancy curve for all establishments must be taken into account when interpreting the component scores for each dimension. Establishments with high positive scores on the trend component RC3 are characterised by a higher than average decrease in occupancy rates in 2001 (i.e. more than –2%) and a lower than average occupancy increase in 2002 (i.e. less than 3.35%). This means that a positive score on RC3 does not necessarily represent a negative change in occupancy rates between 2001 and 2002. In contrast to the dimensions previously identified by the standard PCA, a fourth component with an eigenvalue of greater than 1.0 was derived. This component only explains 1.84% of the overall variance. As it traces the familiar pattern of the length of season, it is expected that a similar component will be derived by the PCA on the AMC data.

The PCA applied to the AMC data, in order to examine the seasonal variations in more detail, obtained a large number of separate components with eigenvalues of greater than 1.0, as was the case for the previous analyses. The scree plot shows clearly that only the first three dimensions contribute significantly to the overall variance (cf. figure G-2, Appendix G) and further tests showed that only these three components trace distinct temporal demand patterns. The component loadings are displayed in figure 8-12.

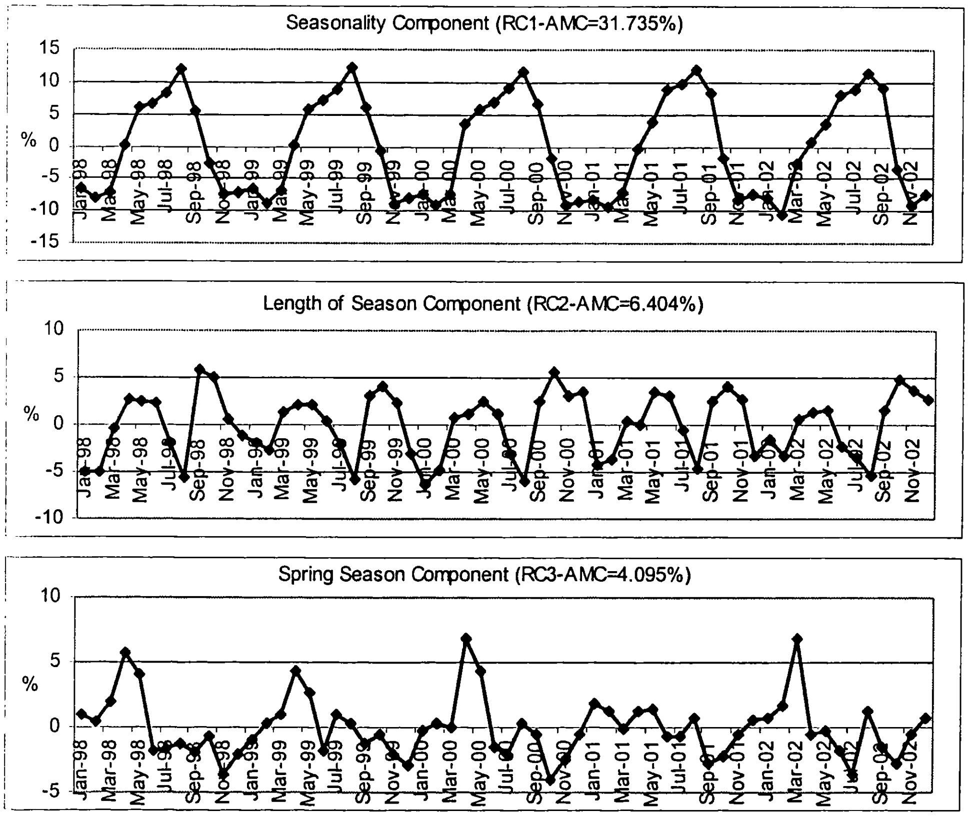


Figure 8-12: Component Loadings for Principal Components Derived from AMC Data, *n*=145, 1998-2002

The similarity in the amounts of variance, explained by each component as well as their shape, confirms that the general dimensions underlying the variability in the data set are consistent and stable. Thus there are appropriate to use to distinguish between accommodation establishments in Wales according to their temporal demand patterns. It is particularly interesting to note that RC3-AMC displays positive component loadings in the spring in all years with the exception of 2001. This indicates that in 2002 a spring season was evident again after the FMD in 2001. Furthermore, the PCA is not only able to detect general changes in the temporal demand variations, but calendar effects can also be traced. As already mentioned, the timing of Easter 2002 was different in comparison to the years 1998 to 2001. The component loadings of RC3-AMC normally peak in April but in 2002 the highest positive component loadings were recorded for March, which confirms that the third dimension is closely related to the importance of Easter.

As already discussed in previous chapters, the occupancy performance of each accommodation establishment can be assessed by analysing their set of component scores on each of the above–identified dimensions. The component scores for the dimensions – occupancy level, trend, seasonality, length of season and spring season – were screened for possible outliers and 17 establishments with extreme positive or negative scores were excluded accordingly from the subsequent cluster and crosstabulation analyses. Normal distribution of the component scores was confirmed by the P-P plots and the results for the Kolmogorov-Smirnov test.

The outcomes of the cluster/crosstabulation analyses for each of the performance dimensions considered separately are very similar to those presented in previous chapters. The composition and the characteristics of the different clusters will, therefore, not be discussed in detail here. However, a summary of the results is presented in table G-8, Appendix G. The table displays those characteristics where significant differences exist between the observed and the expected frequencies for a particular attribute category in a cluster. One of the major drawbacks of a smaller sample size is the fact that the expected frequencies in each cell, i.e. cluster vs. attribute category, is much smaller and in some cases even below 5.0. If the expected count is less then 5.0 then the characteristics in the table are displayed in parentheses. As already mentioned, generalisations based on the associated significance levels for those attribute should only be made with great caution. Also included are some attributes where a much higher than expected count in that cell of the contingency table was recorded but not at a statistically significant level. These results were included in order to get a better understanding of the composition of each cluster. The slight differences in both, the significance levels for some of the attributes and the exact numbers of establishments in each category of the clusters are expected since the sample size is reduced and, thus, the composition of the sample in terms of the characteristics of the establishments has changed. Conclusions about the significance of various attributes in the different clusters should therefore only be drawn with caution where differences from earlier results are evident.

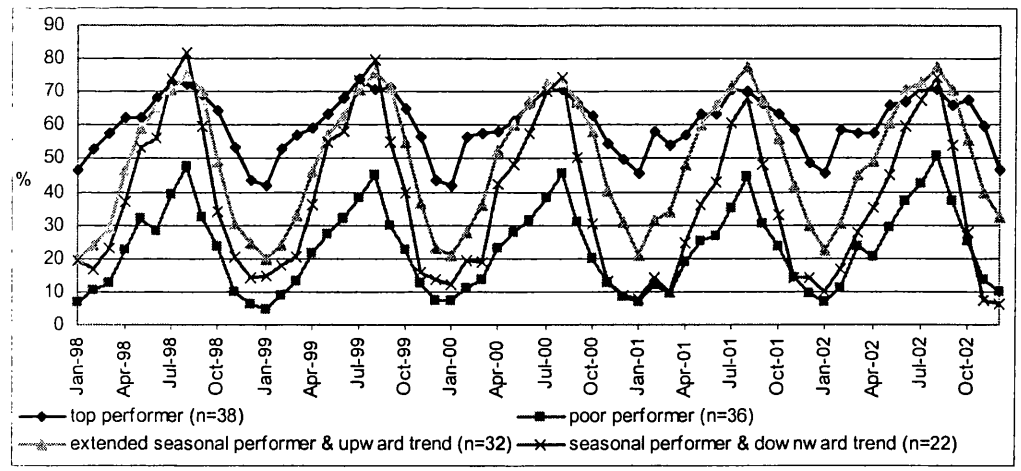


Figure 8-13: Average Occupancy Rates for four Clusters of 'Performers', 1998-2002, *n*=128

Figure 8-13 displays the average room occupancy rates for each of the four clusters of occupancy 'performers' identified, when all RCs are considered simultaneously. It has to be noted that only 128 establishments were included in the analysis as 17 were identified as outliers. The four groups can be labelled in the same way as the results of section 8.1 as 'top performer', 'poor performer', 'extended seasonal performer & upward trend' and 'seasonal performer & downward trend'. The only difference from the previous results is that none of the four clusters achieves high positive scores on the spring season component. However, from figure 8-13 it is evident that the 'poor performers' cluster is characterised by a slight spring season, especially in 1998 and 2002. This cluster also scores 0.137 on RC3-AMC. Apart from this the general demand pattern for each 'performer' cluster is very similar to those previously identified.

The development of occupancy rates for each of the groups in 2002 is particularly interesting. As can be seen from figure 8-13, the average occupancy rates increased for all clusters between 2001 and 2002. The establishments of the 'extended seasonal performers & upward trend' and the 'poor performers' clusters display negative ACS values on RC3, with –0.581 and –0.328, respectively. Whilst the 'extended seasonal performer & upward trend' businesses show a steady increase in annual occupancy rates, from 47% in 1998 to 52.3% in 2002, the 'poor performers' cluster displays only slight changes up 2001 but a considerable increase in the average annual occupancy rate, of 4.3%, in 2002. The highest average increase in annual occupancy figures, between 2001 and 2002 is experienced by the 'seasonal performers & downward trend' cluster, which shows a rise of 4.9%. However, the average occupancy level of that cluster in 2002, of 36%, does not yet reach the 2000 level of 37.1%. This cluster is thus characterised by a positive ACS of 0.874 on RC3, which also indicates the substantial drop in occupancy rates of 6.1% between 2000 and 2001. The 'top performers' cluster displays only slight changes in the average annual occupancy rates for the whole research period 1998 to 2002.

The results for the crosstabulation analysis for the 'performer' clusters obtained for 1998-2002 are displayed in table G-9, Appendix 9. The significant attributes identified for the four groups are very similar to those discussed in previous sections, thus the same conclusions regarding marketing strategies and policies can be deduced. The results show clearly that the PCA for the complete five-year period 1998 to 2002 gives insufficient information about the development of tourism demand patterns after the outbreak of the FMD in 2001 and more particularly, about the recovery process in 2002. Therefore a detailed PCA analysis of the changes in room occupancy rates between the subsequent years is carried out, and presented in the next section.

8.3.2 PCA on Occupancy Change Data between 2002 and 2001

After the unexpected reductions in demand caused by the outbreak of FMD in 2001, the average annual room occupancy rate, for the sample of 145 establishments increased by 3.35% in 2002. Figure 8-14 displays the average rates for 2002 compared to 2001, in addition to the average occupancy change between these two years. It can be seen clearly that positive changes were experienced particularly in the first half of 2002 with a rise in the average room occupancy rates of 12% in March, 8% in June and 4% in September. It must be noted, however, that the high increases in March and June 2002 cannot be solely assigned to recovery effects after the outbreak of FMD in 2001. These positive developments are primarily due to the different timing of Easter (in March 2002) and the two bank holidays in June during that year. The monthly differences between the average room occupancy rates in 2002 and the period 1998-2000 for the 145 establishments, as shown in figure H-5, Appendix H, confirm that the year 2002 proved somewhat different. Positive, but smaller, changes in occupancy rates in March (7.8%) and June 2002 (3.1%) were also recorded compared with those months in 1998-2000. This shows, that even though the tourism demand pattern was different in 2002, the overall occupancy level increased in comparison to 2001, which indicates a recovery process following the end of the FMD outbreak.

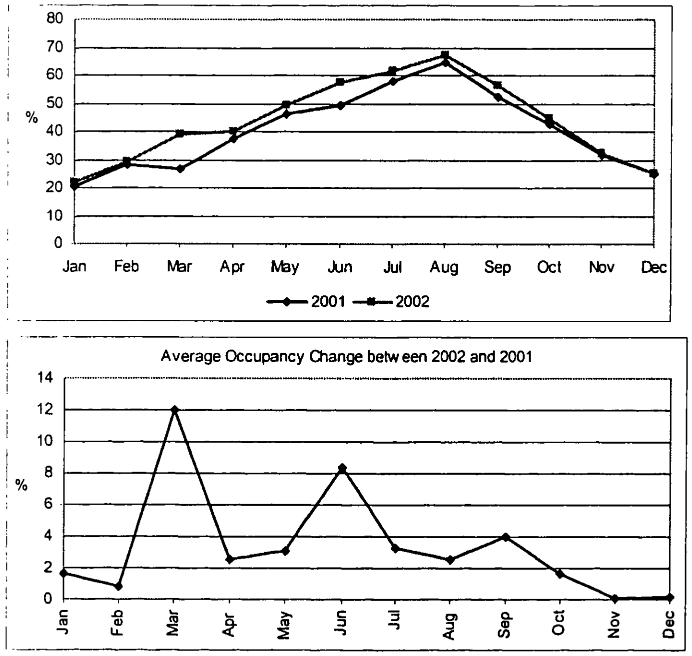


Figure 8-14: Changes in the Average Room Occupancy Rates between 2002 and 2001, *n*=145

A PCA was performed on the differences in the monthly occupancy rates of the 145 establishments calculated for the years 2002 and 2001. In common with the previous analyses, this approach was again based on a correlation matrix to enable comparisons. The detailed PCA results are displayed in tables H-1 to H-4 and figure H-1, Appendix H. Four components were derived, which altogether explain 57.9% of the total variance present in the sample. Figure 8-15 displays the component loadings in the original scale of the variables for each of the four dimensions extracted.

RC1-change 2002 explains just over 20% of the variance and can be used to differentiate between establishments according to the size of their occupancy changes between 2002 and 2001. The component loadings are all positive, with the highest loading displayed in June. A component score of 1 on this dimension would indicate an increase of 10.64% in the average annual occupancy rate in 2002, when compared to 2001. This is 7.29% higher than the average rise of 3.35%. In June the difference amounts to 19%, which is 10.6% more than the average increase for that month throughout the whole sample. In contrast, an establishment, with a component score of

−1 on this dimension, had experienced a loss of 3.94% in the annual average occupancy rate and a decrease of 2.2% for the month of June only.

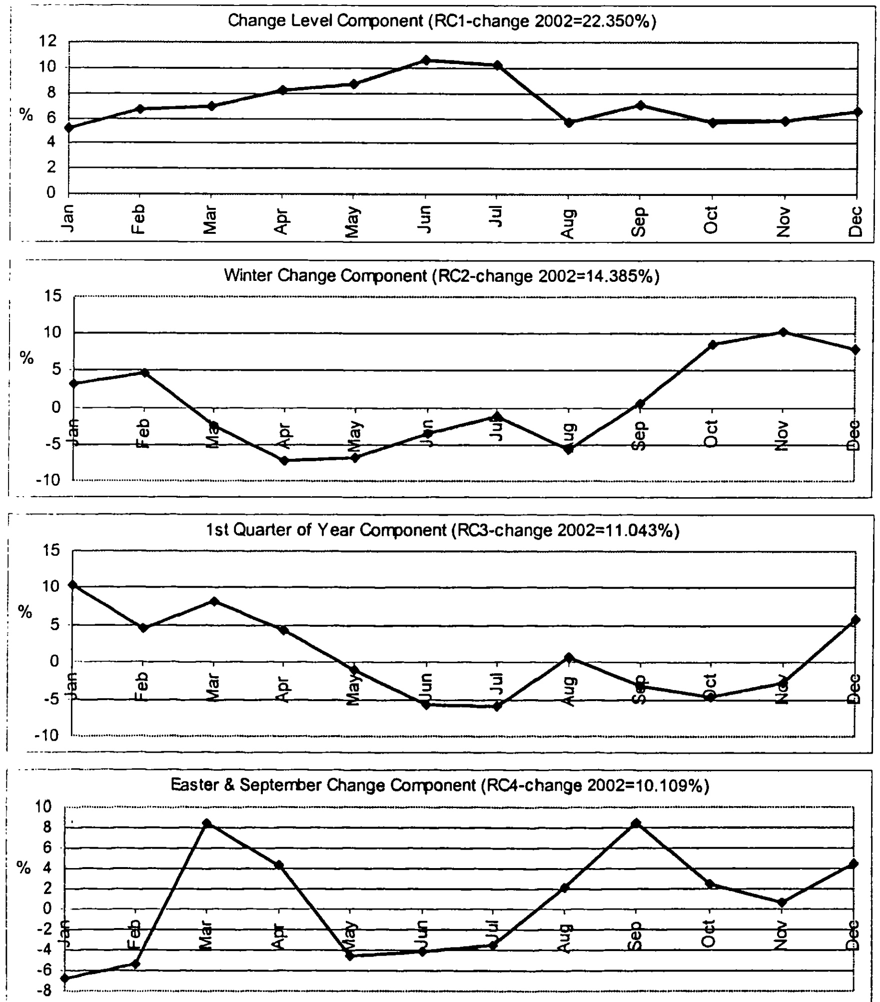


Figure 8-15: Component Loadings for Principal Components of 2002 Change in Occupancy Rates, *n*=145

The second reference curve (RC2-change 2002) accounts for 14.4% of the overall variance of the sample. It can be referred to as the 'winter change component' as it is characterised by high positive loadings between October and December. Establishments with a high positive component score on that dimension display a higher than average increase in occupancy during the last three months of the year (of around 10%). In addition they also experienced a slight loss in occupancy rates between April and August 2002, in contrast to 2001. A high negative score on RC2-change 2002 represents, therefore, a slight increase in occupancy performance from April to August and a lower than average increase during the winter months of 2002. RC3-change 2002 accounts for approximately 11% of the variance, and is characterised by positive loadings between January and April. This indicates that businesses with a positive score will have primarily experienced a positive change in occupancy levels during the first quarter of 2002 and a slight loss between May and November. It is therefore labelled as the '1st quarter of year' component. The last reference curve, explaining 10.1%, shows positive loadings, especially between March and April and August to October. It can be used to distinguish between establishments according to their change in occupancy rates at Easter and in September 2002.

To assess to what extent individual establishments or groups of establishments have been able to recover from the events in 2001, four component scores (one for each change dimension: RC1- to RC4-change 2002) were calculated for each enterprise and examined in detail. Initially the component scores of each dimension were tested for normality and the P-P plots, as well as the Kolmogorov-Smirnov test, confirmed the normal distribution for all change indicators. Secondly, the scores were screened for outliers, which were then excluded from the subsequent cluster/crosstabulation analyses.

Various cluster/crosstabulation analyses were carried out separately for each of the four change indicators. Three clusters were obtained in each case and contingency tables were analysed. It has to be noted that significant differences, relating to the attributes of the establishments, were found only for the clusters identified in relation to the first component RC1-change 2002. Thus, only these are presented below. Out of the 140 establishments (5 were excluded as outliers), 33 achieved high positive component scores on RC1-change 2002 (see table H-5, Appendix H). These are referred to as the 'positive 2002 change' cluster with an ACS of 1.08. The annual average occupancy rate for this group increased, from 33.1% in 2001, to 44.5% in 2002 (see also figures H-2 and H-3, Appendix H). This already indicates that the establishments in that group experienced very low occupancy levels in 2001. A further analysis showed that these businesses lost, on average, 6.54% in occupancy rates in 2001 when compared to 1998-2000. Nearly 50% of the 'positive 2002 change' cluster are countryside non-hotels. Just over 30% of that group are farmhouses and 36% are located in the holiday region Mid Wales/Brecon Beacons ($p \leq 0.01$). The regional distribution of the establishments in this cluster is presented in figure H-4, Appendix H. These attributes are very similar to those identified for the previous '2001 losers' cluster. It is therefore not surprising that over half of the establishments in the 'positive 2002 change' cluster were identified as '2001 loser' in the previous analysis of occupancy changes in 2001 ($p \leq 0.01$). This illustrates that some establishments of the '2001 losers' cluster were successful in increasing occupancy levels in 2002, following the FMD crisis in 2001. An analysis of average annual occupancy rates shows that these establishments not only recovered in 2002, but also reached a higher occupancy level than before, with occupancy rates of 39.6% for 1998-2000, 33.1% in 2001 and 44.5% in 2002.

In contrast, the 'negative 2002 change' cluster, with an ACS of –0.859 on RC1-change 2002, comprises 41 establishments most of which are hotels ($p \leq 0.1$). Over a third of the businesses are seaside hotels and just over a quarter are countryside hotels. A significant proportion of the businesses in that cluster have conference facilities ($p \leq 0.05$), are licensed to hold weddings ($p \leq 0.05$), offer some kind of special breaks ($p \leq 0.05$), out of season prices ($p \leq 0.05$) and special prices for longer stays ($p \leq 0.1$). A closer inspection of the occupancy rates reveals that these establishments lost, on average, 3% (i.e. a decrease in the annual average occupancy rate from 47.3% in 2001 to 44.3% in 2002). These figures also show that the establishments overall operate at higher occupancy levels. An analysis of the 1998-2000 data demonstrates that the majority of the establishments in that cluster did not experience a lowering of occupancy rates in 2001. A significant proportion of that cluster (37%) was also identified as '2001 winners'. However, the establishments in this cluster, which experienced a slight increase in occupancy levels in 2001, lost out in the year 2002, with average occupancy levels dropping even lower than the 1998-2000 figures. It can therefore be concluded that these businesses were unable to hold on to their success of 2001, which might have been caused by displacement effects due to the FMD crisis, e.g. different clientele in 2001. Other factors might well play a far more significant role in explaining the causes of these changes. These include, for instance, marketing campaigns or even an increase in prices after the success in 2001. It would thus be of great interest for policy makers to get more detailed information on these enterprises in relation to marketing campaigns and management decisions.

As already mentioned, the analyses of the contingency tables for the clusters, relating to the dimensions RC2-change 2002 to RC4-change 2002, did not reveal any significant differences between the attributes of the establishments and their cluster membership.

This indicates that attributes, other than the ones covered by conventional categorisations, such as the location, the size, the price or the kind of establishment are responsible for the particular changes in occupancy levels between 2002 and 2001.

'2002 Change' Cluster	2002 winner	Easter & autumn/winter winner	2002 loser & Jubilee winner	2002 loser & March winner
n	42	25	37	25
Number of hotels	16	11	24	16
Number of non-hotels	26	14	13	9
RC1-change 2002: 2002 change level	**0.622**	0.272	**-0.558**	**-0.368**
RC2-change 2002: winter change	-0.639	**0.629**	0.386	-0.148
RC3-change 2002: 1st quarter of year change	-0.229	0.033	-0.302	**0.710**
RC4-change 2002: Easter & September change	0.352	**0.761**	-0.413	-0.372

Table 8-2: Average Component Scores for '2002 Change' Clusters

A cluster approach based on the simultaneous consideration of all change indicators – RC1-change 2002 to RC4-change 2002 – was also carried out in order to identify establishments with similar change patterns. Several cluster analyses were performed including the K-means method based on initial cluster seeds as identified by Ward's method as well as artificially set initial centres. The best results revealing distinct occupancy change patterns were achieved with a four-cluster solution. It has to be noted that only 129 establishments were included in the analysis as 16 were identified as outliers with extreme component scores on one or more RCs. The number of establishments in each cluster and the ACS for each change dimension are displayed in table 8-2.

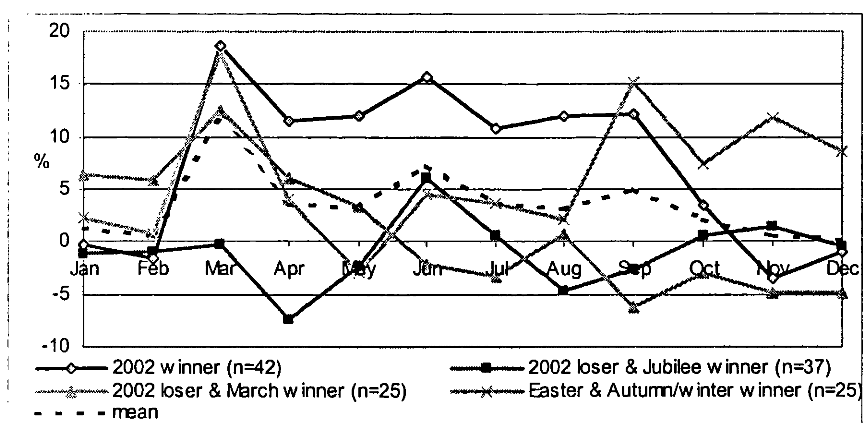


Figure 8-16: Changes in Average Room Occupancy Rates between 2002 and 2001 for '2002 Change' Clusters, *n*=129

Figure 8-16 shows the changes in the average room occupancy rates between 2002 and 2001, for each of the clusters which were labelled as '2002 winner', 2002 loser & March winner', '2002 loser & Jubilee winner' and 'Easter & Autumn/Winter winner'. It can clearly be seen that, apart from the '2002 loser & Jubilee winner' cluster, all groups display a positive occupancy change in March 2002 in comparison to March 2001. These positive changes relate primarily to the different timing of Easter in 2002, but might also be partly the result of recovery effects after the FMD crisis, which hit Wales fully in March 2001.

The '2002 winner' cluster consists of 42 establishments. The annual average occupancy of these businesses increased by 7.48% from 32.5% in 2001 to 39.9% in 2002. They show particular positive developments in March and June 2002, with a difference of over 15%. The crosstabulation analyses revealed that over a quarter of this cluster are farmhouses ($p \leq 0.05$) and are located in Mid Wales/Brecon Beacons. Nearly half of the establishments are categorised as countryside non-hotels ($p \leq 0.1$) and 40% of the businesses charge prices between £21 and £25 per night/person for a double room. The similarity to the results of the separate analysis on RC1-change 2002 is not unexpected, as the '2002 winner' cluster is mainly characterised by a high positive ACS on RC1-change 2002. Figure 8-17 displays the average room occupancy rates for each cluster, for the period 1998-2000, 2001 and 2002. It can clearly be seen that the '2002 winners' experienced a considerable drop in occupancy levels between 1998-2000 and 2001. Thus it is not surprising that 36% of the establishments in this cluster were also identified as '2001 losers' in the previous analysis. It is interesting to note that five establishments, which were labelled as '2001 winners', are also included in this cluster. The regional distribution of the '2002 winners' cluster, displayed in figure 8-18, shows that the majority of the businesses are located in Mid Wales, in the area between Merthyr Tydfil and Newtown. Another accumulation can be seen at seaside locations at the West coast of Wales.

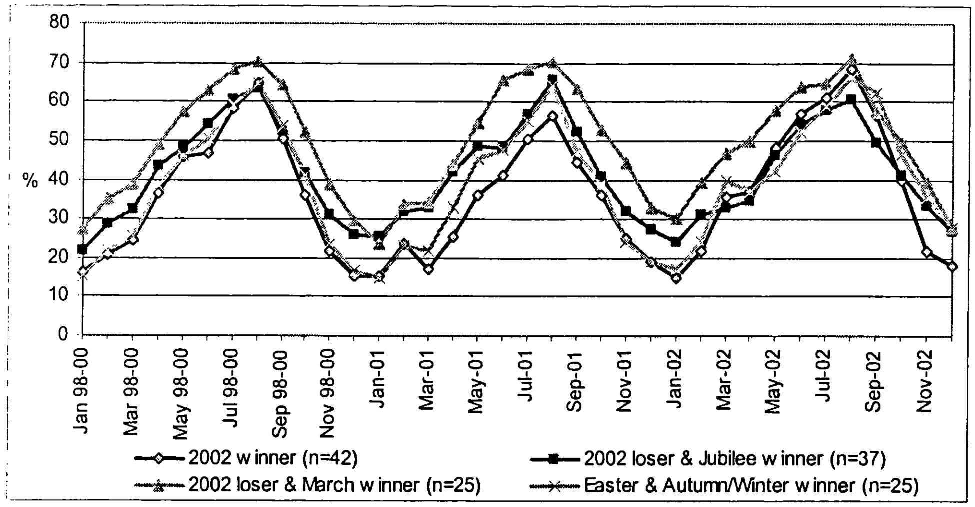


Figure 8-17: Average Room Occupancy Rates for '2002 Change' Cluster, *n*=129

The 'Easter & Autumn/Winter winner' cluster has high positive scores on RC2-change 2002 and RC4-change 2002. The establishments in this group display a positive change in occupancy rates between 2002 and 2001, with a difference of 18% in March and 15% in September. Higher rates are also shown for October to December 2002. The average annual room occupancy rate increased from 36.2% in 2001 to 42.4% in 2002. The figure for 2002 is thus even higher than the average annual 1998-2000 occupancy level of 38.0%. The majority of the establishments in this cluster also experienced a drop in occupancy levels between 1998-2000 and 2001. Thus it is not surprising that 40% of this group was also labelled as '2001 losers'. The crosstabulation analysis did not yield any significant relationships between the attributes of the establishments and the cluster membership. For example, all kinds of establishments are represented in the 'Easter & Autumn/Winter winner' cluster, i.e. 11 hotels, 7 guesthouses, 6 B&Bs and 1 farmhouse. As can be seen from figure 8-18, the regional distribution of these establishments does not show any significant accumulation in a particular location.

The '2002 loser & Jubilee winner' cluster comprises 37 establishments and is characterised by a negative ACS on RC1-change 2002. The businesses in this cluster display negative occupancy changes in nearly every month in 2002, when compared to 2001, with the exception of June. During this month, the occupancy rate is on average 5% higher in 2002 than in 2001. The annual average occupancy rate decreases from 42.98% in 2001 to 41.02% in 2002. As shown in figure 8-18, over 40% of the establishments in this cluster are located in North Wales, especially in the holiday areas around Llandudno and the North Wales Borderland. Over 60% are hotels, particularly seaside (*n*=10) and countryside hotels (*n*=8). Nearly 50% of the businesses in that cluster were identified as 'summer/autumn winners' in the previous analyses, whilst a quarter belonged to the '2001 winner' cluster.

Even though the average annual occupancy rate for the '2002 loser & March winners' increased slightly, from 48.94% in 2001 to 49.78% in 2002, these positive changes were much lower than the average increase for the whole sample. The cluster is thus characterised by a negative ACS on RC1-change 2002. The high positive ACS on RC3-change 2002 indicates a positive growth in occupancy levels from January to April 2002, in contrast to the preceding year. The analysis of the contingency tables again revealed no significant accumulation of establishments of a particular kind or location in that cluster. Nevertheless the results show that over 60% of that cluster are hotels, especially countryside hotels. As can be seen from figure 8-17, the average occupancy rates for this group are much higher than for the other three clusters especially during the shoulder seasons. However, between June and December 2002, the occupancy rates decreased to average levels.

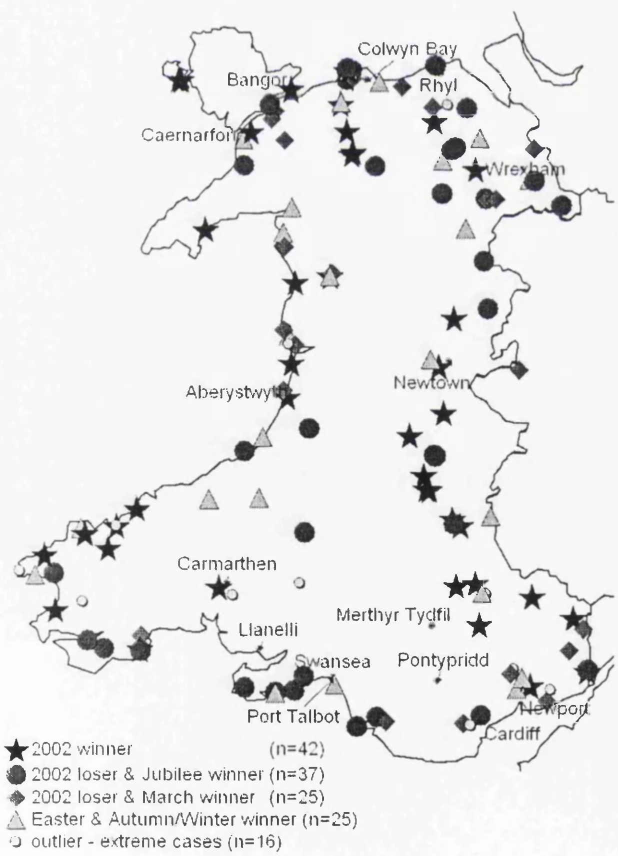


Figure 8-18: Regional Distribution of '2002 Change' Clusters and Outliers

As it proved very difficult to reach any conclusions about the characteristics of the establishments in each cluster, it is suggested that the differences in occupancy rates experienced between 2002 and 2001, were not linked to a particular type or location of establishment, but to other factors such as marketing policies. In order to explain in detail the observed occupancy changes, it would be of great interest to follow up this research by contacting a sample of businesses in each cluster. However, the results also point towards some similarities between the attributes of some of the '2002 change' clusters and the identified '2001 change' clusters. To investigate these similarities further, the changes in the average occupancy rates in 2002 were also assessed for each of the '2001 change' clusters.

8.3.3 Revisiting the '2001 Change' Clusters in 2002

The previous results already indicated a possible relationship between the changes in occupancy performance in 2001 and some of the temporal demand shifts in 2002. This might be caused by impacts of the FMD in 2001 and the following recovery process for some establishments in 2002. Given the complexity of the events in 2002, it is not possible to identify and to separate the causes of the occupancy changes for every establishment in detail. However, the results of the various PCA give some indication about the types of occupancy change patterns experienced by the individual businesses or groups of establishments.

To gain a deeper understanding of the recovery processes in 2002 a PCA, similar to the approaches in sections 8.2.1 and 8.3.2, was applied to the differences in the monthly occupancy rates of the individual establishments between 2002 and 1998-2000. This analysis excludes the year 2001 and the results therefore indicate to what extent establishments improved their occupancy rates in 2002 above the 1998-2000 levels. The PCA was again performed on the correlation matrix and four principal components were derived which together explain 62.8% of the variance present in the change occupancy data set. The component loadings for the four RCs presented on the original scale of the data are presented in figure H-6, Appendix H. The first component accounts for 33.3% of the variance and again relates to the overall size in occupancy changes. A component score of 1 on this RC would indicate an increase in the average occupancy rate in 2002 of 8.9% in comparison to 1998-2000. This is 7.47% higher than the average increase in the annual occupancy rate of the sample of 145 establishments which was only 1.43%.

RC2-change, explaining 13.1% of the variance, can be interpreted as the winter change component. Establishments with a high positive score will show higher occupancy rates, especially in November and December 2002, compared to 1998-2000. RC3-change accounts for 10.8% of the variance and can be used to distinguish between establishments according to their change in occupancy rates during January to February. The last dimension (RC4-change) explains 8.6% of the variance and relates to the different timing of Easter in 2002. Establishments with a high positive score on this dimension will display around 10% higher occupancy rates in March 2002 in contrast to the period 1998 to 2000.

The component scores of these four dimensions, obtained by the PCA, can again be looked upon as indicators of the changes in occupancy performance for every establishment, this time between 2002 and 1998-2000. The advantage of analysing the component scores in comparison to, for example, the annual average occupancy rate, is the fact that the component scores assess an establishment's change relative to the average change of the sample. In addition, the change indicators contain not only information about the overall size of the change, relative to the sample average, but also information about the change pattern. A comparison of the establishments' component scores obtained for the change between 2002 and 1998-2000 with those attained for the change between 2002 and 2001, as well as those calculated for the change between 2002 and 1998-2000, shows which establishments were able to recover fully in 2002 and which were still experiencing losses.

The focal point of this research was the identification of groups of businesses with similar occupancy performance or changes, rather than analysing the performance of individual establishments. It was therefore of great interest to revisit the in section 8.2.2 identified '2001 change' clusters in 2002. The analysis of the temporal demand shifts in 2002 for the '2001 winner', '2001 loser', 'winter recoverer' and the 'summer /autumn recoverer' might well improve the understanding of the recovery processes in 2002 for the establishments in question. As only 145 businesses reported sufficient data in 2002, the numbers of establishments in each of the clusters decreased slightly. The monthly average room occupancy rates for each of the four groups are presented in figure 8-19.

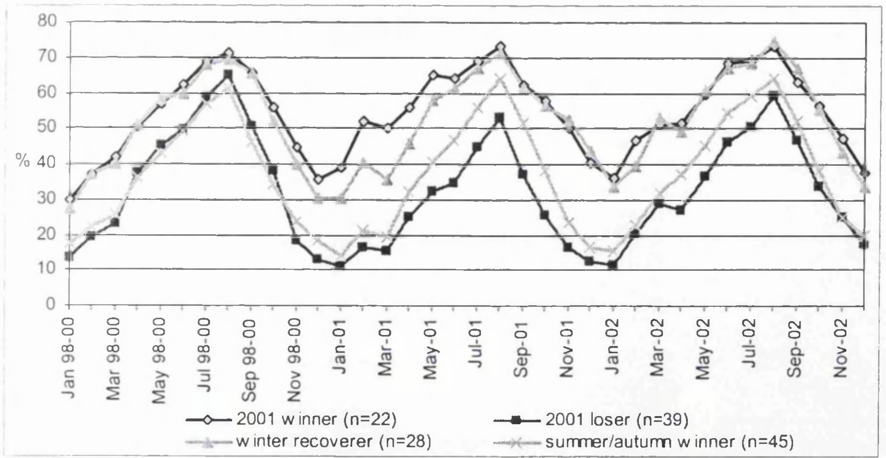


Figure 8-19: Average Occupancy Rates for '2001 Change' Clusters, 1998-2002

Differences between the occupancy levels in 2002, when compared with preceding periods, are clearly evident for all '2001 change' clusters. Table 8-3 displays the ACS for the '2001 change' clusters on each of the RCs identified by the different PCA on room occupancy change data. These change indicators give an overview of the magnitude and the pattern of occupancy changes between the periods 2001 vs. 1998-2000, 2002 vs. 2001 and 2002 vs. 1998-2000 for these four groups. As mentioned before, the structural components of the PCA are derived from the data itself. It should be noted that all RCs or change components, used to calculate the ACS displayed in table 8-3, are those obtained for the reduced sample of 145 establishments. Namely, the PCA performed on the monthly differences between 2001 and the period 1998-2000 for the sample of 170 establishments (cf. section 8.2.1) was repeated for the reduced sample of 145 establishments. The three RCs obtained are displayed in figure H-7, Appendix H. The analysis of the RCs and the component scores confirmed that there are only slight differences between the results for the 170 establishments and the sample containing only 145 businesses. Furthermore, no significant changes were seen in the membership of the establishments to the '2001 change' clusters and thus the original groups could be used for this analysis.

	'2001 change' Cluster	2001 winner	2001 loser	winter recoverer	summer/autumn recoverer
	number of establishments	22	39	28	45
Change 2001 vs. 1998-2000	Change Level Component (RC1-change)	**0.876**	**-0.889**	0.452	0.138
	Summer/Autumn Change Component (RC2-change)	-0.733	-0.477	-0.270	**0.756**
	Winter Component (RC3-change)	-0.403	-0.259	**1.033**	-0.230
Change 2002 vs. 2001	Change Level Component (RC1-change)	**-0.621**	**0.425**	-0.190	-0.002
	Winter Change Component (RC2-change)	0.053	**0.348**	**-0.455**	0.027
	1st Quarter of Year Component (RC3-change)	**-0.329**	-0.218	0.152	0.128
	Easter & September Change Component (RC4-change)	-0.037	0.215	0.077	-0.091
Change 2002 vs. 1998-2000	Change Level Component (RC1-change)	**0.224**	**-0.589**	**0.317**	**0.225**
	Winter Component (RC2-change)	-0.037	**0.480**	-0.008	**-0.346**
	January/February Change Component (RC3-change)	**0.615**	-0.174	0.065	**-0.236**
	Easter Change Component (RC4-change)	0.066	-0.114	**0.263**	-0.145

Table 8-3: ACS for '2001 Change' Clusters for Different Change Components

As can be seen from table 8-3, the '2001 winners' cluster was the only group with a high negative component score on RC1-change for 2002 vs. 2001 (ACS=–0.621) and thus experienced lower occupancy rates in 2002 when compared with 2001. However, the occupancy levels in 2002 were still higher than those recorded for 1998-2000. This is indicated by the positive ACS for RC1-change for 2002 vs. 1998-2000 (ACS=0.224). The monthly average occupancy rates for this group for the three periods analysed are presented in figure H-8, Appendix H. This shows that the positive changes in 2001 and 2002 were primarily experienced between January and June. In fact, the average rates for the rest of the year, July to December, show only slight differences over the years analysed. This is indicated by ACS values close to zero, on the 'winter change' component, for the periods 2002 vs. 2001 and 2002 vs. 1998-2000. It can be concluded that the majority of the establishments in the '2001 winner' cluster were, in 2002, able to hold on to their success experienced in the first half of 2001. Section 8.2.2 revealed that these establishments offer a wide range of facilities and cater not only for leisure but also for business tourists. This might explain the high occupancy performance, especially in January and February, also indicated by the ACS of 0.615 on RC3-change for 2002 vs. 1998-2000. The higher occupancy rates in the first half of 2002 are possibly an indication of repeated visits of business and leisure guests. However, only an analysis of the room occupancy rates for 2003 and 2004 can confirm whether these positive changes in the first half of the year were genuine, or just the result of the calendar effect and the additional bank holiday in 2002.

In contrast, the '2001 losers' cluster is the only group displaying a positive ACS on RC1-change for 2002 vs. 2001 (ACS=0.425). This points towards an increase in the annual average room occupancy rate of 6.66%, from 27.01% in 2001 to 33.67% in 2002. However, the negative ACS on RC1-change for 2002 vs. 1998-2000 (ACS= –0.589) indicates that the majority of these establishments were not able to recover fully in 2002 from the effects of the events in 2001. Between April and October 2002 the average occupancy levels were still below the 1998-2000 figures. Slightly higher rates were recorded only for the out of season months (see Figure H-9, Appendix H). This is also shown by the positive ACS on the 'winter change' component for the changes between 2002 vs. 2001 as well as 2002 vs. 1998-2000, at 0.348 and 0.480, respectively. It can therefore be concluded that the majority of the '2001 loser' establishments not only lost out in every respect in 2001, but also were unable to recover fully in 2002 from the effects of the FMD outbreak. For the main part of the year 2002 the occupancy levels were still below the 1998-2000 averages. This indicates that there is still a long way to go even to reach the same performance levels as those recorded for the period 1998-2000. It might well be of interest for policymakers and providers of funding to analyse, in detail, which businesses of that group have nearly recovered and which are still operating at very low occupancy levels. For example, a more detailed analysis of the component scores for each individual '2001 loser' establishment for each of the 'change indicators' can be used by decision makers to assess the recovery process for each business and to allocate funding to those which need it most. This is demonstrated in section 8.4.

The 'winter recoverers' cluster shows a continuous upward trend in the annual average room occupancy rates. These were calculated at 49.4% for 1998-2000, 52.3% for 2001 and 53.7% for 2002. The negative ACS of –0.19 for RC1-change between 2002 vs. 2001 indicates that the increase in occupancy levels was below the average growth of 3.35% for the whole sample. It is interesting to note that the 'winter recoverers' group was not able to repeat the positive development from the winter months in 2001 in 2002 (ACS on 'winter change' component for 2002 vs. 2001 was –0.455). The overall increase in the annual average occupancy rate in 2002 was due to higher rates in March, June and August 2002 (cf. figure H-10, Appendix H). This is also reflected by the positive ACS of 0.263 obtained on the 'Easter change' component for the period 2002 vs. 1998-2000. It can therefore be concluded that the temporal displacement effect, which shifted business in 2001 for these establishments to a later date of the year, was reversed in 2002. Again, only an analysis of the 2003 occupancy rates will be able to reveal whether these changes were solely the result of the different timing of Easter and the extra bank holiday in June 2002.

The 'summer/autumn recoverers' cluster is characterised by only a slight drop in the annual average occupancy rate from 36.15% in 1998-2000 to 35.32% in 2001. This is also indicated by the ACS of 0.138 on RC1-change for 2001 vs. 1998-2000 as the average decrease of only 0.83% was below the average reduction for the whole sample of –1.92%. The ACS close to zero on RC1-change for 2002 vs. 2001 points towards a positive overall change close to that of the whole sample (around 3.4%). Figure H-11, Appendix H displays the monthly average room occupancy rates for the 'summer/autumn recoverer' cluster. It can be seen that in nearly every month of 2002 higher rates were achieved in comparison to the other periods. The positive ACS of 0.225 on RC1-change for 2002 vs. 1998-2000 confirms that these establishments were therefore able to recover fully from the negative effects of the events in 2001. It is interesting to note that virtually the same average room occupancy rates recorded for August to October 2001 were again achieved in 2002. This is also indicated by the negative ACS on the 'winter' component (RC2-change 2002 vs. 1998-2000) and the 'January/February change' component (RC3-change 2002 vs. 1998-2000), at –0.346 and –0.236, respectively. In addition, higher average occupancy levels were also recorded, especially for March and June 2002, in contrast to the preceding years. The results suggest that in 2002 these businesses were able to recover fully from the loss in the early part of 2001 and, in addition, maintained their increases in occupancy rates in the summer and autumn. As was shown in section 8.2.2, the majority of these establishments belong to the non-hotel sector and are located mainly at the seaside or in towns. The continuing positive developments in occupancy rates might be the result of repeated visits by leisure tourists, positive word-of-mouth from satisfied customers in 2001, special events or simply special offers. Follow-up studies based on structured interviews or questionnaires, with the establishments of this particular cluster, could examine these effects systematically.

8.3.4 Summary of Occupancy Changes in 2002

The PCA for the complete research period 1998 to 2002 confirmed the majority of the results found in chapter 7 and section 8.1. However, some differences in the demand patterns for 2002 when compared to previous research periods are identified by the RCs. The RCs obtained for the 1998 to 2002 period revealed a continuous downward trend after 2001, the significance of Easter for all years with the exception of 2001 and the different timing of Easter in 2002.

The results of the PCA performed on the change data set in section 8.3 demonstrated that the differences in occupancy performance between 2002 and 2001 were not uniform across the sample. This might be due to the complexity of the occupancy changes, i.e. the recovery process after FMD, the aftermath of the terrorist attacks of September 11th, the different timing of Easter in 2002, the celebrations of the Queen's Golden Jubilee with the extra bank holiday and other factors, such as the war in Afghanistan and the ongoing fear of terror attacks. Therefore the definite reasons behind certain changes in tourism demand levels in 2002 can only be speculated. However, the change components identified by the PCA for the period 2002 vs. 2001 separate the overall change in occupancy rates from other temporal shifts in tourism demand, such as the different timing of Easter. Hence they provide highly relevant indicators from a decision-making perspective.

The revisiting of the '2001 change' clusters in 2002 provided some additional insights into the occupancy change patterns for these particular groups. For example, it was demonstrated that the majority of the '2001 loser' establishments experienced a boost in occupancy rates in 2002, but were not able to achieve the 1998-2000 levels. The component scores calculated, for the results of the PCA on the change data set for 2002 vs. 1998-2000, provide an overview of which businesses were able to improve their performance in 2002 in comparison to the period before the FMD crisis hit Wales. However, the results also suggested that a small number of the '2001 loser' establishments, such as some farmhouses located in Mid Wales/Brecon Beacons, were successful in recovering after the FMD year 2001 and even reaching higher occupancy rates than in the years preceding 2001. This might be the result of the extensive marketing campaigns and special events, which targeted the countryside, in particular, following the FMD outbreak. Other factors that may have influenced the demand pattern in 2002 are the funding provided to farm businesses to cover some of the costs of the FMD effects, the weather or just the fact that the countryside was declared open again for business. The results showed also clearly that even though the '2001 winner' businesses were not able to repeat their success of 2001, they were still operating at a higher level than in 1998-2000. Particularly interesting is the fact that the 'summer/autumn recoverers' not only improved their occupancy performance in the first six months of 2002, but also were able to repeat their success from August to October 2001 in 2002. In contrast, the 'winter recoverers' did not achieve the same average occupancy rates in November and December 2002 as in 2001, but improved their performance especially in March and June 2002. This confirms the complexity of the changes in demand patterns in 2002.

The groups of establishments with similar occupancy change profiles identified provide not only useful pointers for the development of marketing strategies, they also act as a kind of filter system to ensure that follow-up research, funding or marketing campaigns are targeted efficiently at the 'right' type of establishments, e.g. '2001 loser' or 'winter recoverer'. In addition to the identification of these groups, a database with the component scores for each individual establishment on each of the identified RCs for the different changes will provide decision makers at a national, regional or sectoral level, or managers of accommodation businesses, with a unique tool for benchmarking purposes. This is demonstrated in the next section.

8.4 Application of Change Indicators for Monitoring the Impacts of a Crisis

In chapter 7, it was demonstrated how spider plots can be used to illustrate the performance gaps for individual businesses, or groups of establishments, in comparison to a competitor or the average. The 'change indicators' identified in this chapter can be used to assess the impacts of events as well as the recovery process after a crisis of a particular establishment relative to the national average, or to a particular group of businesses, e.g. same region or similar occupancy change patterns.

Research has shown that the literature on crisis management in tourism is still limited (Okumus, Altinay & Arasli, 2003). Most of the studies are particularly concerned with the prevention of a crisis and crisis management procedures. Faulkner (2001), for example, provides a general framework for addressing and managing the impacts of tourism-related disasters on a destination level. Ritchie and Crouch (2003) emphasise that

> "it is essential for a destination to develop the capability to anticipate and address the broad range of crises that have the potential to undo many years of careful stewardship" (2003:218).

A shortcoming of most of the crisis management frameworks is the lack of guidelines on how to evaluate the impacts on individual businesses, or groups of businesses, and how to monitor the recovery process on a destination level. As it has been shown that a crisis can have both positive and negative impacts on the tourism industry (Okumus, Altinay & Arasli, 2003), it is important to be able to identify the 'winners' and the 'losers'. The 'change indicators' identified by the PCA can thus provide a valuable framework for assessing changes in the occupancy performance of accommodation establishments from the perspective of a tourist board or trade organisation. This applies especially to small B&Bs and guesthouses with limited financial resources and management skills for which these 'change indicators' would provide an essential tool for decision making. Spider plots are used to illustrate the occupancy changes experienced by an individual business in comparison to the average.

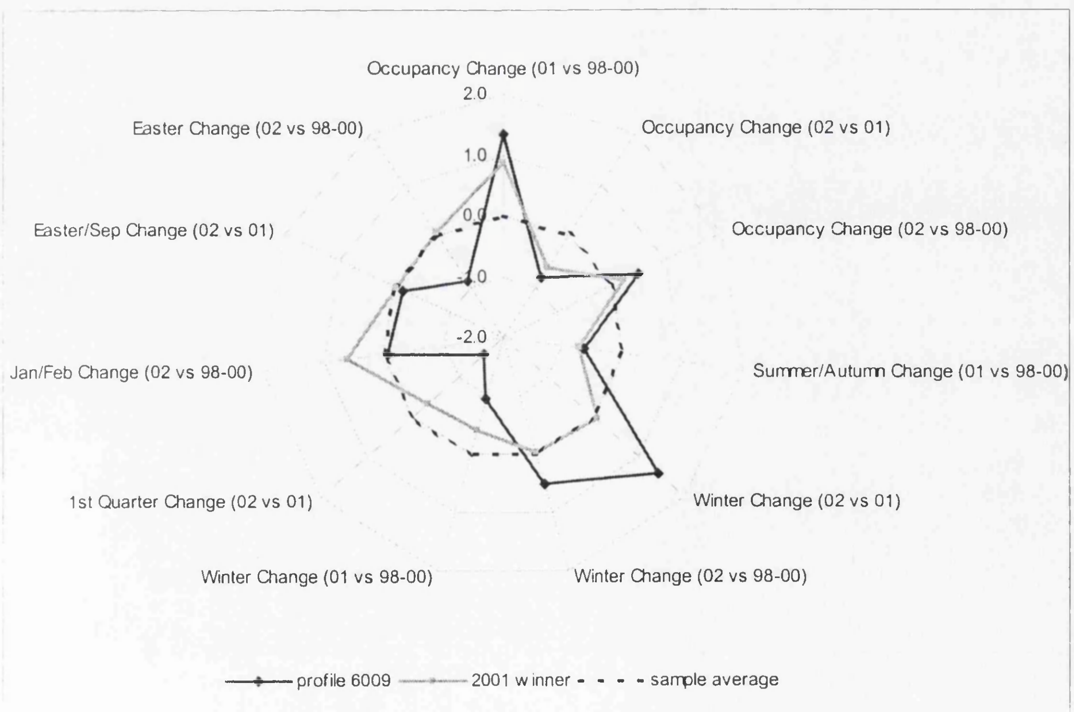


Figure 8-20: Spider Plot for '2001 Winner' Cluster, Case 6009 and the Sample Average

Figure 8-20 presents the spider plot for the '2001 winners' cluster, the average of the sample and establishment 6009 from the '2001 winners' group. This particular establishment was chosen to enable comparisons with the results discussed in section 7.6. Each leg of the spider plot represents a change dimension for all change periods analysed. For this plot, all identified RCs were used to present a complete picture of all possible occupancy changes. It can be seen clearly that establishment 6009 and the '2001 winners' group display higher occupancy rates in 2001 than for 1998-2000. Even though they experienced a decrease in occupancy levels in 2002 in comparison to 2001, their occupancy performance was still above the 1998-2000 levels.

The spider plot also reveals that establishment 6009 experienced much higher occupancy levels in the winter months November to December 2002 compared to 2001. These changes also exceeded the 1998-2000 occupancy levels in those months. Thus the spider plot provides at a glance valuable insight into the occupancy changes in 2001 and 2002. It also reveals that establishment 6009 experienced increases in the occupancy rates in 2001, especially during the spring, as the scores on the 'summer/autumn change (01 vs. 98-00) and 'winter change (01 vs. 98-00) components are very low. This indicates that this particular enterprise might have gained from some kind of displacement effect during the FMD crisis in 2001. A further analysis revealed that establishment 6009 is a 3-star hotel located in the small town of Welshpool in the Brecon Beacons which was close to FMD infected premises. This shows that not all establishments in those areas experienced reduced occupancy rates. However, the increase in performance might be the result of radical price reductions, special offers, a special event in that area or a conference. The spider plot also shows that there is potential for this hotel to improve its occupancy performance, especially in the spring months, as occupancy rates for this period were particularly low in 2002. A comparison with the results presented in section 7.6 confirms that the demand pattern for this particular establishment changed in 2001 and 2002. The results for 2003 and 2004 would reveal whether these changes were only short-term, however at the time of the research the data for these years were not available.

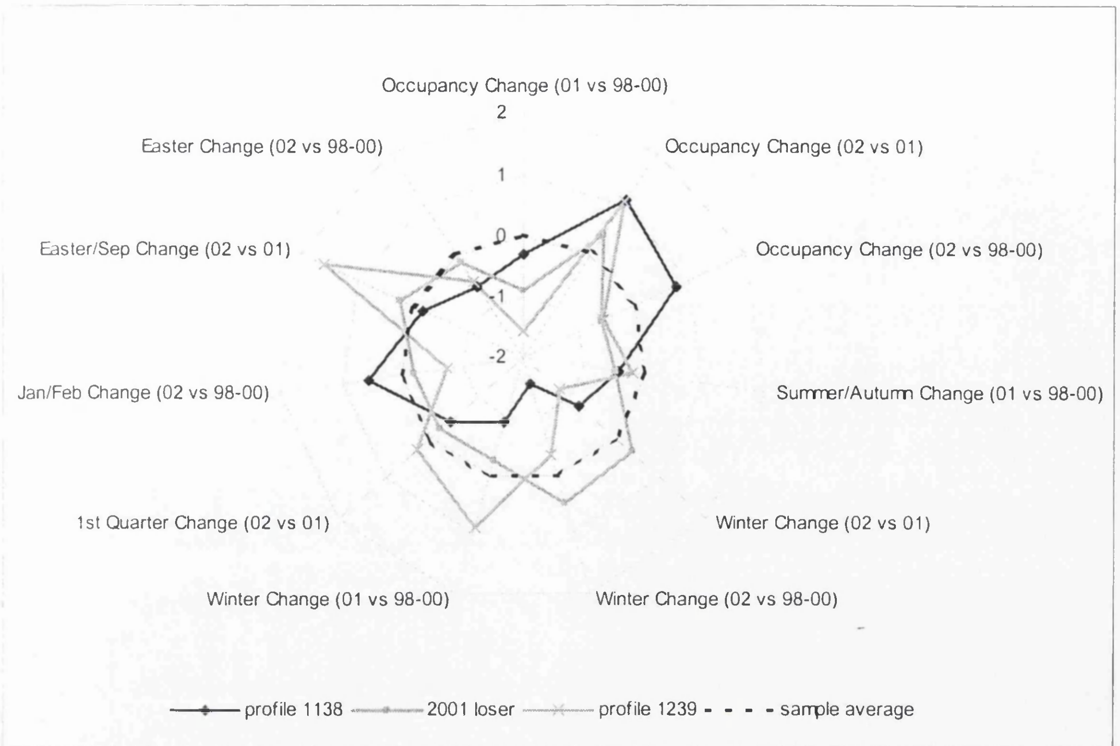


Figure 8-21: Spider Plot for '2001 Loser' Cluster, Case 1138, Case 1239 and the Sample Average

The spider plot in figure 8-21 compares the occupancy changes of two selected farmhouses from the '2001 loser' cluster. Considerable differences in the demand changes to establishment 6009, presented in the previous figure 8-20, are evident. From figure 8-21 it can clearly be seen that both businesses experienced a considerable drop in occupancy rates in 2001, with establishment 1239 showing a higher decrease in comparison to business 1138 and the '2001 loser' cluster. Both farms demonstrated a similar growth in occupancy rates during 2002. It is particularly interesting to note that the farmhouse with profile number 1138 was able to recover fully in 2002 as the occupancy levels in that year were above the 1998-2000 figures. This suggests that some establishments were more severely affected by the events in 2001 than others. Even though the other farmhouse (profile number 1239) also experienced a similar growth in occupancy rates in 2002, it was still operating at a lower level than before the FMD crisis, as shown by the negative value on the 'occupancy change (02 vs. 98-00)' dimension. The spider plot also reveals that establishment 1239 displayed higher rates in the winter months in 2001, in comparison to 1998-2000, but these positive changes were not repeated in 2002. In 2002 this farm was especially successful at Easter and also in September.

The analysis of the changes in room occupancy rates between certain time periods improves the understanding of the effects of a crisis or other events. The examples shown previously clearly demonstrate how the change indicators identified by the PCA, and displayed in the spider plots, can provide useful insights into the understanding of the temporal demand changes at an individual establishment's level. Of course the changes in the occupancy rates for an individual establishment are the results of a combination of general influences and unique circumstances, such as the composition of its demand. These specific factors have to be taken into account when recommendations are formulated. Nevertheless, the spider plots provide at a glance an overview of the positioning of an individual hotel or farmhouse in comparison to the average or a competitor establishment according to their occupancy changes. This can provide essential information for the formulation of marketing strategies and more importantly for the more efficient distribution of financial funds from the perspective of a trade organisation or a tourist board. Furthermore, detailed information about the demand changes experienced by the establishments can assist and improve the monitoring and assessment of the recovery process after a crisis. For example, the insights gained from the comparative studies using the spider plots would both facilitate and improve the quality of follow-up research as certain establishments can be targeted efficiently.

CHAPTER 9

CONCLUSION

This chapter presents a summary of the study's main findings. The contributions of this study are discussed from both theoretical and practical standpoints. The methods employed in the various analyses of temporal demand variations in Wales at a national and sectoral level, i.e. in relation to the serviced accommodation sector, are reviewed and assessed. This is followed by an overview of the implications for Welsh tourism development. The main findings and the contributions are presented in the order in which the objectives of the study were approached. Comments on potentially fruitful directions for further research conclude the chapter.

9.1 Seasonality in Wales – An Aggregated View

The original research objective was the examination of temporal demand variations for Wales at a national level and the comparison with seasonal patterns in other UK regions. The study contributed to the theoretical enhancement of the current level of knowledge in the existing literature on seasonality measures. This was achieved by performing a comprehensive evaluation of available seasonality measures, thus improving the understanding of their merits and limitations.

A wide variety of different approaches for measuring aspects of seasonal variations in tourism demand data, ranging from simple tools for detecting seasonal patterns in time series to considerable more elaborate methods involving decomposition methods were presented. These included single scalar measures such as the Coefficient of Variation and the Gini Coefficient, which were used to evaluate the inequality of the distribution of tourism trips within a year. Even though they are able to give some indication about the degree of seasonal variation in a data set, it was shown that these measures failed to provide a complete picture about the seasonal pattern or its stability. The use of measures to test the stability of seasonal patterns between years, such as Seasonal Plots, Coefficients of Variability and Concentration Indices was demonstrated. It was also shown that the seasonal factors obtained by the Seasonal Decomposition were easy to compare as they reflect the original value for a given month as a proportion of the average month. The drawback of the seasonal decomposition method lies in its main assumption of a stable seasonal pattern over the time period concerned. It was highlighted that the decision of which measure is the most appropriate depends entirely on the research question and the degree of detail required. Therefore, a combination of different approaches is suggested as the best way for analysing seasonal demand variations at a national level.

In terms of its practical contributions, the study demonstrated that there are a number of crucial differences between the seasonal pattern in Wales and those observed in Scotland and England. One of which is the seasonal pattern for short holidays. It was shown that in Wales short holidays are highly seasonal with sharp peaks in the summer and spring, whereas in Scotland and England, for example, there is a much lower variation over the year. The analysis concluded that there is an untapped potential for Wales in the off-season short holiday market and that lessons might well be learned, in this respect, from the marketing strategies employed in the other home nations. Scotland, for example, has achieved a shift in the concentration of short holidays away from the summer peak season by specifically focussing its marketing efforts on sending the message that 'Scotland is open throughout the year' with the 'Autumn Gold' campaign which started in 1996. In contrast, Wales was able to run its first extensive Autumn campaign only in 2002, thanks to increased funding (WTB, 2002).

The long holiday category displays the most acute seasonality and the highest degree of stability of the seasonal pattern. The study suggested that the demand for long holidays in Wales is still governed to a large extent by institutional aspects, such as the timing of school holidays, weather-related factors and tradition/inertia. Scotland in contrast has not only been able to increase the level of long holiday trips, but also succeeded in reducing the concentration in the summer peak months. Whether the marketing strategies employed in Scotland in recent years would work in a similar way in Wales is debatable, but the results obtained suggest that they may well provide some useful guidance.

The research highlighted that even though VFR trips are still only of minor economic importance for Wales, the number of these trips has steadily increased over time with the exception of 2001. Wales not only experienced the greatest decline in the number of VFR trips in 2001, in contrast to Scotland and England, but also the VFR market was not able to recover from these events in 2002. It was concluded that destinations in South Wales catering mainly for business and VFR tourists might well benefit from combining the marketing efforts of both market segments. As VFR trips place fewer demands on the tourist infrastructure, the extreme demand variations have no critical implications from the viewpoint of resource utilisation.

The analysis raised some interesting questions in relation to business tourism. It was shown that Wales displays extreme variations, with different peaks nearly every year in the business tourism market. The importance of monitoring the seasonal variations in that market was highlighted, as in some years the peak for business trips in Wales coincided with the peak season for holidays and thus business and holiday trips competed for many of the same resources. It was therefore concluded that appropriate marketing strategies to direct business tourism demand away from the main holiday season are needed for Wales.

The research provided an overview of the general seasonal pattern of different types of tourism demand in Wales, in comparison to the other UK regions. The conclusions drawn from the analysis of temporal demand variations, at an aggregated level, provide useful pointers for the development of marketing strategies. The study presented a basis on which macro-level policies for extending the tourism season can be evaluated. However, in order to provide more detailed insight into the seasonality problem, this research was complemented by an analysis of room occupancy rates in the Welsh serviced accommodation sector.

9.2 Seasonality in the Welsh Serviced Accommodation Sector

9.2.1 Analysis of Occupancy Performance

Generally, room occupancy time series in the tourist accommodation sector are characterised by a high degree of variation and complexity which can make direct comparisons between demand patterns of different providers particularly difficult. Whilst certain features of the variation during the year will be common across a wide range of establishments, other aspects of the pattern are unique to an individual business or small groups of establishments, e.g. demand fluctuations caused by an annual tourist event in a particular destination. The methodology used to investigate these demand variations in the accommodation sector is adapted from the Principal Components approach. It attempts to separate the common regular patterns of variation, which define the structure of seasonality in the sample overall, from sources of variability which are attributable to individual establishments. In contrast to approaches using, for instance, time series decomposition methods, these structural components are derived from the data themselves rather than being pre-determined, or restricted, by the model applied. As the study focused on the role of seasonality in occupancy patterns as well as changes in demand, there are a number of differences in the method of analysis compared to other applications of PCA which have appeared in the tourism literature. These may also be of interest to other researchers investigating similar issues.

By performing the PCA on a correlation matrix, in contrast to a covariance matrix approach, the patterns of the underlying dimensions are more readily comparable. In addition, the components are more easily interpretable, especially if the variance of the variables in the data set is not homogeneous (as was the case in this research). The results presented clearly demonstrate that by using the raw room occupancy data for the PCA, useful insights into overall occupancy levels, basic seasonal variations and demand trends can be gained. It was also shown that the application of the PCA to mean-and-trend corrected (MTC) data provides a deeper understanding of the various forces shaping the seasonal patterns which are embedded in the time series. This latter approach might therefore be favoured when seasonality issues represent the focus of interest. Furthermore, the research demonstrated how a cluster/crosstabulation analysis can usefully complement the more traditional ANOVA approach to examining the relationships between component scores and various attributes of the accommodation establishments.

The application of the PCA to the various data sets of room occupancy rates of the Welsh serviced accommodation sector over different time periods between 1998 and 2002, revealed the following distinctive temporal patterns describing the occupancy performance: overall occupancy level, trend, seasonality, length of season and the importance of the spring season. The majority of these dimensions are very similar to those identified in earlier studies employing a similar statistical approach. The only exception is the spring season component. The significance of this dimension might be due to the fact that not only hotels, but also guesthouses, B&Bs and farmhouses, were included in the sample. It has been shown that whilst hotels were more likely to extend their season, into the spring and the autumn, a number of guesthouses and B&Bs were only able to extend their summer peak into the preceding spring season. The stability of the other components obtained confirms that the underlying dimensions of occupancy performance remain constant and stable over time and across samples.

The application of the PCA not only identifies the general and regular common patterns underlying the time series, but also produces performance indicators for each individual establishment, which measure its occupancy profile in relation to these common dimensions. It was shown how the indicators obtained – occupancy levels, seasonality, length of season, and importance of spring season – can be used to quantify the degree of similarity or dissimilarity between individual businesses, or groups of establishments, and the average performance of the enterprises in the sample. Therefore, the results obtained provide an ideal platform for benchmarking.

A major section of this research examined the changes in room occupancy rates in 2001 and 2002. The outbreak of FMD and the terror attacks of September 11th caused many establishments to experience significant changes in tourism demand volumes in 2001. The application of PCA on the monthly differences between 2002, 2001 and the preceding years allowed detailed conclusions to be developed regarding the temporal and spatial shifts in demand. The PCA identified highly relevant change indicators from a policymaking perspective, i.e. the first dimension measures the overall change in occupancy rates and the others reflect temporal shifts in demand. Thus, this type of PCA is able to provide definite information about the impacts of the events in 2001 on accommodation occupancy performance.

The limitations of this research are twofold – there are related to the data and the methodological approach. The data analysed in the PCA relates only to the serviced accommodation sector which accounts for 24% of all tourism trips made and 37% of the spending in Wales. For example, an inclusion of occupancy rates for self-catering establishments, which account also for 24% of all tourism trips made and 27% of the spending, would provide a more comprehensive picture of the variable performance of the accommodation sector in Wales. Furthermore the performance indicators identified by the PCA can only be calculated for the establishments in the sample and thus no generalisations on the basis of the performance indicators can be made for other businesses. The methodological approach used in this research is exploratory in nature as it attempts to identify the association between key attributes of establishments and their occupancy performance in order to provide the tourist board with pointers for refining marketing policies. The approach is unable to identify the causes affecting the particular seasonal pattern of tourism demand or occupancy changes. Nevertheless the consistently identified structural components in this research and the differences between different types of establishments will support and improve the development of methods modelling seasonality and their causes.

9.2.2 Implications for Welsh Tourism Development

In terms of its practical contributions, the study demonstrated that in Wales (at least in the serviced accommodation sector), seasonality of demand is a much more complex phenomenon than simply a large difference between tourist numbers in summer and winter. The work has identified a number of structural components which together create the empirically observed pattern of fluctuations in occupancy rates. It is because of this complexity, that a broad-brush approach, which attempts to tackle seasonality in a uniform fashion across the accommodation industry, is likely to be ineffective.

The fact that the analyses presented extend not only to hotels, but also to other parts of the Welsh tourist accommodation industry, is another important aspect from a policy-making perspective. Previous PCA studies of room occupancy data have been confined to the hotel sector. The distinction between different types of accommodation establishments was shown to be of considerable relevance in explaining the observed patterns. Even though establishments from the non-hotel sector display a high degree of variation, between winter and summer, there are a number of differences in the shape of the occupancy curves. For example, B&Bs and farmhouses tend to exhibit a much sharper summer peak than guesthouses. Their summer season, by contrast, typically stretches from May to September. The analysis also reveals that hotels, particularly those with high star gradings, succeeded in lengthening their main season into the spring and especially the autumn. By contrast, mid-priced guesthouses and B&Bs located in the South East of Wales were most successful in extending their summer peak into the spring.

The study's main contributions lie in the area of industry segmentation, i.e. in providing a framework for refining national tourism marketing and development strategies in Wales. Although conventional classifications of accommodation establishments (e.g. by type, location or price) are clearly of relevance for industry segmentation, the results show that they align only to some degree with the observed patterns. Such a-priori classifications, therefore, have significant shortcomings. The performance clusters identified through the data-driven approach used here provided a much more comprehensive picture of which establishments performed poorly and which did well. Various specific conclusions were arrived at about the pitfalls of generalisations about the occupancy profiles of particular types of establishments. As far as sea-side establishments, for instance, are concerned, the research demonstrated that a relatively high degree of differentiation is needed to target efficiently those establishments where a pronounced seasonality of demand represents a problem. The study has been able to pinpoint the parameters upon which more differentiated marketing strategies should be based and provides a quantification of the differences in the performance characteristics of the different segments of the industry.

The analysis of the changes in Welsh room occupancy performance was a major focus of this research. It was demonstrated that the differences in occupancy performance in 2001 and 2002, when compared to 1998-2000, were not uniform across the sample. Groups of establishments with similar occupancy change profiles, e.g. the '2001 winner', '2001 loser', 'summer/autumn recoverer' and 'winter recoverer' were identified. It was shown that the clusters obtained did not neatly align with conventional categories. Given the complexities of the occupancy changes caused by the FMD crisis, the terrorist attacks of September 11th, the different timing of Easter in 2002 and the Queen's Golden Jubilee in 2002, such simple conclusions were not expected in any case. For example, the study showed that a number of accommodation providers, mainly in Welsh coastal resorts, benefited from increased visitor numbers during 2001. It was also revealed that the development of the business tourism market is particularly important for Wales, as 4- and 5-star countryside hotels with conference facilities, some of which were located on close proximity to FMD infected premises, improved their occupancy performance during 2001. It was illustrated that mainly farmhouses and small guesthouses in Mid Wales/Brecon Beacons experienced a considerable drop in occupancy rates in 2001. However, the study also showed that some of those establishments were able to recover fully in 2002, whilst others still have a long way to go. Hence, the groups identified on the basis of the components scores provide not only a comprehensive picture of the demand changes in 2001 and 2002, but also pointers for marketing and development strategies, thus providing an innovative perspective on industry segmentation.

Furthermore, the study demonstrated that the identified occupancy performance and change clusters can act as a kind of filter system to ensure that funding or marketing campaigns are targeted efficiently at the 'right' type of establishments, e.g. '2001 loser' or 'winter recoverer'. It was also illustrated how the change indicators identified by the PCA can contribute to an understanding of the temporal demand changes, at an individual establishment's level, when they are displayed in spider plots. The detailed information about the demand changes obtained, by the application of the PCA, can assist and improve the monitoring and the assessment of the recovery process after a crisis. For example, the insights gained from the comparative studies, using the spider plots, will not only facilitate but also improve the quality of follow-up research as establishments can be efficiently targeted.

9.3 Further Research Areas

The outcomes of this study suggest a number of potentially fruitful directions for further research. As the study identified groups of establishments with similar occupancy profiles, it also presents a useful framework for further investigations into commonalities between the establishments in a given cluster. The data available does not include at present, for instance, details about the marketing mix used by individual establishments nor 'soft' factors such as ambience, friendliness of staff and the swiftness of service. Factors of these kinds may well also play an important role in occupancy performance and by targeting the establishments in a particular cluster, e.g. through follow-up studies based on structured interviews or questionnaires, their effects can be examined systematically. The approach ensures that marketing and development policies aimed at increasing occupancy rates, lengthening the summer season or boosting the summer tourism demand, can be focused on those groups of establishments which are most in need of these developments. Furthermore, detailed information on the identified groups ensure that tourist boards or other organisations cannot only target funding and the provision of training more efficiently, but are also able to monitor their effects by analysing the performance indicators.

A database of all establishments displaying the various occupancy performance and change indicators would provide the tourist board or other trade organisations with useful data for complementing conventional benchmarking studies. In addition to their destination promotion activities and quality auditing, tourist boards could use such databases to provide information and guidance to the industry. The performance of individual establishments or groups of businesses can be easily compared with industry norms or competitors. As these measures or indicators cannot be calculated by individual establishments themselves, access to these benchmarking databases will certainly provide an incentive for establishments to take part in occupancy surveys and, more importantly, to provide occupancy rates conscientious and accurately. The research presented leads naturally on to other possible studies, for example the continuation of the analyses to include the 2003 and 2004 data.

As all tourist boards in the UK are responsible for the implementation of occupancy surveys of serviced accommodation in their area and these surveys are carried out to common specifications and standards, the occupancy data is comparable across the whole of the UK. Therefore, it is possible to apply PCA to monthly room occupancy rates of samples of Scotland and England. It would be of great interest to compare the performance dimensions and the indicators for the establishments between these regions. For instance, the comparison between the 'top performers' of Wales with the 'top performers' of England or Scotland will certainly provide useful insights into the differences in the temporal demand variations between accommodation establishments. Furthermore 'best practice' examples can be identified and lessons can be learned. In the occupancy surveys, data are also collected on the length of stay and the proportion of overseas visitors. If continuous and reliable data is available, these two variables can be similarly analysed using the PCA approach.

The application of the PCA method presented in this research is not limited to the accommodation sector. Similar approaches can be applied to any field where sufficient data is available for individual tourism operators. For example, it would be particularly interesting to analyse the visitation levels at tourist attractions across Wales or even the whole of the UK. Tourist attractions with similar demand patterns can be distinguished and relationships between types of attractions and their performance can be identified. This would complement the research presented in this study, as it would enable comparison of seasonal variations across different sectors.

It should be pointed out that the conclusions arrived at in this research apply only to the context in which the study was conducted – namely, no claim is made that segmentation and policies should in general follow the lines discussed. Also, of course, the validity of the findings obtained for Wales should be monitored in the light of additional data becoming available in the future. However, the work raises a number of questions which might usefully be posed in other similar environments as well.

REFERENCES

Abbey, J. 1983. Is discounting the answer to declining occupancies? International Journal of Hospitality Management, 2(2): 77-82.

Agnew, M. D. & Viner, D. 2001. Potential impacts of climate change on international tourism. Tourism and Hospitality Research, 3(1): 37-60.

Aislabie, C. 1992. Econometric modelling of hotel occupancy rates: an introduction using Singapore data. University of Newcastle, Department of Economics, Institute of Industry Economics, Discussion Paper No. 44. Newcastle.

Ali, A., Clarke, G. M., & Trustrum, K. 1985. Principal components analysis applied to some data from fruit nutrition experiments. Statistician, 34(4): 365-370.

Allock, J. B. 1994. Seasonality. In S. F. Witt & L. Moutinho (Eds.), Tourism Marketing and Management Handbook, 2nd ed.: 86-92. New York: Prentice Hall.

Anderberg, M. R. 1973. Cluster Analysis for Applications. London: Academic Press.

Andrew, W. P., Cranage, D. A., & Lee, C. K. 1990. Forecasting hotel and occupancy rates with time series models: an empirical analysis. Hospitality Research Journal, 14(2): 173-182.

Archer, B. H. 1973. The Impact of Domestic Tourism. Bangor Occasional Papers in Economics No. 2, University of Wales Press. Cardiff.

Ashworth, J. & Thomas, B. 1999. Patterns of seasonality in employment in tourism in the UK. Applied Economics Letter, 6(11): 735-739.

Ball, R. M. 1988. Seasonality: a problem for workers in the tourism labour market? Service Industries Journal, 8(4): 501-513.

Ball, R. M. 1989. Some aspects of tourism, seasonality and local labour markets. Area, 21(1): 35-45.

Barclay, C. 2001. Foot and Mouth Disease - Research Paper 01/35. www.parliament.uk/commons/lib/research/rp2001/rp01-035.pdf; accessed 20.10.2002. House of Commons Library, Science and Environment Section. London.

BarOn, R. V. 1975. Seasonality in Tourism - A Guide to the Analysis of Seasonality and Trends for Policy Making. London: The Economist Intelligence Unit Ltd., Technical Series No. 2.

BarOn, R. V. 1999. The measurement of seasonality and its economic impacts. Tourism Economics, 5(4): 437-458.

Batchelor, R. 2000. The School Year and Tourism - Lessons from Abroad. In British Tourist Authority & English Tourist Board (Eds.), Insights - Tourism Intelligence Papers, Vol. 12: A173-181.

Baum, T. 1993. Human resource concerns in European tourism: strategic response and the EC. International Journal of Hospitality Management, 12(1): 77-88.

Baum, T. 1998. Responding to Seasonality in Peripheral Destinations. In British Tourist Authority & English Tourist Board (Eds.), Insights - Tourism Intelligence Papers, Vol. 10: A107-115.

Baum, T. 1999. Seasonality in tourism: understanding the challenges - Introduction. Tourism Economics, Special Edition on Seasonality in Tourism, 5(1): 5-8.

Baum, T. & Hagen, L. 1999. Responses to seasonality: the experiences of peripheral destinations. International Journal of Tourism Research, 1(5): 299-312.

Baum, T. & Lundtorp, S. 2001. Seasonality in Tourism: An Introduction. In T. Baum & S. Lundtorp (Eds.), Seasonality in Tourism: 1-4. Oxford: Pergamon.

BHO. 2003. How to define a hotel, guesthouse etc. and how are they graded for quality? www.bha.org.uk; accessed 20.10.2002. British Hospitality Association.

Blake, A., Sinclair, M. T., & Sugiyarto, G. 2001. Quantifying the Impact of Foot and Mouth Disease on Tourism and the UK Economy. University of Nottingham, Tourism and Travel Research Institute, Discussion Paper 2001/3. Nottingham.

Boniface, B. G. & Cooper, C. 1994. The Geography of Travel & Tourism (2nd ed.). Oxford: Butterworth-Heinemann.

Bonn, M. A., Furr, H. L., & Uysal, M. 1992. Seasonal variations of coastal resort visitors: Hilton Head Island. Journal of Travel Research, 31(1): 50-56.

Brännäs, K. & Nordström, J. 2002. Tourist Accommodation Effects of Festivals. Umea University, Department of Economics, Umea Economic Studies No. 580. Umea.

Bryman, A. & Cramer, D. 1997. Quantitative Data Analysis with SPSS for Windows. London: Routledge.

BTA. 2002. Annual Report 2002. British Tourist Authority. London.

BTA. 2003a. Key Tourism Facts 2002. www.visitbritain.com/corporate/links/visitbritain/tips.htm; accessed 18.08.2003, British Tourist Authority. London.

BTA. 2003b. Key Facts of Tourism for Scotland 2002. www.staruk.org.uk; accessed 23.10.2003, British Tourist Authority. London.

BTA. 2003c. Key Facts of Tourism for England 2002. www.staruk.org.uk; accessed 23.10.2003, British Tourist Authority. London.

BTA. 2003d. Key Facts of Tourism for Wales 2002. www.staruk.org.uk; accessed 23.10.2003, British Tourist Authority. London.

Buckland, S. T. & Anderson, A. J. 1985. Multivariate Analysis of Atlas Data. In B. J. Morgan & P. M. North (Eds.), Statistics in Ornithology: 93-112. Berlin: Springer.

Buehl, A. & Zoefel, P. 2000. SPSS Version 10. Munich: Addison Wesley.

Burkart, A. J. & Medlik, S. 1981. Tourism - Past, Present and Future (2nd ed.). London: Heinemann.

Butler, R. W. 1994. Seasonality in Tourism: Issues and Problems. In A. V. Seaton (Ed.), Tourism: the State of the Art: 332-339. Chichester: Wiley & Sons.

Butler, R. W. & Mao, B. 1997. Seasonality in Tourism: Problems and Measurement. In P. Murphy (Ed.), Quality Management in Urban Tourism: 9-23. Chichester: Wiley & Sons.

Cadima, J. & Jolliffe, I. T. 1996. Size- and shape-related principal component analysis. Biometrics, Volume 52(2): 710-716.

Calantone, R. & Johar, J. S. 1984. Seasonal segmentation of the tourism market using a benefit segmentation framework. Journal of Travel Research, 23(2): 14-24.

Campbell, R. 1995. Managing Seasonality: Hotels in the Highlands and Islands of Scotland. University of Paisley, Department of Economics and Management, Working Papers No. 82. Paisley.

Catell, R. B. 1966. The scree test for number of factors. Multivariate Behavioral Research, 1(2): 245-276.

Centre for Leisure Research. 2000. UK Occupancy Survey for the Serviced Accommodation: Annual Summary 1999. English Tourist Council, Scottish Tourist Board, Wales Tourist Board, Northern Ireland Tourist Board. University of Edinburgh, Edinburgh.

Centre for Leisure Research. 2001. UK Occupancy Survey for the Serviced Accommodation: Annual Summary 2000. English Tourist Council, Scottish Tourist Board, Wales Tourist Board, Northern Ireland Tourist Board. University of Edinburgh, Edinburgh.

Centre for Leisure Research. 2002. UK Occupancy Survey for the Serviced Accommodation: 2001 Summary of Results. English Tourist Council, VisitScotland, Wales Tourist Board, Northern Ireland Tourist Board. University of Edinburgh, Edinburgh.

Chatfield, C. & Collins, A. 1980. Introduction to Multivariate Analysis. London: Chapman and Hall.

Choi, J. 2003. Developing an economic indicator system (a forecasting technique) for the hotel industry. International Journal of Hospitality Management, 22(2): 147-159.

Chow, W. S., Shyu, J. C., & Wang, K. C. 1998. Developing a forecast system for hotel occupancy rate using integrated ARIMA models. Journal of International Hospitality, Leisure & Tourism Management, 1(3): 55-80.

Chu, F. 1998. Forecasting tourism demand in Asian-Pacific countries. Annals of Tourism Research, 25(3): 597-615.

CMSC. 2001. Tourism - the Hidden Giant - and Foot and Mouth. Fourth Report Volume 1, House of Commons, Culture, Media and Sport Committee, The Stationery Office. London.

CMSC. 2003. The Structure and Strategy for Supporting Tourism. Fourth Report of Session 2002-03, House of Commons, Culture, Media and Sport Committee, The Stationery Office. London.

Coenders, G., Espinet, J. M., & Saez, M. 2001. Predicting Random Level and Seasonality of Hotel Prices. A Structural Equation Growth Curve Approach. University of Girona, Department of Economics, Working Paper 2001/1. Girona.

Commons, J. & Page, S. 2001. Managing Seasonality in Peripheral Tourism Regions: The Case of Northland, New Zealand. In T. Baum & S. Lundtorp (Eds.), Seasonality in Tourism: 153-172. Oxford: Pergamon.

Cooper, C., Fletcher, J., Gilbert, D., & Wanhill, S. 1998. Tourism - Principles and Practice (2nd ed.). Harlow: Longman.

Craddock, J. M. 1965. A meteorological application of principal component analysis. Statistician, Volume 15(2): 143-156.

Daniel, W. W. & Terrell, J. C. 1992. Business Statistics for Management and Economics (6th ed.). Boston: Houghton Mifflin Company.

DCMS. 2001. National Tourism Recovery Strategy: A strategy to tackle the effects of the foot and mouth outbreak on the tourism industry across England, and on incoming tourism to Britain. www.culture.gov.uk/PDF/tourism_recovery.PDF; accessed 28.05.2002, Department for Culture, Media and Sport. London.

De Gooijer, J. G. & Franses, P. H. 1997. Forecasting and seasonality. International Journal of Forecasting, 13(3): 303-305.

Dharmaratne, G. S. 1995. Forecasting tourist arrivals to Barbados. Annals of Tourism Research, 22(4): 804-818.

Donatos, G. & Zairis, P. 1991. Seasonality of foreign tourism in the Greek Island of Crete. Annals of Tourism Research, 18(3): 515-519.

Drakatos, C. 1987. Seasonal concentration of tourism in Greece. Annals of Tourism Research, 14(4): 582-586.

du Preez, J. & Witt, S. F. 2003. Univariate versus Multivariate Time Series Forecasting: An Application to International Tourism Demand. International Journal of Forecasting, 19(3): 435-451.

Duntemann, G. H. 1994. Principal Components Analysis. In M. S. Lewis-Beck (Ed.), Factor Analysis and Related Techniques: 157-245. London: Sage.

Environment Food and Rural Affairs Committee. 2002. The Impact of Foot and Mouth Disease. First Report of Session 2001-02, House of Commons Paper 323. www.publications.parliament.uk/pa/cm200102/cmselect/cmenvfru/323/32302.htm; accessed 30.05.2003, The Stationery Office. London.

European Commission. 2003. Structure, Performance and Competitiveness of European Tourism and its Enterprises. http://europa.eu.int/comm/enterprise/services/tourism/policy-areas/study_competitiveness.htm; accessed 31.10.2003. Luxembourg.

Everitt, B. 1974. Cluster Analysis. London: Heinemann.

Faulkner, B. 2001. Towards a framework for tourism disaster management. Tourism Management, 22(2): 135-147.

Fitzpatrick Associates. 1993. All-Season Tourism: Analysis of Experience, Suitable Products and Clientele. Commission of the European Communities. Directorate-General XXIII - Tourism Unit. Luxembourg.

Fletcher, J. 1994. Economic Impact. In S. F. Witt & L. Moutinho (Eds.), Tourism Marketing and Management Handbook, 2nd ed.: 475-479. New York: Prentice Hall.

Flognfeldt, T. 2001. Long-Term Positive Adjustments to Seasonality: Consequences of Summer Tourism in the Jotunheimen Area, Norway. In T. Baum & S. Lundtorp (Eds.), Seasonality in Tourism: 109-117. Oxford: Pergamon.

Frechtling, D. C. 1989. Input-output analysis and tourism impact studies. Annals of Tourism Research, 16(4): 541-556.

Frechtling, D. C. 1994a. Economic Impact Models. In S. F. Witt & L. Moutinho (Eds.), Tourism Marketing and Management Handbook, 2nd ed.: 488-496. New York: Prentice Hall.

Frechtling, D. C. 1994b. Input-Output Analysis. In S. F. Witt & L. Moutinho (Eds.), Tourism Marketing and Management Handbook, 2nd ed.: 480-484. New York: Prentice Hall.

Frechtling, D. C. 2001. Forecasting Tourism Demand: Methods and Strategies. Oxford: Butterworth-Heinemann.

Freyer, W. 1995. Tourismus - Einführung in die Fremdenverkehrsökonomie (5th ed.). Munich: Oldenburg.

Getz, D. 1991. Festivals, Special Events and Tourism. New York: Van Nostrand Reinhold.

Getz, D. & Nilsson, P. A. 2004. Responses of family businesses to extreme seasonality in demand: the case of Bornholm. Tourism Management, 25(1): 17-30.

Giles, A. R. & Perry, A. H. 1998. The use of a temporal analogue to investigate the possible impact of projected global warming on the UK tourist industry. Tourism Management, 19(1): 75-80.

Goh, C. & Law, R. 2002. Modelling and forecasting tourism demand for arrivals with stochastic nonstationary seasonality and intervention. Tourism Management, 23(5): 499-510.

Gonzales, P. & Moral, P. 1995. An analysis of the international tourism demand in Spain. International Journal of Forecasting, 11(2): 233-251.

Gonzales, P. & Moral, P. 1996. Analysis of tourism trends in Spain. Annals of Tourism Research, 23(4): 739-754.

Grainger, J. & Judge, G. 1996. Changing patterns of seasonality in hotel and tourism demand: an analysis of Portsmouth monthly arrivals data. University of Portsmouth, Department of Economics, Discussion Paper Number 73. Portsmouth.

Grant, M., Human, B., & Le Pelley, B. 1997. Seasonality. In British Tourist Authority & English Tourist Board (Eds.), Insights - Tourism Intelligence Papers, Vol. 9: A5-9.

Greenidge, K. 2001. Forecasting tourism demand: an STM approach. Annals of Tourism Research, 28(1): 98-112.

Gressens, O. & Mouzon Jr., E. D. 1927. The validity of correlation in time sequences and a new coefficient of similarity. Journal of the American Statistical Association, 22(160): 483-492.

Gustavsson, P. & Nordström, J. 2001. The impact of seasonal unit roots and vector ARMA modelling on forecasting monthly tourism flows. Tourism Economics, 7(2): 117-133.

Hair, J., Anderson, R., Tatham, R., & Black, W. 1995. Multivariate Data Analysis (4th ed.). New Jersey: Prentice Hall.

Hall, C. M. & Page, S. J. 1999. The Geography of Tourism and Recreation - Environment, Place and Space. London: Routledge.

Harmann, H. H. & Jones, W. H. 1966. Factor analysis by minimising residuals. Psychometrika, 31(3): 351-368.

Harmann, H. H. 1976. Modern Factor Analysis (3rd ed.). Chicago: University of Chicago Press.

Harris, P. 1985. Testing for variance homogeneity of correlated variables. Biometrika, 72(1): 103-107.

Harris, P. J. & Mongiello, M. 2001. Key performance indicators in European hotel properties: general managers' choices and company profiles. International Journal of Contemporary Hospitality Management, 13(3): 120-127.

Hartmann, R. 1986. Tourism, seasonality and social change. Leisure Studies, 5(1): 25-33.

Higham, J. & Hinch, T. D. 2002. Tourism, sport and seasons: the challenges and potential of overcoming seasonality in the sport and tourism sectors. Tourism Management, 23(2): 175-185.

Hinch, T. D. & Hickey, G. P. 1996. Tourism attractions and seasonality: Spatial relationships in Alberta. In K. Mackay & K. R. Boyd (Eds.), Tourism for All Seasons: Using Research to Meet the Challenge of Seasonality: 69-76. Winnipeg, Manitoba: University of Manitoba.

Hinch, T. D. & Jackson, E. L. 2000. Leisure constraints research: its value as a framework for understanding tourism seasonability. Current Issues in Tourism, 3(2): 87-106.

Hinch, T. D., Hickey, G. P., & Jackson, E. L. 2001. Seasonal Visitation at Fort Edmonton Park: An Empirical Analysis Using a Leisure Constraints Framework. In T. Baum & S. Lundtorp (Eds.), Seasonality in Tourism: 173-186. Oxford: Pergamon.

Hotelling, H. 1933. Analysis of a complex of statistical variables into principal components. Journal of Educational Psychology, 24: 417-441 and 498-520.

Howell, D. C. 1997. Statistical Methods for Psychology (4th ed.). Belmont, California: Duxbury Press.

Hui, T. K. & Yuen, C. C. 2002. A study in the seasonal variation of Japanese tourist arrivals in Singapore. Tourism Management, 23(2): 127-131.

Hylleberg, S. 1992. General Introduction. In S. Hylleberg (Ed.), Modelling Seasonality: 3-14. Oxford: Oxford University Press.

Jackson, J. E. 1991. A User's Guide to Principal Components. New York: Wiley & Sons.

Jassby, A. D. & Powell, T. M. 1990. Detecting changes in ecological time series. Ecology, 71(6): 2044-2052.

Jeffrey, D. 1974. Regional fluctuations in unemployment within the U.S. urban economic system: a study of the spatial impact of short term economic change. Economic Geography, 50(2): 111-123.

Jeffrey, D. & Adams, J. C. 1980. Spatial-sectoral patterns of employment growth in Yorkshire and Humberside, 1963-1975: a time series factor analytic approach. Regional Studies, 14: 441-453.

Jeffrey, D. 1983. Trends and fluctuations in the demand for hotel accommodation: A time series analysis of hotel occupancy rates in England by region and hotel category, 1976-1982. English Tourist Board. London.

Jeffrey, D. 1985a. Spatial and temporal patterns of demand for hotel accommodation - time series analysis in Yorkshire and Humberside, UK. Tourism Management, 6(1): 8-22.

Jeffrey, D. 1985b. Trends and fluctuations in visitor flows to Yorkshire and Humberside hotels: an analysis of daily bed occupancy rates, 1982-1984. Regional Studies, 19(6): 509-522.

Jeffrey, D. & Hubbard, N. J. 1985. Hotel characteristics and occupancy trends - Yorkshire and Humberside hotels, UK, April 1982-March 1984. Tourism Management, 6(4): 280-287.

Jeffrey, D. & Hubbard, N. J. 1986a. Weekly occupancy fluctuations in Yorkshire and Humberside Hotels 1982-1984: Patterns and prescriptions. International Journal of Hospitality Management, 5(4): 177-187.

Jeffrey, D. & Hubbard, N. J. 1986b. Occupancy performance and hotel characteristics: A survey and analysis in Yorkshire and Humberside. English Tourist Board. London.

Jeffrey, D. & Hubbard, N. J. 1988a. Temporal dimensions and regional patterns of hotel occupancy performance in England: a time series analysis of midweek and weekend occupancy rates in 266 hotels in 1984 and 1985. International Journal of Hospitality Management, 7(1): 63-80.

Jeffrey, D. & Hubbard, N. J. 1988b. Foreign tourism, the hotel industry and regional economic performance. Regional Studies, 22(4): 319-329.

Jeffrey, D. & Hubbard, N. J. 1994a. Spatial-temporal patterns in the English hotel and tourist industries: a time series analysis of competitive occupancy performance at the individual hotel level. Geoforum, 25(1): 73-86.

Jeffrey, D. & Hubbard, N. J. 1994b. A model of hotel occupancy performance for monitoring and marketing in the hotel industry. International Journal of Hospitality Management, 13(1): 57-71.

Jeffrey, D. & Barden, R. R. D. 1999. An analysis of the nature, causes and marketing implications of seasonality in the occupancy performance of English hotels. Tourism Economics, 5(1): 69-91.

Jeffrey, D. & Barden, R. R. D. 2000a. Monitoring hotel performance using occupancy time-series analysis: the concept of occupancy performance space. International Journal of Tourism Research, 2(6): 383-402.

Jeffrey, D. & Barden, R. R. D. 2000b. An analysis of daily occupancy performance: a basis for effective hotel marketing? International Journal of Contemporary Hospitality Management, 12(3): 179-189.

Jeffrey, D. & Barden, R. R. D. 2001. Multivariate models of hotel occupancy performance and their implications for hotel marketing. International Journal of Tourism Research, 3(2): 33-44.

Jeffrey, D., Barden, R. R. D., Buckley, P. J., & Hubbard, N. J. 2002. What makes a successful hotel? Insights on hotel management following 15 years of hotel occupancy analysis in England. The Service Industries Journal, 22(2): 73-88.

Jolicoeur, P. & Mosimann, J. E. 1960. Size and shape variation in the painted turtle. A principal component analysis. Growth, 24: 339-354.

Jolicoeur, P. 1963. Note: the multivariate generalization of the allometry equation. Biometrics, 19(3): 497-499.

Jolliffe, I. T. 2002. Principal Component Analysis (2nd ed.). New York: Springer.

Kaiser, H. F. & Rice, J. 1974. Little Jiffy, Mark IV. Educational and Psychological Measurement, 34(1): 111-117.

Keller, J. B. 1962. Factorisation of matrices by least squares. Biometrika, 49(1 and 2): 239-242.

Kennedy, E. L. 1999. Seasonality in Irish tourism, 1973-1995. Tourism Economics, 5(1): 25-47.

Kim, J. H. & Moosa, I. 2001. Seasonal behaviour of monthly international tourist flows: specification and implications for forecasting models. Tourism Economics, 7(4): 381-396.

Kim, J. H. & Ngo, T. 2001. Modelling and forecasting monthly airline passenger flow among three major Australian cities. Tourism Economics, 7(4): 397-412.

Kozak, M. & Rimmington, M. 1998. Benchmarking: destination attractiveness and small hospitality business performance. International Journal of Contemporary Hospitality Management, 10(5): 184-188.

Kozak, M. 2002. Destination benchmarking. Annals of Tourism Research, 29(2): 497-519.

Krakover, S. 2000. Partitioning seasonal employment in the hospitality industry. Tourism Management, 21(5): 461-471.

Krzanowski, W. J. 1988. Principles of Multivariate Analysis - A User's Perspective. Oxford: Clarendon Press.

Kulendran, N. 1996. Modelling quarterly tourist flows to Australia using cointegration analysis. Tourism Economics, 2(3): 203-222.

Kulendran, N. & King, M. L. 1997. Forecasting international quarterly tourist flows using error-correction and time-series models. International Journal of Forecasting, 13(3): 319-327.

Kulendran, N. & Witt, S. F. 2001. Cointegration versus least-squares regression. Annals of Tourism Research, 28(2): 291-311.

Kulendran, N. & Witt, S. F. 2003. Leading indicator tourism forecasts. Tourism Management, 24(5): 503-510.

Kuznets, S. 1932. Seasonal pattern and seasonal amplitude: measurement of their short-time variations. Journal of the American Statistical Association, 27(177): 9-20.

Kuznets, S. 1933. Seasonal Variations in Industry and Trade. New York: National Bureau of Economic Research.

Law, R. 1998. Room occupancy forecasting: a neural network approach. International Journal of Contemporary Hospitality Management, 10(6): 234-239.

Law, R. & Au, N. 1999. A neural network model to forecast Japanese demand for travel to Hong Kong. Tourism Management, 20(1): 89-97.

Laws, E. 1995. Tourist Destination Management - Issues, Analysis and Policies. London: Routledge.

Leiper, N. 1979. The framework of tourism. Annals of Tourism Research, 6(4): 390-407.

Leiper, N. 1995. Tourism Management (2nd ed.). Melbourne: RMIT Press.

Leurgans, S. E., Moyeed, R. A., & Silvermann, B. W. 1993. Canonical correlation analysis when data are curves. Journal of the Royal Statistical Society - Series B (Methodological), 55(3): 725-740.

Lickorish, L. J. & Jenkins, C. L. 1997. An Introduction to Tourism. Oxford: Butterworth-Heinemann.

Lim, C. & McAleer, M. 2000. A seasonal analysis of Asian tourist arrivals to Australia. Applied Economics, 32(4): 499-509.

Lim, C. & McAleer, M. 2001a. Monthly Seasonal Variations - Asian Tourism to Australia. Annals of Tourism Research, 28(1): 68-82.

Lim, C. & McAleer, M. 2001b. Forecasting tourist arrivals. Annals of Tourism Research, 28(4): 965-977.

Lim, C. & McAleer, M. 2002. Time series forecasts of international travel demand for Australia. Tourism Management, 23(4): 389-396.

Lim, C. & McAleer, M. 2003. Modelling international travel demand from Singapore to Australia. www.e.u-tokyo.ac.jp/cirje/research/03research02dp.html; accessed 02.03.2004, CIRJE-F-214, Discussion Paper. Tokyo.

Lundtorp, S., Rassing, C. R., & Wanhill, S. R. C. 1999. The off-season is 'no season': the case of the Danish island of Bornholm. Tourism Economics, 5(1): 49-68.

Lundtorp, S. 2001. Measuring Tourism Seasonality. In T. Baum & S. Lundtorp (Eds.), Seasonality in Tourism: pp. 23-50. Oxford: Pergamon.

Manning, R. E. & Powers, L. A. 1984. Peak and off-peak use: redistributing the outdoor recreation/tourism load. Journal of Travel Research, 23(2): 25-31.

Mardia, K. V., Kent, J. T., & Bibby, J. M. 1979. Multivariate Analysis. London: Academic Press.

Martin, C. A. & Witt, S. F. 1989. Forecasting tourism demand: a comparison of the accuracy of several quantitative methods. International Journal of Forecasting, 5(1): 7-19.

Mathieson, A. & Wall, G. 1982. Tourism - Economic, Physical and Social Impacts. Essex: Longmann.

McEnnif, J. 1992. Seasonality of tourism demand in the European Community. EIU Travel & Tourism Analyst, 3: 67-88.

Middleton, V. T. 2001. Marketing in Travel and Tourism (3rd ed.). Oxford: Butterworth-Heinemann.

Mill, R. C. & Morrison, A. M. 1998. The Tourism System - An Introductory Text (3rd ed.). Dubuque, Iowa: Kendall/Hunt Publishing Co.

Mitchell, L. S. & Murphy, P. 1991. Geography and tourism. Annals of Tourism Research, 18(1): 57-60.

Moore, T. W. 1989. Handbook of Business Forecasting. New York: Harper and Row.

Morrison, A. 1998. Small firm statistics: a hotel sector focus. Service Industries Journal, 18(1): 132-142.

Mourdoukoutas, P. 1988. Seasonal employment and unemployment compensation: the case of the tourist industry of the Greek island. American Journal of Economics and Sociology, 47(3): 315-329.

Murphy, P. E. 1985. Tourism - A Community Approach. London: Methuen.

National Assembly for Wales. 2002a. Foot and Mouth Disease Controls: An Assessment by the National Assembly for Wales. http://www.wales.gov.uk/newsflash/content/inquiries/FMDsubmission.rtf; accessed on 11.05.2003. Cardiff.

National Assembly for Wales. 2002b. Overview of FMD infected premises in Wales 2001. http://www.wales.gov.uk/newsflash/content/inquiries/overview.jpg; accessed 11.05.2003. Cardiff.

National Audit Office. 2002. The 2001 Outbreak of Foot and Mouth Disease. Report by the Comptroller and Auditor General HC 939 Session 2001-2002: 21 June 2002, The Stationery Office. London.

National Centre for Social Research. 2000. Leisure Day Visits: a report of the 1998 UK day visits survey. London.

Netherlands & Ministerie van Economische Zaken. 1991. Improving seasonal spread of tourism. Paper presented at the Report prepared as a briefing document for the conference "Improving seasonal spread of Tourism", 16/17th October 1991, Noordwijk.Ministerie van Economische Zaken.

Newidiem. 1999. Farm and Agri-tourism Scoping Study. Newidiem. Cardiff.

NFO WorldGroup. 2003. UK Occupancy Survey for Serviced Accommodation - 2002 Summary Report. Visit Britain, Northern Ireland Tourist Board, VisitScotland, Wales Tourist Board. London.

Norkett, P. 1985. Financial success: elusive goal for the hotel trade. Accountancy, 96(1): 69-74.

O'Driscoll, T. 1985. Seasonality in the trans-atlantic vacation market. Annals of Tourism Research, 12(1): 109-110.

Office for National Statistics. 2002. Travel Trends - A Report on the 2001 International Passenger Survey. The Stationery Office. London.

Office for National Statistics. 2003a. Overseas Travel and Tourism Quarter 1 2003 (Revised Edition 08.10.2003). MQ6 Transport Travel and Tourism. London.

Office for National Statistics. 2003b. Travel Trends - A Report on the 2002 International Passenger Survey. The Stationery Office. London.

Ogden, S. M. 1998. Comment: benchmarking and best practice in the small hotel sector. International Journal of Contemporary Hospitality Management, 10(5): 189-190.

Okumus, F., Altinay, M., & Arasli, H. 2003. The impact of Turkey's economic crisis of February 2001 on the tourism industry in Northern Cyprus. Tourism Management, article in press, available online 4 November 2003 at www.sciencedirect.com.

Owens, D. J. 1994. The all-season opportunity for Canada's resorts. The Cornell Hotel and Restaurant Administration Quarterly, 35(5): 28-41.

Pattie, D. C. & Snyder, J. 1996. Using a neural network to forecast visitor behaviour. Annals of Tourism Research, 23(1): 151-164.

Pearce, P. L. 1995. Tourism Today: A Geographical Analysis (2nd ed.). Harlow: Longmann.

Pearson, K. 1901. On lines and planes of closest fit to systems of points in space. Philosophical Magazine, 6(2): 559-572.

Phelps, A. 1988. Seasonality in tourism and recreation: the study of visitor patterns. A comment on Hartmann. Leisure Studies, 7(1): 33-39.

Preisendorfer, R. W. 1988. Principal Component Analysis in Meteorology and Oceanography. Amsterdam: Elsevier Science Publishers.

Rao, C. R. 1958. Some statistical methods for comparison of growth curves. Biometrics, 14(1): 1-17.

Richards, P. 2003. Tourism. www.parliament.uk/commons/lib/research/rp2003/rp03-073.pdf; accessed 30.10.2003, Library Research Paper 03/073, House of Commons. London.

Ritchie, J. R. B. & Crouch, G. I. 2003. The Competitive Destinations - A Sustainable Tourism Perspective. Oxon: CABI Publishing.

Roberts, D. 2001. Rural change and the impact of foot and mouth disease. Countryside Recreation, 9(3/4): 4-8.

Ross, J. 1964. Mean performance and the factor analysis of learning data. Psychometrika, 29(1): 67-73.

Rossello, J., Riera, A., & Sanso, A. 2003. The economic determinants of seasonal patterns - Seasonality in monthly international arrivals to the Balearic Islands. Paper presented at the VI Encuentro De Economia Aplicada, 5th-7th June 2003, Granada

Russo, J. A. 1991. Variance analysis: evaluating hotel room sales. Cornell Hotel and Restaurant Administration Quarterly, 31(4): 60-65.

Scott, A., Christie, M., & Midmore, P. 2004. Impact of the 2001 foot-an-mouth disease outbreak in Britain: implications for rural studies. Journal of Rural Studies, 20(1): 1-14.

Scottish Tourist Board. 1997. In-House Trade Survey - Autumn Gold Campaign Scotland. Scottish Tourist Board. Edinburgh.

Scottish Tourist Board. 1998. Seasonality in Scotland. Final Report. System Three, Scottish Tourist Board. Edinburgh.

Scottish Tourist Board. 2000a. Seasonality Solutions - A Guide to Marketing your Business. System Three, UK Marketing Scottish Tourist Board. Inverness.

Scottish Tourist Board. 2000b. Autumn Gold 1999 - Research Findings. George Street Research Limited, Scottish Tourist Board. Edinburgh.

Seaton, A. V. & Palmer, C. 1997. Understanding VFR tourism behaviour: the first five years of the United Kingdom tourism survey. Tourism Management, 18(6): 345-355.

Sharma, S. 1996. Applied Multivariate Techniques. New York: Wiley & Sons.

Sharpley, R. & Craven, B. 2001. The 2001 foot and mouth crisis - rural economy and tourism policy implications: a comment. Current Issues in Tourism, 4(6): 527-537.

Sheth, J. N. 1969. Using factor analysis to estimate parameters. Journal of the American Statistical Association, 64(327): 808-822.

Smeral, E. & Witt, S. F. 1996. Econometric forecasts of tourism demand 2005. Annals of Tourism Research, 23(4): 891-907.

Smeral, E. & Weber, A. 2000. Forecasting international tourism trends to 2010. Annals of Tourism Research, 27(4): 982-1006.

Smith, K. 1990. Tourism and climate change. Land Use Policy, 7(2): 176-180.

Smith, S. L. J. 1995. Tourism Analysis: A Handbook (2nd ed.). Harlow: Longmann.

Snepenger, D., Houser, B., & Snepenger, M. 1990. Seasonality of demand. Annals of Tourism Research, 17(4): 628-630.

Somers, K. M. 1986. Multivariate allometry and removal of size with principal components analysis. Systematic Zoology, 35(3): 359-368.

Somers, K. M. 1989. Allometry, isometry and shape in principal component analysis. Systematic Zoology, 38(2): 169-173.

Song, H. & Witt, S. F. 2000. Tourism demand modelling and forecasting: modern econometric approaches. Oxford: Pergamon.

Song, H. & Witt, S. F. 2003. Tourism forecasting: the general-to-specific approach. Journal of Travel Research, 42(1): 65-74.

Song, H., Witt, S. F., & Jensen, T. C. 2003. Tourism forecasting: accuracy of alternative econometric models. International Journal of Forecasting, 19(1): 123-141.

Song, H., Wong, K. K. F., & Chon, K. K. S. 2003. Modelling and forecasting the demand for Hong Kong tourism. International Journal of Hospitality Management, 22(4): 435-451.

Sørensen, N. 1999. Modelling the seasonality of hotel nights in Denmark by county and nationality. Tourism Economics, 5(1): 9-23.

Soseilo, J. A. & Mings, R. C. 1987. Assessing the seasonality of tourism. Visions in Leisure and Business, 6(2): 25-38.

Spotts, D. M. & Mahoney, E. M. 1993. Understanding the fall tourism market. Journal of Travel Research, 32(2): 3-15.

Stevens, J. 1996. Applied Multivariate Statistics for the Social Sciences (3rd ed.). Mahwah, New Jersey: Lawrence Erlbaum Associates.

Sundberg, P. 1989. Shape- and size-constrained principal components analysis. Systematic Zoology, 38(2): 166-168.

Sundgaard, E., Rosenberg, L., & Johns, N. 1998. A typology of hotels as individual players: the case of Bornholm, Denmark. International Journal of Contemporary Hospitality Management, 10(5): 180-183.

Sutcliffe, C. M. & Sinclair, M. T. 1980. The measurement of seasonality within the tourist industry: an application to tourist arrivals in Spain. Applied Economics, 12(4): 429-441.

The Countryside Alliance. 2002. Submission to the Inquiry into the lessons to be learned from the Foot and Mouth Outbreak of 2001. www.countryside-alliance.org/policy/020318ande.pdf; accessed 28.07.2002, Countryside Alliance. London.

Thompson, D., Muriel, P., Russell, D., Osborne, P., Bromley, A., Rowland, M., Creigh-Tyte, S., & Brown, S. 2003. Economic costs of the foot and mouth disease outbreak in the United Kingdom in 2001. www.defra.gov.uk/corporate/inquiries/lessons/fmdeconcostrev.pdf; accessed 28.10.2003, DEFRA/DCMS. London.

Tucker, L. R. 1958. Determination of parameters of a functional relation by factor analysis. Psychometrika, 23(1): 19-23.

Tucker, L. R. 1966. Learning theory and multivariate experiment: illustration by determination of generalized learning curves. In R. B. Catell (Ed.), Handbook of Multivariate Experimental Psychology: 476-501. Chicago: Rand McNally.

Turner, L. W., Reisinger, Y., & Witt, S. F. 1998. Tourism demand analysis using structural equation modelling. Tourism Economics, 4(4): 301-323.

Turner, L. W. & Witt, S. F. 2001a. Factors influencing demand for international tourism: tourism demand analysis using structural equation modelling, revisited. Tourism Economics, 7(1): 21-38.

Turner, L. W. & Witt, S. F. 2001b. Forecasting tourism using univariate and multivariate structural time-series models. Tourism Economics, 7(2): 135-147.

UKTS. 1995. The UK Tourist: Statistics 1994. English Tourism Council, Northern Ireland Tourist Board, Scottish Tourist Board, Wales Tourist Board. Hawick: Buccleuch Printers Limited.

UKTS. 1996. The UK Tourist: Statistics 1995. English Tourism Council, Northern Ireland Tourist Board, Scottish Tourist Board, Wales Tourist Board. Hawick: Buccleuch Printers Limited.

UKTS. 1997. The UK Tourist: Statistics 1996. English Tourism Council, Northern Ireland Tourist Board, Scottish Tourist Board, Wales Tourist Board. Hawick: Buccleuch Printers Limited.

UKTS. 1998. The UK Tourist: Statistics 1997. English Tourism Council, Northern Ireland Tourist Board, Scottish Tourist Board, Wales Tourist Board. Hawick: Buccleuch Printers Limited.

UKTS. 1999. The UK Tourist: Statistics 1998. English Tourism Council, Northern Ireland Tourist Board, Scottish Tourist Board, Wales Tourist Board. Hawick: Buccleuch Printers Limited.

UKTS. 2000a. The UK Tourist: Statistics 1999. English Tourism Council, Northern Ireland Tourist Board, Scottish Tourist Board, Wales Tourist Board. Hawick: Buccleuch Printers Limited.

UKTS. 2000b. The UK Tourist: Key Trends 1990-99. English Tourism Council, Northern Ireland Tourist Board, Scottish Tourist Board, Wales Tourist Board. Cardiff: Hartley's Printing Company.

UKTS. 2002a. The UK Tourist: Statistics 2000. English Tourism Council, Visit Scotland, Wales Tourist Board. Burgess Hill: Quentin Press.

UKTS. 2002b. The UK Tourist: Statistics 2001. English Tourism Council, Visit Scotland, Wales Tourist Board. Burgess Hill: Quentin Press.

UKTS. 2003. The UK Tourist: Statistics 2002. Visit Britain, Visit Scotland, Wales Tourist Board. Burgess Hill: Quentin Press.

Uysal, M., Fesenmaier, D. R., & O'Leary, J. 1994. Geographic and seasonal variation in the concentration of travel in the United States. Journal of Travel Research, 32(3): 61-64.

Wall, G. & Yan, M. 2003. Disaggregating visitor flows - the example of China. Tourism Analysis, 7(3/4): 191-205.

Wanhill, S. R. C. 1980. Tackling seasonality: a technical note. International Journal of Tourism Management, 1(4): 243-245.

Weaver, D. & Oppermann, M. 2000. Tourism Management. Brisbane: Wiley & Sons.

Williams, A. M. & Shaw, G. 1991. Tourism and Economic Development - Western European Experiences (2nd ed.). Chichester: Wiley & Sons.

Wilton, D. & Wirjanto, T. 1998. An Analysis of the Seasonal Variation in the National Tourism Indicators - A Report Prepared for the Canadian Tourism Commission. Department of Economics, University of Waterloo. Waterloo.

Winter Tourism Sub-Committee Members & Apropos Planning. 2002. Warming Up to Winter Tourism - A Product Development Strategy. Canadian Tourism Commission. Ottawa.

Witt, S. F., Newbould, G. D., & Watkins, A. J. 1992. Forecasting domestic tourism demand: application to Las Vegas arrivals data. Journal of Travel Research, 31(1): 36-41.

Witt, S. F. & Witt, C. A. 1992. Modelling and forecasting demand in tourism. London: Academic Press.

Witt, S. F. 1994. Econometric demand forecasting. In S. F. Witt & L. Moutinho (Eds.), Tourism Marketing and Management Handbook, 2nd ed.: 516-520. New York: Prentice Hall.

Witt, S. F. & Witt, C. A. 1994. Demand elasticities. In S. F. Witt & L. Moutinho (Eds.), Tourism Marketing and Management Handbook, 2nd ed.: 521-529. New York: Prentice Hall.

Witt, S. F. & Witt, C. A. 1995. Forecasting tourism demand: a review of empirical research. International Journal of Forecasting, 11(3): 447-475.

Witt, S. F., Song, H., & Louvieris, P. 2003. Statistical Testing in Forecasting Model Selection. Journal of Travel Research, 42(2): 151-158.

Wöber, K. W. 2002. Benchmarking in Tourism and Hospitality Industries: The Selection of Benchmarking Partners. Oxon: CABI Publishing.

Wootton, G. & Stevens, T. 1995. Business tourism: a study of the market for hotel-base meetings and its contribution to Wales' tourism. Tourism Management, 16(4): 305-313.

WTB. 1999. Wales Serviced Accommodation Occupancy Survey 1998. Wales Tourist Board. Cardiff.

WTB. 2000a. Achieving Our Potential - A Tourism Strategy For Wales. Wales Tourist Board. Cardiff.

WTB. 2000b. Survey of Tourism Trends in Wales 2000 - Management Summary. Wales Tourist Board, Beaufort Research. Cardiff.

WTB. 2000c. Wales Serviced Accommodation Occupancy Survey 1999. Wales Tourist Board. Cardiff.

WTB. 2001a. Vision in Action: Annual Report 2000-2001. Wales Tourist Board. Cardiff.

WTB. 2001b. Wales Serviced Accommodation Occupancy Survey 2000. Eres, Wales Tourist Board. Cardiff.

WTB. 2002. Last Bank Holiday of the season - A much needed boost for tourism (Press Release 16.09.2002). www.wtbonline.gov.uk; accessed 10.03.2003, Wales Tourist Board. Cardiff.

WTB & MC. 2002. Wales Tourism Business Monitor. www.wtbonline.gov.uk; accessed 10.05.2003, Wales Tourist Board, Moffat Centre for Travel & Tourism Business Development. Cardiff.

WTB. 2003a. Domestic (UK) tourism to Wales 2002. Research Information, Wales Tourist Board. Cardiff.

WTB. 2003b. Overseas visitors to Wales 2002. Research Information, Wales Tourist Board. Cardiff.

WTB. 2003c. Fast Facts on Tourism. www.wtbonline.gov.uk; accessed 31.10.2003, Wales Tourist Board. Cardiff.

WTB. 2003d. Tourism Trends Digest. Wales Tourist Board. Cardiff.

WTB. 2003e. Star Quality Grading - Serviced Accommodation (4th ed.). Cardiff: Wales Tourist Board.

WTO. 1984. Economic Review of World Tourism. World Tourism Organization. Madrid.

WTO & UNSTAT. 1994. Recommendations on Tourism Statistics. World Tourism Organization, United Nations. United Nations Publications: New York.

WTO. 2000. Tourism Highlights 2000. World Tourism Organization. Madrid.

WTO. 2002. Tourism Highlights 2002. World Tourism Organization. Madrid.

WTO. 2003. Tourism Highlights 2003. World Tourism Organization. Madrid.

Yacoumis, J. 1980. Tackling seasonality - the case of Sri Lanka. International Journal of Tourism Management, 1(2): 84-98.

Youell, R. 2001. Foot and mouth disease - impact on the tourism industry in rural Wales. www.aber.ac.uk/aberonline/uwa3001.html; accessed 28.10.2002, UWA 30/01. University of Wales Aberystwyth.

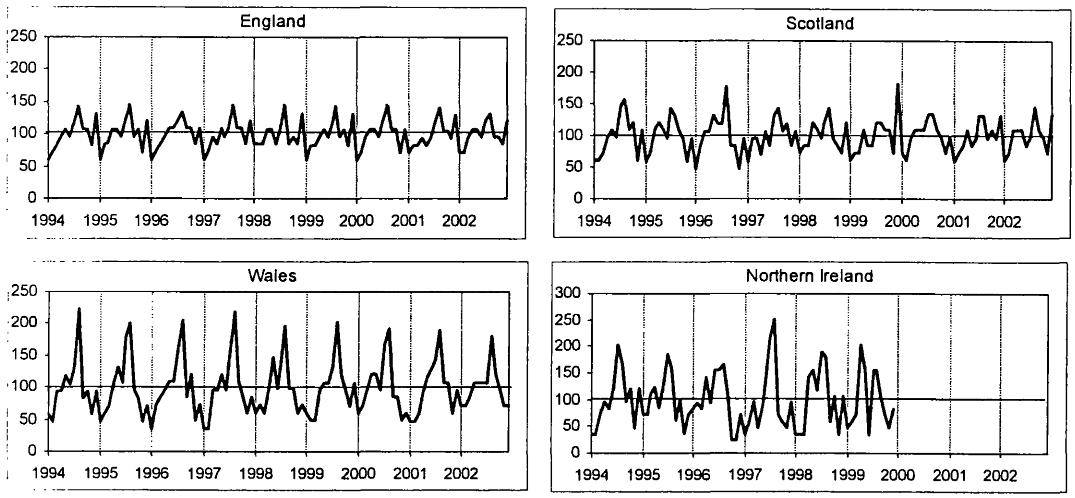
APPENDICES

Appendix A

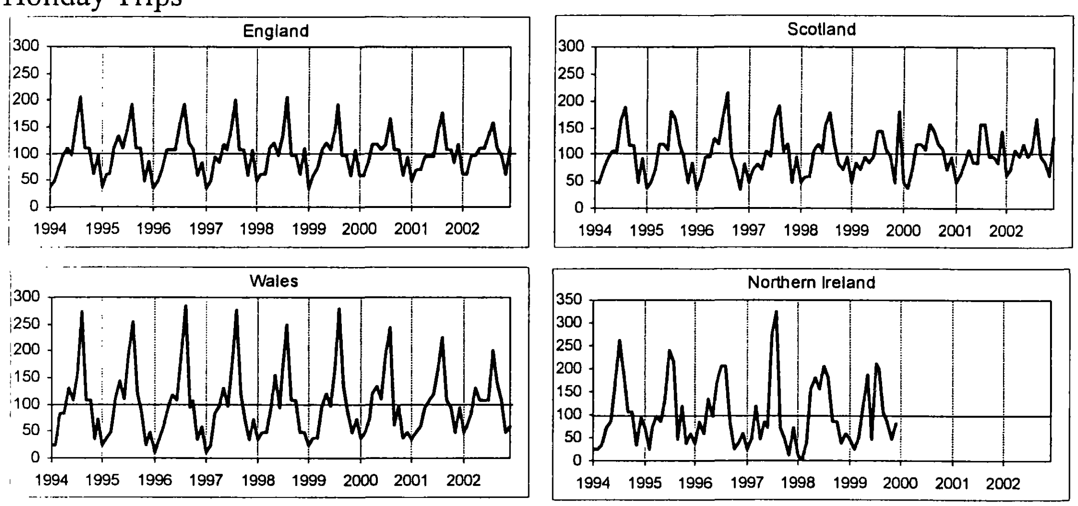
Appendix A: Seasonality Patterns and Seasonality Measures for UK Regions1994-2002

Figure A-1: Graphical Comparisons of Seasonality Patterns in the UK Regions, 1994-2002 (%)

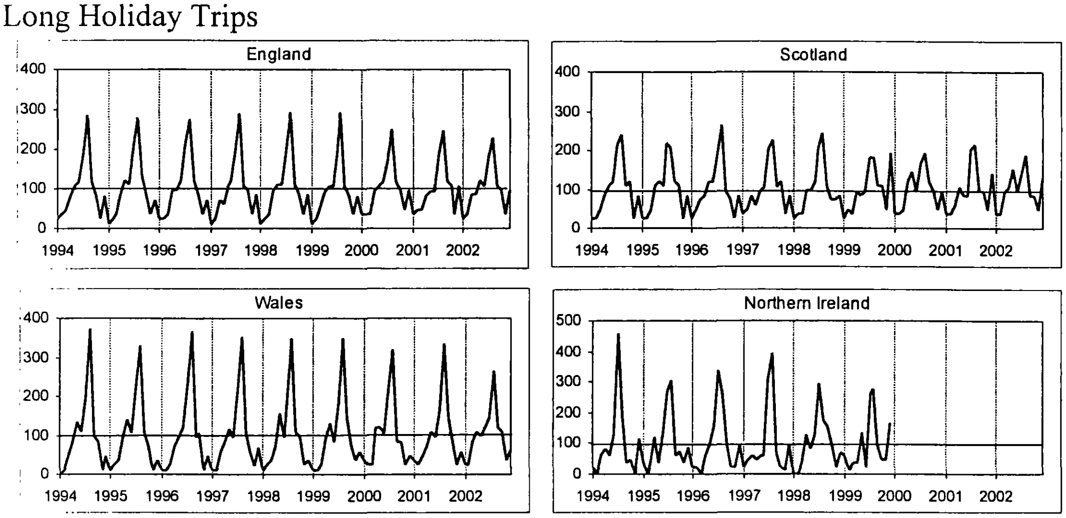
Tourism Trips



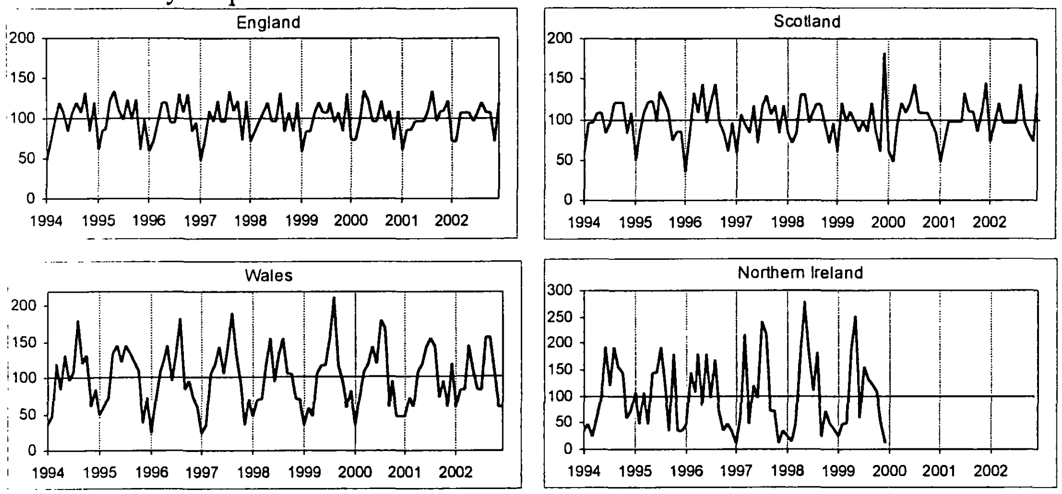
Holiday Trips



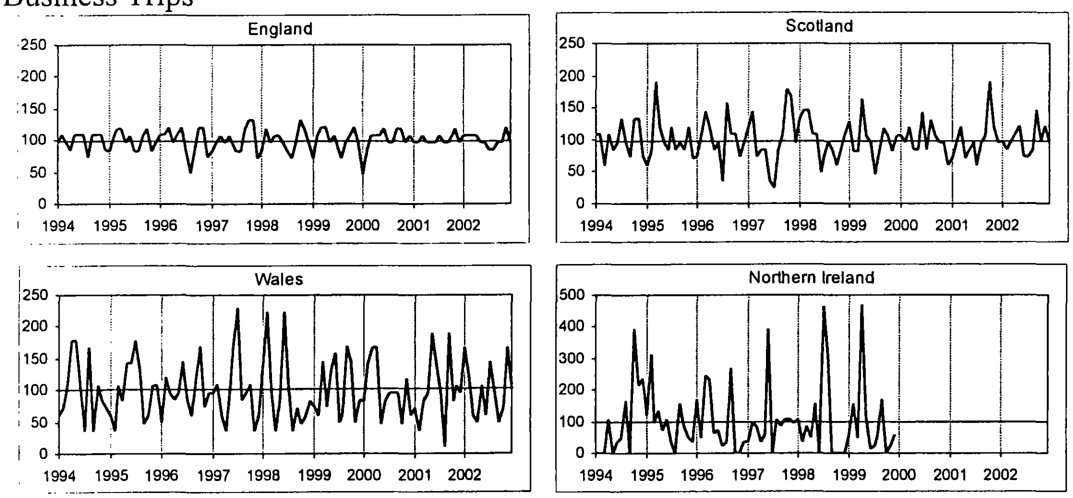
Long Holiday Trips



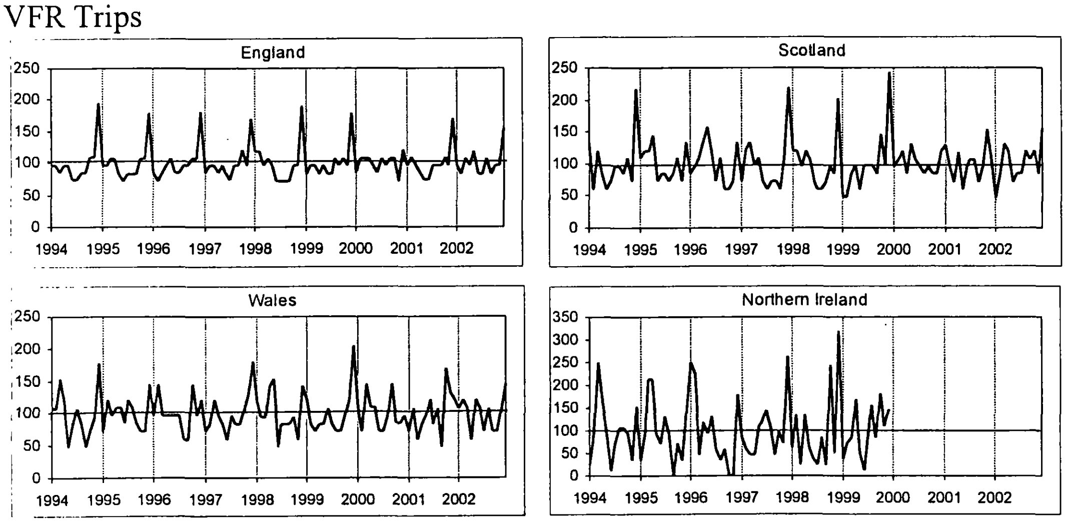
Short Holiday Trips



Business Trips



VFR Trips



Note: Data are normalised with average annual demand defined as 100

Table A-1: Gini Coefficient (GC), Coefficient of Variation (CV) and Seasonality Indicator (SI) for Different Kinds of Domestic Demand and UK Regions, 1994-1999

Type of Demand	Region	1994			1995			1996			1997			1998			1999			1994-1999	1994-1999	1994-1999
		GC	CV	SI	GC	CV	SI	GC	CV	SI	GC	CV	SI	GC	CV	SI	GV	CV	SI	Mean GC	Mean GV	Mean SI
Tourism Trips	UK overall	0.144	0.270	0.647	0.133	0.249	0.681	0.124	0.238	0.688	0.131	0.251	0.647	0.112	0.220	0.688	0.130	0.242	0.694	0.129	0.245	0.674
	England	0.130	0.240	0.701	0.123	0.231	0.694	0.109	0.208	0.750	0.119	0.226	0.688	0.102	0.207	0.694	0.121	0.229	0.701	0.117	0.223	0.705
	Scotland	0.173	0.323	0.635	0.140	0.263	0.694	0.187	0.360	0.561	0.130	0.240	0.701	0.120	0.225	0.694	0.166	0.331	0.550	0.153	0.290	0.639
	Wales	0.216	0.458	0.447	0.255	0.492	0.495	0.240	0.466	0.485	0.255	0.504	0.458	0.206	0.411	0.510	0.217	0.429	0.490	0.231	0.460	0.481
Holiday Trips	UK overall	0.238	0.460	0.495	0.262	0.496	0.485	0.248	0.484	0.480	0.242	0.479	0.468	0.220	0.439	0.485	0.230	0.449	0.495	0.240	0.468	0.485
	England	0.237	0.466	0.485	0.238	0.451	0.516	0.233	0.444	0.521	0.224	0.439	0.500	0.215	0.430	0.485	0.217	0.417	0.521	0.227	0.441	0.505
	Scotland	0.235	0.447	0.531	0.245	0.456	0.556	0.271	0.520	0.468	0.224	0.431	0.526	0.210	0.394	0.561	0.207	0.394	0.556	0.232	0.440	0.533
	Wales	0.337	0.682	0.366	0.375	0.716	0.393	0.372	0.752	0.351	0.368	0.728	0.362	0.323	0.640	0.401	0.356	0.713	0.359	0.355	0.705	0.372
Long Holiday Trips (+4nts)	UK overall	0.396	0.796	0.344	0.410	0.806	0.351	0.400	0.799	0.351	0.385	0.775	0.344	0.391	0.786	0.344	0.383	0.783	0.340	0.394	0.791	0.346
	England	0.374	0.754	0.351	0.402	0.784	0.359	0.388	0.775	0.362	0.382	0.766	0.347	0.389	0.792	0.340	0.382	0.786	0.340	0.386	0.776	0.350
	Scotland	0.363	0.704	0.417	0.339	0.650	0.458	0.345	0.691	0.379	0.306	0.603	0.443	0.332	0.658	0.413	0.308	0.580	0.521	0.332	0.648	0.438
	Wales	0.491	1.033	0.266	0.478	0.965	0.301	0.506	1.062	0.272	0.456	0.967	0.283	0.465	0.960	0.287	0.462	0.948	0.287	0.476	0.989	0.283
Short Holiday Trips	UK overall	0.121	0.235	0.765	0.122	0.232	0.750	0.137	0.258	0.758	0.133	0.258	0.694	0.107	0.200	0.758	0.124	0.238	0.750	0.124	0.237	0.746
	England	0.127	0.242	0.758	0.128	0.238	0.742	0.120	0.223	0.765	0.130	0.249	0.750	0.097	0.180	0.758	0.105	0.199	0.765	0.118	0.222	0.756
	Scotland	0.093	0.180	0.833	0.133	0.249	0.742	0.173	0.325	0.694	0.118	0.222	0.773	0.115	0.212	0.765	0.159	0.323	0.550	0.132	0.252	0.726
	Wales	0.218	0.407	0.556	0.211	0.394	0.688	0.225	0.420	0.550	0.271	0.505	0.526	0.187	0.349	0.647	0.258	0.495	0.472	0.229	0.429	0.573
Visits to friends & relatives	UK overall	0.130	0.313	0.521	0.112	0.249	0.589	0.102	0.236	0.595	0.115	0.277	0.556	0.156	0.334	0.526	0.115	0.297	0.526	0.122	0.284	0.552
	England	0.134	0.319	0.516	0.121	0.275	0.561	0.120	0.277	0.556	0.107	0.249	0.589	0.156	0.334	0.526	0.103	0.261	0.561	0.124	0.286	0.551
	Scotland	0.203	0.429	0.463	0.135	0.252	0.694	0.170	0.313	0.641	0.211	0.445	0.458	0.191	0.391	0.495	0.233	0.520	0.413	0.191	0.392	0.527
	Wales	0.204	0.387	0.561	0.124	0.232	0.688	0.128	0.263	0.694	0.158	0.321	0.556	0.177	0.334	0.647	0.165	0.370	0.490	0.159	0.318	0.606
Business Trips	UK overall	0.066	0.126	0.817	0.068	0.129	0.842	0.100	0.194	0.833	0.097	0.186	0.765	0.072	0.138	0.842	0.078	0.147	0.825	0.080	0.153	0.821
	England	0.061	0.128	0.917	0.078	0.147	0.842	0.119	0.232	0.825	0.103	0.193	0.765	0.092	0.171	0.765	0.092	0.172	0.833	0.091	0.174	0.824
	Scotland	0.133	0.247	0.758	0.163	0.342	0.526	0.172	0.325	0.641	0.255	0.475	0.556	0.171	0.315	0.688	0.150	0.295	0.607	0.174	0.333	0.629
	Wales	0.271	0.510	0.561	0.238	0.440	0.561	0.184	0.347	0.589	0.277	0.552	0.434	0.328	0.651	0.447	0.245	0.463	0.589	0.257	0.494	0.530

Table A-2: Gini Coefficient (GC), Coefficient of Variation (CV) and Seasonality Indicator (SI) for Different Kinds of Domestic Demand and UK Regions, 2000-2002

Type of Demand	Region	2000			2001			2002			2000-2002	2000-2002	2000-2002
		GC	CV	SI	GC	CV	SI	GC	CV	SI	Mean GC	Mean CV	Mean SI
Tourism trips	UK overall	0.120	0.232	0.688	0.123	0.231	0.694	0.110	0.214	0.688	0.118	0.225	0.690
	England	0.118	0.231	0.694	0.111	0.210	0.708	0.100	0.187	0.758	0.110	0.209	0.720
	Scotland	0.119	0.226	0.750	0.127	0.236	0.758	0.132	0.249	0.688	0.126	0.237	0.732
	Wales	0.227	0.438	0.521	0.227	0.428	0.526	0.148	0.308	0.556	0.201	0.392	0.534
Holiday trips	UK overall	0.174	0.330	0.601	0.182	0.356	0.556	0.148	0.291	0.641	0.168	0.326	0.599
	England	0.163	0.314	0.601	0.176	0.342	0.567	0.151	0.293	0.635	0.163	0.316	0.601
	Scotland	0.197	0.367	0.641	0.183	0.352	0.641	0.162	0.308	0.595	0.181	0.342	0.626
	Wales	0.334	0.650	0.413	0.273	0.540	0.443	0.233	0.452	0.495	0.280	0.547	0.450
Long holiday trips (4 nights and more)	UK overall	0.323	0.650	0.397	0.327	0.656	0.397	0.295	0.584	0.439	0.315	0.630	0.411
	England	0.313	0.623	0.401	0.317	0.634	0.405	0.300	0.586	0.439	0.310	0.614	0.415
	Scotland	0.278	0.518	0.521	0.306	0.592	0.468	0.260	0.482	0.526	0.281	0.530	0.505
	Wales	0.433	0.891	0.312	0.410	0.870	0.298	0.329	0.662	0.375	0.391	0.808	0.328
Short Holiday Trips	UK overall	0.099	0.187	0.817	0.100	0.194	0.750	0.075	0.156	0.833	0.091	0.179	0.800
	England	0.107	0.201	0.750	0.097	0.187	0.750	0.088	0.180	0.833	0.097	0.189	0.778
	Scotland	0.135	0.263	0.694	0.130	0.254	0.688	0.110	0.219	0.694	0.125	0.245	0.692
	Wales	0.263	0.484	0.556	0.203	0.374	0.641	0.189	0.362	0.635	0.219	0.407	0.610
VFR trips	UK overall	0.072	0.138	0.842	0.103	0.235	0.601	0.085	0.193	0.647	0.087	0.189	0.697
	England	0.070	0.139	0.833	0.109	0.249	0.589	0.097	0.206	0.647	0.092	0.198	0.690
	Scotland	0.087	0.164	0.765	0.139	0.263	0.654	0.158	0.297	0.647	0.128	0.241	0.689
	Wales	0.132	0.254	0.688	0.178	0.333	0.595	0.130	0.252	0.694	0.147	0.280	0.659
Business trips	UK overall	0.082	0.164	0.825	0.055	0.107	0.833	0.061	0.117	0.825	0.066	0.129	0.828
	England	0.095	0.199	0.842	0.035	0.079	0.842	0.055	0.107	0.833	0.062	0.128	0.839
	Scotland	0.121	0.229	0.701	0.161	0.338	0.526	0.112	0.214	0.688	0.131	0.260	0.638
	Wales	0.220	0.413	0.601	0.278	0.535	0.526	0.237	0.438	0.595	0.245	0.462	0.574

Table A-3: Coefficient of Variability for each Month, Type of Demand and Region calculated for 1994-1999

Type of Demand	Region	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Mean 1994-1999
Tourism Trips	UK overall	0.079	0.066	0.057	0.092	0.000	0.079	0.074	0.042	0.098	0.060	0.084	0.089	**0.068**
	England	0.153	0.084	0.057	0.092	0.000	0.079	0.053	0.034	0.098	0.046	0.060	0.079	**0.070**
	Scotland	0.126	0.161	0.184	0.174	0.141	0.137	0.091	0.142	0.098	0.162	0.191	0.268	**0.156**
	Wales	0.236	0.260	0.258	0.050	0.115	0.060	0.132	0.060	0.143	0.137	0.156	0.181	**0.149**
Holiday Trips	UK overall	0.129	0.119	0.183	0.098	0.063	0.060	0.041	0.024	0.060	0.062	0.122	0.096	**0.088**
	England	0.129	0.122	0.183	0.098	0.077	0.060	0.062	0.033	0.085	0.060	0.084	0.120	**0.093**
	Scotland	0.141	0.226	0.163	0.163	0.146	0.085	0.076	0.135	0.087	0.196	0.236	0.346	**0.167**
	Wales	0.411	0.266	0.335	0.079	0.105	0.064	0.083	0.054	0.110	0.170	0.238	0.190	**0.175**
Long holiday trips (4 nights and more)	UK overall	0.350	0.188	0.274	0.156	0.082	0.110	0.049	0.017	0.055	0.000	0.219	0.084	**0.132**
	England	0.387	0.188	0.316	0.163	0.070	0.058	0.049	0.032	0.084	0.057	0.144	0.077	**0.136**
	Scotland	0.188	0.310	0.365	0.186	0.140	0.087	0.069	0.132	0.070	0.223	0.506	0.432	**0.226**
	Wales	0.490	0.387	0.369	0.128	0.159	0.123	0.113	0.041	0.161	0.215	0.490	0.281	**0.246**
Short holiday trips	UK overall	0.186	0.084	0.106	0.087	0.052	0.062	0.046	0.057	0.098	0.058	0.122	0.099	**0.088**
	England	0.156	0.084	0.096	0.087	0.063	0.092	0.062	0.052	0.098	0.089	0.129	0.129	**0.095**
	Scotland	0.275	0.188	0.162	0.145	0.141	0.111	0.130	0.167	0.087	0.209	0.159	0.303	**0.173**
	Wales	0.298	0.242	0.319	0.145	0.089	0.111	0.121	0.165	0.145	0.132	0.293	0.122	**0.182**
VFR trips	UK overall	0.149	0.120	0.079	0.112	0.079	0.122	0.084	0.140	0.090	0.070	0.062	0.065	**0.098**
	England	0.149	0.158	0.096	0.112	0.079	0.084	0.084	0.140	0.111	0.070	0.064	0.050	**0.100**
	Scotland	0.337	0.346	0.161	0.211	0.399	0.224	0.212	0.221	0.129	0.335	0.181	0.244	**0.250**
	Wales	0.225	0.220	0.272	0.199	0.371	0.279	0.143	0.195	0.211	0.273	0.285	0.192	**0.239**
Business trips	UK overall	0.106	0.085	0.141	0.140	0.060	0.094	0.112	0.129	0.098	0.077	0.107	0.137	**0.107**
	England	0.141	0.070	0.107	0.140	0.060	0.085	0.111	0.183	0.123	0.089	0.145	0.137	**0.116**
	Scotland	0.298	0.241	0.447	0.236	0.126	0.355	0.624	0.281	0.180	0.369	0.334	0.178	**0.306**
	Wales	0.442	0.655	0.266	0.644	0.285	0.252	0.665	0.558	0.545	0.438	0.381	0.202	**0.444**

Table A-4: Coefficient of Variability for each Month, Type of Demand and Region calculated for 2000-2002

Type of Demand	Region	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Mean 2000-2002
Tourism Trips	UK overall	0.102	0.000	0.075	0.067	0.139	0.069	0.100	0.000	0.067	0.069	0.091	0.124	**0.075**
	England	0.102	0.091	0.075	0.067	0.139	0.000	0.000	0.049	0.067	0.067	0.143	0.100	**0.075**
	Scotland	0.108	0.102	0.125	0.000	0.139	0.125	0.173	0.051	0.067	0.069	0.173	0.173	**0.109**
	Wales	0.200	0.217	0.229	0.111	0.060	0.164	0.216	0.037	0.176	0.125	0.200	0.241	**0.165**
Holiday Trips	UK overall	0.124	0.108	0.173	0.111	0.111	0.067	0.051	0.071	0.000	0.069	0.108	0.111	**0.092**
	England	0.124	0.108	0.143	0.133	0.111	0.067	0.091	0.071	0.000	0.067	0.204	0.111	**0.102**
	Scotland	0.133	0.327	0.208	0.111	0.192	0.125	0.198	0.077	0.133	0.125	0.167	0.201	**0.167**
	Wales	0.173	0.133	0.167	0.158	0.119	0.062	0.277	0.082	0.405	0.069	0.157	0.367	**0.181**
Long holiday trips (4 nights and more)	UK overall	0.217	0.000	0.446	0.075	0.124	0.067	0.038	0.057	0.111	0.000	0.000	0.069	**0.100**
	England	0.217	0.173	0.446	0.079	0.111	0.111	0.067	0.057	0.060	0.069	0.173	0.069	**0.136**
	Scotland	0.000	0.000	0.367	0.062	0.301	0.075	0.176	0.069	0.183	0.075	0.000	0.201	**0.126**
	Wales	0.217	0.000	0.581	0.250	0.111	0.111	0.208	0.125	0.260	0.151	0.247	0.124	**0.199**
Short holiday trips	UK overall	0.102	0.087	0.125	0.111	0.111	0.069	0.062	0.056	0.069	0.067	0.173	0.111	**0.095**
	England	0.102	0.091	0.125	0.164	0.111	0.000	0.067	0.056	0.069	0.000	0.247	0.060	**0.091**
	Scotland	0.200	0.333	0.133	0.133	0.069	0.133	0.201	0.173	0.067	0.151	0.199	0.265	**0.172**
	Wales	0.250	0.091	0.286	0.148	0.148	0.260	0.357	0.077	0.545	0.069	0.124	0.508	**0.239**
VFR trips	UK overall	0.075	0.139	0.111	0.125	0.199	0.079	0.069	0.069	0.125	0.069	0.199	0.169	**0.119**
	England	0.075	0.139	0.067	0.125	0.250	0.087	0.125	0.069	0.125	0.067	0.157	0.169	**0.121**
	Scotland	0.458	0.125	0.294	0.192	0.438	0.125	0.125	0.176	0.199	0.183	0.385	0.195	**0.241**
	Wales	0.217	0.250	0.405	0.286	0.111	0.250	0.091	0.067	0.568	0.484	0.222	0.200	**0.263**
Business trips	UK overall	0.286	0.125	0.000	0.067	0.000	0.183	0.125	0.079	0.111	0.067	0.124	0.000	**0.097**
	England	0.378	0.125	0.000	0.067	0.069	0.133	0.125	0.075	0.133	0.111	0.124	0.069	**0.117**
	Scotland	0.199	0.075	0.124	0.208	0.217	0.353	0.167	0.240	0.173	0.433	0.124	0.247	**0.213**
	Wales	0.484	0.567	0.545	0.581	0.624	0.451	0.247	0.713	0.655	0.270	0.241	0.284	**0.472**

Figure A-2: Seasonal Plot for Short Holiday Trips in Wales 1994-1999 and 2000-2002

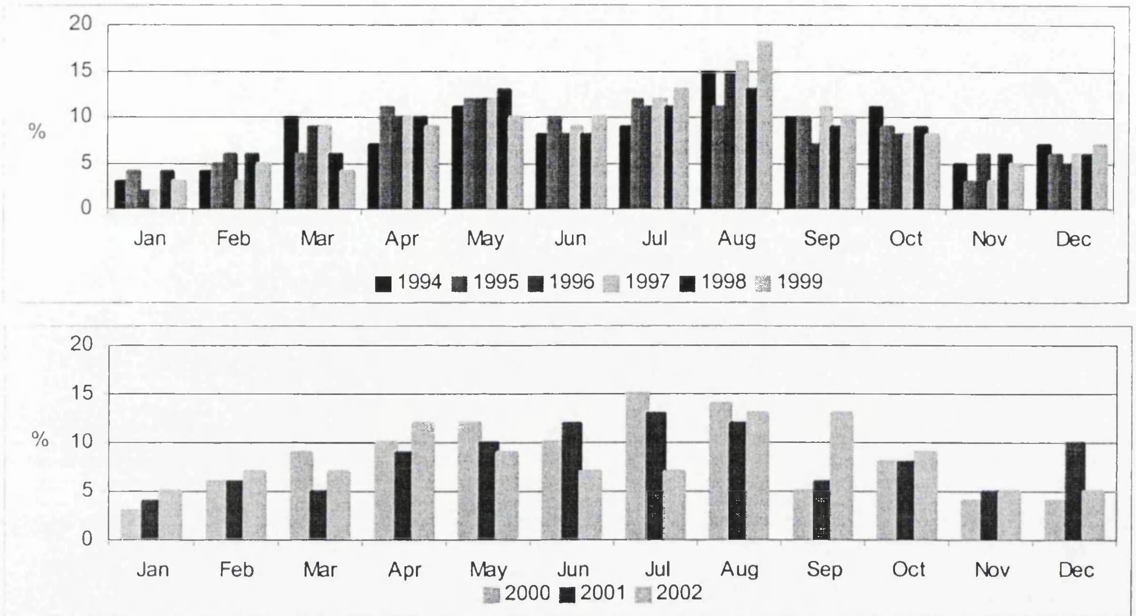


Figure A-3: Seasonal Plot for VFR Trips in Wales 1994-1999 and 2000-2002

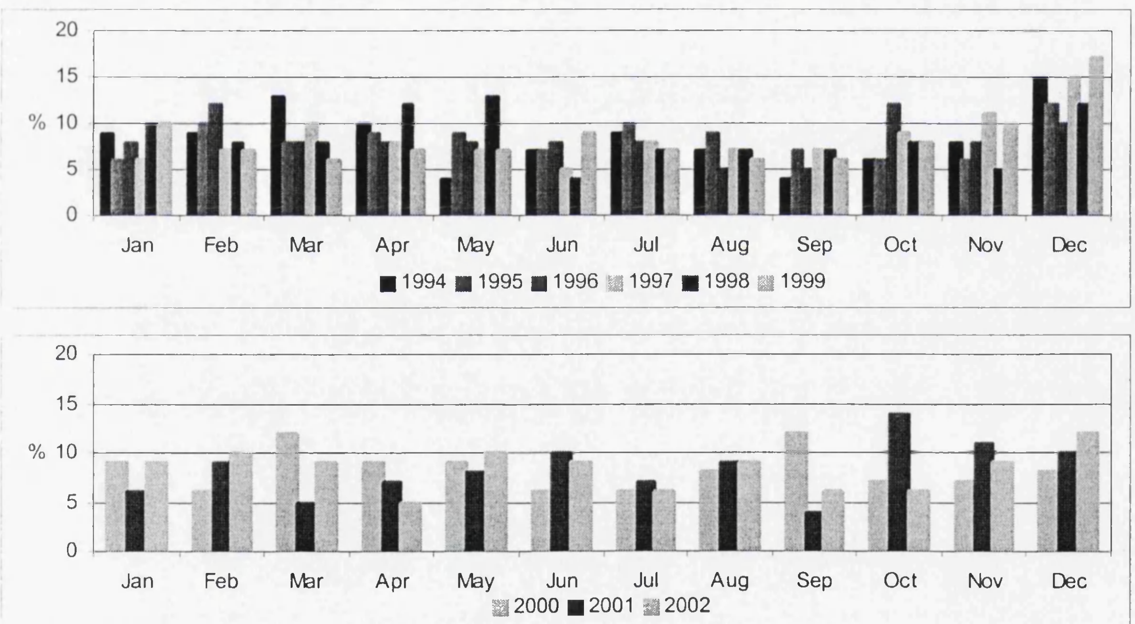


Table A-5: Concentration Indices for VFR Trips, 1994-2002

Concentration Indices for VFR trips as percentage of annual figure for VFR trips, 1994-2002												
	May/Jun			Jul/Aug			Sep/Oct			Nov-Apr		
	Wales	Scotland	England	Wales	Scotland	England	Wales	Scotland	England	Wales	Scotland	England
1994	10.9	11.0	14.1	15.8	16.0	13.1	9.9	16.0	16.2	63.4	57.0	56.6
1995	16.2	13.0	12.9	19.2	13.0	13.9	13.1	16.0	15.8	51.5	58.0	57.4
1996	16.0	23.0	16.0	13.0	15.0	15.0	17.0	10.0	17.0	54.0	52.0	52.0
1997	12.0	15.2	15.2	15.0	11.1	14.1	16.0	11.1	18.2	57.0	62.6	52.5
1998	16.8	14.9	13.9	13.9	9.9	11.9	14.9	13.9	13.9	54.5	61.4	60.4
1999	16.0	13.1	14.9	13.0	16.2	15.8	14.0	19.2	16.8	57.0	51.5	52.5
mean 1994-1999	***14.6***	***15.0***	***14.5***	***15.0***	***13.5***	***14.0***	***14.1***	***14.4***	***16.3***	***56.2***	***57.1***	***55.2***
2000	15.2	19.8	15.0	14.1	14.9	17.0	19.2	14.9	18.0	51.5	50.5	50.0
2001	18.0	12.7	12.1	16.0	17.6	16.2	18.0	13.7	17.2	48.0	55.9	54.5
2002	19.0	12.9	16.8	15.0	16.8	15.8	12.0	18.8	14.9	54.0	51.5	52.5
mean 2000-2002	***17.4***	***15.1***	***14.7***	***15.0***	***16.4***	***16.3***	***16.4***	***15.8***	***16.7***	***51.2***	***52.6***	***52.3***

Table A-6: Concentration Indices for Short Holiday Trips, 1994-2002

Concentration Indices for short holiday trips as percentage of annual figure for short holiday trips, 1994-2002												
	May/Jun			Jul/Aug			Sep/Oct			Nov-Apr		
	Wales	Scotland	England	Wales	Scotland	England	Wales	Scotland	England	Wales	Scotland	England
1994	19.0	16.0	16.0	24.0	18.0	19.0	21.0	20.0	20.0	36.0	46.0	45.0
1995	22.2	18.4	20.4	23.2	21.4	18.4	19.2	15.3	18.4	35.4	44.9	42.9
1996	20.2	20.0	17.8	26.3	22.0	18.8	15.2	15.0	19.8	38.4	43.0	43.6
1997	20.8	15.7	18.2	27.7	20.6	19.2	18.8	18.6	19.2	32.7	45.1	43.4
1998	20.8	18.8	18.0	23.8	18.8	19.0	17.8	17.8	16.0	37.6	44.6	47.0
1999	19.6	15.2	18.8	30.4	15.2	18.8	17.6	17.2	16.8	32.4	52.5	45.5
mean 1994-1999	***20.4***	***17.3***	***18.2***	***25.9***	***19.3***	***18.9***	***18.3***	***17.3***	***18.4***	***35.4***	***46.0***	***44.6***
2000	22.0	19.0	18.2	29.0	21.0	18.2	13.0	18.0	17.2	36.0	42.0	46.5
2001	22.0	16.2	16.2	25.0	20.2	20.2	14.0	16.2	17.2	39.0	47.5	46.5
2002	16.2	16.0	17.0	20.2	20.0	19.0	22.2	15.0	18.0	41.4	49.0	46.0
mean 2000-2002	***20.1***	***17.1***	***17.1***	***24.7***	***20.4***	***19.1***	***16.4***	***16.4***	***17.4***	***38.8***	***46.2***	***46.3***

Table A-7: Concentration Indices for Long Holiday Trips, 1994-2002

Concentration Indices for long holiday trips as percentage of annual figure for long holiday trips, 1994-2002												
	May/Jun			Jul/Aug			Sep/Oct			Nov-Apr		
	Wales	Scotland	England	Wales	Scotland	England	Wales	Scotland	England	Wales	Scotland	England
1994	20.2	19.0	18.8	47.5	38.0	39.6	15.2	19.0	16.8	17.2	24.0	24.8
1995	20.8	19.2	19.2	46.5	35.4	40.4	14.9	19.2	18.2	17.8	26.3	22.2
1996	17.8	20.0	18.0	50.5	38.0	41.0	16.8	14.0	17.0	14.9	28.0	24.0
1997	17.6	16.8	19.0	47.1	35.6	40.0	13.7	18.8	17.0	21.6	28.7	24.0
1998	21.0	18.2	18.4	45.0	37.4	40.8	17.0	15.2	16.3	17.0	29.3	24.5
1999	18.0	15.0	17.6	44.0	30.0	41.2	18.0	18.0	15.7	20.0	37.0	25.5
mean 1994-1999	***19.2***	***18.0***	***18.5***	***46.8***	***35.7***	***40.5***	***15.9***	***17.4***	***16.8***	***18.1***	***28.9***	***24.2***
2000	18.8	20.0	18.8	44.6	30.0	34.7	13.9	18.0	17.8	22.8	32.0	28.7
2001	17.0	13.9	15.7	42.0	34.7	36.3	19.0	15.8	18.6	22.0	35.6	29.4
2002	18.2	20.8	19.0	34.3	27.7	34.0	19.2	13.9	17.0	28.3	37.6	30.0
mean 2000-2002	***18.0***	***18.2***	***17.8***	***40.3***	***30.8***	***35.0***	***17.4***	***15.9***	***17.8***	***24.4***	***35.1***	***29.4***

Appendix B

Appendix B: Research Sample Characteristics

Table B-1: Comparison of Frequencies in Characteristics in Research Sample and National Sample

	Hotels				Non-Hotels			
	WSAOS 1998	WSAOS 1999	WSOAS 2000	**Research Sample 1998-2000**	WSAOS 1998	WSAOS 1999	WSOAS 2000	**Research Sample 1998-2000**
Number of Establishments in Sample	n=255	n=259	n=235	**n=99**	n=235	n=212	n=176	**n=111**
Average Number of Rooms per Establishment	26	26	26	**30**	4	4	4	**4**
Average Number of Beds per Establishment	55	53	54	**62**	8	9	10	**8**
Region								
North Wales	39.6%	35.1%	34.5%	**39.4%**	29.4%	27.8%	25.6%	**28.8%**
Mid Wales	20.0%	21.6%	23.4%	**23.2%**	27.2%	26.4%	29.0%	**33.3%**
South Wales	40.4%	43.2%	42.1%	**37.4%**	43.4%	45.8%	45.5%	**37.8%**
Unitary Authorities								
Cardiff/ Vale of Glamorgan	3.9%	4.2%	4.7%	**3.0%**	1.7%	1.4%	1.7%	**0.9%**
Newport/ Monmouthshire/ Torfaen/ Blaneau Gwent/ Caerphilly	7.5%	7.3%	7.2%	**9.1%**	7.7%	9.0%	9.1%	**9.0%**
Rhondda Cynon Taff/ Bridgend/ Merthyr Tydfil	2.7%	3.5%	3.0%	**3.0%**	2.1%	1.4%	1.7%	**1.8%**
Neath&Port Talbot/ Swansea	6.3%	6.6%	5.5%	**3.0%**	3.8%	3.8%	3.4%	**3.6%**
Carmarthenshire/ Pembrokeshire	17.3%	17.4%	17.0%	**13.1%**	20.4%	22.2%	22.7%	**15.3%**
Ceredigion	4.7%	3.9%	3.8%	**4.0%**	6.8%	6.6%	8.5%	**6.3%**
Powys	14.5%	18.1%	19.1%	**15.2%**	21.3%	21.2%	21.6%	**24.3%**
Denbighshire/ Flintshire/ Wrexham	9.4%	7.7%	8.5%	**11.1%**	7.2%	5.7%	6.3%	**8.1%**
Conwy	16.5%	13.5%	12.3%	**19.2%**	10.2%	11.3%	8.5%	**10.8%**
Gwynedd/ Anglesey	17.3%	17.8%	18.7%	**19.2%**	18.7%	17.5%	16.5%	**19.8%**
Grading*								
not graded	*(8.6%)*	14.3%	10.6%	**3.0%**	*(20.0%)*	9.9%	9.1%	**7.2%**
1 Stars	*(2.4%)*	5.8%	6.4%	**4.0%**	*(14.5%)*	7.5%	7.4%	**5.4%**
2 Stars	*(8.6%)*	34.0%	35.7%	**26.3%**	*(36.2%)*	30.7%	33.0%	**19.8%**
3 Stars	*(42.0%)*	37.1%	37.9%	**48.5%**	*(25.1%)*	45.8%	43.8%	**56.8%**
4 Stars	*(32.5%)*	8.1%	8.9%	**15.2%**	*(0%)*	6.1%	6.3%	**10.8%**
5 Stars	*(5.9%)*	0.8%	0.4%	**3.0%**	*(0%)*	0%	0.6%	**0%**
*(*1998 figures for Crowns)*								

Source: WSAOS Figures from (WTB, 1999, 2000c, 2001b)

Table B-2: Comparison of Average Room Occupancy Rates for Different Characteristics and Years between Research Sample (RS) and National WSAOS Sample for Hotels (in %)

Hotels		1998		1999			2000		2001		2002	
		WSAOS	RS n=99	WSAOS	RS n=99		WSAOS	RS n=99	WSAOS	RS n=82	WSAOS	RS n=76
Average Annual Room Occupancy		**53**	**49**	**53**	**48**		**52**	**48**	**54**	**51**	**55**	**52**
Region	North Wales	53	49	52	48		53	48	*	49	52	50
	Mid Wales	44	45	42	45		43	45	*	48	49	54
	South Wales	56	50	56	49		55	48	*	54	57	55
	South West Wales	*	47	*	46		*	47	*	54	60	56
	South East Wales	*	54	*	52		*	49	*	55	55	54
Size	1-3 room	*	*	*	*		*	*	*	*	*	*
	4-10 rooms	44	40	42	39		40	37	43	38	43	43
	11-25 rooms	50	51	49	49		46	47	48	51	50	52
	26-50 rooms	53	52	54	51		56	52	54	54	54	56
	51-100 rooms	56	54	54	55		59	59	61	60	59	60
	over 100 rooms	65	59	66	60		65	59	67	60	68	59
Grade	not graded	*50*	32	*	31		40	34	52	*	51	*
	1 Stars	*	28	33	28		31	27	*	*	*	*
	2 Stars	*32*	43	45	42		43	40	46	45	51	47
	3 Stars	*49*	52	56	51		57	50	55	51	55	53
	4 Stars	*54*	60	65	61		63	62	63	63	62	63
	5 Stars	*68*	44	*	44		*	47	59	44	53	44
Location	Seaside	54	48	53	48		56	48	56	51	55	54
	City/Small/Large town	57	54	57	52		56	52	60	53	61	55
	City/Large Town	64	*	64	*		60	*	67	*	69	*
	Small Town	49	*	50	*		51	*	54	*	52	*
	Country/Village	49	48	46	46		46	46	48	49	49	48
Tariff (in £)	<15	*	*	*	*	<20	42	23	*	*	*	*
	15-24	34	30	35	31	20-29.99	33	31	*	34	45	38
	25-34	43	47	46	45	30-39.99	49	52	*	53	47	56
	35-44	53	50	49	50	40-49.99	53	49	*	55	55	57
	45-54	55	60	53	59	50-59.99	55	65	*	64	57	63
	>55	59	51	58	51	>60	59	50	*	51	59	50

* information on annual average room occupancy rate not available or not applicable

Table B-3: Comparison of Average Room Occupancy Rates for Different Characteristics for Different Years between Research Sample (RS) and National WSAOS Sample for Non-Hotels (in %)

Non-Hotels		1998 WSAOS	1998 RS n=111	1999 WSAOS	1999 RS n=111		2000 WSAOS	2000 RS n=111	2001 WSAOS	2001 RS n=88	2002 WSAOS	2002 RS n=69
Average Annual Roomoccupancy		37	33	38	34		36	33	31	28	41	34
Type	Guesthouses	*	38	*	38		*	38	35	34	46	39
	B&Bs	*	28	*	29		*	29	27	25	35	31
	Farmhouses	*	31	*	31		*	30	*	21	*	28
Region	North Wales	35	28	36	29		31	28	*	24	36	29
	Mid Wales	33	33	32	32		32	31	*	24	32	29
	South Wales	41	37	43	38		41	39	*	34	49	40
	South West Wales	*	36	*	38		*	38	*	37	51	42
	South East Wales	*	38	*	39		*	39	*	31	47	39
Size	1-3 room	34	31	35	32		32	31	26	25	33	31
	4-10 rooms	40	36	41	37		40	36	35	32	43	38
	11-25 rooms	*	*	*	*		*	*	*	*	*	*
	26-50 rooms	*	*	*	*		*	*	*	*	*	*
	51-100 rooms	*	*	*	*		*	*	*	*	*	*
	over 100 rooms	*	*	*	*		*	*	*	*	*	*
Grade	not graded	*32*	31	29	29		26	29	26	23	37	32
	1 Stars	*34*	42	31	43		35	41	32	41	40	40
	2 Stars	*36*	35	39	34		35	33	34	29	41	36
	3 Stars	*44*	31	39	32		37	31	29	24	42	31
	4 Stars	*	38	51	39		46	33	35	38	41	43
	5 Stars	*	*	*	*		*	*	*	*	*	*
Location	Seaside	42	40	43	41		39	40	36	38	41	42
	City/Small/Large town	38	38	40	37		37	37	42	36	53	41
	City/Large Town	*	*	*	*		*	*	56	*	68	*
	Small Town	38	*	40	*		37	*	29	*	39	*
	Country/Village	33	30	34	30		33	30	26	23	36	30
Tariff (in £)	<15	34	*	*	*	<20	29	27		25	35	28
	15-24	34	30	33	30	20-29.99	38	35		28	41	36
	25-34	45	43	47	46	30-39.99	45	34		*	52	*
	35-44	*	*	*	*	40-49.99	*	*		*	*	*
	45-54	*	*	*	*	50-59.99	*	*		*	*	*
	>55	*	*	*	*	>60	*	*		*	*	*

* information on annual average room occupancy rate not available or not applicable

Figure B-1: Regional Distribution of Establishments by Type of Establishment, *n*=210

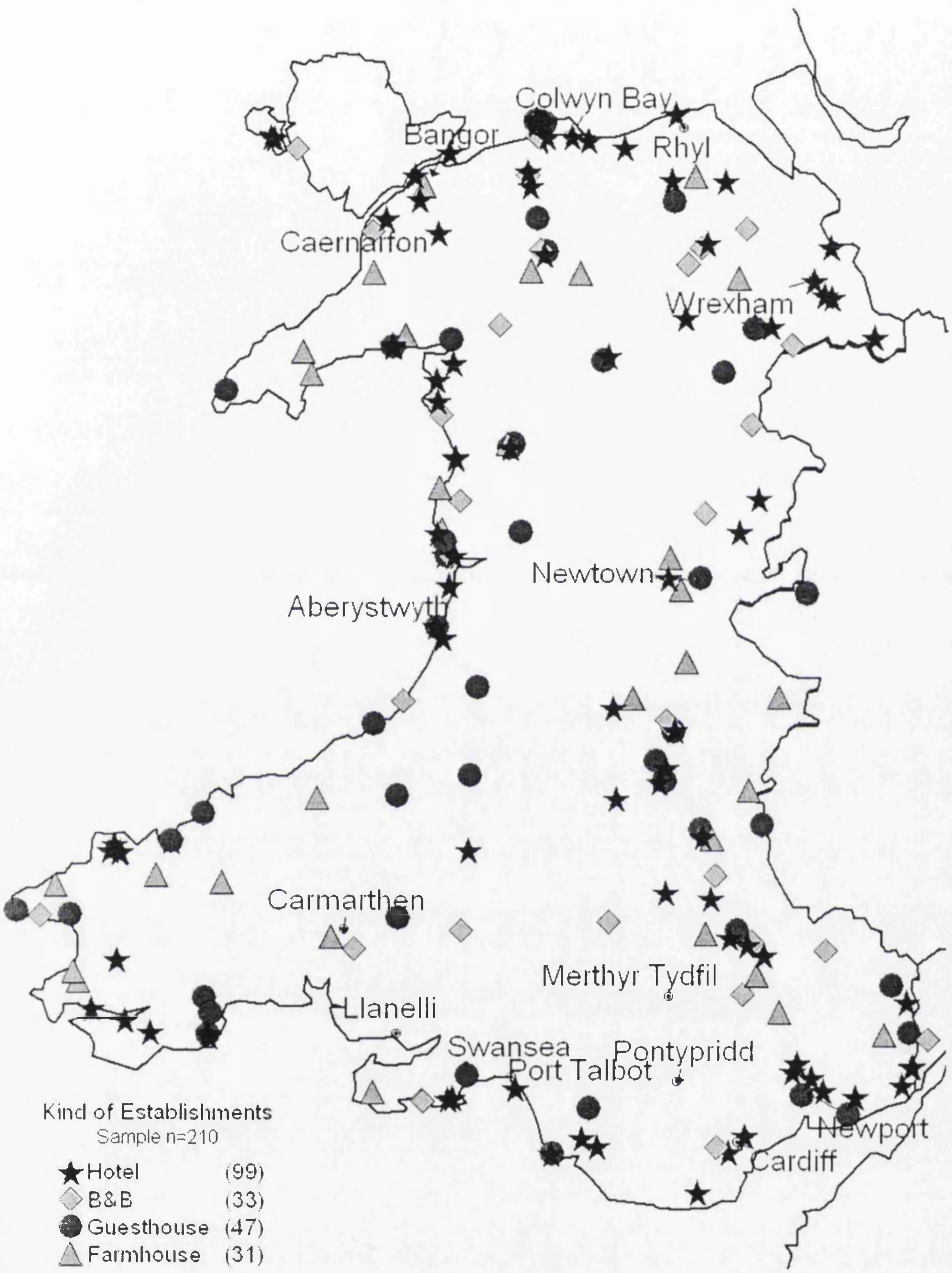


Figure B-2: Regional Distribution of Establishments by 12 Holiday Regions, n=210

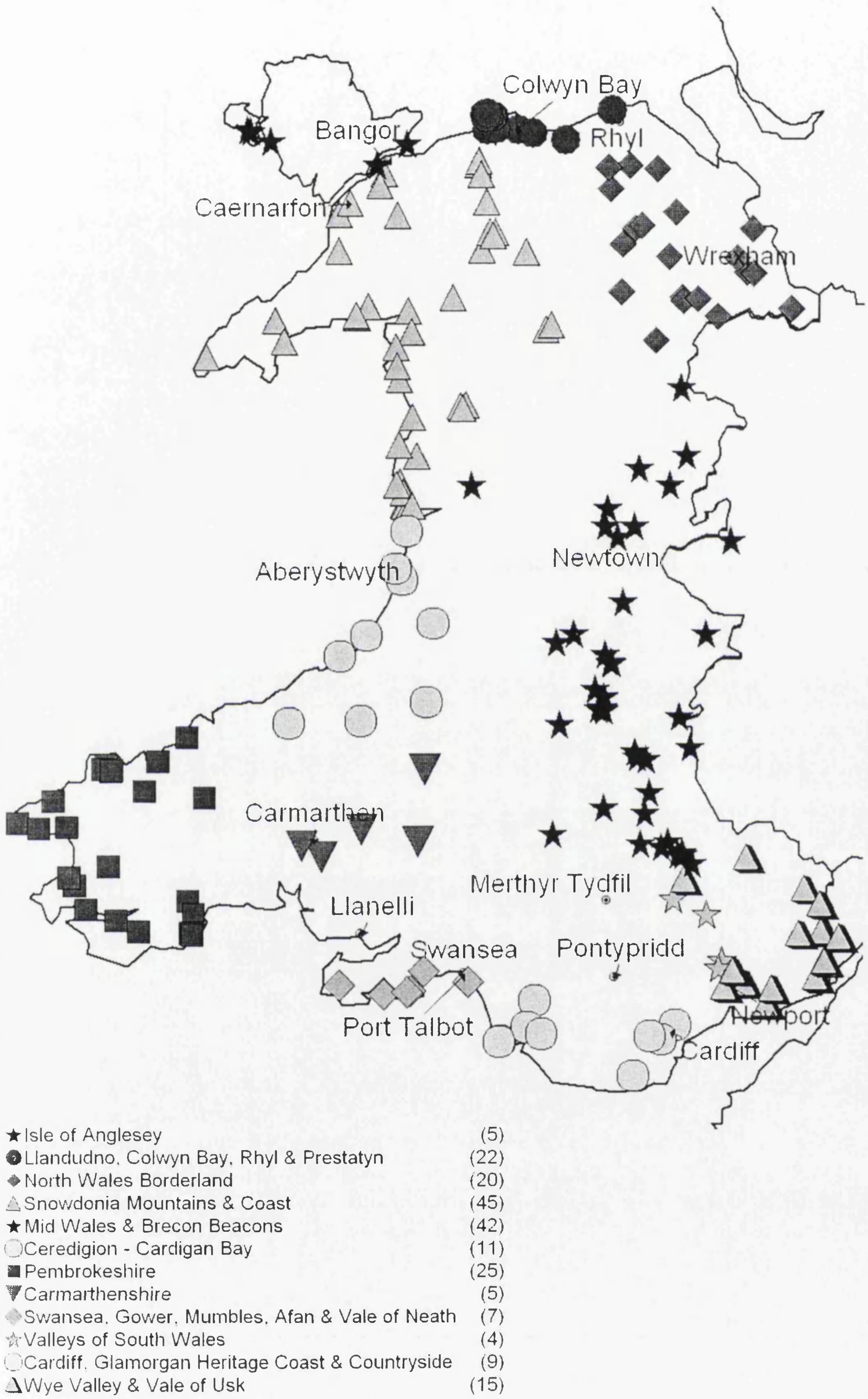


Figure B-3: Regional Distribution of Establishments by Aggregated Holiday Regions, *n*=210

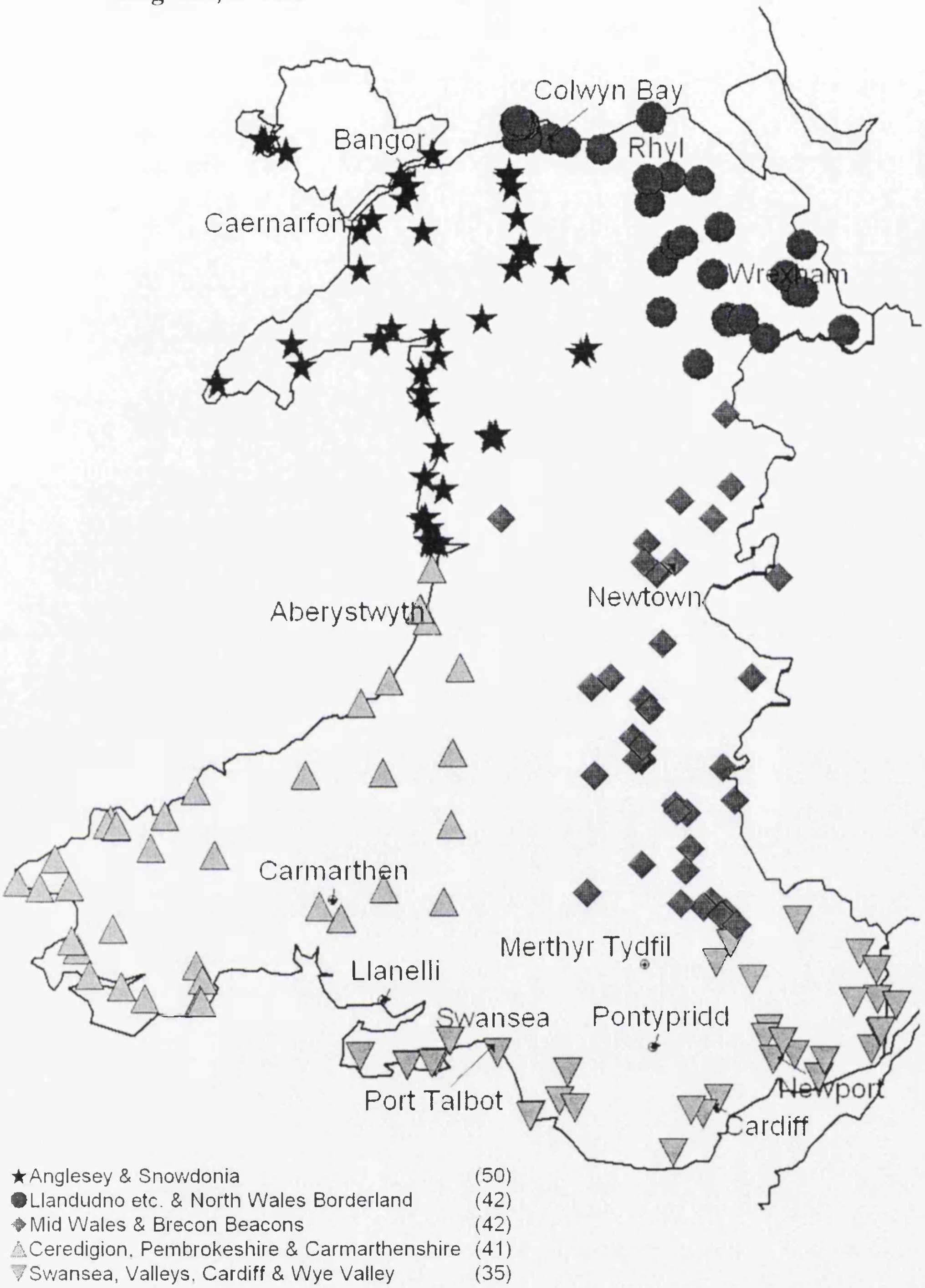


Figure B-4: Regional Distribution of Establishments by Location (3 groups), n=210

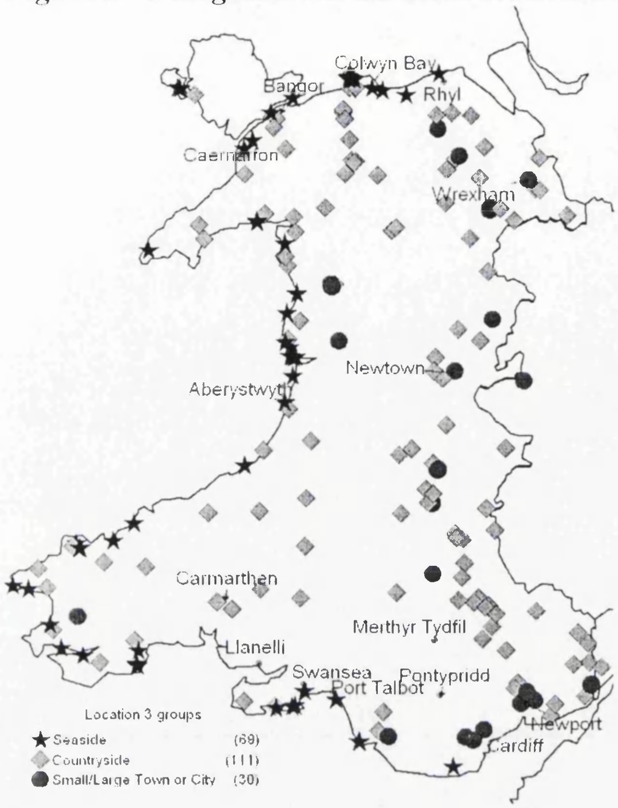
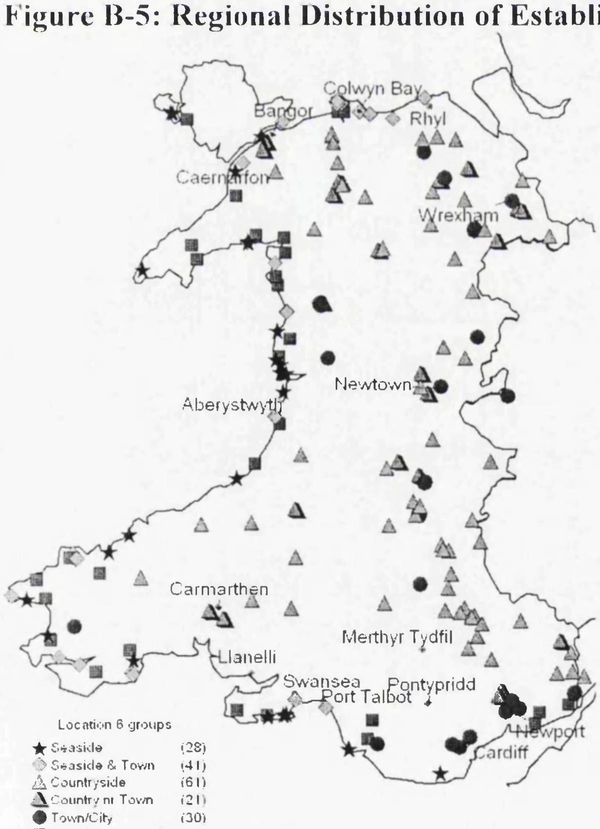


Figure B-5: Regional Distribution of Establishments by Location (6 groups), n=210



Appendix C

Appendix C: PCA Results for *n*=210, 1998-2000

Table C-1: Average Occupancy Rates and Standard Deviation for *n*=210, 98-00

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
JAN98	19.8714	20.92210	210
FEB98	24.8701	22.76263	210
MAR98	29.2079	23.39853	210
APR98	42.1236	21.16111	210
MAY98	51.1694	21.88750	210
JUN98	52.3460	23.14688	210
JUL98	60.6181	21.02948	210
AUG98	67.0671	20.66125	210
SEP98	54.6320	23.75129	210
OCT98	40.6276	22.18361	210
NOV98	26.0461	23.09479	210
DEC98	19.8106	19.41681	210
JAN99	18.5404	19.67722	210
FEB99	23.5697	22.09595	210
MAR99	29.4541	21.69677	210
APR99	40.3280	20.30189	210
MAY99	48.4316	21.68233	210
JUN99	52.5632	23.26670	210
JUL99	60.8456	21.37992	210
AUG99	65.6437	21.94278	210
SEP99	54.9476	23.50712	210
OCT99	42.6918	23.49937	210
NOV99	28.0620	24.07317	210
DEC99	19.9894	20.34034	210
JAN00	18.3907	19.24024	210
FEB00	25.5080	23.14816	210
MAR00	29.0301	22.61283	210
APR00	43.5652	20.51050	210
MAY00	47.6413	21.18455	210
JUN00	52.5063	22.28766	210
JUL00	59.3893	21.49512	210
AUG00	64.3767	22.36613	210
SEP00	51.0337	23.26799	210
OCT00	39.4423	24.48293	210
NOV00	26.2618	23.66032	210
DEC00	21.7880	23.00822	210

Table C-2: KMO and Bartlett's Test for PCA, *n*=210

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.965
Bartlett's Test of Sphericity	Approx. Chi-Square	9739.490
	df	630
	Sig.	.000

Table C-3: Principal Components Extracted for *n*=210, 98-00, Correlation Matrix

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	22.550	62.639	62.639	22.550	62.639	62.639
2	4.416	12.267	74.905	4.416	12.267	74.905
3	.919	2.554	77.459			
4	.835	2.321	79.780			
5	.640	1.777	81.557			
6	.518	1.438	82.995			
7	.508	1.411	84.406			
8	.418	1.162	85.569			
9	.383	1.063	86.631			
10	.364	1.012	87.644			
11	.343	.953	88.597			
12	.316	.877	89.474			
13	.290	.806	90.280			
14	.284	.789	91.069			
15	.257	.713	91.782			
16	.250	.693	92.475			
17	.235	.652	93.127			
18	.225	.625	93.752			
19	.218	.606	94.358			
20	.199	.554	94.911			
21	.189	.525	95.436			
22	.182	.506	95.943			
23	.163	.452	96.394			
24	.150	.416	96.811			
25	.146	.404	97.215			
26	.128	.355	97.570			
27	.124	.346	97.916			
28	.112	.310	98.226			
29	.107	.298	98.524			
30	.100	.278	98.802			
31	9.123E-02	.253	99.056			
32	8.313E-02	.231	99.286			
33	7.863E-02	.218	99.505			
34	7.368E-02	.205	99.710			
35	5.696E-02	.158	99.868			
36	4.762E-02	.132	100.000			

Extraction Method: Principal Component Analysis.

Figure C-1: Scree Plot for PCA, *n*=210, 98-00

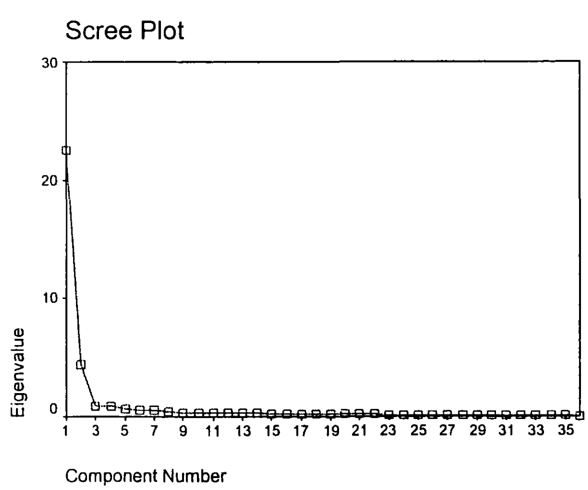


Table C-4: Component Loadings for PCA, *n*=210, 98-00

Component Matrix[a]

	Component	
	1	2
JAN98	.681	-.378
FEB98	.733	-.360
MAR98	.835	-.333
APR98	.865	-3.90E-03
MAY98	.776	.245
JUN98	.748	.288
JUL98	.781	.354
AUG98	.620	.610
SEP98	.791	.265
OCT98	.871	-6.03E-02
NOV98	.821	-.351
DEC98	.777	-.413
JAN99	.775	-.355
FEB99	.837	-.364
MAR99	.877	-.275
APR99	.854	6.663E-02
MAY99	.810	.312
JUN99	.810	.366
JUL99	.796	.435
AUG99	.618	.592
SEP99	.821	.289
OCT99	.868	2.161E-02
NOV99	.832	-.374
DEC99	.768	-.424
JAN00	.769	-.404
FEB00	.825	-.356
MAR00	.871	-.287
APR00	.828	.187
MAY00	.818	.270
JUN00	.823	.338
JUL00	.753	.445
AUG00	.574	.583
SEP00	.768	.311
OCT00	.845	-7.06E-02
NOV00	.769	-.385
DEC00	.771	-.358

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Table C-5: Average Occupancy Rates and Standard Deviation for AMC Data, n=210, 1998-2000

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
Jan98	-20,8277	14,54962	210
Feb98	-15,8291	14,58143	210
Mar98	-11,4913	12,54358	210
Apr98	1,4245	9,86497	210
May98	10,4702	12,77829	210
Jun98	11,6468	14,30797	210
Jul98	19,9190	12,62789	210
Aug98	26,3680	16,68687	210
Sep98	13,9328	14,29901	210
Oct98	-,0715	10,09011	210
Nov98	-14,6530	12,90905	210
Dec98	-20,8885	11,94631	210
Jan99	-21,8818	12,83670	210
Feb99	-16,8526	12,36843	210
Mar99	-10,9681	10,62484	210
Apr99	-,0943	9,62004	210
May99	8,0094	11,97091	210
Jun99	12,1409	13,00076	210
Jul99	20,4234	11,99843	210
Aug99	25,2215	16,98160	210
Sep99	14,5253	12,54411	210
Oct99	2,2695	11,83939	210
Nov99	-12,3603	13,61027	210
Dec99	-20,4328	13,27010	210
Jan00	-21,5205	12,96754	210
Feb00	-14,4031	13,54118	210
Mar00	-10,8810	11,50264	210
Apr00	3,6541	11,45499	210
May00	7,7302	11,26006	210
Jun00	12,5952	11,66624	210
Jul00	19,4782	12,72977	210
Aug00	24,4655	17,59266	210
Sep00	11,1226	13,38446	210
Oct00	-,4688	12,09743	210
Nov00	-13,6493	14,07648	210
Dec00	-18,1231	14,55714	210

Table C-6: Principal Components Extracted from AMC Data, *n*=210, 1998-2000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.608	32.244	32.244	11.608	32.244	32.244
2	2.642	7.339	39.583	2.642	7.339	39.583
3	2.015	5.597	45.180	2.015	5.597	45.180
4	1.536	4.267	49.447	1.536	4.267	49.447
5	1.378	3.829	53.276	1.378	3.829	53.276
6	1.327	3.685	56.960	1.327	3.685	56.960
7	1.215	3.376	60.336	1.215	3.376	60.336
8	1.089	3.026	63.362	1.089	3.026	63.362
9	.973	2.704	66.065			
10	.952	2.644	68.710			
11	.890	2.471	71.181			
12	.874	2.428	73.609			
13	.819	2.275	75.884			
14	.798	2.218	78.102			
15	.743	2.064	80.165			
16	.723	2.009	82.174			
17	.654	1.815	83.990			
18	.607	1.687	85.677			
19	.573	1.591	87.268			
20	.524	1.455	88.724			
21	.482	1.338	90.062			
22	.446	1.239	91.300			
23	.427	1.186	92.486			
24	.406	1.127	93.613			
25	.363	1.007	94.620			
26	.355	.985	95.606			
27	.317	.882	96.487			
28	.273	.759	97.246			
29	.265	.735	97.981			
30	.248	.688	98.670			
31	.188	.523	99.192			
32	.159	.443	99.635			
33	.131	.365	100.000			
34	1.088E-15	3.023E-15	100.000			
35	6.881E-18	1.911E-17	100.000			
36	-3.69E-16	-1.025E-15	100.000			

Extraction Method: Principal Component Analysis.

Figure C-2: Scree-Plot for PCA on AMC-Data, *n*=210, 1998-2000

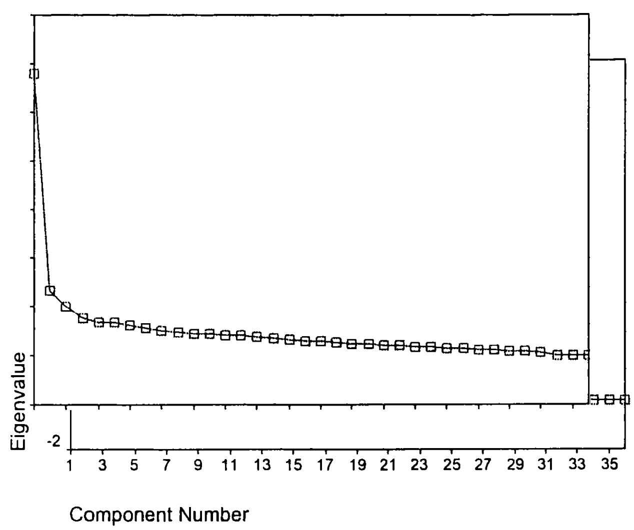


Table C-7: Component Loadings for PCA on AMC-Data, *n*=210, 1998-2000

Component Matrix[a]

	Component							
	1	2	3	4	5	6	7	8
Jan98	.502	-.365	-2.09E-02	-3.11E-02	.205	-.109	.243	-.425
Feb98	.547	-.316	-1.60E-02	2.810E-02	.413	-.118	.141	-3.40E-03
Mar98	.630	-8.16E-02	.245	4.058E-02	.318	-.311	4.910E-02	.150
Apr98	-2.13E-02	.321	.495	-.320	-2.33E-02	7.296E-03	.312	.467
May98	-.452	.220	.316	-.115	-.388	8.677E-02	3.285E-02	.328
Jun98	-.509	.186	-.178	.220	-.168	.393	9.374E-02	-.182
Jul98	-.609	-.180	-2.19E-03	-.124	-.130	.150	-.313	7.191E-02
Aug98	-.748	-.390	-9.49E-02	-5.57E-02	-.103	-8.18E-02	-.154	6.113E-03
Sep98	-.467	.377	-7.99E-02	.336	.147	.144	-.161	-6.43E-02
Oct98	.118	.570	-.129	-.109	.141	-7.12E-02	-.247	-.222
Nov98	.629	2.826E-02	-.190	2.346E-02	-3.19E-02	-.133	-8.70E-02	.107
Dec98	.639	-3.54E-02	-.201	-4.20E-02	-.432	2.028E-02	.118	-9.08E-02
Jan99	.578	-.245	7.807E-03	-3.06E-02	-.244	-8.04E-02	.237	-7.10E-02
Feb99	.716	-.113	5.712E-02	.122	8.877E-02	-5.61E-02	-7.06E-02	.134
Mar99	.641	.144	.176	.302	7.150E-03	-.106	-.234	.159
Apr99	-8.80E-02	6.557E-02	.596	.306	-.192	-.342	3.240E-02	-.259
May99	-.530	.135	.269	.452	-1.27E-02	-3.91E-02	-.105	-.131
Jun99	-.613	2.776E-02	-.229	.300	.116	4.040E-02	3.354E-02	.147
Jul99	-.721	-.168	8.265E-03	-.259	3.104E-02	2.958E-02	-.209	4.402E-02
Aug99	-.706	-.344	-6.71E-02	-.365	-9.48E-02	-.147	-.179	-8.34E-02
Sep99	-.501	.325	-.160	-.199	6.995E-02	.114	4.634E-02	-.128
Oct99	1.211E-02	.492	-.119	-.424	.430	.196	.169	-.110
Nov99	.724	.121	-.151	-6.00E-02	3.378E-03	.121	9.870E-02	.190
Dec99	.680	-.247	-.160	7.953E-02	-.175	.214	.184	6.926E-02
Jan00	.610	-.398	5.777E-02	1.321E-02	-7.12E-02	.396	-3.71E-02	-8.16E-02
Feb00	.657	-.187	.150	3.912E-02	.203	.227	-.347	7.202E-02
Mar00	.627	6.269E-02	.192	1.704E-02	.139	.188	-.323	7.719E-02
Apr00	-.309	3.152E-02	.658	-.291	5.598E-03	3.448E-02	-7.84E-02	-.297
May00	-.502	8.311E-02	.325	8.188E-02	.131	.179	.444	-8.68E-02
Jun00	-.624	-1.40E-02	-7.72E-02	.353	.149	.228	.157	.194
Jul00	-.719	-.271	-.276	-2.12E-03	.167	-.133	.166	.105
Aug00	-.690	-.391	-8.94E-02	-.121	9.674E-03	-.225	-1.41E-02	.118
Sep00	-.518	.197	-.217	.214	-.105	-.350	.154	2.268E-02
Oct00	.200	.528	-.288	-9.80E-02	-2.68E-02	-.404	-9.14E-02	3.114E-02
Nov00	.686	.241	-.185	-8.19E-02	-.188	-8.25E-02	-3.66E-02	6.044E-03
Dec00	.590	.260	-8.28E-02	-6.78E-02	-.317	6.505E-02	4.585E-02	-.196

Extraction Method: Principal Component Analysis.

a. 8 components extracted.

Figure C-3: Boxplot for Principal Component Scores of PCA, *n*=210, 1998-2000

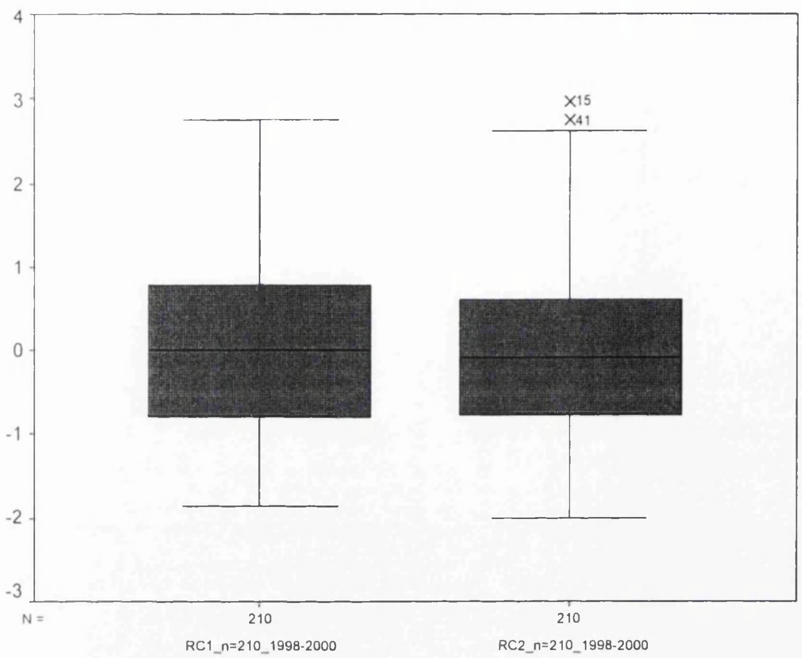


Figure C-4: Boxplot for Principal Component Scores of AMC-Data, *n*=210, 1998-2000

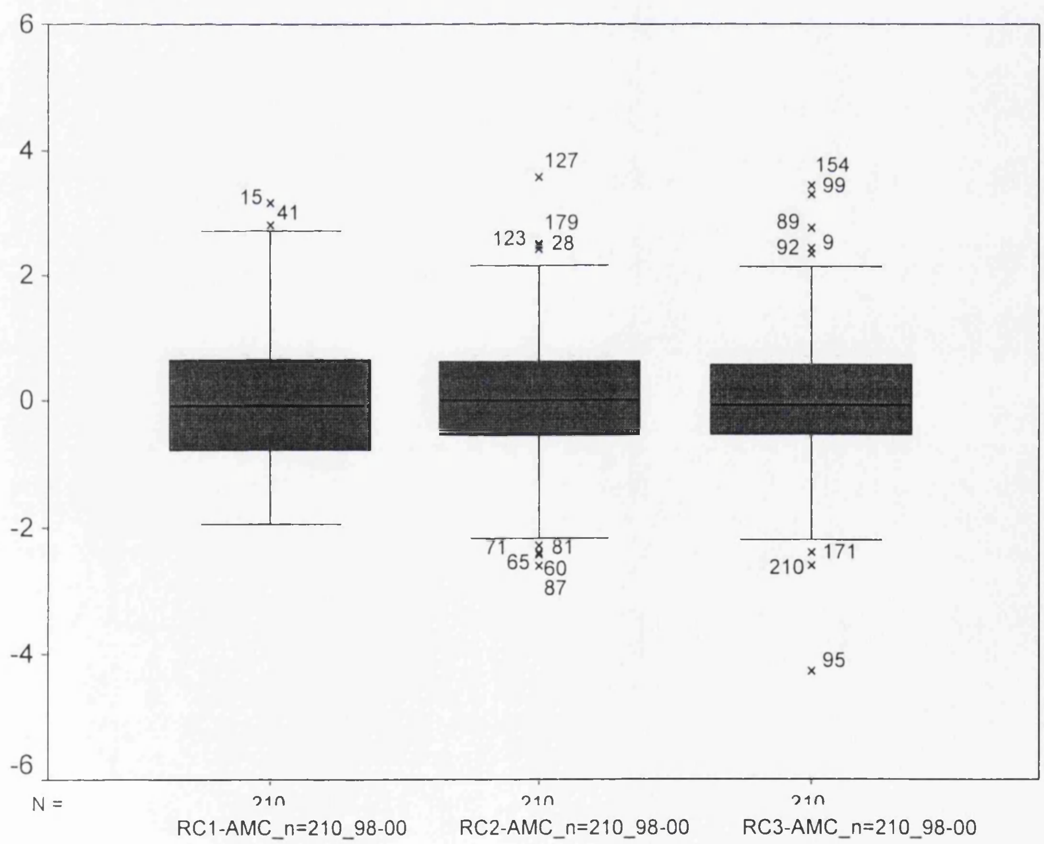


Table C-8: Average Component Score for Outliers on RC2

Report

new outliers		RC2_n=210_1998-2000
extreme seasonality	Mean	2.8510431
	N	2
	Std. Deviation	.15986690

Table C-9: Average Component Scores for Outliers on RC1-AMC to RC3-AMC

Report

new outliers		RC1-AMC_n =210_98-00	RC2-AMC_n =210_98-00	RC3-AMC_n =210_98-00
extreme seasonality	Mean	2.9791073	-.6125746	.5072560
	N	2	2	2
	Std. Deviation	.25188118	2.11291117	1.74579317
extreme length season	Mean	.6077056	2.7496139	-.6169988
	N	4	4	4
	Std. Deviation	1.17818761	.54733437	1.07695045
extreme short season	Mean	.3210446	-2.4409080	-.5642838
	N	5	5	5
	Std. Deviation	.81809173	.10968836	.82452812
extreme spring season	Mean	.1115707	-.2880674	2.8369068
	N	5	5	5
	Std. Deviation	.62709133	1.28410352	.48784830
extreme no spring season	Mean	.3064129	.5137527	-3.1075003
	N	3	3	3
	Std. Deviation	1.56455614	.68768723	1.02873131
Total	Mean	.0000000	.0000000	.0000000
	N	210	210	210
	Std. Deviation	1.00000000	1.00000000	1.00000000

Figure C-5: Normal P-P Plot for Occupancy Level Component Scores, *n*=210

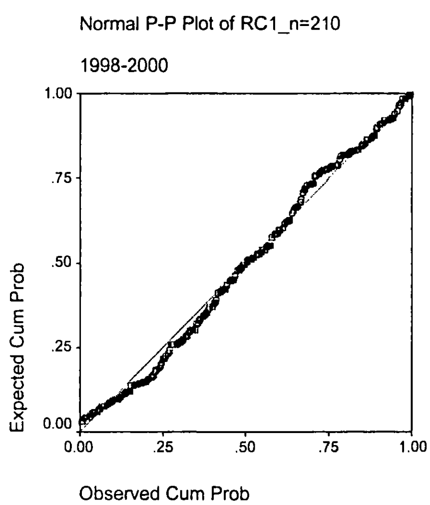


Figure C-6: Normal P-P Plot for Seasonality Component Scores, *n*=210

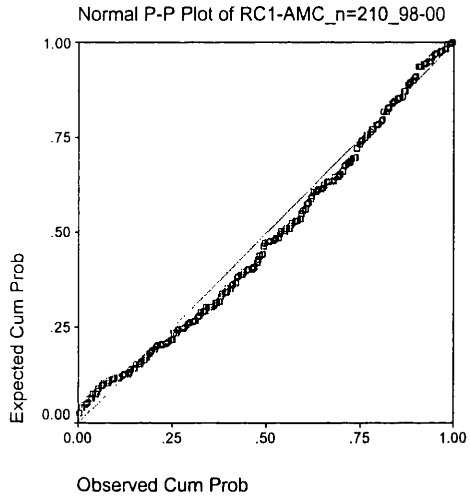


Figure C-7: Normal P-P Plot for Length of Season Component Scores, *n*=210

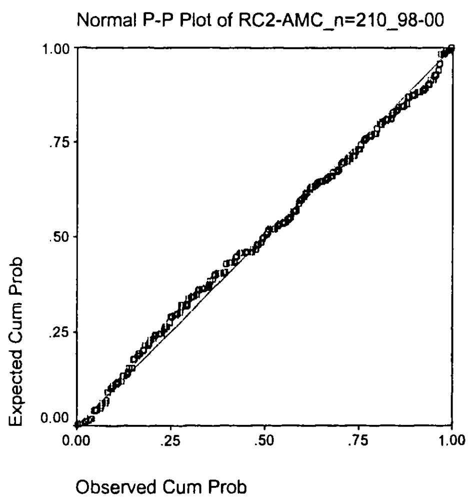


Figure C-8: Normal P-P Plot for Spring Season Component Scores, *n*=210

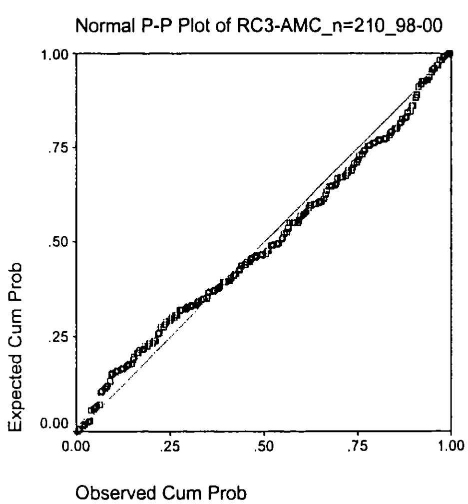


Table C-10: Kolmogorov-Smirnov Test for Normality for RC1 to RC3-AMC, *n*=210

One-Sample Kolmogorov-Smirnov Test

		RC1_n=210 _1998-2000	RC1-AMC_n =210_98-00	RC2-AMC_n =210_98-00	RC3-AMC_n =210_98-00
N		210	210	210	210
Normal Parameters[a,b]	Mean	.0000000	.0000000	.0000000	.0000000
	Std. Deviation	1.00000000	1.00000000	1.00000000	1.00000000
Most Extreme Differences	Absolute	.054	.062	.043	.059
	Positive	.054	.062	.036	.055
	Negative	-.051	-.040	-.043	-.059
Kolmogorov-Smirnov Z		.776	.905	.623	.858
Asymp. Sig. (2-tailed)		.583	.386	.832	.454

a. Test distribution is Normal.

b. Calculated from data.

Results PCA on Covariance Matrix (*n*=210, 1998-2000)

Table C-11: KMO and Bartlett's Test for PCA, *n*=210 (Covariance Matrix)

KMO and Bartlett's Test[a]

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.965
Bartlett's Test of Sphericity	Approx. Chi-Square	9739.490
	df	630
	Sig.	.000

a. Based on correlations

Table C-12: Principal Components extracted for n=210, 1998-2000, Covariance Matrix

Total Variance Explained

	Component	Initial Eigenvalues[a]			Extraction Sums of Squared Loadings		
		Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
Raw	1	11061.441	62.906	62.906	11061.441	62.906	62.906
	2	2120.664	12.060	74.966	2120.664	12.060	74.966
	3	459.245	2.612	77.578			
	4	417.631	2.375	79.953			
	5	299.383	1.703	81.656			
	6	253.967	1.444	83.100			
	7	235.181	1.337	84.437			
	8	208.137	1.184	85.621			
	9	186.510	1.061	86.682			
	10	171.213	.974	87.655			
	11	166.201	.945	88.601			
	12	152.622	.868	89.469			
	13	145.881	.830	90.298			
	14	134.134	.763	91.061			
	15	129.942	.739	91.800			
	16	125.905	.716	92.516			
	17	117.841	.670	93.186			
	18	114.087	.649	93.835			
	19	103.449	.588	94.423			
	20	98.681	.561	94.985			
	21	90.829	.517	95.501			
	22	88.082	.501	96.002			
	23	78.339	.446	96.447			
	24	72.003	.409	96.857			
	25	70.529	.401	97.258			
	26	62.901	.358	97.616			
	27	61.239	.348	97.964			
	28	56.110	.319	98.283			
	29	49.990	.284	98.567			
	30	46.602	.265	98.832			
	31	43.187	.246	99.078			
	32	39.589	.225	99.303			
	33	38.537	.219	99.522			
	34	34.879	.198	99.721			
	35	27.036	.154	99.874			
	36	22.070	.126	100.000			
Rescaled	1	11061.441	62.906	62.906	22.544	62.621	62.621
	2	2120.664	12.060	74.966	4.411	12.254	74.875
	3	459.245	2.612	77.578			
	4	417.631	2.375	79.953			
	5	299.383	1.703	81.656			
	6	253.967	1.444	83.100			
	7	235.181	1.337	84.437			
	8	208.137	1.184	85.621			
	9	186.510	1.061	86.682			
	10	171.213	.974	87.655			
	11	166.201	.945	88.601			
	12	152.622	.868	89.469			
	13	145.881	.830	90.298			
	14	134.134	.763	91.061			
	15	129.942	.739	91.800			
	16	125.905	.716	92.516			
	17	117.841	.670	93.186			
	18	114.087	.649	93.835			
	19	103.449	.588	94.423			
	20	98.681	.561	94.985			
	21	90.829	.517	95.501			
	22	88.082	.501	96.002			
	23	78.339	.446	96.447			
	24	72.003	.409	96.857			
	25	70.529	.401	97.258			
	26	62.901	.358	97.616			
	27	61.239	.348	97.964			
	28	56.110	.319	98.283			
	29	49.990	.284	98.567			
	30	46.602	.265	98.832			
	31	43.187	.246	99.078			
	32	39.589	.225	99.303			
	33	38.537	.219	99.522			
	34	34.879	.198	99.721			
	35	27.036	.154	99.874			
	36	22.070	.126	100.000			

Extraction Method: Principal Component Analysis.

a. When analyzing a covariance matrix, the initial eigenvalues are the same across the raw and rescaled solution.

Figure C-9: Scree Plot for PCA, *n*=210, 1998-2000 (Covariance Matrix)

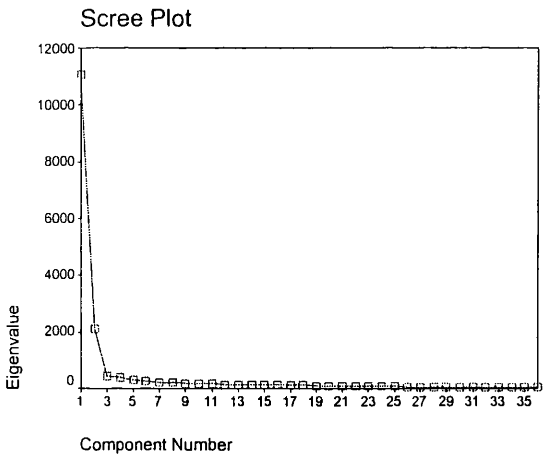


Table C-13: Component Loadings for PCA, *n*=210, 1998-2000 (Covariance Matrix)

Component Matrix[a]

	Raw		Rescaled	
	Component		Component	
	1	2	1	2
JAN98	14.199	-7.844	.679	-.375
FEB98	16.686	-8.261	.733	-.363
MAR98	19.510	-7.894	.834	-.337
APR98	18.280	-.099	.864	-.005
MAY98	16.968	5.368	.775	.245
JUN98	17.342	6.800	.749	.294
JUL98	16.384	7.403	.779	.352
AUG98	12.764	12.547	.618	.607
SEP98	18.867	6.426	.794	.271
OCT98	19.347	-1.335	.872	-.060
NOV98	18.953	-8.143	.821	-.353
DEC98	15.048	-7.904	.775	-.407
JAN99	15.165	-6.889	.771	-.350
FEB99	18.460	-8.096	.835	-.366
MAR99	19.018	-5.995	.877	-.276
APR99	17.277	1.323	.851	.065
MAY99	17.539	6.754	.809	.312
JUN99	18.889	8.589	.812	.369
JUL99	16.987	9.252	.795	.433
AUG99	13.527	12.910	.616	.588
SEP99	19.341	6.880	.823	.293
OCT99	20.463	.480	.871	.020
NOV99	20.070	-9.116	.834	-.379
DEC99	15.557	-8.502	.765	-.418
JAN00	14.720	-7.645	.765	-.397
FEB00	19.084	-8.315	.824	-.359
MAR00	19.693	-6.536	.871	-.289
APR00	16.940	3.725	.826	.182
MAY00	17.324	5.710	.818	.270
JUN00	18.361	7.562	.824	.339
JUL00	16.205	9.514	.754	.443
AUG00	12.835	12.968	.574	.580
SEP00	17.959	7.285	.772	.313
OCT00	20.798	-1.803	.849	-.074
NOV00	18.281	-9.259	.773	-.391
DEC00	17.796	-8.330	.773	-.362

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Table C-14: Principal Components extracted from AMC Data, *n*=210, 1998-2000

Total Variance Explained

	Component	Initial Eigenvalues[a] Total	% of Variance	Cumulative %	Extraction Sums of Squared Loadings Total	% of Variance	Cumulative %
Raw	1	2128.457	34.823	34.823	2128.457	34.823	34.823
	2	490.731	8.029	42.851	490.731	8.029	42.851
	3	280.473	4.589	47.440	280.473	4.589	47.440
	4	258.239	4.225	51.665	258.239	4.225	51.665
	5	237.220	3.881	55.546	237.220	3.881	55.546
	6	207.466	3.394	58.940	207.466	3.394	58.940
	7	198.627	3.250	62.190	198.627	3.250	62.190
	8	176.405	2.886	65.076	176.405	2.886	65.076
	9	170.830	2.795	67.871	170.830	2.795	67.871
	10	151.592	2.480	70.351			
	11	144.960	2.372	72.723			
	12	140.634	2.301	75.024			
	13	133.698	2.187	77.211			
	14	127.621	2.088	79.299			
	15	119.727	1.959	81.258			
	16	113.890	1.863	83.121			
	17	103.903	1.700	84.821			
	18	97.819	1.600	86.421			
	19	92.584	1.515	87.936			
	20	86.075	1.408	89.344			
	21	77.682	1.271	90.615			
	22	74.040	1.211	91.826			
	23	66.851	1.094	92.920			
	24	61.691	1.009	93.929			
	25	59.982	.981	94.911			
	26	51.897	.849	95.760			
	27	48.086	.787	96.547			
	28	44.613	.730	97.276			
	29	40.950	.670	97.946			
	30	39.069	.639	98.586			
	31	35.885	.587	99.173			
	32	27.550	.451	99.623			
	33	23.019	.377	100.000			
	34	4.4E-14	7.152E-16	100.000			
	35	-1.1E-14	-1.7E-16	100.000			
	36	-8.6E-14	-1.4E-15	100.000			
Rescaled	1	2128.457	34.823	34.823	11.531	32.032	32.032
	2	490.731	8.029	42.851	2.565	7.124	39.155
	3	280.473	4.589	47.440	1.906	5.294	44.449
	4	258.239	4.225	51.665	1.512	4.201	48.650
	5	237.220	3.881	55.546	1.389	3.858	52.508
	6	207.466	3.394	58.940	1.307	3.632	56.140
	7	198.627	3.250	62.190	1.168	3.245	59.385
	8	176.405	2.886	65.076	.995	2.764	62.149
	9	170.830	2.795	67.871	1.077	2.992	65.141
	10	151.592	2.480	70.351			
	11	144.960	2.372	72.723			
	12	140.634	2.301	75.024			
	13	133.698	2.187	77.211			
	14	127.621	2.088	79.299			
	15	119.727	1.959	81.258			
	16	113.890	1.863	83.121			
	17	103.903	1.700	84.821			
	18	97.819	1.600	86.421			
	19	92.584	1.515	87.936			
	20	86.075	1.408	89.344			
	21	77.682	1.271	90.615			
	22	74.040	1.211	91.826			
	23	66.851	1.094	92.920			
	24	61.691	1.009	93.929			
	25	59.982	.981	94.911			
	26	51.897	.849	95.760			
	27	48.086	.787	96.547			
	28	44.613	.730	97.276			
	29	40.950	.670	97.946			
	30	39.069	.639	98.586			
	31	35.885	.587	99.173			
	32	27.550	.451	99.623			
	33	23.019	.377	100.000			
	34	4.4E-14	7.152E-16	100.000			
	35	-1.1E-14	-1.7E-16	100.000			
	36	-8.6E-14	-1.4E-15	100.000			

Extraction Method: Principal Component Analysis.

a. When analyzing a covariance matrix, the initial eigenvalues are the same across the raw and rescaled solution.

Figure C-10: Scree Plot for PCA on AMC Data, n=210, 1998-2000 (Covariance Matrix)

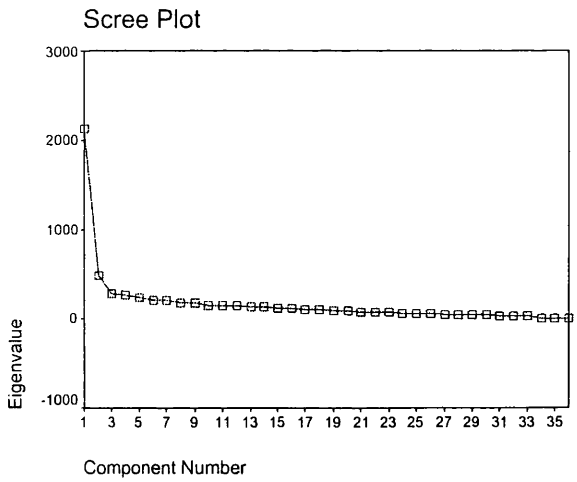


Table C-15: Component Loadings for PCA on AMC Data, n=210, 1998-2000 (Covariance Matrix)

Component Matrix[a]

	Raw			Rescaled		
	Component			Component		
	1	2	3	1	2	3
Jan98	7.271	-5.795	-.068	.500	-.398	-.005
Feb98	7.920	-5.276	.397	.543	-.362	.027
Mar98	7.841	-1.899	2.745	.625	-.151	.219
Apr98	-.019	2.395	3.434	-.002	.243	.348
May98	-5.605	3.011	3.364	-.439	.236	.263
Jun98	-7.005	4.509	-1.875	-.490	.315	-.131
Jul98	-7.676	-1.121	.455	-.608	-.089	.036
Aug98	-13.124	-6.411	-1.871	-.787	-.384	-.112
Sep98	-6.430	6.788	.878	-.450	.475	.061
Oct98	1.307	4.407	-1.009	.130	.437	-.100
Nov98	8.047	-.089	-2.829	.623	-.007	-.219
Dec98	7.472	-.520	-3.620	.625	-.043	-.303
Jan99	7.234	-3.373	-.788	.564	-.263	-.061
Feb99	8.732	-1.748	.980	.706	-.141	.079
Mar99	6.720	1.274	1.738	.633	.120	.164
Apr99	-.701	.763	4.181	-.073	.079	.435
May99	-6.120	2.532	3.911	-.511	.212	.327
Jun99	-7.821	1.550	-1.734	-.602	.119	-.133
Jul99	-8.654	-1.545	.692	-.721	-.129	.058
Aug99	-12.631	-6.559	-2.181	-.744	-.386	-.128
Sep99	-6.054	4.152	-1.979	-.483	.331	-.158
Oct99	.415	4.705	-.572	.035	.397	-.048
Nov99	9.954	1.255	-2.321	.731	.092	-.171
Dec99	8.926	-3.007	-1.927	.673	-.227	-.145
Jan00	7.744	-4.836	1.895	.597	-.373	.146
Feb00	8.790	-2.718	3.932	.649	-.201	.290
Mar00	7.114	.360	2.861	.618	.031	.249
Apr00	-3.348	.111	6.739	-.292	.010	.588
May00	-5.265	1.773	4.104	-.468	.157	.364
Jun00	-7.039	1.177	.741	-.603	.101	.064
Jul00	-9.216	-2.830	-2.842	-.724	-.222	-.223
Aug00	-12.961	-7.768	-2.568	-.737	-.442	-.146
Sep00	-6.822	3.288	-3.390	-.510	.246	-.253
Oct00	2.536	5.264	-3.989	.210	.435	-.330
Nov00	9.740	2.782	-4.228	.692	.198	-.300
Dec00	8.727	3.397	-3.255	.599	.233	-.224

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Appendix D

Appendix D: Summary Results from ANOVA/t-test and Cluster/Crosstabulation Analysis for n=210 & n=170

Table D-1: Summary ANOVA/t-test Results, n=210, 1998-2000

	RC1 - Occupancy Performance		RC1-AMC - Seasonality		RC2-AMC - Length of Season		RC3-AMC - Spring Season	
Sample Size	210		208		201		202	
	high occupancy performance above average	**low occupancy performance below average**	**highly seasonal above average**	**damped seasonality below average**	**pronounced summer peak**	**extended summer peak**	**pronounced summer peak but with average autumn rates**	**extended season into spring**
District			South West (ACS=0.58)	South East (ACS=-0.51)	South West (ACS=-0.45)	North (ACS=0.24)	South West non-hotels (ACS=-0.43)	South East non-hotels (ACS=0.29)
Aggregated Holiday Areas	Swansea/Valleys/Cardiff/ Wye Valley (ACS=0.40)	Mid Wales & Brecon Beacons (ACS=-0.23)	Anglesey/Snowdonia (ACS=0.49); Ceredigion/Pembrokeshire/ Carmarthenshire (ACS=0.43)	Swansea/Valleys/ Cardiff/Wye Valley (ACS=-0.64)	Ceredigion/ Pembrokeshire/ Carmarthenshire (ACS=-0.45)	Llandudno/ North Wales Borderland (ACS=0.26); Anglesey/Snowdonia (ACS=0.15)		
Location	city/town (ACS=0.30)	countryside (ACS=-0.26)	seaside (ACS=0.29)	city/town (ACS=-0.57)				
Location (7 groups)	seaside and town (ACS=0.41)	countryside near sea (ACS=-0.38)	pure' seaside (ACS=0.65)	pure' town/city (ACS=-0.57)	seaside (ACS=-0.32)	seaside and town (ACS=0.26)	city/town (ACS=-0.36)	countryside (ACS=0.20)
Kind of Establishment	hotel (ACS=0.46)	non-hotel (ACS=-0.41)	non-hotel (ACS=0.19)	hotel (ACS=-0.27)	non-hotel (ACS=-0.32)	hotel (ACS=0.36)		
Kind of Establishments further refined		B&B (ACS=-0.67); farmhouse (ACS=-0.56)	farmhouse (ACS=0.38); guesthouse (ACS=0.23)	hotel (ACS=-0.27)	farmhouse (ACS=-0.50); B&B (ACS=-0.43)	hotel (ACS=0.36)		
Kind of Establishment & Location	city/town hotel (ACS=0.72)	countryside non-hotel (ACS=-0.59)	seaside non-hotel (ACS=0.78)	town hotel (ACS=-0.73)	seaside non-hotel (ACS=-0.51)	countryside hotel (ACS=0.41); town hotel (ACS=0.38)		
	guesthouses in South East (ACS=0.52)	guesthouses in North (ACS=-0.63)						

	RC1 - Occupancy Performance		RC1-AMC - Seasonality		RC2-AMC - Length of Season		RC3-AMC - Spring Season	
Sample Size	210		208		201		202	
	high occupancy performance above average	low occupancy performance below average	highly seasonal above average	damped seasonality below average	pronounced summer peak	extended summer peak	pronounced summer peak but with average autumn rates	extended season into spring
Size of Establishment	over 50 rooms (ACS=0.94); 26-50 rooms (ACS=0.66); 11-25 rooms (ACS=0.51)	1-3 rooms (ACS=-0.52); 4-10 rooms (ACS=-0.17)	4-10 rooms (ACS=0.24)	11-25 rooms (ACS=-0.52); 26-50 rooms (ACS=-0.50)	1-3 rooms (ACS=-0.38)	over 50 rooms (ACS=0.88); 11-25 rooms (ACS=0.38)	over 51 rooms (ACS=-0.75); 26-50 rooms (ACS=-0.29)	11-25 rooms (ACS=0.21)
Tariff Category (in Pounds)	45-54 (ACS=1.05); over 55 (ACS=0.67); 35-44 (ACS=0.52)	up to 24 (ACS=-0.59)	up to 24 (ACS=0.17)	35-44 (ACS=-0.44)	up to 24 (ACS=-0.41)	45-54 (ACS=0.72); 35-44 (ACS=0.44); over 55 (ACS=0.44)	over 55 (ACS=-0.41)	25-34 (ACS=0.26)
WTB star grading	4 & 5 star (ACS=0.57)	ungraded & 1 star (ACS=-0.4)	3 star non-hotels (ACS=0.39)	ungraded & 1star non-hotels (ACS=-0.38)	ungraded & 1star hotels (ACS=-0.39)	3 star hotels (ACS=0.59); 4 and 5 star hotels (ACS=0.45)		
Conference Facilities	yes (ACS=0.69)	no (ACS=-0.28)	no (ACS=0.17)	yes (ACS=-0.50)	no (ACS=-0.16)	yes (ACS=0.41)	yes (ACS=-0.26)	no (ACS=0.07)
Wedding Licence	yes (ACS=0.62)	no (ACS=-0.14)	no (ACS=0.11)	yes (ACS=-0.66)	no (ACS=-0.07)	yes (ACS=0.35)	yes (ACS=-0.37)	no (ACS=0.04)
Gym/Pool/Sauna	yes (ACS=0.93)	no (ACS=-0.12)	no (ACS=0.03)	yes (ACS=-0.46)	no (ACS=-0.04)	yes (ACS=0.39)	yes (ACS=-0.35)	no (ACS=0.02)
Golf/Putting Green	yes (ACS=0.60)	no (ACS=-0.05)	no (ACS=-0.000)	yes (ACS=-0.39)				
Internet	yes (ACS=0.08)	no (ACS=-0.61)			no (ACS=-0.45)	yes (ACS=0.07)		
WTB Brochure	yes (ACS=0.12)	no (ACS=-0.21)						
Special Breaks	yes (ACS=0.39)	no (ACS=-0.20)	no (ACS=0.09)	yes (ACS=-0.26)	no (ACS=-0.17)	yes (ACS=0.27)		
Special Price for Longer Stays	yes (ACS=0.31)	no (ACS=-0.24)			no (ACS=-0.20)	yes (ACS=0.35)		
Out of Season Prices	yes (ACS=0.56)	no (ACS=-0.19)			no (ACS=-0.12)	yes (ACS=0.36)	yes (ACS=-0.26)	no (ACS=0.04)
Christmas/Easter Specials	yes (ACS=0.76)	no (ACS=-0.07)			no (ACS=-0.03)	yes (ACS=0.35)	yes (ACS=-0.44)	no (ACS=0.01)
Activities Nearby	yes (ACS=0.15)	no (ACS=-0.29)						

Table D-2: Results for Cluster/Crosstabulation Analysis separately for each Dimension, 1998-2000 (without outliers)

		Occupancy Level (RC1)		Seasonality (RC1-AMC)		Length of Season (RC2-AMC)		Spring Season (RC3-AMC)	
		high occupancy performance	low occupancy performance	high seasonal	low seasonality	sharp summer peak	extended season	no spring season	spring season
Results Cluster-analysis	Clustercases	70	57	40	83	47	59	44	59
		51 Hotels 19 Non-Hotels	9 Hotels 48 Non-Hotels	13 Hotels 27 Non-Hotels	49 Hotels 34 Non-Hotels	9 Hotels 38 Non-Hotels	40 Hotels 19 Non-Hotels	22 Hotels 22 Non-hotels	25 Hotels 34 Non-Hotels
	Cluster ACS	1.137	-1.224	1.456	-0.945	-1.148	1.000	-1.109	0.956
Results Cross-Tabulation Analysis	Region	South East *		South West**	South East*	South West**	North Wales*		South East*
	Aggregated or Separate Holiday Region	Swansea/Valleys/ Cardiff/Wye Valley*		Anglesey/ Snowdonia*** (Pembroke-shire*)*	Swansea/Valleys/ Cardiff/Wye Valley** North Wales Borderland**	Ceredigion/ Pembrokeshire/ Carmarthenshire**	Llandudno/ North Wales Borderland*		
	Location	seaside & town*	countryside*	'pure' seaside ****	city/town **	countryside near sea*			
	Kind	Hotel****	Non-Hotel****			Non-Hotel***	Hotel**		
	Non-Hotel Subgroups		B&B*** farmhouse**	farmhouse* guesthouse (n=12)		B&B** farmhouse*			
	Kind&Location	City/Town Hotel** & Seaside Hotel**	Countryside Non-Hotel****	Seaside Non-Hotel****	City/Town Hotel*	Countryside Non-Hotel**	Countryside Hotel*		
					Countryside Hotel**	Seaside Non-Hotel**			
	Tariff Groups in Pounds	35-44**; 45-54***	up to 24****	21-25**	45-54*	up to 24****	35-44**		25-34**
		over 55*					(45-55*)		
	Size	11-25 rooms** 26-50 rooms*** over 50 rooms***	1-3 rooms****	4-10 rooms*	11-25 rooms**	1-3 rooms***	over 50 rooms****	(over 50 rooms****)	11-25 rooms*
	WTB Star Grading	4 & 5 stars*			ungraded & 1 star*				
	Facilities and Special Offers	conference****	not in WTB brochure*		conference**	no webinfo ***	conference**		
		wedding license***	no activities advertised***		wedding**		special breaks**		
		gym/pool/sauna etc.*** special breaks*** specials for longer stays* out-of-season prices*** Christmas etc. specials***					specials for longer stays** out-of-season prices* Christmas etc. specials*		

Table D-3: Results for Cluster/Crosstabulation Analysis for all Dimensions, *n*=191, 1998-2000 (without outliers)

		top performers	seasonal performer	spring performer	poor performers
Results Clusteranalysis	n	58	43	42	48
		50 Hotels 8 Non-Hotels	16 Hotels 27 Non-Hotels	16 Hotels 26 Non-Hotels	11 Hotels 37 Non-Hotels
	Cluster ACS occupancy seasonality length season spring season	 **0.996** -0.677 **0.511** -0.305	 0.031 **1.254** 0.136 -0.199	 -0.096 -0.172 -0.033 **0.862**	 **-1.184** -0.393 -0.662 -0.219
Results Cross-Tabulation Analysis	**Region**	South East	South West***	South East*	Mid (n=18)
	Aggregated Holiday Region	Swansea/Valleys/ Cardiff/ Wye Valley**	Anglesey/ Snowdonia***	Mid Wales/ Brecon Beacons**	
		Llandudno/ North Wales Borderland*	Ceredigion/ Pembrokeshire/ Carmarthenshire**		
	Kind	Hotel****			Non-Hotel**
	Non-Hotel Subgroups				B&Bs** farmhouses**
	Location	city/town***	seaside **	countryside*	
	Kind & Location	City/Town Hotel**** Countryside Hotel***	(Seaside Non-Hotel***)	Countryside Non-Hotel*	Countryside Non-Hotel***
	Tariff Groups in Pounds	£35-44*** £45-54*** over £55****	up to £24 (n=23)		up to £24***
	Size	11-25 rooms*** 26-50 rooms**** over 50 rooms****	4-10 rooms**		1-3 rooms***
	WTB Star Grading	4 and 5 stars (n=12)		2 stars*	ungraded and 1 star*
	Facilities	conferences**** wedding**** gym/pool/sauna etc.***** special breaks**** out of season prices*** specials for longer stays** Christmas etc. specials****			no webinfo* no out of season prices* no specials for longer stays* no conferences*

p-values * p<=0.1
** p<=0.05
*** p<=0.01
**** p<=0.001

Note: Figures are in parentheses for significant attributes where expected count is less than 5

Table D-4: Results for Cluster/Crosstabulation Analysis separately for each Dimension, 1998-2001 (without outliers)

		Occupancy Level (RC1)		2001 Trend (RC3)		Seasonality (RC1-AMC)		Length of Season (RC2-AMC)		Spring Season (RC3-AMC)	
		high occupancy performance	low occupancy performance	2001 upward trend	2001 downward trend	high seasonality	low seasonality	sharp summer peak	extended season	no spring season	spring season
Results Cluster-analysis	Cluster-cases	66	50	40	38	25	71	39	39	56	36
		50 Hotels 16 Non-Hotels	8 Hotels 42 Non-Hotels	22 Hotels 18 Non-Hotels	12 Hotels 26 Non-Hotels	9 Hotels 16 Non-Hotels	42 Hotels 29 Non-Hotels	6 Hotels 33 Non-Hotels	31 Hotels 8 Non-Hotels	31 Hotels 25 Non-Hotels	14 Hotels 22 Non-Hotels
	Cluster ACS	1.034	-1.199	-1.021	1.062	1.552	-0.896	-1.115	1.149	-0.842	0.991
Results Cross-Tabulation Analysis	Region				South East*	(South West***)	South East*				South East (n=13)
	Aggre-gated or Separate Holiday Region	Swansea/ Valleys/ Cardiff/Wye Valley*				Anglesey/ Snowdonia** (Ceredigion/ Pembrokeshire/ Carmarthenshire**)	Swansea/Valleys/ Cardiff/Wye Valley**	Ceredigion/ Pembrokeshire/ Carmarthenshire (n=10)	Llandudno/ North Wales Borderland (n=12)	Llandudno/ North Wales Borderland*	Anglesey/ Snowdonia*
	Location	seaside & town* seaside*	countryside**	seaside & town*	countryside (n=26)	seaside**	city/town *	seaside*		country near town**	
	Kind	Hotel***	Non-Hotel***					Non-Hotel***	Hotel***		
	Non-Hotel Sub-groups		B&B**** Farmhouse (n=11)	B&B* (n=10)	Farmhouse***			B&B** Farmhouse**			
	Kind & Location	City/Town Hotel** & Seaside Hotel**	Countryside Non-Hotel****	Seaside Hotel*	Countryside Non-Hotel***	Seaside Non-Hotel****	Countryside Hotel*	Countryside Non-Hotel***	Countryside Hotel***		
		Countryside Hotel*						(Seaside Non-Hotel**)			

	Occupancy Level (RC1)		2001 Trend (RC3)		Seasonality (RC1-AMC)		Length of Season (RC2-AMC)		Spring Season (RC3-AMC)	
	high occupancy performance	low occupancy performance	2001 upward trend	2001 downward trend	high seasonality	low seasonality	sharp summer peak	extended season	no spring season	spring season
Tariff Groups in Pounds	£35-44*** £45-54**	up to £24****	£35-£44**			£45-£54 (n=9)	up to £24****	£35-£44** (£45-£55**)		
Size	11-25 rooms* 26-50 rooms*** over 50 rooms***	1-3 rooms***			4-10 rooms (n=12)	11-25 rooms (n=16) 26-50 rooms*	1-3 rooms**	(over 50 rooms****)	over 50 rooms***	11-25 rooms*
WTB Star Grading	4 stars*							4 stars*		
Facilities and Special Offers	conference**** wedding license*** gym/pool/sauna etc.*** special breaks** out-of-season prices*** Christmas etc. specials**	no Web info** no activities advertised*** no longer stays* no out-of-season prices*			no special breaks*	conference** wedding*** Golf* gym/pool/sauna etc.**	no specials for longer stays*	conference*** wedding* special breaks** specials for longer stays*** out-of-season prices**		

p-values:		
	*	p<=0.1
	**	p<=0.05
	***	p<=0.01
	****	p<=0.001

Note: Figures in parentheses for significant attributes where expected count is less than 5

Table D-5: Results for Cluster/Crosstabulation Analysis for all Dimensions, *n*=150, 1998-2001 (without outliers)

		top performer	extended seasonal performer & 2001 winner	spring/seasonal performer & 2001 loser	poor performer
Results Clusteranalysis	n	35	36	35	44
		30 Hotels 5 Non-Hotels	28 Hotels 8 Non-Hotels	8 Hotels 27 Non-Hotels	9 Hotels 35 Non-Hotels
	Cluster ACS				
	occupancy	**1.132**	0.351	-0.008	**-1.087**
	2001 trend	0.094	**-0.620**	**0.738**	-0.226
	seasonality	-0.991	**0.464**	**0.415**	-0.093
	length season	**0.383**	**0.641**	-0.079	**-0.699**
	spring season	-0.005	-0.493	**0.744**	-0.196
Results Cross-Tabulation Analysis	**Region**	South East***			
	Aggregated or Separate Holiday Region	Swansea/Valleys/ Cardiff/ Wye Valley****	Llandudno/ North Wales Borderland*	Snowdonia Mountains*	
	Kind	Hotel***	Hotel**	Non-Hotel**	Non-Hotel***
	Non-Hotel Subgroups			Guesthouse (n=12) (Farmhouse***, n=10)	B&B***
	Location	city/town***	seaside & town** seaside**	countryside (n=24)	
	Kind & Location	(City/Town Hotel***) Countryside Hotel**	Seaside Hotel***	Countryside Non-Hotel***	Countryside Non-Hotel***
	Tariff Groups	£35-44** (£45-54**)	(over £55**)		up to £24****
	Size	11-25 rooms*** 26-50 rooms**** over 50 rooms****	(26-50 rooms*) (over 50 rooms***)	4-10 rooms*	1-3 rooms**
	WTB Star Grading	4 and 5 stars*		(ungraded and 1 star*)	
	Facilities & Special Offers	conferences*** wedding*** gym/pool/sauna etc.**	conferences** wedding** gym/pool/sauna etc.** special breaks** out of season prices*** specials for longer stays* (Christmas etc. specials***)		(no Web info**) no out of season prices* no activities advertised* no conferences**

p-values:

*	p<=0.1
**	p<=0.05
***	p<=0.01
****	p<=0.001

Note: Figures in parentheses for significant attributes where expected count is less than 5

Appendix E

Appendix E: PCA Results for *n*=170, Change 2001 vs. 1998-2000

Table E-1: Average Occupancy Rates and Standard Deviation for *n*=170

Descriptive Statistics

	N	Mean	Std. Deviation	Variance
Jan_change 2001-average 1998-2000	170	-.5100588	13.84679243	191.734
Feb_change 2001-average 1998-2000	170	1.2382157	12.59757041	158.699
Mar_change 2001-average 1998-2000	170	-5.42555	13.71321351	188.052
Apr_change 2001-average 1998-2000	170	-6.93302	15.67204563	245.613
May_change 2001-average 1998-2000	170	-5.25139	15.76965507	248.682
Jun_change 2001-average 1998-2000	170	-5.67494	17.95951615	322.544
Jul_change 2001-average 1998-2000	170	-5.59996	14.75222069	217.628
Aug_change 2001-average 1998-2000	170	-3.51469	15.02147013	225.645
Sep_change 2001-average 1998-2000	170	-3.85073	14.69255446	215.871
Oct_change 2001-average 1998-2000	170	-1.45084	12.87258218	165.703
Nov_change 2001-average 1998-2000	170	1.1040196	10.64736357	113.366
Dec_change 2001-average 1998-2000	170	1.7254510	11.39706705	129.893
JAN2001	170	19.44335	20.70505338	428.699
FEB2001	170	27.07435	24.20606951	585.934
MAR2001	170	24.98741	23.27553073	541.750
APR2001	170	35.50435	23.19256777	537.895
MAY2001	170	44.42441	23.51827973	553.109
JUN2001	170	47.76518	25.79055029	665.152
JUL2001	170	56.21665	24.21388574	586.312
AUG2001	170	63.03876	22.32722922	498.505
SEP2001	170	51.13665	23.74984464	564.055
OCT2001	170	41.24500	24.38624429	594.689
NOV2001	170	29.70347	25.35479802	642.866
DEC2001	170	23.62918	22.72625837	516.483
Jan_mean 1998-2000	170	19.95341	18.25293232	333.170
Feb_mean 1998-2000	170	25.83614	21.64868836	468.666
Mar_mean 1998-2000	170	30.41296	21.91724896	480.366
Apr_mean 1998-2000	170	42.43737	19.23585313	370.018
May_mean 1998-2000	170	49.67580	19.98183869	399.274
Jun_mean 1998-2000	170	53.44012	21.08445462	444.554
Jul_mean 1998-2000	170	61.81661	19.50542577	380.462
Aug_mean 1998-2000	170	66.55345	19.40082332	376.392
Sep_mean 1998-2000	170	54.98737	21.41748432	458.709
Oct_mean 1998-2000	170	42.69584	21.71410453	471.502
Nov_mean 1998-2000	170	28.59945	22.08724834	487.847
Dec_mean 1998-2000	170	21.90373	19.60826165	384.484
Valid N (listwise)	170			

Table E-2: KMO and Bartlett's Test for PCA, *n*=170, Change 2001

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.843
Bartlett's Test of Sphericity	Approx. Chi-Square	705.894
	df	66
	Sig.	.000

Table E-3: Principal Components extracted for *n*=170, Change 2001 vs. 1998-2000

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.755	39.628	39.628	4.755	39.628	39.628
2	1.354	11.284	50.912	1.354	11.284	50.912
3	1.079	8.994	59.906	1.079	8.994	59.906
4	.797	6.641	66.547			
5	.781	6.511	73.059			
6	.724	6.030	79.088			
7	.608	5.063	84.151			
8	.502	4.187	88.338			
9	.424	3.531	91.869			
10	.387	3.228	95.097			
11	.300	2.502	97.599			
12	.288	2.401	100.000			

Extraction Method: Principal Component Analysis.

Figure E-1: Scree Plot for PCA, *n*=170, Change 2001 vs. 1998-2000

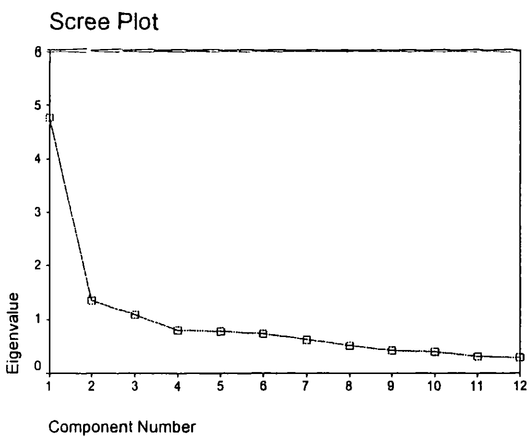


Table E-4: Component Loadings for PCA, *n*=170, Change 2001 vs. 1998-2000

Component Matrix [a]

	Component		
	1	2	3
Jan_change 2001-average 1998-2000	.431	.609	-.250
Feb_change 2001-average 1998-2000	.643	.360	-.189
Mar_change 2001-average 1998-2000	.720	.324	-.134
Apr_change 2001-average 1998-2000	.712	-4.34E-03	-9.69E-02
May_change 2001-average 1998-2000	.768	3.864E-02	-.245
Jun_change 2001-average 1998-2000	.659	-.170	-5.21E-02
Jul_change 2001-average 1998-2000	.726	-.290	-7.58E-02
Aug_change 2001-average 1998-2000	.672	-.226	-9.33E-02
Sep_change 2001-average 1998-2000	.567	-.519	2.729E-02
Oct_change 2001-average 1998-2000	.528	-.397	.284
Nov_change 2001-average 1998-2000	.647	.162	.504
Dec_change 2001-average 1998-2000	.330	.361	.736

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Figure E-2: Boxplot for Principal Component Scores of PCA, *n*=170, Change 2001 vs. 1998-2000

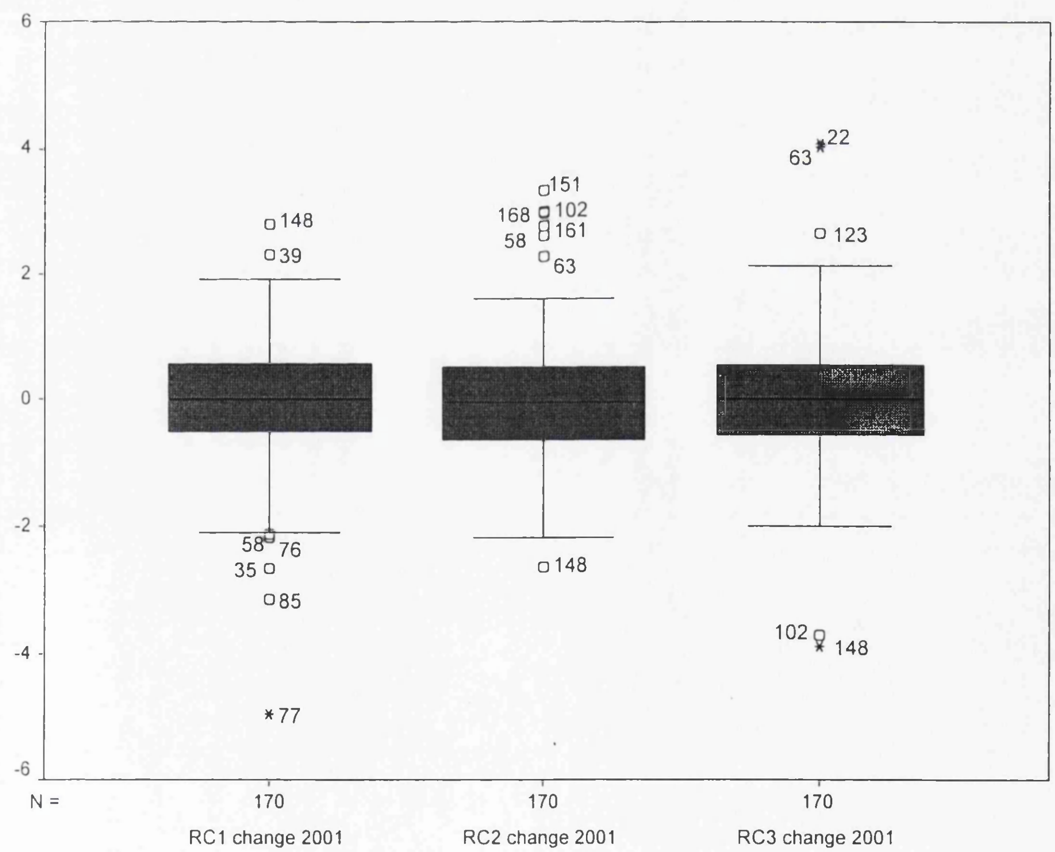


Table E-5: Average Components Score for Outliers on RC1-Change 2001 to RC3-Change 2001

Report

outliers change 2001_98-00		RC1 change 2001	RC2 change 2001	RC3 change 2001
case 39_extreme positive RC1 change 2001_98-00	Mean	2.3134524	.3473588	-.7510845
	N	1	1	1
extreme negative RC1 change 2001_98-00	Mean	-3.2425309	-.7179723	-.6291499
	N	4	4	4
extreme positive RC2 change 2001_98-00	Mean	.1819727	3.0253821	.2277698
	N	3	3	3
extreme positive RC3 change 2001_98-00	Mean	-.3795352	-.5405785	3.3525066
	N	2	2	2
case 58_extreme neg RC1 change & extreme pos RC2 change	Mean	-2.1350568	2.6217923	-.5928902
	N	1	1	1
case 63_extreme pos RC2 change & extreme pos RC3 change	Mean	-1.0910604	2.2723137	4.0063817
	N	1	1	1
case 102_extreme pos RC2 change & extreme neg RC3 change	Mean	-.7835438	3.0052647	-3.7320395
	N	1	1	1
case 148_ extrem positive RC1 & extreme neg RC2 & extreme neg RC3	Mean	2.8022094	-2.6435812	-3.8983420
	N	1	1	1
Total	Mean	.0000000	.0000000	.0000000
	N	170	170	170

Table E-6: Identification of Outliers, *n*=170 for Change 2001 vs. 1998-2000 (Profile Numbers and Case Numbers)

Case Summaries

				Case Number	Profile Number
outliers change 2001_98-00	extreme positive RC1 change 01	1		39	610
		Total	N		1
	extreme negative RC1 change 01	1		35	512
		2		76	1167
		3		77	1173
		4		85	1419
		Total	N		4
	extreme positive RC2 change 01	1		151	6530
		2		161	6662
		3		168	6795
		Total	N		3
	extreme positive RC3 change 01	1		22	319
		2		123	6247
		Total	N		2
	extreme neg RC1 change & extreme pos RC2	1		58	905
		Total	N		1
	extreme pos RC2 change & extreme pos RC3	1		63	997
		Total	N		1
	extreme pos RC2 change & extreme neg RC3	1		102	6030
		Total	N		1
	case 148_ pos RC1&negRC2&negRC3	1		148	6523
		Total	N		1
	Total	N			170

Figure E-3: Normal Distribution Plot for RC1-Change 2001

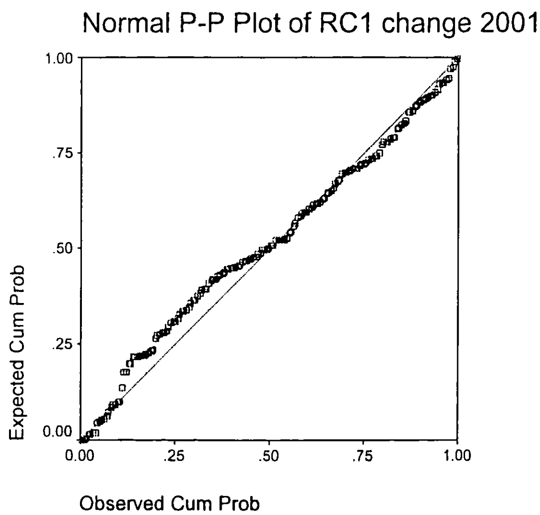


Figure E-4: Normal Distribution Plot for RC2-Change 2001

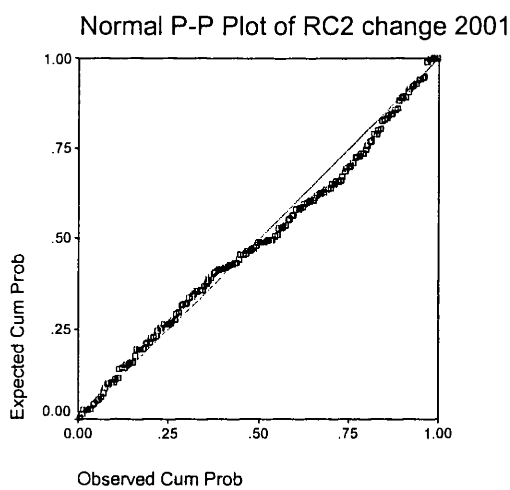


Figure E-5: Normal Distribution Plot for RC3-Change 2001

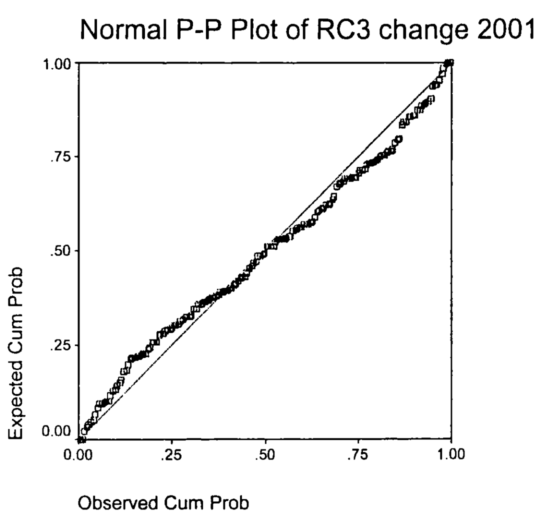


Table E-7: Kolmogorov-Smirnov Test for Normality for RC1-Change to RC3-Change, *n*=170, 2001 vs. 1998-2000

One-Sample Kolmogorov-Smirnov Test

		RC1 change 2001	RC2 change 2001	RC3 change 2001
N		170	170	170
Normal Parameters[a,b]	Mean	.0000000	.0000000	.0000000
	Std. Deviation	1.00000000	1.00000000	1.00000000
Most Extreme Differences	Absolute	.081	.067	.077
	Positive	.045	.067	.077
	Negative	-.081	-.035	-.077
Kolmogorov-Smirnov Z		1.052	.879	1.008
Asymp. Sig. (2-tailed)		.219	.423	.261

a. Test distribution is Normal.

b. Calculated from data.

Appendix F

Appendix F: Summary Results Cluster/Crosstabulation Analysis for Occupancy Change between 2001 and 1998-2000

Table F-1: Results for Cluster/Crosstabulation Analysis separately for each Dimension for PCA on Change Data 2001 vs. 1998-2000

		Occupancy Change Level (RC1-change)		Summer/Autumn Change (RC2-change)		Winter Change (RC3-change)	
		positive 2001 occupancy change	negative 2001 occupancy change	positive summer/autumn occupancy change	negative summer/autumn occupancy change	positive winter occupancy change	negative winter occupancy change
Results Cluster-analysis	Clustercases	58	18	38	45	23	68
		40 Hotels 18 Non-Hotels	3 Hotels 15 Non-Hotels	14 Hotels 24 Non-Hotels	22 Hotels 23 Non-Hotels	15 Hotels 8 Non-Hotels	31 Hotels 37 Non-Hotels
	Cluster ACS	0.894	-1.386	0.992	-1.121	1.245	-0.749
Results Cross-Tabulation Analysis	Region		(South East* (n=8))				
	Aggregated or Separate Holiday Region		(Mid Wales/ Brecon Beacons* (n=6)			Ceredigion/ Pembrokeshire/ Carmarthenshire (n=7)	Llandudno/North Wales Borderland (n=20)
	Location	seaside (n=26) seaside & town (n=17)	countryside**	('pure' seaside*, (n=8))			countryside near sea (n=14)
	Kind	Hotel**	Non-Hotel**				
	Non-Hotel Sub-groups		(Farmhouse****(n=9))				
	Kind & Location	Seaside Hotel**	Countryside Non-Hotel****				
	Tariff Groups in Pounds	£35-44** (n=14) £55 and more* (n=9)	£21-25* (n=9)			£25-34* (n=10)	
	Size	11-25 rooms* (n=14) over 50 rooms*** (n=13)	1-3 rooms**				
	WTB Star Grading	4 and 5 stars* (n=14)				(4 and 5 star** (n=7))	
	Facilities and Special Offers	conference*** wedding license*** gym/pool/sauna etc.*** special breaks* Christmas etc. specials*			(no Webinfo* (n=7)) special out-of-season prices* Christmas etc. specials* special services*	conferences (n=11)	no Web Info (n=14)

Tables F-2: Results Clusteranalysis for 'Change' Cluster, without Outliers, Initial Cluster Centres from Ward's Method, *n*=156, 2001 vs. 1998-2000

RC1 change 2001 RC2 change 2001 RC3 change 2001 * Ward Method

Ward Method		RC1 change 2001	RC2 change 2001	RC3 change 2001
1	Mean	.6890492	-.4635912	.6781041
	N	43	43	43
	Std. Deviation	.52859183	.63023845	.55639692
2	Mean	.4779025	1.1001368	.1668473
	N	20	20	20
	Std. Deviation	.67362444	.32678144	.52317772
3	Mean	-.0338918	-.0253112	-.5456827
	N	74	74	74
	Std. Deviation	.52987834	.66451510	.53843233
4	Mean	-1.2948367	-.5748174	.4200711
	N	19	19	19
	Std. Deviation	.42063403	.70156043	.63462847
Total	Mean	.0774184	-.0687580	.0006170
	N	156	156	156
	Std. Deviation	.80332805	.79855236	.77181251

Quick Cluster

Initial Cluster Centers

	Cluster			
	1	2	3	4
RC1 change 2001	.68905	.47790	-.03389	-1.29484
RC2 change 2001	-.46359	1.10014	-.02531	-.57482
RC3 change 2001	.67810	.16685	-.54568	.42007

Input from FILE Subcommand

Iteration History[a]

Iteration	Change in Cluster Centers			
	1	2	3	4
1	6.158E-02	.145	9.150E-02	7.501E-02
2	2.594E-02	.107	6.633E-02	.000
3	.000	5.666E-02	3.996E-02	.000
4	.000	3.160E-02	2.565E-02	.000
5	6.151E-02	.000	4.282E-02	.000
6	.000	.000	.000	.000

a. Convergence achieved due to no or small distance change. The maximum distance by which any center has changed is .000. The current iteration is 6. The minimum distance between initial centers is 1.427.

Final Cluster Centers

	Cluster			
	1	2	3	4
RC1 change 2001	.68946	.33540	-.05672	-1.26935
RC2 change 2001	-.50547	.85484	-.24025	-.63038
RC3 change 2001	.74217	.00988	-.65688	.37659

Number of Cases in each Cluster

Cluster	1	39.000
	2	41.000
	3	56.000
	4	20.000
Valid		156.000
Missing		.000

Report

Cluster change 2001_98-00 all		RC1 change 2001	RC2 change 2001	RC3 change 2001
2001 winner & winter recoverer	Mean	.6894630	-.5054684	.7421723
	N	39	39	39
summer/autumn recoverer	Mean	.3354043	.8548408	.0098773
	N	41	41	41
2001 winter loser	Mean	-.0567214	-.2402490	-.6568782
	N	56	56	56
2001 loser	Mean	-1.2693479	-.6303753	.3765870
	N	20	20	20
outlier	Mean	-.8626625	.7661606	-.0068751
	N	14	14	14
Total	Mean	.0000000	.0000000	.0000000
	N	170	170	170

Figure F-1: Change in Room Occupancy Rates for 'Change' Clusters 2001 vs. 1998-2000 (Ward Cluster Centres)

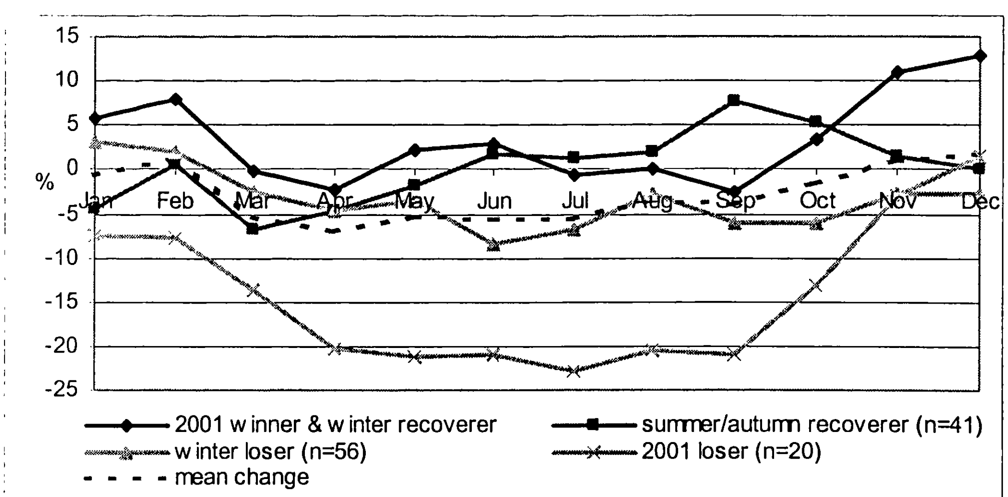


Figure F-2: Average Room Occupancy Rates for 'Change' Clusters 2001 vs. 1998-2000 (Ward Cluster Centres)

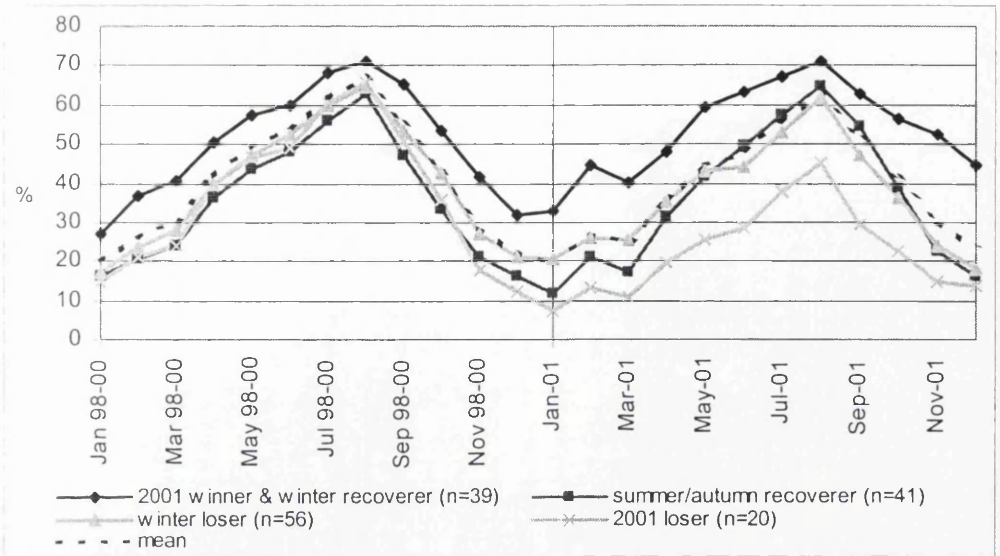


Figure F-3: Regional Distribution of Change Cluster and Outlier (Ward Cluster Centres), 2001 vs. 1998-2000

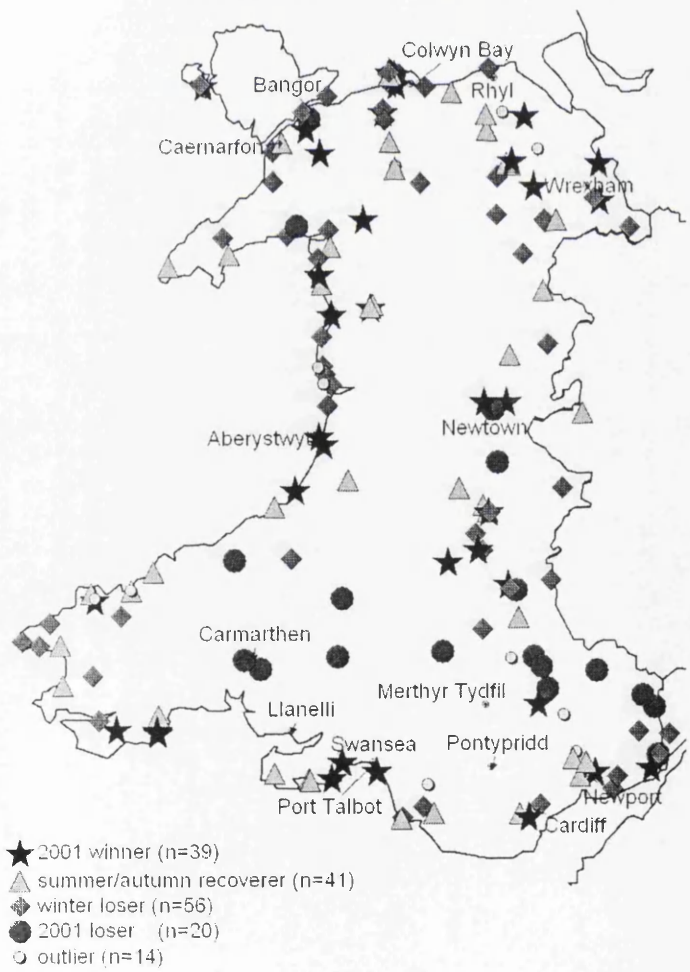


Table F-3: Results for Cluster/Crosstabulation Analysis for all Dimensions (*n*=156, change 2001 vs. 1998-2000, Initial Cluster Seeds from Ward's Method)

		2001 winner & winter recoverer	winter loser	summer/autumn recoverer	2001 loser
Results Clusteranalysis	n	39	56	41	20
		29 Hotels 10 Non-Hotels	27 Hotels 29 Non-Hotels	15 Hotels 26 Non-Hotels	5 Hotels 15 Non-Hotels
	Cluster ACS				
	2001 change (RC1)	**0.689**	-0.057	0.335	**-1.269**
	summer/autumn change (RC2)	-0.505	-0.240	**0.854**	-0.630
	winter change (RC3)	**0.742**	**-0.657**	0.009	0.376
	District				(South East** (n=9))
	Kind	Hotel**	Hotel (n=22)		Non-Hotel (n=15)
	Non-Hotel Subgroups		Guesthouse (n=14)	B&B (n=10) Guesthouse (n=12)	(Farmhouse*** (n=8))
	Location	seaside & town (n=12)		seaside (n=8)	countryside**
	Kind & Location	Countryside Hotel** Seaside Hotel (n=12)			Countryside Non-Hotel***
	Tariff Groups	(£45-54** (n=7)) (over £55* (n=7))			up to £24 (n=12) £21-25 (n=9)
	Size	(26-50 rooms (n=7)) (over 50 rooms*** (n=10))			1-3 rooms (n=9) 4-10 rooms (n=9)
	WTB Star Grading	(4 and 5 stars* (n=10))			
	Facilities & Special Offers	conferences*** wedding** gym/pool/sauna etc.** special breaks* out of season prices** (Christmas etc. specials*)	no Web Info (n=8)		

p-values:
* p<=0.1
** p<=0.05
*** p<=0.01
**** p<=0.001

Note: Figures in parentheses for significant attributes where expected count is less than 5

Tables F-4: Results Clusteranalysis for 'Change' Cluster, Initial Cluster Centres Set Artificially, *n*=156, 2001 vs. 1998-2000

Quick Cluster 1

Initial Cluster Centers

	Cluster			
	1	2	3	4
RC1 change 2001	1.00000	-1.00000	.00000	.00000
RC2 change 2001	.00000	.00000	.00000	1.00000
RC3 change 2001	.00000	.00000	1.00000	.00000

Input from FILE Subcommand

Iteration History[a]

	Change in Cluster Centers			
Iteration	1	2	3	4
1	.369	.611	.503	.285
2	.235	1.597E-02	.195	8.833E-02
3	.202	.000	6.520E-02	5.844E-02
4	5.301E-02	.000	.000	2.467E-02
5	.000	.000	.000	.000

a. Convergence achieved due to no or small distance change. The maximum distance by which any center has changed is .000. The current iteration is 5. The minimum distance between initial centers is 1.414.

Final Cluster Centers

	Cluster			
	1	2	3	4
RC1 change 2001	.83874	-.70665	.51553	.22098
RC2 change 2001	-.67761	-.49776	-.28981	.75974
RC3 change 2001	-.36239	-.20524	1.05778	-.21650

Number of Cases in each Cluster

Cluster	1	25.000
	2	50.000
	3	29.000
	4	52.000
Valid		156.000
Missing		.000

Quick Cluster 2

Initial Cluster Centers

	Cluster			
	1	2	3	4
RC1 change 2001	.10000	-.10000	.00000	.00000
RC2 change 2001	.00000	.00000	.00000	.10000
RC3 change 2001	.00000	.00000	.10000	.00000

Input from FILE Subcommand

Iteration History[a]

	Change in Cluster Centers			
Iteration	1	2	3	4
1	.808	.830	.991	.819
2	.198	5.119E-02	.234	9.809E-02
3	.202	.000	6.520E-02	5.844E-02
4	5.301E-02	.000	.000	2.467E-02
5	.000	.000	.000	.000

a. Convergence achieved due to no or small distance change. The maximum distance by which any center has changed is .000. The current iteration is 5. The minimum distance between initial centers is .141.

Final Cluster Centers

	Cluster			
	1	2	3	4
RC1 change 2001	.83874	-.70665	.51553	.22098
RC2 change 2001	-.67761	-.49776	-.28981	.75974
RC3 change 2001	-.36239	-.20524	1.05778	-.21650

Number of Cases in each Cluster

Cluster	1	25.000
	2	50.000
	3	29.000
	4	52.000
Valid		156.000
Missing		.000

Report

Cluster Number of Case		RC1 change 2001	RC2 change 2001	RC3 change 2001
2001 winner	Mean	.8387377	-.6776058	-.3623922
	N	25	25	25
2001 loser	Mean	-.7066536	-.4977593	-.2052353
	N	50	50	50
winter recoverer	Mean	.5155319	-.2898118	1.0577789
	N	29	29	29
summer/autumn winner	Mean	.2209824	.7597385	-.2164955
	N	52	52	52
Total	Mean	.0774184	-.0687580	.0006170
	N	156	156	156

Figure F-4: Change in Room Occupancy Rates for 'Change' Clusters 2001 vs. 1998-2000 (Initial Cluster Centres Set Artificially)

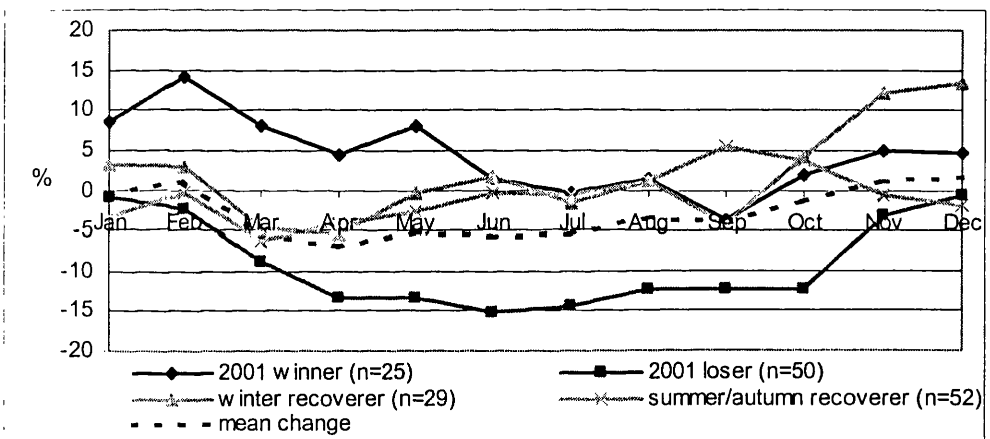


Table F-5: Results for Cluster/Crosstabulation Analysis for all Dimensions (*n*=156, change 2001 vs. 1998-2000, Initial Cluster Centres Set Artificially)

		2001 winner	winter recoverer	summer/autumn recoverer	2001 loser
Results Clusteranalysis	n	25	29	52	50
		21 Hotels 4 Non-Hotels	22 Hotels 7 Non-Hotels	19 Hotels 33 Non-Hotels	14 Hotels 36 Non-Hotels
	Cluster ACS				
	2001 change (RC1)	**0.839**	**0.516**	0.221	**-0.707**
	summer/autumn change (RC2)	-0.678	-0.289	**0.759**	-0.498
	winter change (RC3)	-0.362	**1.058**	-0.217	-0.205
	Kind	Hotel**	Hotel**		Non-Hotel**
	Non-Hotel Subgroups			B&B (n=12) Guesthouse (n=15)	Farmhouse*** Guesthouse (n=15)
	Location	seaside & town*** seaside**		seaside (n=10)	countryside*
	Kind & Location	Seaside Hotel***	Countryside Hotel**	Seaside Non-Hotel (n=10) Town Non-Hotel (n=6)	Countryside Non-Hotel***
	Tariff Groups	(£35-44** (n=8)) (over £55*** (n=7))	£25-34 (n=11) over £55 (n=5)	up to £20**	up to £24* (n=29) £21-25*** (n=25)
	Size	(26-50 rooms** (n=6)) (over 50 rooms*** (n=7))	11-25 rooms* (n=9)		1-3 rooms (n=21) 4-10 rooms* (n=22)
	WTB Star Grading		(4 and 5 stars* (n=8))	(ungraded and 1 star*)	
	Facilities & Special Offers	conferences*** wedding*** (gym/pool/sauna etc.**) special breaks*** out of season prices*** (Christmas etc. specials***)	conferences** wedding* (gym/pool/sauna etc.**)		(no Web info*) no special breaks* no conferences*

p-values:	
*	p<=0.1
**	p<=0.05
***	p<=0.01
****	p<=0.001

Note: Figures in parentheses for significant attributes where expected count is less than 5

Appendix G

Appendix G: Summary Results Cluster/Crosstabulation Analysis for *n*=145, 1998-2002

Table G-1: Average Occupancy Rates and Standard Deviation for *n*=145

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
JAN98	22.6670	21.91911	145
FEB98	26.2399	23.72074	145
MAR98	30.4027	23.83291	145
APR98	43.2088	21.65419	145
MAY98	51.2368	21.98036	145
JUN98	54.0424	23.70608	145
JUL98	63.0264	20.08937	145
AUG98	67.6985	19.79199	145
SEP98	56.3463	23.57051	145
OCT98	42.3687	22.45492	145
NOV98	28.1403	23.07126	145
DEC98	21.6200	19.87955	145
JAN99	20.0133	20.46333	145
FEB99	25.2177	22.64272	145
MAR99	31.0138	22.16242	145
APR99	40.6734	19.85371	145
MAY99	49.3063	21.60756	145
JUN99	53.9986	22.80163	145
JUL99	62.8356	20.82991	145
AUG99	66.6346	20.79941	145
SEP99	56.6997	23.79645	145
OCT99	45.1079	23.28500	145
NOV99	30.1508	24.32775	145
DEC99	21.4379	20.53421	145
JAN00	20.1639	19.61054	145
FEB00	27.9030	23.62564	145
MAR00	31.5017	23.07064	145
APR00	44.3614	20.80676	145
MAY00	49.5220	21.61792	145
JUN00	54.7894	21.94798	145
JUL00	61.8765	20.93419	145
AUG00	65.5169	21.56280	145
SEP00	53.9332	21.66903	145
OCT00	42.4991	24.42123	145
NOV00	29.9592	24.22870	145
DEC00	24.8327	24.12601	145
January 2001	20.5714	21.34911	145
February 2001	28.2406	24.98799	145
March 2001	26.7809	23.46064	145
April 2001	37.3025	23.13614	145
May 2001	45.9439	23.47705	145
June 2001	49.0173	25.99126	145
July 2001	58.0383	23.54235	145
August 2001	64.6457	21.87180	145
September 2001	52.3153	23.95115	145
October 2001	42.7472	24.59553	145
Novmber 2001	31.9966	25.30017	145
December 2001	25.0076	22.75053	145
JAN02	22.1771	22.82154	145
FEB02	29.0754	24.85018	145
MAR02	38.7510	22.45476	145
APR02	39.8774	22.26565	145
MAY02	49.0626	22.48556	145
JUN02	57.4193	21.05244	145
JUL02	61.2919	22.06600	145
AUG02	67.1754	20.41332	145
SEP02	56.2896	23.42780	145
OCT02	44.4268	24.88752	145
NOV02	32.1243	25.82138	145
DEC02	25.1496	23.28698	145

Table G-2: KMO and Bartlett's Test for PCA, *n*=145, 1998-2002

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.959
Bartlett's Test of Sphericity	Approx. Chi-Square	12622.881
	df	1770
	Sig.	.000

Table G-3: Principal Components extracted for *n*=145, 1998-2002, Correlation Matrix

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	38.077	63.461	63.461	38.077	63.461	63.461
2	6.821	11.368	74.830	6.821	11.368	74.830
3	1.706	2.843	77.672	1.706	2.843	77.672
4	1.102	1.836	79.508	1.102	1.836	79.508
5	.826	1.377	80.885			
6	.761	1.268	82.153			
7	.693	1.154	83.307			
8	.627	1.046	84.353			
9	.580	.967	85.320			
10	.535	.892	86.212			
11	.472	.786	86.998			
12	.441	.734	87.732			
13	.409	.682	88.414			
14	.390	.650	89.064			
15	.378	.631	89.694			
16	.359	.598	90.292			
17	.351	.585	90.877			
18	.332	.553	91.430			
19	.309	.514	91.944			
20	.280	.467	92.411			
21	.274	.457	92.869			
22	.260	.434	93.303			
23	.242	.404	93.707			
24	.230	.384	94.091			
25	.217	.361	94.452			
26	.214	.356	94.809			
27	.200	.333	95.142			
28	.193	.322	95.464			
29	.187	.312	95.776			
30	.176	.293	96.069			
31	.162	.270	96.339			
32	.150	.249	96.588			
33	.143	.238	96.827			
34	.140	.233	97.060			
35	.129	.216	97.276			
36	.128	.213	97.489			
37	.118	.197	97.686			
38	.107	.178	97.864			
39	.104	.174	98.038			
40	9.512E-02	.159	98.197			
41	8.945E-02	.149	98.346			
42	8.655E-02	.144	98.490			
43	8.237E-02	.137	98.627			
44	8.011E-02	.134	98.761			
45	7.373E-02	.123	98.884			
46	7.208E-02	.120	99.004			
47	6.892E-02	.115	99.119			
48	5.914E-02	9.857E-02	99.217			
49	5.794E-02	9.657E-02	99.314			
50	5.610E-02	9.350E-02	99.407			
51	5.436E-02	9.060E-02	99.498			
52	4.667E-02	7.779E-02	99.576			
53	4.485E-02	7.476E-02	99.650			
54	4.341E-02	7.235E-02	99.723			
55	3.552E-02	5.920E-02	99.782			
56	3.451E-02	5.751E-02	99.840			
57	3.055E-02	5.091E-02	99.890			
58	2.322E-02	3.870E-02	99.929			
59	2.227E-02	3.711E-02	99.966			
60	2.025E-02	3.375E-02	100.000			

Extraction Method: Principal Component Analysis.

Figure G-1: Scree Plot for Standard PCA, *n*=145, 1998-2002

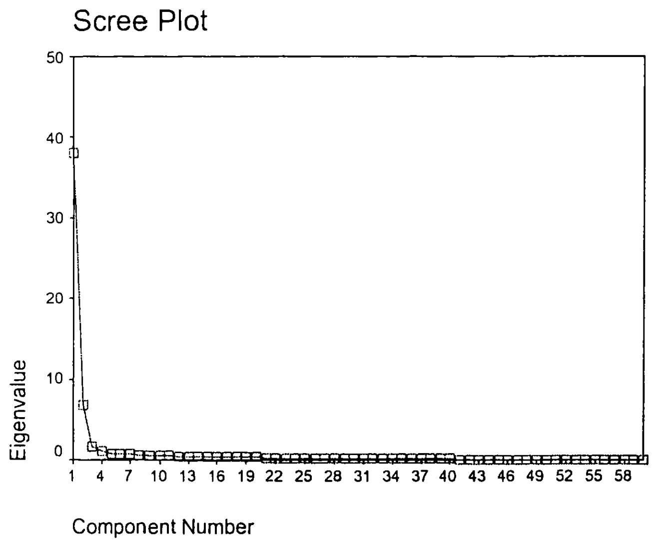


Table G-4: Component Loadings for Standard PCA, *n*=145, 1998-2002

Component Matrix[a]

	Component			
	1	2	3	4
JAN98	.713	-.335	.281	.162
FEB98	.717	-.361	.209	.229
MAR98	.829	-.304	.211	6.458E-02
APR98	.842	-1.16E-02	.286	-.138
MAY98	.755	.248	.247	-.193
JUN98	.759	.255	.261	-.171
JUL98	.768	.385	.260	8.749E-03
AUG98	.626	.574	.260	.187
SEP98	.764	.205	.150	-.312
OCT98	.878	-.121	.142	-.163
NOV98	.829	-.332	6.109E-03	3.841E-02
DEC98	.796	-.402	9.346E-02	2.158E-02
JAN99	.764	-.319	.174	-3.32E-02
FEB99	.814	-.368	.176	.105
MAR99	.873	-.280	.107	-7.07E-02
APR99	.885	2.964E-02	.183	-.155
MAY99	.825	.281	.242	-.178
JUN99	.813	.337	.131	-1.86E-02
JUL99	.781	.446	.200	3.585E-02
AUG99	.614	.605	.169	.217
SEP99	.828	.278	7.348E-02	-.103
OCT99	.858	-6.75E-04	7.312E-02	-.115
NOV99	.850	-.329	-1.55E-02	-4.78E-02
DEC99	.776	-.376	1.485E-02	9.189E-02
JAN00	.767	-.372	7.484E-02	.247
FEB00	.799	-.362	.169	.207
MAR00	.873	-.280	1.571E-02	4.575E-03
APR00	.820	.189	.127	-9.89E-02
MAY00	.801	.272	5.801E-02	-.150
JUN00	.838	.335	3.350E-02	-2.56E-02
JUL00	.769	.457	1.524E-02	.170
AUG00	.613	.567	2.822E-02	.300
SEP00	.841	.331	-3.51E-02	-6.59E-02
OCT00	.884	-3.42E-02	-8.93E-02	-7.70E-02
NOV00	.813	-.344	-.171	-2.43E-02
DEC00	.827	-.323	-.107	-9.04E-02
January 2001	.746	-.461	-5.75E-02	.146
February 2001	.800	-.415	-3.45E-02	.186
March 2001	.846	-.346	-.144	2.712E-02
April 2001	.872	-5.28E-02	-.169	7.622E-02
May 2001	.869	.121	-.205	-5.46E-02
June 2001	.773	.298	-.226	-4.44E-02
July 2001	.816	.371	-.180	8.067E-02
August 2001	.642	.502	-.220	.237
September 2001	.808	.306	-.220	-7.33E-02
October 2001	.881	-9.25E-02	-.181	-6.32E-02
Novmber 2001	.855	-.348	-.188	-4.28E-02
December 2001	.809	-.366	-7.88E-02	.117
JAN02	.793	-.318	-.107	3.668E-02
FEB02	.829	-.377	2.260E-02	.153
MAR02	.773	-7.91E-02	-.148	-7.18E-02
APR02	.861	6.643E-02	-.177	-7.11E-02
MAY02	.845	.185	-.143	-8.41E-02
JUN02	.797	.424	-.187	.117
JUL02	.709	.429	-.237	.123
AUG02	.631	.593	-.148	.215
SEP02	.722	.420	-.255	-7.66E-02
OCT02	.830	-7.78E-02	-.268	-.110
NOV02	.774	-.307	-.208	-.117
DEC02	.743	-.283	-.209	-.195

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

Table G-5: Average Occupancy Rates and Standard Deviation for AMC Data, n=145, 1998-2002

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
JAN98	-19.5829	13.77337	145
FEB98	-16.0100	15.06190	145
MAR98	-11.8471	11.80466	145
APR98	.9589	9.82208	145
MAY98	8.9870	12.93850	145
JUN98	11.7926	13.91803	145
JUL98	20.7766	11.95155	145
AUG98	25.4487	15.81736	145
SEP98	14.0965	14.57610	145
OCT98	.1189	9.96941	145
NOV98	-14.1095	12.83650	145
DEC98	-20.6298	11.49014	145
JAN99	-21.9108	12.94549	145
FEB99	-16.7064	13.02664	145
MAR99	-10.9103	10.92112	145
APR99	-1.2508	8.04586	145
MAY99	7.3822	10.61618	145
JUN99	12.0745	12.10914	145
JUL99	20.9115	11.76851	145
AUG99	24.7104	16.44015	145
SEP99	14.7755	12.74324	145
OCT99	3.1838	11.57923	145
NOV99	-11.7733	13.06714	145
DEC99	-20.4863	13.15460	145
JAN00	-22.0743	13.20106	145
FEB00	-14.3352	14.13621	145
MAR00	-10.7366	11.47963	145
APR00	2.1232	10.92086	145
MAY00	7.2837	11.72630	145
JUN00	12.5512	10.92068	145
JUL00	19.6382	12.24833	145
AUG00	23.2786	16.45267	145
SEP00	11.6950	11.08219	145
OCT00	.2608	11.27974	145
NOV00	-12.2790	13.96683	145
DEC00	-17.4056	13.91425	145
January 2001	-19.6459	13.51238	145
February 2001	-11.9767	13.70177	145
March 2001	-13.4364	10.82485	145
April 2001	-2.9148	9.90098	145
May 2001	5.7267	9.94051	145
June 2001	8.8000	14.70864	145
July 2001	17.8210	12.74468	145
August 2001	24.4285	16.96122	145
September 2001	12.0980	13.27498	145
October 2001	2.5299	11.60497	145
Novmber 2001	-8.2207	11.77317	145
December 2001	-15.2097	12.64515	145
JAN02	-21.3913	14.07823	145
FEB02	-14.4929	15.08820	145
MAR02	-4.8173	13.36590	145
APR02	-3.6909	10.00697	145
MAY02	5.4942	11.04051	145
JUN02	13.8509	11.40978	145
JUL02	17.7236	13.60032	145
AUG02	23.6070	15.53933	145
SEP02	12.7212	14.28708	145
OCT02	.8585	11.94490	145
NOV02	-11.4441	15.50113	145
DEC02	-18.4188	14.33905	145

Table G-6: Principal Components extracted from AMC Data, n=145, 1998-2002

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	19.041	31.735	31.735	19.041	31.735	31.735
2	3.843	6.404	38.139	3.843	6.404	38.139
3	2.457	4.095	42.234	2.457	4.095	42.234
4	2.256	3.760	45.994	2.256	3.760	45.994
5	1.840	3.067	49.061	1.840	3.067	49.061
6	1.786	2.977	52.038	1.786	2.977	52.038
7	1.735	2.891	54.929	1.735	2.891	54.929
8	1.638	2.730	57.659	1.638	2.730	57.659
9	1.575	2.625	60.284	1.575	2.625	60.284
10	1.439	2.399	62.683	1.439	2.399	62.683
11	1.343	2.239	64.922	1.343	2.239	64.922
12	1.230	2.050	66.972	1.230	2.050	66.972
13	1.209	2.014	68.987	1.209	2.014	68.987
14	1.163	1.939	70.926	1.163	1.939	70.926
15	1.094	1.823	72.749	1.094	1.823	72.749
16	1.038	1.730	74.479	1.038	1.730	74.479
17	.955	1.591	76.070			
18	.942	1.569	77.640			
19	.844	1.407	79.047			
20	.785	1.308	80.355			
21	.722	1.203	81.558			
22	.701	1.169	82.727			
23	.642	1.070	83.797			
24	.611	1.018	84.816			
25	.591	.984	85.800			
26	.586	.977	86.777			
27	.566	.944	87.721			
28	.544	.907	88.628			
29	.490	.817	89.445			
30	.480	.801	90.245			
31	.465	.775	91.021			
32	.441	.735	91.756			
33	.387	.644	92.400			
34	.363	.605	93.005			
35	.354	.591	93.596			
36	.340	.566	94.162			
37	.316	.527	94.688			
38	.309	.515	95.203			
39	.274	.457	95.660			
40	.264	.440	96.100			
41	.238	.396	96.496			
42	.220	.367	96.863			
43	.209	.349	97.212			
44	.203	.338	97.550			
45	.190	.316	97.866			
46	.189	.315	98.181			
47	.175	.291	98.472			
48	.159	.266	98.738			
49	.156	.260	98.998			
50	.136	.227	99.225			
51	.129	.215	99.440			
52	.105	.175	99.615			
53	8.540E-02	.142	99.757			
54	7.484E-02	.125	99.882			
55	7.086E-02	.118	100.000			
56	5.207E-16	8.678E-16	100.000			
57	1.681E-16	2.802E-16	100.000			
58	-1.38E-16	-2.304E-16	100.000			
59	-2.64E-16	-4.405E-16	100.000			
60	-3.96E-16	-6.605E-16	100.000			

Extraction Method: Principal Component Analysis.

Figure G-2: Scree Plot for PCA on AMC Data, *n*=145, 1998-2002

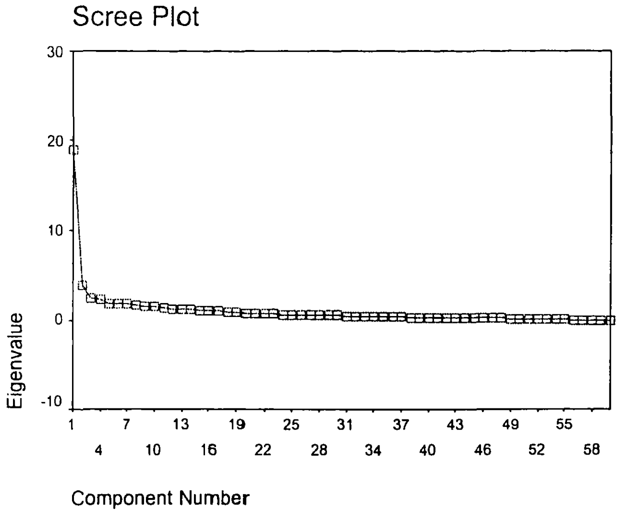


Table G-7: Component Loadings for PCA on AMC Data, *n*=145, 1998-2002

Component Matrix[a]

	Component			
	1	2	3	4
JAN98	.476	-.367	6.902E-02	.243
FEB98	.532	-.327	2.970E-02	.118
MAR98	.594	-2.91E-02	.163	.190
APR98	-2.79E-02	.282	.583	-.192
MAY98	-.470	.196	.312	-.172
JUN98	-.483	.171	-.129	-5.78E-02
JUL98	-.699	-.167	-.141	-2.14E-02
AUG98	-.752	-.349	-7.64E-02	-.173
SEP98	-.370	.393	-.136	.181
OCT98	.258	.498	-6.91E-02	-.284
NOV98	.572	4.788E-02	-.282	7.849E-02
DEC98	.629	-.101	-.183	-2.40E-02
JAN99	.511	-.143	-7.42E-02	-7.31E-02
FEB99	.676	-.206	2.460E-02	.169
MAR99	.633	.132	9.522E-02	.112
APR99	-2.67E-02	.253	.533	.210
MAY99	-.537	.195	.249	.282
JUN99	-.590	3.948E-02	-.149	8.077E-02
JUL99	-.753	-.180	8.004E-02	-5.15E-02
AUG99	-.738	-.350	2.063E-02	-.236
SEP99	-.472	.241	-9.49E-02	-1.98E-02
OCT99	6.900E-02	.347	-4.95E-02	-.119
NOV99	.686	.183	-.163	-2.16E-02
DEC99	.607	-.235	-.219	-.132
JAN00	.558	-.479	-1.60E-02	2.083E-02
FEB00	.646	-.336	1.843E-02	.233
MAR00	.647	6.041E-02	2.081E-03	8.763E-02
APR00	-.320	.112	.617	2.167E-02
MAY00	-.478	.212	.363	.192
JUN00	-.629	9.803E-02	-.137	5.045E-02
JUL00	-.749	-.249	-.167	-9.94E-04
AUG00	-.707	-.360	1.275E-02	-.261
SEP00	-.602	.219	-5.41E-02	-5.70E-02
OCT00	.169	.502	-.361	-6.73E-02
NOV00	.652	.222	-.182	-2.82E-02
DEC00	.612	.245	-3.76E-02	-.110
January 2001	.622	-.307	.128	-6.72E-02
February 2001	.692	-.265	9.606E-02	.243
March 2001	.671	3.058E-02	-7.45E-03	1.037E-02
April 2001	4.430E-02	-4.55E-04	.131	-.119
May 2001	-.394	.344	.141	-6.87E-02
June 2001	-.607	.212	-4.85E-02	.103
July 2001	-.759	-4.72E-02	-5.55E-02	5.291E-02
August 2001	-.710	-.274	3.962E-02	-.329
September 2001	-.630	.194	-.214	.109
October 2001	.156	.347	-.189	.149
Novmber 2001	.698	.235	-4.19E-02	4.961E-02
December 2001	.579	-.252	4.766E-02	-8.21E-02
JAN02	.577	-.104	4.472E-02	-.234
FEB02	.704	-.215	.108	5.365E-02
MAR02	.195	4.039E-02	.514	-1.25E-02
APR02	-6.17E-02	.130	-5.68E-02	.655
MAY02	-.308	.141	-2.79E-02	.558
JUN02	-.709	-.210	-.158	.164
JUL02	-.641	-.249	-.261	.199
AUG02	-.733	-.352	7.795E-02	-.154
SEP02	-.636	.103	-.102	6.411E-02
OCT02	.285	.400	-.235	-.172
NOV02	.585	.231	-3.52E-02	-.282
DEC02	.521	.192	4.880E-02	-.469

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

Figure G-3: Regional Distribution of Occupancy Performance Clusters and Outliers, 1998-2002, n=145

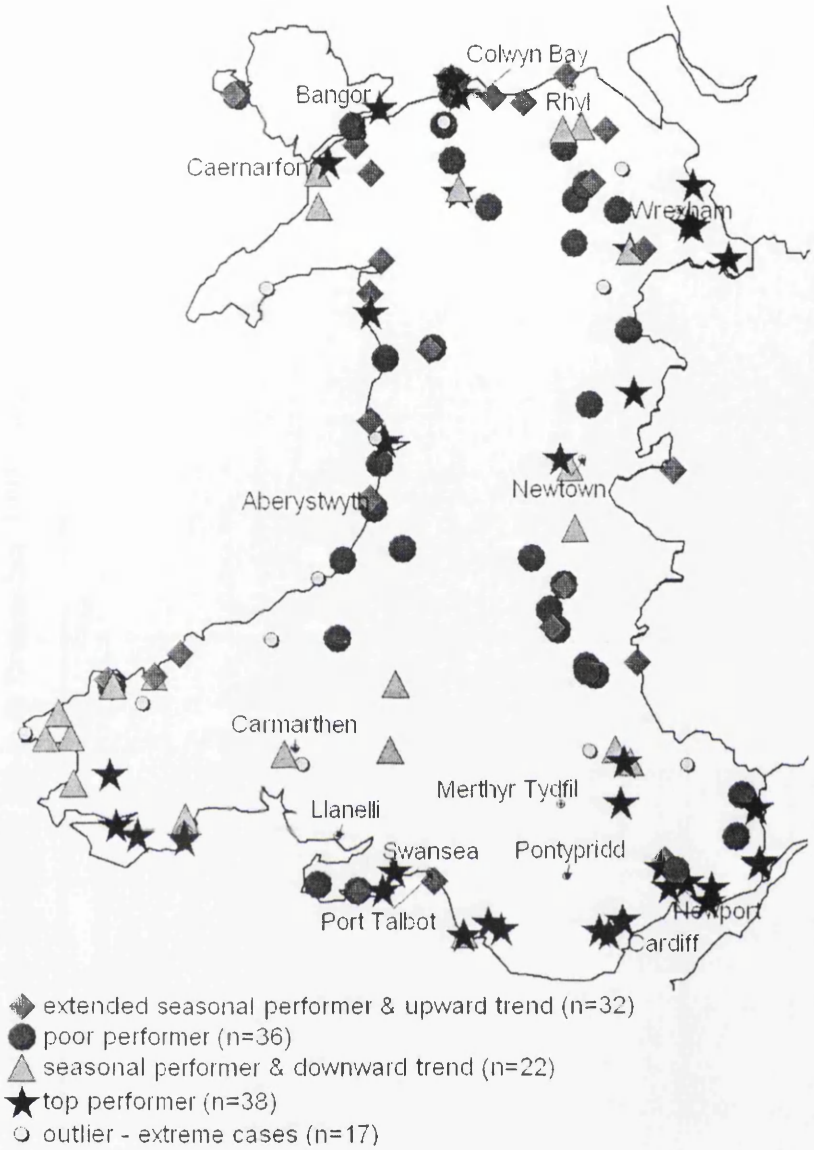


Table G-8: Results for Cluster/Crosstabulation Analysis separately for each Dimension, 1998-2002 (without outliers)

		Occupancy Level (RC1)		Trend (RC3)		Seasonality (RC1-AMC)		Length of Season (RC2-AMC)		Spring Season (RC3-AMC)	
		high occupancy performance	low occupancy performance	upward trend	downward trend	high seasonality	low seasonality	sharp summer peak	extended season	no spring season	spring season
Results Cluster-analysis	n	145 (no outliers)		140 (5 outliers)		144 (1 outlier)		141 (4 outliers)		138 (n=7)	
	Cluster-cases	57	44	58	18	25	60	30	39	36	43
		44 Hotels 13 Non-Hotels	8 Hotels 36 Non-Hotels	34 Hotels 24 Non-Hotels	8 Hotels 10 Non-Hotels	9 Hotels 16 Non-Hotels	39 Hotels 21 Non-Hotels	8 Hotels 22 Non-Hotels	33 Hotels 6 Non-Hotels	22 Hotels 14 Non-Hotels	19 Hotels 24 Non-Hotels
	Cluster ACS	1.009	-1.193	-0.815	1.622	1.546	-0.906	-1.215	1.023	-1.022	0.777
Results Cross-Tabulation Analysis	Region	South East (n=18)	Mid* (n=16)			(South West****, n=11)	South East** (n=22)	(South West**, n=9)			South East (n=13)
	Aggre-gated or Separate Holiday Region	Swansea/ Valleys/ Cardiff/Wye Valley* (n=16)				Ceredigion/ Pembrokeshire/ Carmarthenshire** (n=11) Anglesey/ Snowdonia (n=8)	Swansea/Valleys/ Cardiff/Wye Valley** (n=20)	Ceredigion/ Pembrokeshire/ Carmarthen-shire*** (n=13)	Llandudno/ North Wales Borderland* (n=15)	Llandudno/ North Wales Borderland (n=13) (North Wales Borderland*, n=8)	Anglesey/ Snowdonia* (n=13)
	Location	seaside & town* (n=19) seaside* (n=28)	countryside** (n=31)		countryside (n=8)	seaside* (n=14)	city/town * (n-15)	(seaside*, n=9) (country near sea*, n=7)			Countryside* (n=18)
	Kind	Hotel***	Non-Hotel****					Non-Hotel**	Hotel***		
	Non-Hotel Sub-groups		B&B*** (n=13) Farmhouse*** (n=12)		Farmhouse (n=4)			(Farmhouse*, n=7)			
	Kind & Location	Seaside Hotel** (n=22)	Countryside Non-Hotel**** (n=29)	Seaside Hotel (n=19)	Countryside Non-Hotel (n=8)	(Seaside Non-Hotel****, n=8)	City/Town Hotel* (n=10)	Countryside Non-Hotel (n=13)	Countryside Hotel* (n=12)		Countryside Non-Hotel* (n=20)
							Countryside Hotel (n=16)	(Seaside Non-Hotel**, n=8)	City/Town Hotel*, n=7)		

		Occupancy Level (RC1)		Trend (RC3)		Seasonality (RC1-AMC)		Length of Season (RC2-AMC)		Spring Season (RC3-AMC)	
		high occupancy performance	low occupancy performance	2001 upward trend	2001 downward trend	high seasonality	low seasonality	sharp summer peak	extended season	no spring season	spring season
	Tariff Groups in Pounds	£35-44*** (n=16) £45-54* (n=8)	up to £24**** (n=38)	£35-£44 (n=11) over £55* (n=10)		£21-25** (n=13)	(£45-£54*, n=8)	up to £24*** (n=23)	£35-£44* (n=10) (over £55*, n=7)		
	Size	11-25 rooms* (n=14) 26-50 rooms** (n=12) over 50 rooms** (n=13)	1-3 rooms*** (n=24)	over 50 rooms (n=11)		4-10 rooms* (n=13)	11-25 rooms* (n=165 26-50 rooms* (n=11)	1-3 rooms (n=13)	over 50 rooms**** (n=15)	(over 50 rooms**, n=10)	
	WTB Star Grading	4 stars (n=11)									
	Facilities and Special Offers	conference**** (n=35) wedding license** (n=19) gym/pool/sauna etc.** (n=14) special breaks** (n=32) out-of-season prices** (n=24) Christmas etc. specials* (n=11)	(no Web info***, n=8) no activities advertised** (n=23) no special breaks* (n=35) no conferences*** (n=43)			no special breaks (n=20) no conferences* (n=23)	conference** (n=31) wedding*** (n=22) gym/pool/sauna etc.* (n=14)	(no Web Info*, n=5)	conference*** (n=23) wedding* (n=13) special breaks** (n=25) specials for longer stays* (n=26) out-of-season prices* (n=17)		

p-values:
* p<=0.1
** p<=0.05
*** p<=0.01
**** p<=0.001

Note: Figures in parentheses for significant attributes where expected count is less than 5

Table G-9: Results for Cluster/Crosstabulation Analysis for all Dimensions, n=128, 1998-2002 (without outliers)

		top performers	extended seasonal performer & upward trend	seasonal performer & downward trend	poor performers
Results Clusteranalysis	n	38	32	22	36
		33 Hotels 5 Non-Hotels	25 Hotels 7 Non-Hotels	4 Hotels 18 Non-Hotels	10 Hotels 26 Non-Hotels
	Cluster ACS Occupancy (RC1) Trend (RC3) Seasonality (RC1-AMC) Length of season (RC2-AMC) Spring season (RC3-AMC)	 **1.0169** 0.135 -0.901 **0.231** -0.012	 0.418 **-0.581** **0.464** **0.770** -0.509	 -0.283 **0.874** **0.965** -0.896 -0.081	 **-1.069** -0.328 -0.331 -0.376 0.137
Results Cross-Tabulation Analysis	**Region**	South East*** (n=18)		(South West****, n=10)	Mid** (n=15)
	Aggregated or Separate Holiday Region	Swansea/Valleys/ Cardiff/ Wye Valley**** (n=17)	Llandudno/ North Wales Borderland (n=11)	(Ceredigion/ Pembrokeshire/ Carmarthenshire***, n=10)	Mid Wales/Brecon Beacons* (n=10)
	Kind	Hotel** (n=33)	Hotel* (n=25)	Non-Hotel*** (n=18)	Non-Hotel*** (n=26)
	Non-Hotel Subgroups			Guesthouse (n=7) (Farmhouse***, n=7)	(B&B**, n=10)
	Location	city/town* (n=11)	seaside & town*** (n=14) seaside** (n=19)	countryside (n=13) seaside (n=8)	countryside* (n=24)
	Kind & Location	Countryside Hotel** (n=14) (City/Town Hotel***, n=9)	Seaside Hotel*** (n=16)	Countryside Non-Hotel* (n=11) (Seaside Non-Hotel***, n=6)	Countryside Non-Hotel**** (n=21)
	Tariff Groups	£35-44* (n=11) (£45-54**, n=7)	over £55** (n=6)	up to £24*** (n=17) £21-25**** (n=19)	up to £24*** (n-25) up to £20****(n=15)
	Size	11-25 rooms*** (n=14) (26-50 rooms**, n=9)	(over 50 rooms****, n=11)	1-3 rooms* (n=10) 4-10 rooms (n=11)	1-3 rooms*** (n=18)
	WTB Star Grading				
	Facilities & Special Offers	conferences*** (n=25) wedding*** (n=16) gym/pool/sauna etc.* (n=10) special breaks* (n=22)	conferences* (n=18) special breaks* (n=19) out of season prices (n=14) specials for longer stays** (n=24) (Christmas etc. specials**, n=8)	no conferences** (n=22)	no special breaks* (n=29) no specials for longer stays* (n=26) no activities advertised** (n=20) no conferences* (n=31) no Web info (n=5)

p-values:		
	*	p<=0.1
	**	p<=0.05
	***	p<=0.01
	****	p<=0.001

Note: Figures in parentheses for significant attributes where expected count is less than

Appendix H

Appendix H: PCA and Cluster/Crosstabulation Analysis Results for Occupancy Change 2002-2001, n=145

Table H-1: Average Occupancy Rates and Standard Deviation for 2002 Change, n=145

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
change_january 2002-2001	1.6057	16.60274	145
CH_FEB	.8349	13.73201	145
CH_MAR	11.9701	18.71519	145
CH_APR	2.5750	16.18062	145
CH_MAY	3.1186	15.82062	145
CH_JUN	8.4020	16.71291	145
CH_JUL	3.2537	15.37118	145
CH_AUG	2.5297	13.73077	145
CH_SEP	3.9743	15.66641	145
CH_OCT	1.6797	14.58615	145
CH_NOV	.1277	16.09852	145
CH_DEC	.1420	17.57010	145

Table H-2: KMO and Bartlett's Test for PCA for 2002 Change, n=145

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.603
Bartlett's Test of Sphericity	Approx. Chi-Square	290.745
	df	66
	Sig.	.000

Table H-3: Principal Components Extracted for 2002 Change, *n*=145, Correlation Matrix

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.682	22.350	22.350	2.682	22.350	22.350
2	1.726	14.385	36.735	1.726	14.385	36.735
3	1.325	11.043	47.778	1.325	11.043	47.778
4	1.213	10.109	57.886	1.213	10.109	57.886
5	.965	8.041	65.928			
6	.823	6.860	72.788			
7	.723	6.028	78.815			
8	.682	5.687	84.502			
9	.563	4.693	89.195			
10	.509	4.238	93.433			
11	.478	3.987	97.420			
12	.310	2.580	100.000			

Extraction Method: Principal Component Analysis.

Figure H-1: Scree Plot for PCA on 2002 Change, *n*=145

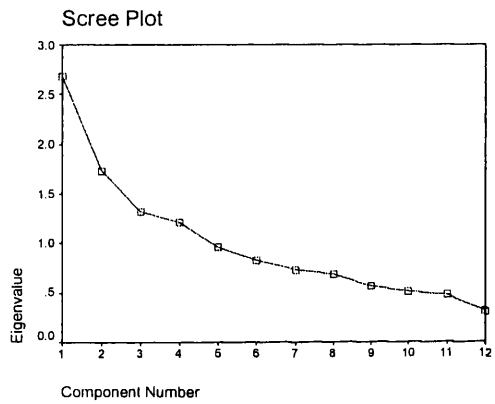


Table H-4: Component Loadings for PCA on 2002 Change, *n*=145

Component Matrix[a]

	Component			
	1	2	3	4
change_january 2002-2001	.311	.184	.621	-.406
CH_FEB	.489	.337	.335	-.395
CH_MAR	.371	-.129	.437	.455
CH_APR	.509	-.445	.263	.267
CH_MAY	.554	-.423	-6.81E-02	-.295
CH_JUN	.634	-.207	-.343	-.248
CH_JUL	.665	-7.39E-02	-.393	-.227
CH_AUG	.417	-.422	5.420E-02	.159
CH_SEP	.453	3.684E-02	-.207	.541
CH_OCT	.387	.592	-.323	.167
CH_NOV	.358	.634	-.176	3.726E-02
CH_DEC	.375	.454	.330	.258

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

Tables H-5: Results Clusteranalysis for RC1-Change 2002-2001

Initial Cluster Centers

	Cluster		
	1	2	3
rc1_change 2002_2001	-.00545	-.93911	1.05405

Input from FILE Subcommand

Iteration History[a]

Iteration	Change in Cluster Centers		
	1	2	3
1	2.172E-02	3.578E-02	3.440E-08
2	2.189E-02	2.268E-02	1.547E-02
3	1.435E-02	2.207E-02	.000
4	7.698E-03	.000	1.542E-02
5	.000	.000	.000

a. Convergence achieved due to no or small distance change. The maximum distance by which any center has changed is .000. The current iteration is 5. The minimum distance between initial centers is .934.

Final Cluster Centers

	Cluster		
	1	2	3
rc1_change 2002_2001	.06021	-.85858	1.08494

Number of Cases in each Cluster

Cluster	1	66.000
	2	41.000
	3	33.000
Valid		140.000
Missing		.000

Report

rc1_change 2002_2001

Occupancy Change	Mean	N	Std. Deviation
average 2002 change	.0602063	66	.26428785
negative 2002 change	-.8585817	41	.37268718
positive 2002 change	1.0849450	33	.37691726
outlier - extr pos 2002 change	2.9826411	2	.66992351
outlier - extr neg 2002 change	-3.51341	3	1.54552046
Total	.0000000	145	1.00000000

Figure H-2: Changes in Average Room Occupancy Rates between 2002 and 2001 for RC1-Change 2002-2001 Clusters

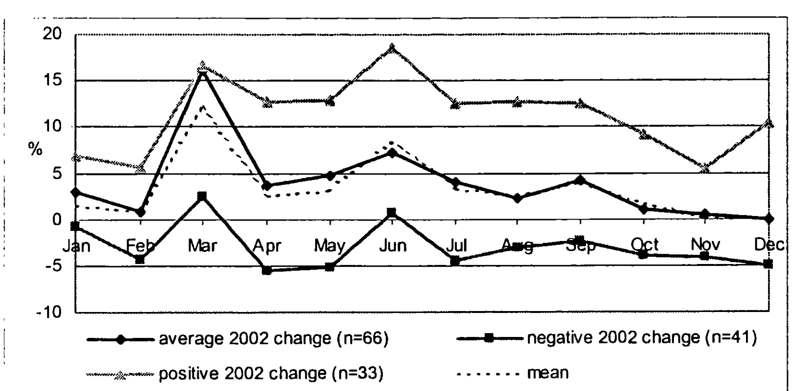


Figure H-3: Average Room Occupancy Rates for RC1-Change 2002-2001 Clusters

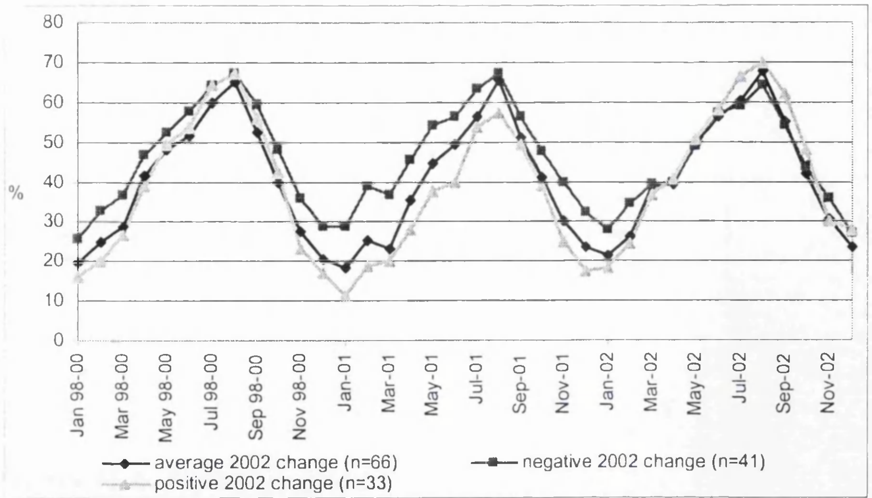


Figure H-4: Geographical Distribution of RC1-Change 2002-2001 Clusters and Outliers, *n*=145

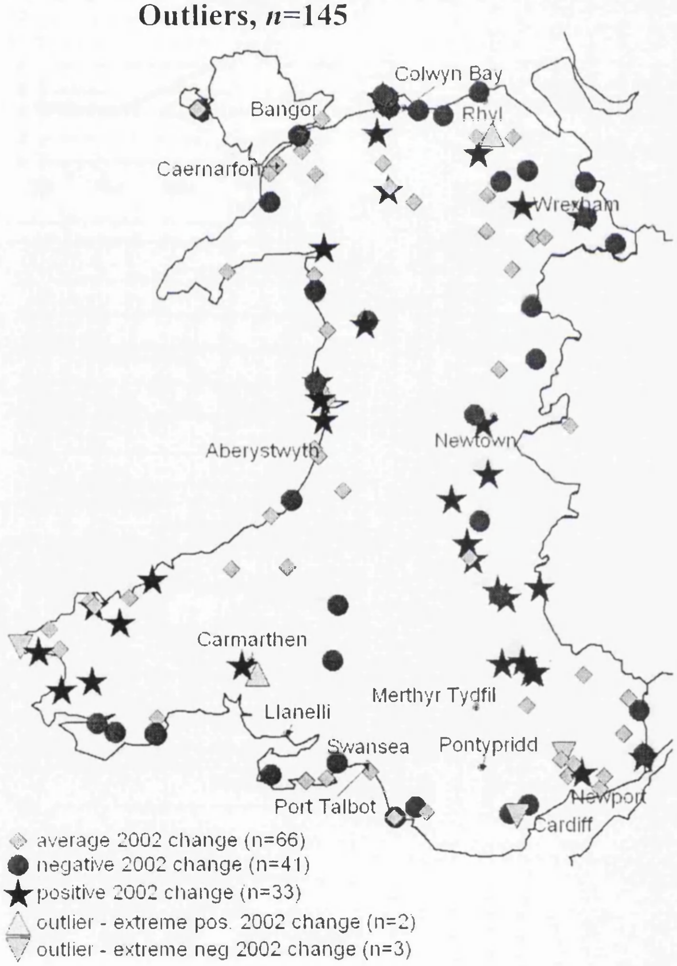


Figure H-5: Changes in the Average Room Occupancy Rates between 2002, 2001 and 1998-2000, *n*=145

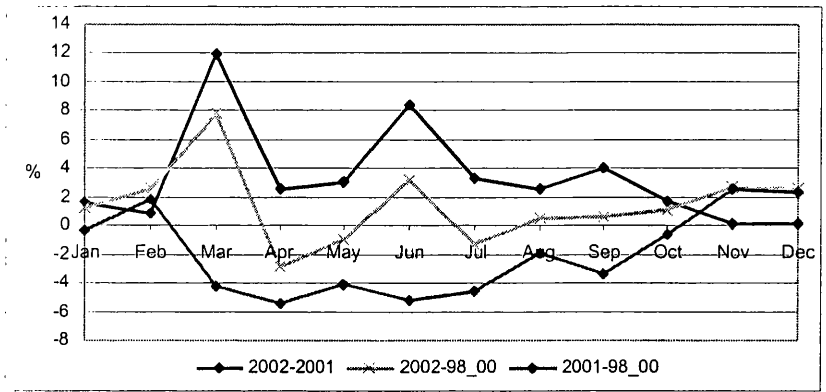


Figure H-6: Component Loadings for Principal Components of Occupancy Change between 2002 and 1998-2000, *n*=145