Spatial prioritisation of conservation areas on the fringes of KwaZulu-Natal protected areas: application of the characteristics framework using tourism competitiveness

By J.O. Flanagan

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DECLARATION

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JO Flanagan Date

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Dr E Wale: Supervisor Date

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Mr M.A.G. Darroch: Co-Supervisor Date

ABSTRACT

Prioritisation of conservation areas has become a major area of study over the last few decades as a result of greatly increased rates of biodiversity loss and extinction with the rapidly expanding human population and development. These extinctions are most commonly associated with habitat loss, the prevention of which is part of the mandate of Ezemvelo KwaZulu-Natal Wildlife (EKZNW). Prioritisation has historically been aimed at areas of predominantly biological importance. Currently, EKZNW faces requests from the South African government to provide jobs, develop communities, and conserve biodiversity. This study proposes that right from the outset of the identification of potential conservation areas in KZN, the tourism potential should be a factor considered by decision makers in prioritisation. In order to present such a case, the dissertation considers the role of competitive advantage within tourism. Multiple linear regression is used to quantify the competitive advantage gained by KZN nature-based tourism destinations by virtue of macro environmental and locational factors. The results of the analyses of competitiveness are used to predict the relative advantage of a number of potential conservation sites currently being considered by EKZNW staff.

The thesis is the first, to the author's knowledge, to consider the prioritisation of conservation areas using tourism competitive advantage at a macro-level as a tool for decision making. This tool could save costs of in-depth tourism feasibility studies at destinations that could potentially be shown to have low potential competitive advantage. Funds could then rather be focused on further feasibility studies at destinations already shown to have some form of competitive advantage.

The study analyses secondary financial data, collected from a variety of EKZNW protected areas with different accommodation types. The sources of primary data on the marketed attributes of the destinations are pamphlets and EKZNW internet sites. Panel data are analysed using Tobit regression to identify the effects of changes in attributes of destinations on competitiveness. Three variables identified in the literature are used as proxies for competitiveness: price, occupancy percentage and revenue per available room. The Tobit analyses are supported by estimations using Generalised Least Squares (GLS) regression and the results were found to be relatively robust to changes in estimation techniques. Marginal effects from the Tobit regression analyses are used to rank the relative

competitiveness and order priority of conservation for a number of potential sites under consideration by EKZNW.

With regard to prioritisation, the Tobit models estimated that the most influential macro-environmental factors influencing the competitive advantage of destinations are:

- *Their location beside the ocean,*
- *The presence of the Big Five (lion, leopard, elephant, rhino and buffalo),*
- *The size of the destination protected area, and*
- *The distance from Johannesburg.*

With regard to competitiveness, important management or destination factors affecting the competitiveness of destinations were:

- *Star rating (i.e. Quality of resort), (star-rated destinations had increased competitiveness),*
- *Provision of breakfast within accommodation fee, (competitiveness was lower at destinations that included breakfast in accommodation fees),*
- *Facilities inside the accommodation for self-catering, (such facilities are preferred), and*
- *Pricing strategies that reflect the relative demand.*

The thesis results suggest that it is vital to consider the competitive advantage of a site when assessing the site for conservation. A number of the recommendations can be drawn from the study regarding the marketing and management of current EKZNW tourism destinations: the incomes and annual Rand turn-over of these sites could be significantly improved by focussing on the variety of potential tourists and targeting specific niche markets, such as birders and visitors interested in historic or cultural sites. An important future focus for EKZNW could be to set competitive pricing relative to the experience offered in order to improve their overall performance. This is especially necessary when there are large discrepancies between the value placed on an attribute by EKZNW (e.g. high prices for birding) and the behaviour displayed by tourists using that attribute (e.g. low occupancy levels in birding destinations).

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LIST OF ABBREVIATIONS

EKZNW	**Ezemvelo KwaZulu-Natal Wildlife**
GLS	**Generalised least squares**
HPA	**Hedonic price analysis**
KZN	**KwaZulu-Natal**
MCP	**Maximum coverage problem**
MINSET	**Minimum set classification**
MLE	**Maximum likelihood estimation**
NBT	**Nature-based tourism**
Occ%	**Occupancy percentage**
OLS	**Ordinary least squares**
PA(s)	**Protected area(s)**
PCA	**Principal component analysis**
PU(s)	**Planning Unit(s)**
RevPAR	**Revenue per available room**
SAN Parks	**South African National Parks**
WTO	**World Tourism Organisation**
UNWTO	**United Nations World Tourism Organisation**

CHAPTER 1. INTRODUCTION

1.1 Background to the study

Prioritisation of conservation areas is a key topic for current debate as parts of the world are currently experiencing mass extinction of multiple species and biodiversity loss (Ceballos & Ehrlich, 2002). Cardinale *et al.* (2012), in a review of biodiversity loss and implications for humanity, defined biodiversity as "the variety of life, including variation among genes, species and functional traits." The imperatives that have emerged on the effects of biodiversity loss are primarily ecological, relating to ecosystem functioning, however the outcomes of biodiversity loss are largely a societal impact. Deterioration of ecosystem functions reduces the level of ecosystem services which are the benefits that ecosystems provide to humanity. Such services are essential for life on Earth and are made up of two primary groups; provisioning services (e.g. provision of food, wood, fresh water) and regulating services (e.g. climate, pest/disease control) (Cardinale *et al.,* 2012). Thus, conservation of the Earth in one form or another will remain essential. Given that resources for conservation are limited, the pertinent economic questions would be: 'What should be conserved?' and 'How should these resources be conserved?'

Natural resource conservation and use theory originated from two primary, conflicting schools of thought. The first, the predominant economic perspective, regarded the environmental resource base "as an infinitely large and adaptable capital stock" which could be used and substituted for as scarcity became evident (Dasgupta, 1996). The second school of thought was the predominant ecological perspective that would "regard the human presence as an inessential component of the ecological landscape" and concludes that biodiversity conservation is best achieved by the absence of humans (Dasgupta, 1996). Given the increasing global population (Haub, 2012), and growing pressure on natural resources as sources of fuel and/or for alternative land uses, this second view is infeasible. These extreme views indicate the challenge inherent in the methods and ability to reconcile how to manage natural resources. Prioritisation of conservation areas globally has and still generates considerable debate primarily due to differences in points of view relating to:

- Substitutability in production between man-made capital and natural capital (Constanza *et al.,* 2007); perfectly substitutable views suggesting that there is no reason to conserve natural capital given that it is replaceable by man-made capital.

Conversely, imperfect substitution indicates that there is a need to conserve resources for future generations.

- The concept of value as defined by ecological and neoclassical economists; ecologists typically define value as "that which is desirable or worthy of esteem for its own sake; thing or quality having intrinsic value" (Webster's New World Dictionary, 1988). This is also called a biocentric value, that is, an intrinsic value attached to all living creatures (Taylor, 1989; Haider & Jax, 2007). This *intrinsic* value implies something that is "of value *in* and *for* itself" (Callicott, 1989, cited by Freeman, 2003), i.e. value not determined by its utility. This is compared to an economist's perspective, a fair or proper equivalent in money or commodities, where the 'equivalent' refers to the equivalent effect on the welfare or utility of individuals (Freeman, 2003). This could also be described as an anthropocentric value, i.e. a value given to nature only in as far as it is useful to human interests (Haider & Jax, 2007).
- All biological resources are valuable and should be conserved for *moral* and *ethical* reasons (Fox, 1984 cited by Freeman, 2003); this leaves no basis for priority setting, it implies that everything should be conserved.

From an economic view-point, resource scarcity does not permit the conservation of everything. This, combined with both land and budget available for conservation being limited (Ando *et al.*, 1998; Polasky *et al.*, 2001) and that not all areas that would be useful for conservation can be exclusively accessed for such a purpose at the same time, necessitates prioritisation. In order to prioritise, there must be a ranking or differentiation of areas so that higher priority areas for conservation may be targeted. The prioritisation of conservation areas has previously been done in many ways, primarily based on ecological aspects, depending on the focus of the conservation effort (Sarkar *et al*., 2006).

Conservation projects are typically complex systems involving intervention strategies and their relationships with biological habitats, human-caused threats and social considerations (Salfasky & Margoluis, 1999). Ecological prioritisation methods (further discussed in Chapter 2) have been coupled with efforts to include socio-economic criteria into planning tools (Faith, 1995) as well as aspects such as provision of ecosystem goods and services (Naidoo *et al.,* 2008; Chan *et al.,* 2006). Combining these aspects has resulted in the development of algorithmic models which currently make up the field of systematic conservation planning often utilising various forms of multi-criteria decision analysis (Faith, 1995; Margules & Pressey, 2000; Sarkar *et al.*, 2006). Because of the time frame of the evolution of these methods, most current reserves were allocated predominantly on either species-specific basis or depending on opportunistic land availability or an *ad hoc* basis (Gotmark *et al.,* 1986; Pressey *et al.,* 1993 cited by Freitag *et al.,* 1996) rather than being selected by any specific in-depth scientific methodology. As methods have been developed, they have begun to include certain aspects of agricultural land use and/or potential income streams (e.g. Polasky *et al.,* 2005; 2008; Mouysset *et al.,* 2011). Though there has been a gradual change from purely ecological to ecological and socio-economic prioritisation of conservation areas (further discussed in Chapter 2), there has not, to the author's knowledge been any effort to specifically consider the potential tourism incomes.

The United Nations World Tourism Organisation (UNWTO) defines tourism as "activities of individuals travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited" (UNWTO, 2013). The definition of ecotourism has varied and developed in the literature over time. The first explicit definition was offered by Ceballos-Lascurain (1987) who defined ecotourism as tourism involving:

- Travelling to relatively undisturbed or uncontaminated areas,
- Specific objective of studying, admiring and enjoying the scenery, its wild plants and animals, and
- Enjoying existing cultural manifestations, both past and present found in the area.

The key differences between conventional tourism and ecotourism are:

- In ecotourism the key attractant is natural resource-based, whereas in conventional tourism, the attractant may be natural or man-made (e.g. a theme park such as uShaka Marine World).
- In ecotourism there is an emphasis on benefit sharing with communities.

Nature-based-tourism (NBT) is tourism for which the main attractant is nature-related; examples include photo-tourism and hunting (Aylward, 2003). NBT is a product sold in ecotourism and possibly in other conventional tourism.

Conservation of biodiversity in South Africa is overseen by two major players; Ezemvelo KwaZulu-Natal Wildlife (EKZNW) and South African National (SAN) Parks. EKZNW is a quasi-public organisation which is entrusted with the long-term conservation of biodiversity within the province of KwaZulu-Natal (KZN) (EKZNW, 2013). SAN Parks is responsible for management of a range of National Parks in the remaining portion of South Africa (SAN Parks, 2013). In light of the threats to biodiversity from urban/agricultural development, mismanagement of natural resources and lack of awareness of the value of biodiversity, prioritisation of conservation areas is very important to SAN Parks and EKZNW. Prioritisation within EKZNW is effected using a systematic conservation planning tool called Conservation-Plan (Escott *et al.*, 2012). Computer software is used to select a minimum network of parks or areas that can be acquired to conserve all current species and biomes. The Conservation-Plan software does this by analysing individual Planning Units (PUs) in order to allocate a relative biodiversity importance value to that specific PU. From this, the minimum set of PUs that make-up the network retaining a certain level of biodiversity is selected, this is called the MINSET. The software uses purely ecological based data to allocate biodiversity importance.

The preferred manner of both EKZNW and SAN Parks to cover the costs of conservation is through income from various methods of nature based tourism (NBT), provided by enterprises operating within the national parks and protected areas (PAs). To date there does not seem to be a formal conservation prioritisation tool that these organisations use to include both ecological and financial factors in prioritising conservation areas. This study aims to help build such a tool by ranking potential conservation areas with a level of comparative NBT potential. The research problem is more clearly outlined in the next section.

1.2 Statement of the research problem

Attempting to address the challenges posed by the trade-off between biodiversity conservation and economic development is one of the most complicated issues facing humanity (Wilson, 1992; Pimm *et al.*, 1995; Myers *et al.*, 2000; Salfasky *et al.*, 2001). If land was abundant, such conflict would be of little consequence because there would be abundant space for both conservation and alternative forms of development. However, there is land scarcity in many countries due to socio-political considerations such as the desire for economic development or budget constraints (Sarkar *et al.*, 2006). In South Africa, these land pressures are evident in the form of alternative economic activities (e.g. agriculture) and consumptive uses of resources by communities.

A limited budget prevents current conservation boards from procuring and protecting all potential conservation priorities at once. Just as limited conservation budgets must be allocated to maximize the conservation return on investment (i.e. return in the form of species protection) (Murdoch *et al.*, 2007), they should also be allocated in order to achieve optimum social, conservation and monetary returns. This could improve monetary returns and increase the ability of EKZNW (and other conservation areas) to conserve other valuable biodiversity that does not generate other independent cash income, e.g. endemic plant/reptile species. To the author's knowledge, globally no spatial prioritisation studies have specifically aimed at conservation based on the potential success of NBT enterprises. The current EKZNW method of prioritisation of conservation areas has a very strong representation of biodiversity priorities. However, biodiversity conservation is a challenge including ecological, financial and social dimensions. One of the shortfalls of the current EKZNW prioritisation method is that it fails to take into account the financial income potential from NBT, or the impacts of conservation on the communities in the area in question.

This study focuses on the prioritisation of conservation areas from a new perspective. Rather than prioritisation according to purely biodiversity conservation potential, it is argued that areas could be prioritised for conservation according to both biodiversity level and the potential financial incomes of prospective ecotourism enterprises suitable to that area. The focus is on linking the presence/proximity of various environmental/spatial factors, and the potential financial incomes from an ecotourism enterprise at that site. For this reason, although the EKZNW long-term focus is on ecotourism enterprises, this study isolates the NBT aspect of ecotourism, emphasising on relative financial potential (more on the choice to of an NBT focus as compared to an ecotourism focus is discussed in Chapter 2). Aspects that improve the financial performance of a NBT resort in this study are referred to as *competitiveness aspects* because they contribute to the relative competitiveness of a tourism enterprise potentially operated on that site (Ritchie & Crouch, 2003).

This study is justified because conservation of all biodiversity is not feasible for EKZNW due to limited resources for conservation (e.g. money, time, space). Thus, choice of conservation areas must reflect this resource scarcity. Taking into account the potential financial incomes gained by virtue of spatial aspects that improve competitiveness (i.e. resources conserved and positioning of conservation areas), is one way to achieve this. Competitive advantage due to improved financial incomes can thus assist in covering the costs of conservation.

1.3 Research objectives

Given the background to the study and the specific research problem discussed above, the general objective of this study is to show how adding a relative competitiveness component (from NBT operated within potential PAs) can improve the prioritisation of conservation areas by EKZNW. This will be achieved through addressing the following specific objectives:

1) Identify site attributes that contribute to the competitiveness of NBT for EKZNW PAs in KZN,
2) Quantify the comparative effect of the attributes identified in (1) on competitiveness from a number of perspectives relating to financial incomes, and,
3) Given the results of (1) and (2), evaluate the prioritisation of a number of potential or recent conservation sites under consideration by EKZNW.

1.4 Expected research outcomes

The expectation of this study is that the inclusion of factors reflecting NBT financial income potential into a conservation prioritisation model will differentiate between otherwise equally important conservation priorities and indicate the financially more sustainable choice. Practically, this will be demonstrated and will create a priority listing according to NBT value for a limited number of potential conservation sites currently under consideration by EKZNW. This will not give each destination a score, rather it will order the destinations relative to the alternatives presented. This will help guide EKZNW decision makers in their choices on which areas to conserve and how to prioritise them. The study will also identify a limited number of destination management and marketing issues that could be examined and developed in order to enhance the competitiveness of destinations.

Only financial aspects are used in this study as compared to aspects pertaining to the community, (e.g. local benefit-sharing and/or transaction costs), because these are essentially issues for implementation of a specific project rather than blanket conditions that could be ascertained before-hand. And, as noted by Parker & Khare (2008), it is best to begin with analysis of financial aspects pertaining to ecotourism enterprise development (further discussed in Section 2.1). The largest difference between ecotourism and conventional NBT is based in the methods used (i.e. community involvement). The financial income aspects (and the focus of this study) vary little, thus, the terms tourism and ecotourism are used interchangeably in this thesis, depending on whether statements pertain strictly to financial aspects, or if they have results that extend into the greater PA management.

Academically, this study is a pilot study on how to include the competitiveness of NBT into decisions about the prioritisation of conservation areas. The actual effects of elements of tourism competitiveness will be observed and will provide indications as to what aspects of natural resource endowment are especially important in a destination gaining competitive advantage in KZN.

1.5 Scope and limitations of the study

From the outset this study had a number of limitations. Firstly, a potentially biased sample because data were only sourced from EKZNW. The study utilised time-series or panel data in order to ensure the use of reliable financial data over a period of time across a large number of sites. The nature of such financial data is that it is often difficult to obtain from multiple companies. The focus on EKZNW PAs was taken primarily because the organisation had similar data categories in similar forms available for all of its NBT enterprises. Thus, there was a limitation of the size of the data set and, subsequently, the number of variables that could be studied. Because all of the data were from EKZNW, there are two added disadvantages:

1) There are no relative comparable data for private tourism operators in KZN, and
2) The EKZNW tourism functions are operated as a secondary focus because the primary mandate of EKZNW is biodiversity conservation.

Thus, the outcomes of the study would be limited to 'in-house' EKZNW PA relative comparisons. For this reason, a number of aspects measuring competitiveness are identified and assessed, allowing the estimated results for each model with different dependent variables to be compared and contrasted.

The second major limitation is that the study data are not based on direct contact with tourists. Past studies present fairly reliable and consistent indications of tourist preferences with regard to wildlife viewing (e.g. Lindsey *et al.*, 2007; Di Minin *et al*., 2013); however, with regard to rarer, or niche activities there are few studies. Areas that have limited literature with specific reference to South Africa include fishing, birding and historical/cultural tours.

Thirdly, the study presents only one side of the effects of location on competiveness, namely tourism incomes. Location may have statistically significant effects on running costs and access for the supplier; this would in turn possibly affect the balance of preference for conservation. For example, consider a destination that may perform poorly in tourist preference because it is relatively small, however if close to a city, running costs may be sufficiently low that profits are acceptable. These limitations strongly impact on the suggested directions for future research which are addressed in Section 5.3.

1.6 Structure of the thesis

This thesis begins by reviewing literature on conservation and tourism (Chapter 2); this includes the reasons of focus on NBT as compared to ecotourism, an outline of ecological prioritisation of conservation areas and how this approach has been adjusted slightly to include economic aspects. It also outlines the relationships between tourism, competitiveness and conservation, and reviews past frameworks used to study tourism.

Chapter 3 contains the empirical methodology where the models used are outlined and the determinants of competitiveness specified are justified. This also contains a section on how the empirical research will be applied to a conservation choice problem. Chapter 4 presents and contains a discussion of the empirical results and applications to conservation. Chapter 5 discusses policy recommendations relating to conservation prioritisation and NBT by EKZNW in light of the major findings of the thesis. It also discusses areas for further research. The thesis is brought to a close in chapter 6 with a short summary.

CHAPTER 2. THE STATUS OF RELEVANT RESEARCH RELATED TO CONSERVATION PRIORITY SETTING

2.1 Introduction

Globally, studies in relation to the placement of areas for conservation and/or economic activities have varied widely over the last two decades. Early studies focussed primarily on reserve selection methods in which an area that is selected would be exclusively for conservation purposes. For this reason, the techniques used were primarily based on theories from ecology. Two main methods came out in the literature. The first method, though not formalised, is selection of sites on the basis of increased probability of the presence of an endangered species; this is species specific conservation site selection (Arthur *et al.*, 2004). In the second method, reserve sites were selected irrespective of endangerment to maximize the number of species that could be conserved in the area as set by a limited budget (Ando *et al.*, 1998; Polasky *et al.*, 2001); this method of reserves site selection was often called the maximum coverage problem (MCP) (Eppink & van den Bergh, 2007). More recent priorities have begun to contain additional aspects such as provision of ecosystem goods and services (Naidoo *et al.*, 2008; Chan *et al.*, 2006).

The type of tourism which has most often been regarded as the most "conservation-friendly" is ecotourism (as defined in Chapter 1), the success of which is based upon three main factors (Wight, 1993; Weaver & Lawton, 2007; Parker & Khare, 2008):

(1) Environmental
(2) Socio-cultural, and
(3) Economic.

Parker & Khare (2008) suggest many critical elements within these three factors that should be investigated prior to investment into an ecotourism enterprise. They recommend first investigating the economic factors, as the enterprise will ultimately fail without economic success, secondly, the environmental factors, and lastly, local community and benefit-sharing issues. The latter are the most resource-demanding; in addition, in order to discuss partnerships, benefit sharing etc. there must be a potential project in place which requires the completion of the first two factors before a project can be planned (Christie & Crompton, 2001).

Within this chapter, Section 2.1.1 considers the benefits and challenges associated in the relationships between tourism and conservation prioritisation. Section 2.1.2 outlines the move in research from a purely ecological perspective to the inclusion of an economic perspective in addressing the prioritisation problem. Section 2.1.3 outlines the tourism competitiveness framework presented by Crouch & Ritchie (1999) and the implications of this framework for this study. This is a theoretical framework included in order to clarify the relationships between aspects of competitiveness included in this study and competitiveness as a whole.

Section 2.2 considers empirical studies which consider the evaluation of factors affecting competitiveness (Section 2.2.1), studies in the closely related field of valuation of environmental products which are not directly marketable (Section 2.2.2), and an outline of the characteristics framework and how it relates to the current study (Section 2.2.3). The chapter closes with a summary of the theoretical and empirical literature.

2.1.1 Linking conservation prioritisation and tourism competitiveness

Increasing tourism is often identified as one of the solutions for poverty alleviation in Africa, especially Southern Africa. It is a fast growing sector in a number of countries containing the world's poorest people. The WTO (2002) found that tourism was a significant export for 83 per cent of developing countries. A number of these countries are in sub-Saharan Africa within which about 300 million people live under extreme poverty (UNDP, 2003). These are only a number of the facts that result in tourism being a tool used to improve livelihoods in Southern Africa. South Africa's *White Paper on the Development and Promotion of Tourism* (1996) was especially foresighted in promoting the development of *responsible and sustainable* tourism as a key entity for future generations (DEAT, 1996). This includes aspects of sustainable management of resources, the inclusion of communities in decision making and use of impact assessment prior to development among others. Despite the emphasis on tourism in sub-Saharan Africa, the region only made up on average just over 1.5 per cent of the global gross domestic product to travel and tourism from 2000 to 2012 (WTTC, 2013). South African tourism has grown at a rate of 5.3 per cent over the same period (WTTC, 2013). The growth figure in South African tourism highlights the importance that tourism plays with regard to conservation.

It is necessary to differentiate the public and private nature of tourism products as well as conservation. Biodiversity conservation and the provision of NBT opportunities contain aspects of both private and public goods. Public interest is maintained by the conservation of biodiversity for future generations, all individuals have the opportunity to benefit from this conservation, for example in deriving an existence value[1]. A second key element in which the public interest is served by conservation is with regard to ecosystem services. These are defined by the Millennium Ecosystem Assessment (MEA, 2005) as benefits people obtain from ecosystems, categorized into:

- Supporting services
- Provisioning services
- Regulating services
- Cultural services

Identification and evaluation of such ecosystem services is an area of current debate (e.g. Atkinson *et al.,* 2012; Grabowski *et al.,* 2012; van Wiligen *et al.,* 1996). However, that is not the primary purpose of this study.

The conflict generated between the relatively public interest of the protected area (Biodiversity conservation) and the private interests (NBT) result in a necessary trade-off of preferences. This is noted by South African National Parks (SAN Parks) when pointing out the commitments which follow as a result of their stated values; "Finally, acknowledge that conversion of some natural and cultural capital has to take place for the purpose of sustaining our mandate, but that this should never erode the core values…" (SAN PARKS, 2006). NBT, the preferred source of revenue for EKZNW (EKZNW, 2009), even at very low volumes will in some way increase the ecological foot-print left by humans in a protected area, even if only in the form of roads affecting traffic of animals and edge-effects in vegetation (e.g. Laurance *et al.,* 2006; Hunter, 2002; Gossling *et al.,* 2002; Turner, 1996). The implication of this realisation is that neither conservation of biodiversity, nor revenue-generating activities, can be undertaken as an individual activity without affecting the other activity's incomes or conservation status.

Put simply, tourism and conservation do not always have mutually beneficial outcomes. The reason is that conservation seeks to primarily retain the environment in its current state, whereas tourism seeks to take people into that environment in order to enjoy the benefits therein, which could degrade the natural capital (e.g. Liu *et al.,* 2001) (Goodwin, 1996). For example, if an area is pristine, isolated bush-veld, a tourist may desire isolation, but by virtue

[1] For the purpose of this study 'Existence value' is defined as an unmeasured utility derived by an individual due to the knowledge of the conservation of a resource for future generations. For alternative perspectives on the construction of this definition, consult Larson (1993), Aldred (1994), and Attfield (1998).

of the development of a tourism enterprise, the isolation decreases. As more roads are built to make the area more accessible, more people desire to see it, and the 'isolation' factor may totally disappear. This remains true for species and biodiversity that are sensitive to disturbance, if tourism is introduced to finance 'conservation'; the very nature of that tourism may be detrimental to what is conserved (Cater, 1993; Goodwin, 1996; Green & Giese, 2004)[2]. Thus, the desirability of practitioners and EKZNW to pursue ecotourism enterprises that provide a sustainable source of tourism revenues to provide incomes for conservation and community beneficiation.

Although prioritisation can be undertaken from either the public goods perspective, focusing for example, on ecosystem services, this thesis addresses the problem from the private goods perspective. This entails a focus on use values of areas protected for conservation, in this case, tourism. The reason is that it is suggested that in light of current demands on the government in South Africa for what are perceived as *urgent* public services such as provision of electricity, water and education, the long-term public goods such as conservation may be required to become self-sustaining. This is compounded by a relatively short term political time-line which drives politicians thus the *urgency* of short-term change often overrides the importance of the long-term. The debate about whether investment in long-term public goods is more or less important than the short-term is not addressed here. However, the demands for conservation agencies to make money and be self-sustaining are real and evident. This study therefore focuses on the private aspects of conservation, namely, NBT.

The challenges of concurrently pursuing tourism and conservation outcomes are well documented (e.g. Butler & Boyd, 2000), and have been considered in multiple environments. Examples specific to Africa have been considered by Lilieholm & Romney (2000), among others. Some of the complications associated with partnerships in tourism and conservation are considered by Goodwin (2000), along with reference to multiple specific examples in the pursuit of responsible tourism by Spenceley (2010). The emphasis of the relevance of this section in relation to the study is, however, not rooted in these complications. Rather, this study suggests that a tourism destination can be financially successful if placed in a spatially more competitive location. This is only a small part of the challenge relating to the prioritisation of conservation areas and the implementation of such tourism resorts. However, it is an important starting point for consideration. With this in mind, Section 2.1.3 outlines a framework within which tourism competitiveness can be assessed.

[2] For more on this discussion on this, the ecological fields of habitat fragmentation are relevant.

2.1.2 Ecological and economic prioritisation of conservation

The selection of species for target conservation has been done in a number of ways, including various classifications, such as whether a species is a key-stone species (these have a disproportionately large effect on the ecosystem relative to its total biomass, e.g. elephant), an umbrella species (if conserved, these species allow the conservation of other species predominantly due to its large habitat requirements, e.g. wild-dog), or a flagship species (species used as a tool or emblem to motivate public support and finance, e.g. rhino, koala-Bear). Most conservation policies are designed to conserve those species. There are many varying ways in which these species are identified and selected for conservation. However, the base principle is that areas are selected to target those selected species.

If conservation success is rated per unit rand, the choice of species to conserve becomes problematic because of the different perceived value of species. To illustrate this, consider a situation where there is a choice between conserving a population of 30 elephant, or conserving 10 lion. Both investments will cost one million Rand. The conservation choice is now deciding if 10 lion are comparatively more valuable than 30 elephant or *vice versa*. The valuation problem presents itself in the following questions:

- Are elephant equally, more or less valuable than lion?
- How can the value of these animals be converted to one unit/weight? (e.g. is 1 elephant =2.1 lion?)
- If these values cannot be economically defined, how are choices (and hence priorities) made?

These questions have been answered in various ways in biology and ecology, but the economic problem is still very relevant. Biologically, Weitzman (1992) suggested that conservation of species should be according to the relative uniqueness of the genetic material that those species retain towards total biodiversity. He uses the concept of a distance function or relative displacement of genetic material from the closest similar species and developed a method where conservation priorities were developed at a species level. This was later used, among others, by Reist-Marti *et al.* (2003) to prioritize cattle breeds for conservation. The use of biodiversity genetic conservation has, however, come under criticism for ignoring non-genetic values that species could potentially have, such as economic use and non-use values (Mainwaring, 2001). Tourism is one potential way in which the use-values of these species could be taken into consideration. At the protected area level in this study, application of management strategy techniques is relevant to a higher level of biodiversity than the species level. Thus, Weitzman's technique is made more relevant by Weikard (2002) who adapted the same concept for application at an ecosystem level (different level of aggregation). Additionally, an indicator was developed by Onal (2003) in which both species' richness as well as the uniqueness of the various species contribute to the relative biodiversity level.

Prioritisation by use of genetic material, however, is limited in that it merely takes into account the ideal species to conserve rather than the cost and/or cost effectiveness of management strategies undertaken or any other externalities (e.g. other species also conserved/decrease in certain species due to competition in one direction). Weitzman (1998) went on to add changes species survival to his original model, finding that including long-term survival probability was essential. Witting *et al.* (2000) and van der Heide *et al.* (2005) included multiple species interactions and the effect of conservation effort on survival rate. Baumgartner (2004) went on to include the provision of ecosystem services that are generated by the protection of a specific species. Through all of these studies it becomes apparent that the choice of what to prioritize in conservation is very complex, mainly due to the trade-offs in the metric and complication in accounting for other socio-economic and management factors.

The selection of conservation areas has moved from a basis of species-area curves, or the island bio-geography theory, to a basis on localized socioeconomic and biological data incorporated into computer-based conservation planning tools (Sarkar *et al.,* 2006). These tools identify conservation priorities most often according to either (a) sets of complementary sites required to meet conservation targets or (b) the relative contribution that an individual site makes to the total biodiversity conservation in the area (Sarkar *et al.*, 2006). One example of a programme that can focus on both of these aspects is Conservation-Plan (C-Plan), as used by EKZNW, (Ferrier *et al.,* 2000) which has an ability to calculate the relative importance of a planning unit (PU) (for example, Lombard *et al.*, 2003). The name given to the value of relative importance allocated to a PU is the "level of irreplaceability"[3] and is measured between zero and one. In KZN, if a PU is allocated an irreplaceability level of one, it is essential that it be conserved in order to maintain the current overall level of biodiversity in KZN. Such a PU will be in the minimum set[4] of selected PUs 100% of the time. If that PU

[3] "Irreplaceability" is a ranked likelihood that a specific area would be required in order to meet a conservation target (Escott *et al.,* 2012).
[4] The "minimum set" refers to the smallest area of complementary sites needed to achieve quantitative targets for biodiversity (Escott *et al.,* 2012).

is ‘lost’ and allocated to infrastructure development or deteriorated by use for agriculture, then the overall biodiversity is irreversibly deteriorated. As the irreplaceability level decreases (i.e. approaches zero), the PU in question is less critical for conservation and hence less likely to be selected in a MINSET solution. In this way, land areas are selected for conservation by EKZNW from the most to the least irreplaceable (Escott *et al.*, 2012).

Even when these species are selected, however, the challenge remains of where to conserve them, hence the development of the second, site selection problem. A key assumption is that reserve site selection is constrained by funding, and not all selected areas for conservation may be achievable. In addition, areas selected may be developed by the time that the funds and transaction take place; hence resulting in a lower conservation value. Drechsler (2005) notes that different types of land use will have different effects on species survival and/or ecosystem services, hence there is a need to take into account spatially heterogeneous land use pressures, as done by Arthur *et al.* (2002), Pfaff & Sanchez-Azofeifa (2004), Polasky *et al.* (2005; 2008), and Mouysset *et al.* (2011), among others. Conservation areas under various management regimes have been formalised to a much larger extent with regard to the management of conservation in agricultural areas, e.g. Polasky *et al.* (2005; 2008) and Mouysset *et al.* (2011). These studies, among others, use ecological and economic data to develop decision-making tools. Ecological indices are compiled either from secondary data on studies that have been done within the area in question in the past or from collection of primary data. Economic models have been compiled according to the land use that the area in question may potentially be put under, for example, forestry, farming, pasture systems, or priority conservation and the potential revenues that could be derived from the use in question.

Cost-effective conservation is conservation that maintains maximum diversity (i.e. species richness and uniqueness) per unit of money invested. It is based on the premise that conservation efforts are hampered by limited budgets (Eppink & van den Bergh, 2007) and the effectiveness of conservation is measured in non-monetary terms, such as protected/resulting ‘bird-pairs’ or ‘viable population groups,’ among others (Hughey *et al.*, 2003). Studies such as those by Polasky *et al.* (2005; 2008) and Mouysset *et al.* (2011) are primarily based on cost-effective conservation and take into account agricultural incomes. These incomes from non-conservation based enterprises assist in covering the cost of conservation.

To the author's knowledge, no spatial prioritisation studies have specifically aimed at including the level of competitiveness of NBT. The closest comparative studies are conservation in communities within agricultural landscapes, which take into consideration the biodiversity conserved by agricultural activities.

2.1.3 The tourism competitiveness framework

Ritchie & Crouch (2003, p.2) described the dimensions of tourist destination competitiveness as *"…what makes a tourism destination truly competitive is its ability to increase tourism expenditure, to increasingly attract visitors while providing them with satisfying, memorable experiences, and to do so in a profitable way, while enhancing the well-being of destination residents and preserving the natural capital of the destination for future generations."* Thus, competitiveness of ecotourism is multidimensional, including aspects of environmental, economic, technological, political, cultural and social strengths.

Conceptually this is not unlike the migration literature which describes *push* and *pull* factors affecting migration decisions (Martin & Zurcher, 2008). Applied to tourism, the concept behind the factors is that tourists are *pushed* by their own internal forces which are largely intangible, such as intrinsic desire for a holiday. *Pull* factors are those that result due to the attractiveness of a destination as it is perceived by the tourist (Mohammad & Som, 2010). These may include tangibles (such as accommodation), or intangibles such as experiences of novelty or tranquillity and are closely linked to the marketed image of the destination (Baloglu & Uysal, 1996).

Porter (1996), cited by Ritchie & Crouch (2003) claimed that the economic competitiveness of a nation is derived from four main factors, with regard to a tourist destination:

1) *Factor conditions*: these include the factors of production such as infrastructure or skilled labour necessary to compete in a given industry.
2) *Demand conditions*: the nature of individual demand for the industry's product.
3) *Related and supporting industries*: the presence or absence of these industries in the region of the supplier (ecotourism resort) that are internationally (in this case regionally) competitive.
4) *Firm strategy, structure and rivalry*: the nature of domestic rivalry as well as the conditions in the nation that govern how companies are created, organised and managed.

Relating these to push and pull factors, (1) and (3) above could be considered as relevant pull factors. Although the aspects presented by Porter (1996) are not exhaustive of factors affecting competition in ecotourism, Ritchie & Crouch (2003) used them as a basis for developing their competitiveness framework. The framework identifies 36 destination characteristics which are clustered into five key groups; within each of these groups there are characteristics that are the result of either the competitive (micro) environment or the global (macro) environment; these macro- and micro-competition environment factors are not split. The five clusters which represent the key elements of competitiveness are (Ritchie & Crouch, 2003):

- *Core resources and attractors:* these include the primary reasons for destination appeal. Although other components are essential for the success and profitability of an ecotourism enterprise, these factors are the fundamental drivers for choice of type of holiday destination, e.g. proximity to the ocean or the presence of rare game species at a destination.
- *Supporting factors and resources:* these factors provide the foundations upon which the successful tourist industry relies in order to help tourists 'appreciate' the core resources and attractions. A destination with many core resources and attractors but without the supporting resources to facilitate ecotourism cannot be exploited, e.g. accommodation infrastructure.
- *Destination policy, planning and development:* this is especially important when multiple goals are ensued with particular economic, social and other societal goals. These aspects vary widely between institutions and hence have to be assessed as per ecotourism enterprise, e.g. careful consideration given to biodiversity conservation.
- *Destination management:* these characteristics focus on the implementation of the planning and policy objectives in order to enhance the *core resource and attractors* for the tourist, strengthen the effectiveness of the *supporting factors and resources,* and adapt to the opportunities or restrictions presented or imposed by the *qualifying and amplifying determinants,* e.g. allocative efficiency of resources within the destination.
- *Qualifying and amplifying determinants:* these factors could also be called *situational conditioners* because their effects on the competitiveness of a tourist destination are to define its scale, limit or potential. These aspects either magnify or moderate the

destination competitiveness by filtering the influence of the other groups of factors, e.g. location or security.

The conceptual model of the destination competitiveness framework has been slightly for this study (Figure 1) and shows how all of the 36 characteristics combine to either enhance or detract from the competitiveness of the destination in question. The names for types of input were altered from various types of "resources" to relevant characteristic types of economic capital. These specific characteristics (central) are a result of either the *comparative* advantage as a result of resource endowment (left) or the *competitive* advantage as a result of resource deployment (right). The comparative advantage (resource endowment) is the main point of interest in this thesis because that is directly related to location and thus conservation prioritisation. The adaptions to the framework are the sources of comparative advantage. The terminology has been adjusted to be more applicable to an economic perspective on destination competitiveness and sustainability. The types of capital presented are taken from Goodwin (2003) and are used within the sustainable livelihoods development frameworks.

The specific characteristics of destinations that are listed are not exhaustive, and in this study, not all will be relevant. Certain characteristics will be explained to a greater degree as they are applicable in the construction of the framework for the current study (Section 3.3.3). Note that there is a key difference between the competitiveness framework and the current study. The competitiveness framework focuses primarily on the factors and processes within a destination that determines its sustainability and competitiveness within the influence of global factors which are beyond the control of management (Ritchie & Crouch, 2003). The current study, however, focuses on the comparison of factors leading to competitive advantage *between* destinations. It is important when considering the methodology and results of this study that the concept of competitiveness due to spatial and comparative characteristics is not considered isolated from other aspects of competitiveness as identified in this framework, i.e. although this study identifies some aspects of competitiveness, there are multiple other aspects which would also be required for a competitive NBT enterprise to succeed.

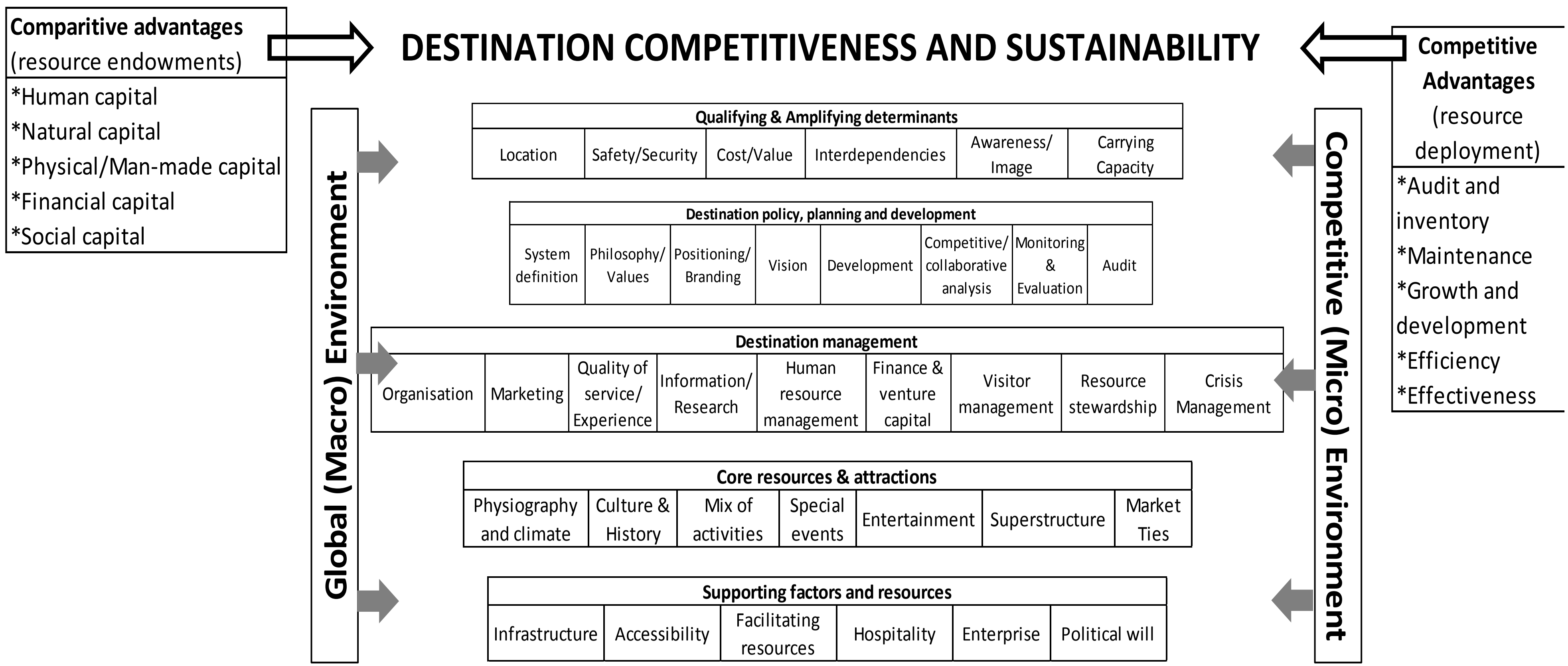

Figure 1. Conceptual model of destination competitiveness
Source: Adapted from Ritchie & Crouch, 2003

2.2 Studies apportioning income value to destination characteristics

2.2.1 Hedonic price analyses

Hedonic price analysis (HPA) regresses the price of a visit to a destination on various characteristics of the destination. HPA has been mostly developed within the property valuation literature; however in recent years it has been more widely used in tourism studies. Because of the large volume of tourism globally which is based in hotels, these make up the majority of the studies pertaining to the effects of characteristics on price (e.g. Espinet *et al.,* 2003; Papatheodorou, 2002). Another wide field of study using hedonic pricing is the effect of environmental attributes on property prices and/or willingness to pay to visit a destination (e.g. Garrod, 1992; Marcouiller, 1998). A few studies have extended to more remote locations and assessed different factors affecting tourism, such as Hunt *et al.* (2005) who valued factors affecting Ontario's sport fishing. In South Africa, very few hedonic price analyses of tourism have been undertaken, especially in the field of protected area tourism. Wright (2001) regressed the prices from a range of wildlife destinations in South Africa on the characteristics of the destination in question. His work varies from the current study on both the level of aggregation of the data and the application of the models. Wright (2001) used an overview of a wide range of parks and regressed one price per park on the attributes, in order to estimate values for particular attributes. The current study considers a number of indicators of competitiveness of the destinations over a period of time (i.e. panel data as compared to cross sectional data). This study applies the results to both a problem of conservation prioritisation and to management implications for competitiveness.

Freeman (2003, p.7) defines the economic theory of value as being "*based on the ability of things to satisfy human needs and wants or to increase the well-being or utility of individuals.*" Thus, in a perfectly competitive market it would be expected that the price is a good indicator of the utility that individuals derive from consuming a product. For this reason, price is a generally accepted indicator of the quality or desirability of a product. This follows a typically neo-classical economics perspective on price. In environmental economics, it does not necessarily follow that price is a good indicator of overall value or usefulness of a product to one party or another. For example, gold may be *valued* (in money terms) more highly than water, however, in a desert, water is infinitely more useful than gold. Similarly, someone having sufficient water in a desert may still *value* gold more highly relative to someone having gold and no water. Similarly, when a tourist destination wants to *sell* a tourism product, the perception of value in money terms may vary between seller and buyer. Because of the complex interaction between P and room occupancies, price may no longer be a good indicator of relative value to the seller of the tourism product. Thus, other competitiveness indicators are also considered.

2.2.2 Occupancy and revenue per available room analyses

As outlined in Section 2.2.1, with regard to valuing the product from the perspective of the destination in question, price may not be the best indicator of relative value. The reason for this is that the value of an attribute in a destination to the owner, or supplier of that attribute is based on both the willingness of a tourist to pay, and the price, i.e. a price, may be relatively high, but if the prospective tourist is unwilling or unable to pay the price, the characteristic is of no value to the seller. The price may not accurately reflect the relative competitiveness of the destination because it does not take into account the returns to investment in selling that product. Price may indicate what consumers are willing to pay for, but not necessarily what makes a tourism destination competitive.

A wider accepted proxy measure for tourism profitability and competitiveness is occupancy percentage (Occ%). Jeffrey *et al.* (2002) analysed success factors for hotels based on 15 years of occupancy records for hotels in England. Jeffrey & Barden (2000, 2001) explored the usefulness of Occ% in analysing hotel performance and later the implications for marketing. Occ% was cited as being a key driver of success in hotels and various other tourist destinations. In Kenya, Occ% has been identified as a crucial element to the success of community-based tourism enterprise development, and in South Africa, Loon & Polakow (2001) identified the importance of Occ% in the success of ecotourism ventures.

Occ% is possibly the most widely used proxy for success or competitiveness of tourism destinations, however it is fairly widely stated that Revenue per available room (RevPAR) is the best indicator (e.g. O’Neill & Mattila, 2006; Papatheodorou, 2002). The challenge with such a measurement is that few companies are willing to part with specific incomes data, thus studies use alternatives such as price and occupancy.

2.2.3 The characteristics framework

Given the variety of studies outlined (Sections 2.2.1 and 2.2.2), the characteristics framework was selected as the most applicable methodological framework for this study. Classical demand studies focus on the theory of demand in microeconomics, based on the assumption that individuals derive utility by consuming goods *per se* (Stabler *et al.,* 2010). The characteristics framework is an alternative to this classical ecotourism demand setting. The focus is on the consumption of characteristics which are associated with goods, rather than the goods themselves, *i.e.* the goods are desired or otherwise, due to the characteristics that they possess. The framework itself attempts to compare a variety of characteristics at various levels to understand an individual tourist's optimum choices within a budget and time constraint. Note that this is useful in understanding the concept of tourist choice and thus beginning to understand the factors that make a destination more or less competitive.

At the destination level, modelling tourist choice based on the utility maximisation framework takes the following standard form (Papatheodorou, 2006):

$$maxU = g(\boldsymbol{z}) \tag{2.1}$$

s.t. $\boldsymbol{z} = \boldsymbol{B} \cdot \boldsymbol{x}; \; \boldsymbol{p} \cdot \boldsymbol{x} + \sum_{i=1}^{N} \boldsymbol{F_i} \leq \boldsymbol{Y}; \; \sum_{n=1}^{\infty} (\boldsymbol{x_i} + \boldsymbol{t_i}) \leq \boldsymbol{T}; \quad \boldsymbol{Y}, \boldsymbol{T} \geq \boldsymbol{0},$

Where:

U: Utility of consumer

z: The column vector of quantities of characteristics ***j***, (these could be binomial, i.e. a presence/absence variable, or a continuous variable such as distance to destination),

x: Is the column vector of the number of days spent in each destination ***i***,

B: Shows the consumption technology matrix, via the quantity of each characteristic ***j*** consumed by staying one day in destination ***i***,

p: Daily cost of living in the tourist destination (in a row vector),

$\boldsymbol{F_i}$: the return fare to destination ***i***,

Y: NBT budget,

T: Total time available for the tourist (external limitations, e.g. leave time), and

$\boldsymbol{t_i}$: return travelling time to the destination.

Because the technology is assumed to be linear and additive, for each characteristic $\boldsymbol{j}$ (Papatheodorou, 2006):

$$z_j = \sum_{i=1}^{N} B_{ji} x_i \tag{2.2}$$

The framework is better understood using Figure 2. A tourist destination may display two different attributes, namely, attractions (natural or built - depicted on the x-axis) and facilities (hotel, restaurant or camping, depicted on the y-axis):

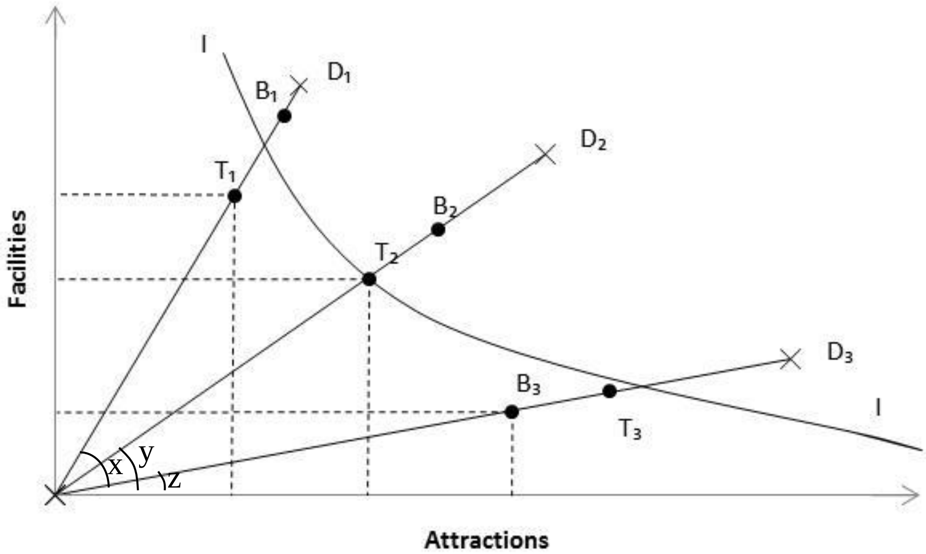

Figure 2. Application of the characteristics model in ecotourism

Source: Extracted from Stabler *et al*. (2010).

A tourist who visits destinations OD_1, OD_2 and OD_3 experiences the facility and attraction characteristics in ratios of x, y, and z, respectively. Although the graphical illustration does not include multiple characteristics, the statistical model can accommodate multiple characteristics, thus attributes (e.g. price and distance to destination) can be added. The consumption technology matrix (***B*** above) is captured by these rays (OD_1, OD_2 and OD_3), and shows the ratio that the length of stay is converted into consumption of meaningful characteristics (attractions and facilities). From the figure it is apparent that destination D_1 attempts to gain competitive advantage by having more (or better) facilities and a lower proportion of attractions. Conversely, D_3 has more attractions and comparatively less facilities. D_2 is an intermediate between the two options. The consumer preference or indifference curve is shown by I-I. Accordingly, there is no notable preference between one destination and another if the consumable quantity of goods lies along this curve. If consumer preferences change, this is captured by a change in gradient of the indifference curve, I-I. This framework assumes that destinations are chosen by tourists in a discrete manner, *i.e.* tourists spend their vacation time at either D_1, D_2 or D_3, and no linear combinations are permitted.

The length of stay, and hence quantity of characteristics 'consumed,' in each resort is limited by both time available for the tourist and the tourist's budget (Rugg, 1973). For each resort, D_1, D_2 and D_3, the limits on the length of stay due to time and budget are represented by points T_1, B1;T_2, B2; and T_3, B3, respectively. These points on the consumption vectors (OD_1, OD_2 and OD_3) represent a characteristics combination known as a vertex. Thus, for destination D_1 the limiting factor for the tourist is time available, T_1. For D_2 the limiting factor is also time, T_2. And for the last destination, D_3, the limiting factor is budget, B_3. The consumer's maximum utility is defined by the point at which the indifference curve intersects with the attainable set of vortices, in this example T_2. Although this framework relates to individual tourist choices, it is relevant to this NBT study because the study of aggregate ecotourism is primarily rooted in individual tourist choices. The application of this concept is extended in the next section in relation to the present study.

The current study is based on aspects relating to this framework, though not relating directly to tourist choice. This study focuses on measuring and comparing the *relative* level of advantage that is captured in monetary terms by different NBT destinations rather than focusing on the tourist choice itself. However, the tourist choices are assumed to fit the characteristics framework. Competitiveness of ecotourism destinations can be individually assessed in depth according to a wide range of characteristics (e.g. Ritchie & Crouch, 2003). Alternatively, a wide number of resorts can be compared according to the characteristics of the products that they provide from the perspective of the tourist (e.g. Papatheodorou, 2002).

Within the context of tourist-based HPA research, the most common is the analysis of the consumer's implicit value of various environmental attributes. These attributes are usually singular and relatively clearly defined, such as air quality (e.g. Anderson & Crocker, 1971) or view from a property (e.g. Lansford & Jones, 1995). Different tourists have varying preferences for bundles of characteristics in different ratios, thus their choice and willingness to pay vary. It is assumed that the ratio of observed preference for combinations of characteristics (provided in a destination) will reflect the ratios within the overall demand for that type of ecotourism.

2.3 Summary

Over the last few decades the prioritisation of conservation areas has changed from being based on an almost entirely ecological focus to a combined economic and ecological focus. Despite this trend, there has been no prioritisation (to the author's knowledge) according to NBT potential; rather, the economic aspect has focused on least cost conservation. In order to prioritise also considering NBT potential, it is necessary to understand the factors that contribute to NBT potential, and ultimately, competitive advantage. This study proposes that a well-placed and managed tourism enterprise in a PA can cover its own expenses and have surplus income that can be directed towards the conservation costs of the PA in question. One of the first requirements for a viable tourism enterprise is a set of factors that attract visitors to a destination (Ritchie & Crouch, 1999). Destinations with better attractants and a better location are expected to be more competitive in the long-run and hence generate more income. Thus, a PA located in order to give advantage to tourism competitiveness, compared to an alternative PA with similar ecological conservation value which does not enhance tourism competitiveness, is expected to be more sustainable. More competitive tourism destinations should thus be preferred for prioritisation. Variations in public and private priorities for conservation prioritisation may also influence these linkages and so were outlined in theory (Section 2.1.1) and considered in the results and discussion.

The most widely used theoretical framework considering the concept of competitiveness is the Tourism Competitiveness Framework (Ritchie & Crouch, 1999). This forms the basis for understanding the factors influencing competitiveness; however, with regard to empirical studies it has not been widely applied. This study tries to include the aspect of competitiveness of tourism into the decision about the prioritisation of conservation site selection. It aims to *quantify* the *relative* competitive potential gained by an NBT destination due to its resources (natural and man-made), its position or environmental factors. This is as part of a larger interest in the development of ecotourism in line with the concept of the Triple Bottom Line[5] (Elkington, 1997; Hacking & Guthrie, 2008) and with EKZNW principles (EKZNW, 2009). Note that *competitiveness* in the terms of the characteristics framework refers to overall profitability, however in this study *competitiveness* focusses on the *relative* desirability of a destination. This desirability should impact/influence the profitability but will not necessarily reflect profitability exactly.

[5] The triple bottom line refers to management systems based on three pillars, easily summarised as people, profit and planet (Slaper & Hall, 2001).

Valuation of environmental characteristics (using market price) and/or analysis of indicators of success in tourist resorts (such as occupancy percentage and revenue per available room) have formed the basis of empirical analysis. In an attempt to clearly evaluate factors giving competitive advantage to destinations, this study assesses all three variables which are all well-conceptualised empirically for tourism within the characteristics framework. The reason for this multiple use of independent variables is more clearly explained in the methodology (Section 3.3.3). The theoretical components for this study, therefore, are largely drawn from the Tourism Competitiveness Framework, and the empirical methodology from the Characteristics Framework, as is outlined in the next chapter.

CHAPTER 3. THE EMPIRICAL METHODOLOGY

3.1 Introduction

As outlined in Section 2.3 the methodological elements of the study are drawn from two separate frameworks, the characteristics framework and the tourism competitiveness framework. This chapter begins by describing the study area and data collection, followed by a theoretical outline and justification of the economic and econometric models used. Variables are identified which are applicable to this study with specific reference to spatial variables as they are important for the prioritisation process. Once the prospective econometric models are presented, a number of potential econometric problems are identified. The chapter closes with a section that describes possible solutions to the expected econometric issues outlined.

Section 3.2 outlines the sources of data, followed by discussion of the econometric methods used in Section 3.3. This includes the general economic model, the dependent variables selected to proxy competitiveness and the independent variables under consideration affecting competitiveness, the specified econometric equations, criteria for selection of the modelling technique and justification of the models selected for the analysis. A description of, and solutions to, a number of econometric estimation challenges is presented in Section 3.4.

3.2 Sources of data

3.2.1 Study area

This study focuses on a method to help prioritise conservation areas in the province of KZN in South Africa. There are three reasons for the focus of the study within this area:

1) It has high biodiversity, including a number of endemic species and some areas in the northern parts of the province are ranked as international biodiversity hotspots,
2) There is currently a large focus on increasing tourism in the province for conservation and economic empowerment reasons, and
3) EKZNW could provide the necessary data.

3.2.2 Data collection

Monthly data were collected directly from EKZNW for a period of 41 months, coded 1-41 as a time variable. However, data records were incomplete for time periods 1, 2 and 41. There were no data for time periods 10 and 11. Thus, these five time periods were omitted from the analysis and 36 time periods were used. Note that the financial income values that are used are actual transactions that occurred. This is preferred to using pamphlet or advertised prices as it more accurately represents the market price of the tourism product (Papatheodorou, 2002). The result is a set of panel data described as a 'short' panel in that the number of time periods is smaller than the number of cross-sectional units (accommodation codes, described below). Data for tourism-related aspects were collected by searching the EKZNW web site and pamphlets. This is a common practice for investigating factors attracting tourists as the choice of destination is largely made prior to departure (i.e. before seeing the destination) and their expectations of the tourism product are likely shaped by the advertising related to that product (Papatheodorou, 2002).

Each tourism product was grouped into a product type according to the PA that it was in and the accommodation type. Each different combination of accommodation type and protected area was given an individual code number. Thus, different products were given different codes so that the prices paid for one night of accommodation in a specific destination were recorded separately (e.g. a two bed chalet in protected area A is given a different code (Code1) to a two bed chalet in protected area B (Code2). Similarly, a four bed chalet in protected area A is assigned a different code to both of these (Code3)). The result was 135 codes spread through 28 different protected areas. The sample consisted of over ten variations in accommodation types with a high level of very unique characteristics associated with many of these. For this reason, a limited number of accommodation classes were selected in order to compare across similar features and to take into account the sources of the majority of incomes to EKZNW destinations. All chalet accommodation types, log cabins, camping and caravanning accommodation types were retained to give a limited number of comparisons which are well spread over a number of sites. Accommodation types omitted were hiking huts, group cabins, safari tents and luxury lodges. The resulting data set contained 93 accommodation codes spread through 24 PAs and took into account 78% of the EKZNW annual income. The highest income earner over the whole period was chalets (54.2%) followed by log cabins (12.2%) and a variety of camp sites (11.8%).

3.3 Econometric models employed

3.3.1 The economic model

The HPA for the current study regresses price of accommodation type on a number of facilities, location and activity attributes. Core resources and attractants make up the factors that the PA is endowed with that are key motivators for an individual to visit a destination (Ritchie & Crouch, 2003). These, therefore, affect the tourist willingness to pay for a product containing these attractants, and their decision to visit a place at all, including: the type of physiography of an area, its proximity to places of historical or cultural significance and the activities that may be undertaken while visiting. Additional man-made (rather than naturally endowed) core resources and attractants include the tourism superstructure such as the type or quality of accommodation and the facilities available. Thus, price paid for accommodation can be shown as the function:

Price = f(Attractants, Facilities, Availability, Location/Accessibility, (3.1)

Service level, Internal management)

It is expected that as the level of attractants and available facilities rise, the price would rise. Conversely, as the availability of a product increases it is expected that the price of that product would fall. Location/Accessibility is potentially more complex to predict. Improved accessibility would imply decreased travel cost and decreased travel time which would, in turn, imply that there is a larger budget available for tourism accommodation expenses and hence higher prices could be paid (Stabler *et al.*, 2010). However, if an area is located close to an urban centre, or is not some distance away to travel, there may be a crucial element of the tourist experience that is omitted, namely remoteness. NBT is the form of tourism closely associated with a desire for tranquillity and remoteness, especially some distance away from development and urban centres. The complications imposed within this study by these opposing attributes are greatly reduced because most EKZNW PAs within the sample are at least one hour from any major urban centre (i.e. all are considered remote). As a result it is expected that price will increase as the accessibility of a resort increases.

Given these over-arching classes of determinants, the selection of explanatory variables to be included in the study models are selected from the tourist preference literature rooted in factors affecting tourist resort competitiveness (Ritchie & Crouch, 2003) and individual tourist choices (See Papatheodorou (2002), Lindsey *et al.*, (2007), and Di Minin *et al.* (2013) among others).

3.3.2 The dependent variables to proxy competitiveness

Most tourist preference studies focus on the micro-economic decisions of individual tourists. Lim (1997) found four key determinants of tourism demand: tourist arrivals and/or departures (43.6%), tourist expenses (41.9%), travel imports and/or exports (6%) and the number of nights spent in a type of accommodation (8.5%). These dependent variables adequately capture the individual factors of tourist demand; however, they do not adequately capture the cumulative effect of tourist choices on a destination in question. The most notable comparisons of competitiveness of destinations was conceptualised by Crouch & Ritchie (1999) and has been adjusted to meet various objectives (e.g. Enright & Newton, 2004; 2005). These methods are all, however, qualitative/perspective based with relative importance allocated to certain categories of organisation or development by managers or professionals, rather than quantitative. There have been no studies to the author's knowledge that have attempted to empirically link these factors to the level of competitiveness of a particular destination. The study begins to fill a gap in the literature on the link between tourism destination competitiveness and the cash-in-hand earned by ecotourism destinations.

In line with the framework conceptualised and expanded by Ritchie & Crouch (2003), competitive advantage of a destination is determined by the attributes of a destination including both man-made and natural resources and the processes and human resources. The competitive advantage gained by a particular destination by virtue of its location or physical and natural resources could theoretically be valued. The method to value such attributes fits best within the characteristics framework as outlined in Section 2.2.3. The value of the location in question would be the present value of the future expected net returns to that destination; the value associated with a particular attribute or trait would be the increase in the present value of that destination over another alternative destination by virtue of having the particular attribute in question. The final valuation of such resources is beyond the scope of this study; however, the concept can form the basis for this study. Because the focus is on *comparative* advantage, it is plausible to compare the relative present values as derived by EKZNW from those attributes. The assumption made is that the current trends in tourism expenditure, tastes and preferences will remain the same for the foreseeable future.

In a competitive market, price adjusts in order to compensate for changes in the level of demand and supply of a product. This takes into account factors such as consumer tastes and preferences, thus price paid for a product should technically represent the 'market' value placed on that product. If this is the case for ecotourism, then higher prices should be associated with destinations that have a product that generates higher customer utility, *i.e.* products containing characteristics that are of higher value to consumers than a similar destination of lower price, *ceteris paribus.* However, in an imperfectly competitive market where price is either set at fixed levels over time periods, there is a lack of information or there are changes in supply and/or demand, the attributes of the products may not be captured by changes in price. As a result, price may be a less useful indicator of value. Additionally, price in tourism is largely set by the destination in question and then potentially altered due to special offers or the influence of agents. This means that the 'pegging price' from which changes occur is set by the supplier and as a result, in an imperfect market the price will be biased towards the value placed on the resource by the supplier. Situations may occur where a destination which has a higher price may have lower visitation numbers and, consequently, derive less income than a destination that has a lower price and higher visitation numbers.

Percentage occupancy (Occ%) has commonly been touted as an important indicator of profitability in the tourism literature (e.g. Porter *et al*., 2003; Haber & Reichel, 2005) and may be a potential alternative indicator of relative competitiveness. This takes into account the popularity of a destination (number of arrivals or bed-nights) in relation to the size of the destination's accommodation infrastructure. This has the advantage of taking into account the choice of consumers' destination and can indicate a strong level of preference for particular characteristics from the tourists' perspective. The disadvantage is that it does not take into account the value (in Rands) gained in income. For example, heavy price discounting may result in high occupancy levels and have little effect on overall profitability (Middleton, 1994; Moutinho & Peel, 1994).

To try and gain a clear understanding of the advantages gained by destinations (in terms of income) by virtue of location and/or natural resources, this study preforms three sets of analyses. These are regressions of the destination location, natural and man-made resources on three different independent variables: the first two, price (P) and Occ% are strongly supported in tourism research demand studies, and, despite their draw-backs for the current study (as discussed above), provide a useful grounding for the research.

The third analysis will use a dependent variable also widely accepted in theory, but rarely used in empirical models, namely 'Revenue per available room' (RevPAR). Malk & Schmidgall (1993) (cited by Jeffrey & Barden, 2001), point out that this measure (RevPAR) or profit per available room (ProPAR) would be more desirable than Occ% as measures of profit and sales performance. Despite this, there are relatively few published empirical studies using these dependent variables. The common reason suggested for this is that the data required are often not available at sufficiently regular intervals in a consistent form across different study sites (Jeffrey & Barden, 2001). Additionally, the private nature of profitability information means that surveys requesting such data are often incomplete. This study, however, has access to the RevPAR data from EKZNW. ProPAR is not used for the study due to data constraints and the complications of allocating individual profitability measures to various accommodation types within EKZNW destinations when the costs cannot be sufficiently segregated.

It is noted that within this study the importance of using P, Occ% and RevPAR as proxies for competitiveness rests on the fact that although one measure may be preferable to another, the data are not drawn from a competitive market. Because the data are collected through one institution (EKZNW) which runs operations from a central base, the assumption is that pricing may not be flexible at the park level, nor may various management decisions. For this reason, one proxy for competitiveness may under or over-represent the importance of particular attributes. Using many proxies may also identify issues to be considered in future research. The use of P, Occ% and RevPAR results in an assumption that the destination that earns greater income is the most profitable; this may not be true, however these proxies can still represent the relative desirability of a destination which will in turn impact the competitiveness. As was stated previously, ProPAR would be the most desirable dependent variable, however data of this nature was not available.

3.3.3 The independent variables affecting competitiveness

Independent variables were selected based on the general economic equation for this study (Equation 3.1, Section 3.3.1) and the proxy variables for competitiveness, P, Occ% and RevPAR (Section 3.3.2). Note that the actual data used for the RevPAR analysis were revenue per available room night, not per available room. This gives a more exact comparative variable because it is dependent on the number of nights a room is available in a month and thus takes into consideration closures for renovation, free bed nights or shorter months. The magnitudes of revenues per available room night are understandably lower than per room analyses over a month. In a 30 day month, there are 30 room nights, as compared to just one room. Although the magnitudes are different, the *relative* importance of variables will remain unchanged because all data sources use the room night variable.

Not all independent variables are valid for all of the proxies for competitiveness analysed. For those that are common, although the qualifying comments below refer to a relationship with P or effects on competitiveness, this is assumed to be the same for Occ% and RevPAR unless otherwise stated. This section closes with two summary tables of all of the independent variables and their relevance to each dependent variable to compare between the models (Tables 1 and 2). These tables include relevant references supporting the inclusion of the variables in the analysis. Some customer specific effects and/or small variations in value, e.g. from a view or proximity to a specific area of interest, may be lost because the data are averages over a monthly time period. However, from the perspective of EKZNW, the average income per bed night at an aggregate level is more important than consumer specific-effects of preference. A 'Bed-Night' refers to the number of nights a bed can be or is used; thus a two-bed chalet would equate to 60 bed nights in a typical 30-day month. Price per bed night (P) was regressed on the attributes and characteristics of the destination in question.

Given Equation 3.1, independent variables must proxy the following aspects:

- Location/Accessibility,
- Attractants,
- Facilities
- Availability
- Service level
- Internal management.

Location factors affecting competitiveness influence both the supply and demand factors for that tourism. From the supplier's perspective, a good location may cut costs and hence increase competitiveness. From a tourist (demand) perspective, a good location may imply that it is cheaper to get to the destination due to distance, wear and tear on the vehicle, or time travelled. This is easily conceptualised within the characteristics framework outlined in Section 2.2.3 as either a direct cost or a time cost. Thus the relationship between distance and competitiveness (whether P, Occ% or RevPAR) is expected to be negative in line with Nicolau & Mas (2006). Additionally, location may be influenced by proximity to places of alternative (non-nature based) interest, e.g. shopping or movies. Accessibility must, therefore, take into consideration a number of aspects, of which a number may be highly correlated, such as:

- Distance (costs of fuel and discomfort),
- Road quality (costs associated with wear and tear),
- Travel time (opportunity cost of time), and
- Proximity to urban area.

Fenwick & Lyne (1999), in an agricultural study, suggested that accessibility factors could be joined using an index created by combining a weighted importance of each aspect. In this study, the origin of the tourists is unknown. Thus, weighting an aspect such as distance or travel time is impossible.

The Google Maps system, developed and patented by Ran (2001), calculates the time taken to travel to a destination. The system takes into account the quality of road and the distance travelled and yields a travel time estimate in hours and minutes. Thus using this estimate as a measure of location relative to a point would take into consideration three of the four accessibility factors mentioned. Scientifically, the Google Maps, time estimates have been shown to be relatively accurate and have been included into Stata software (Ozimek & Miles, 2011). The same time estimates are accessible using internet free-ware. Use of this travel time variable, accessed from Google Maps solves the challenges of combining distance, road quality and time. However, there is an inherent problem of where to measure the distance to a destination from. Ma & Swinton (2011) in a hedonic analysis of land values, measured the distance to the closest major road and the distance to the closest city. The particulars of which city was closest were captured using a set of dummy variables. In this study, the distance to the closest major road is irrelevant because it is captured in the time variable off Google maps. Using the closest city for the distance variable is problematic because tourists will typically be willing to travel much further for holidays than the distance to the closest city. Additionally, because tourism takes into account international visitors, distance to an international airport may be relevant.

Wright (2001) in a hedonic price analysis of game reserve tariffs in South Africa included the presence of an airstrip at a destination, but omitted any other accessibility variables. In this study, two possible sources of tourists were chosen, namely Johannesburg and Durban, because:

1) Given the distribution of EKZNW PA's through KZN, it makes sense that a large number of visitors will come from both of these two urban centres,
2) Given the large size of Durban and Johannesburg and their relative economic productivity, it is likely that a large portion of the overall visitors come from in or around those areas, and
3) International visitors using an airport are likely to use either the King Shaka International Airport (Durban) or O.R. Tambo International Airport (Johannesburg).

Having both of these destinations as potential sources, it does not make practical sense to only record the distance to the closer of the two cities because in most cases this would be Durban. The resulting option is to either include both distances independently into the regression analysis, or join the variables (possibly using an average). Joining the measures implies that the marginal cost of an hour of travel from one city (e.g. Johannesburg) would be the same as that for a person travelling from the other city (e.g. Durban). This may be true in that the direct cost per hour is probably roughly equal. However, given that O.R. Tambo International Airport is larger than King Shaka International Airport, and that on average the distances from Johannesburg are larger than from Durban, the response to time travel may be different. For this reason, the travel times from both Johannesburg and Durban were included in the analysis separately, as DJ and DD, respectively.

A second accessibility factor derived termed urban proximity (UP) was captured as a binomial variable (=1 for destinations with close urban proximity, and 0 otherwise). Destinations within an hour and a half of Durban, or less than 30 minutes from another large urban centre, were given a 1 for UP, e.g. Vernon Crookes nature reserve (1.75 hours from Durban, but less than 30 min from other coastal towns). The separation of 1.5 hours for Durban and 0.5 hours elsewhere is due to variations in perceptions of distance due to different size cities. The reason for specifying UP as a binomial variable and not as a continuous variable is that the discrete nature of consumer perceptions can play a role in considering destinations (Papatheodorou, 2002). Consumers may perceive a destination as 'near' or 'far.' As a result, a destination that is within some distance from an area (say less than 1 hour drive) may be considered in a different category to a destination which is relatively far (e.g. 3 hours). Thus they may be treated as potential 'day' destinations rather than over-night visits.

Certain elements of both location and attraction are closely linked to the physiography[6] of the destination. These elements were captured by separating the destinations into a number of macro physiographic groups and activities available at the destination in question. Physiography grouped destinations into categories Oc, GR, DL and M for 'ocean,' 'game reserve,' 'Dam/lake' and 'mountains' was a set of classifications that are used to distinguish groups of characteristics on EKZNW resort summaries. Separating these groups was considered in order to allow the individual analysis of aspects within these groups. However, on closer examination it was found that a large number of activities, views and facilities unrelated to the study question are contained within these groupings and, hence, there was potential for large collinearity biases. For example, free hiking trails and Drakensberg views were common to all of the mountain reserves as they are in the Drakensberg. Similarly, all deep sea fishing, beach-bathing and scuba diving activity possibilities are limited to the ocean resorts. For this reason, some specific activities were omitted.

Another physiographic variable included which relates to both location and activities was a size dummy variable which was aimed at capturing small destination areas (S) (1 for small areas and 0 otherwise). Destinations that were less than 10 000 ha in size were treated as small. The cut-off of 10 000 ha was chosen for two reasons: Firstly, 10 000 ha is a threshold size used within EKZNW to distinguish variations in conservation management as a result of different scale fauna and flora (Carbutt & Goodman, 2010). Secondly, there was a natural break in sizes at roughly 10 000 ha, with most destinations being much larger than 10 000 ha or smaller. The assumption made in this regard is that if the park is perceived as managed differently for conservation, there is a possibility that this may impact on the tourism management of the area. One exception was made to this size categorisation: A destination slightly smaller than 10 000 ha was recorded as large because it was bordered by large conservation areas, freely accessible to individuals staying at that destination, thus the area accessible to tourists is significantly larger than 10 000 ha. It is expected that the competitiveness of tourism in small destinations will be lower than in large destinations. The primary reason for this is that the amount of area that could potentially be 'explored' during an activity (i.e. hiking, game driving, birding) is less and, thus, less desirable.

There are three main classes of activities available in EKZNW PAs that are not limited specifically to one or the other class of physiography as mentioned above (i.e. Oc, GR, DL and M). These include birding, game viewing and fishing. Quality of birding and game

[6] Physiography refers to the physical features and geography of the region (Merriam-Webster, 2013)

viewing were captured by two binomial variables each, birding (B) and exceptional birding (EB), and exceptional game viewing (EG) and small/common game species (SCG). These variables were split into separate binomial variables for two reasons:

1) To account for the discrete choice nature of consumer decisions and the complications that this could potentially cause for functional forms in the econometric model, e.g. the consumer's perception of wildlife quality is not usually related to the number of species, rather it is good or excellent in relative terms rather than smooth measurements (Papatheodorou, 2002).
2) The response to one level of quality of an attribute may not linearly increase, e.g. 'good birding' may be less than half of the value of 'excellent birding.' As a result using an ordinal category may not display a linear relationship with the dependent variable.

Birding is a rapidly growing NBT area (Cordell *et al.,* 1999; Biggs, 2013; Vas, 2013), yet remains a niche activity, possibly because of relatively higher education levels of birders. Capturing the quality of birding could be done by:

1) Creating a birding quality index taking into account the number of species and/or presence of rare species,
2) Creating a ranked variable of the quality of birding, or,
3) Creating a number of discrete (binomial) variables in order to categorise various levels of birding quality.

Given the discrete nature of tourist choice discussed previously, and the difficulty with capturing accurate data from tourist leaflets, the first option of creating a birding quality index was rejected. The second option makes an assumption that the value of birding increases linearly as the rank of birding quality increases. This may not be the case since birding is characterised as a niche activity, with much higher value accorded to higher quality birding (Jones, 2001; Vardman, (1980, 1982) and Valentine, 1984, all cited by Valentine & Birtles, 2004). This value accumulation is not necessarily even. For this reason it was decided to form two dichotomous birding variables, for 'birding present' (B) and exceptional birding (EB). Destinations for which no reference to birding was made in the advertising pamphlets were allocated a 0 for both B and EB. If the mentioned number of species was less than 300, the destination was allocated a 1 in B and 0 in EB. If the number of species was over 300 and there was specific reference made to a number of rare birds, the destination was allocated a 1 in EB and a 0 in B. The reason for the selection of this break in species number is the level of influence placed on birding in pamphlets. Parks advertising over 300 species contained a much higher amount of advertising in pamphlets compared to parks advertising less than 300 species.

Game viewing was captured following a similar rationale as presented for birding. Absence of any game type was captured as a 0 in both EG and SCG, and the presence of small/common game was captured by a 1 in SCG and a 0 in EG. The presence of exceptional game viewing was captured as a 1 in EG. Exceptional fishing opportunities were captured using a binomial variable (EF) which was allocated a 1 for exceptional fishing and 0 otherwise. Fishing was only captured by one binomial variable because the data collected did not have sufficient distinction in emphasis of fishing quality to warrant more than one group. It is expected that the presence of any of these activities would improve the tourist experience and hence increase price (Lindsey *et al*., 2007; Hunt *et al*., 2005).

Two additional measures for quality of game viewing were included to take into account effects of the 'Big Five.' The "Big Five" are five large terrestrial species which were originally called so because they were the most dangerous or difficult to hunt on foot. These include lion, leopard, elephant, buffalo and rhino. The 'Big Five' have become a somewhat iconic African marketing tool and a label that can be used to advertise destinations because they attract tourists for game viewing (Lindsey *et al.,* 2007; Scholes & Biggs, 2004 cited by Di Minin *et al.,* 2013). The number of the big five (NBF) present is represented as a discrete variable, zero to five for the number of the big animals present. It is expected that as NBF increases, there would be higher tourist interest and hence higher prices charged. The possibility remains that the utility derived from the presence of individual species of the Big Five do not cumulate linearly and that there is a premium paid in order to have the opportunity of seeing ALL of the Big Five. In order to take this into account, a binomial variable (BF) was included where the presence of all of the Big Five =1 and if not, 0. This is strongly supported by evidence that a destination containing all of the Big Five has a significant marketing advantage (Scholes & Biggs, 2004 cited by Di Minin *et al*., 2013).

Historical and cultural tourism has increased greatly over the last two decades (Silberberg, 1995; Lynch *et al.,* 2011). The growth of this sector has been subjected to ethical and cultural complications because of the impacts on the, sometimes isolated, cultures of the people visited, e.g. Medina (2003) and Smith (2009), among others. It still, however, remains a fast growing sector and is expected to be a strong pull factor to certain destinations in EKZNW parks, with specific reference to the 'battlefields' of KZN (e.g. from Zulu and Anglo-Boer wars of the 1800s-early 1900s) (Pers. Comm. Escott, 2013). For this reason, a binomial variable, HC, was used to represent proximity to a place of historical or cultural significance (=1 for close proximity and 0 otherwise). The expectation is that P would increase if there is an area of great historical or cultural significance close-by because it adds to the possibility of more valuable activities/entertainment.

Facilities took into account broad accommodation classes and some additional, specific facilities. The broad accommodation classes were split using binomial variables for chalet (Ch), log cabin (LC), camp site (C), caravan site (Ca) and caravan/camp site (CaC). Note that these binomial variables capture a broad difference between accommodation types and the effect in the model is similar to that of fixed effects. In essence it implies that the price for a camp-site or log cabin will differ as a result of varying characteristics of a destination. An added implication is that the marginal effects of an additional attribute (e.g. HC described above) is the same regardless whether an individual is camping or staying in a chalet. Notes about an improved view quality were captured using a binomial variable (V) (=1 for good view noted, and 0 otherwise). View is expected to have a positive relationship with P as customers would pay premiums for better views, *ceteris paribus*. The presence of an electricity plug was captured using the binomial Z (=1 if the site had a plug, and 0 otherwise).

Within each destination, accommodation is sold at various unit sizes. This means that within one accommodation type, e.g. chalets, there could be two-bed, 4-bed or 6-bed chalets. This was captured as the unit size, US. P should decrease as US increases, because as US increases, more people typically share one kitchen, bathroom or lounge. Although these units would most commonly be allocated to families, it is assumed that the utility from staying in that destination would decrease as more sharing is required, thus decreasing P. From a sales perspective, the tourist destination would have invested less in infrastructure per bed in larger units because, as mentioned above, more facilities would be shared. In addition to the size of the unit, the number of units may have an impact on the relative value placed on accommodation. If a certain accommodation type, e.g. log cabins, were in very short supply, it is expected that there would be higher P, Occ% and RevPAR, the number of available units, TU would be expected to have a negative relationship with all of the dependent variables. This is compounded by the likelihood that the fewer the number of units available, the more remote, or isolated the destination would feel. Because NBT is commonly associated with peace and quiet, it’s expected that at least to a small extent, isolation would command a premium.

The only facility taken into consideration specifically was the presence or absence of a restaurant (R), captured as a binomial dummy variable (=1 for presence, and 0 otherwise). Other facilities are combined with the quality of service because of the use of star rating measures. The Tourism Grading Council of South Africa allocates ‘Stars’ in order to grade quality within tourism destinations. Not all destinations are rated; however, typically owners will have their resort rated for publicity or advertising reasons. Stars are rated on quality of facilities and service. For one to three star rating, the conditions include (TGCSA, 2013):

- A formal reception area,
- Servicing of rooms 7 days/week (included in room fee),
- Breakfast available/provided,
- On-site representative must be contactable at all times, and
- Plus optional extras from higher rating grades.

Four and five star rating includes:

- Food and beverages available for all meals (including room service),
- Formal dining area,
- Valet services,
- Portage of luggage,
- Additional facilities, e.g. child handling facilities, message/office services etc., and
- Full housekeeping and laundry services, among others.

The advantage of using star-rating is that it is universally recognised and hence consumers know before visiting a resort the benefits there-in. The disadvantage is that the effect of specific functions or services is lost. The service-level, although not specific, is closely related to the star-rating. Star-rating is expected to be more influential in consumer choice than specific services because it is widely used and can be identified prior to visiting a destination. This variable is typically captured by a categorical variable (zero to five) because there are five levels of rating and zero would represent unrated. However, in this case the data set only has 3-star rated resorts and un-rated resorts. Thus, star rating is captured as a single binomial dummy variable for three star rating (TSR) (=1 for presence of three-star rating, and 0 represents unrated).

Certain destinations may qualify for a star rating and yet have not been rated. Technically, this would cause a problem with the quality rating and use of TSR. However, because decisions to visit a tourism destination are typically made prior to visiting the destination, the absence of the rating should technically have an effect. Similarly, the pricing structure implemented by the supplier is expected to reflect rating status and thus P would be influenced positively by TSR. With regard to Occ% and RevPAR, this positive relationship may be poorly reflected if the price is not competitively set. However, overall it is still expected that the TSR will be positively related to both of these competitiveness measures. It should be noted that on two of the three main media sources used for this study (internet and one set of pamphlets), there was little or no indication of the star-rating, this may have implications for the effectiveness of the star-rating in improving competitiveness as analysed by the study data.

Additional service measures include the practice that some destination chalet prices included breakfast in the accommodation cost. This was captured in the binomial (BB) (=1 for bed and breakfast included, and 0 for no breakfast included). The expected relationship of BB with P is positive because the product has additional services. The absence of self-catering facilities within some types of accommodation was captured by a non-self-catering variable (NSC) (=1 for non-self-catering destinations, and 0 otherwise). Although non-self-catering rooms are expected to be similar in price to self-catering units, dinner, bed and breakfast are included at all destinations that offer a class of NSC rooms. Thus, it is expected that NSC will be positively related to P. The relationship with Occ% and RevPAR is unknown because it depends on the consumer trade off of utility derived from meals provided (which would predict that they are positively related) and the additional cost of such means (possibly be negatively related). A number of arguments are outlined in the discussions of the results (Section 4.3).

One final variable was used to capture special events. Over the time period studied, there has only been one major event held in South Africa that was noted, the World Cup (June-July, 2010). An increased number of foreign tourists in the country should increase the chance of visitors to EKZNW PAs and hence increase Occ% and RevPAR. This variable (WC) is not expected to have a different effect between groups. Rather, it is expected to account for variations in one time period. The inclusion of this variable may yield useful implications for expectations in the future regarding large national events and competitiveness. For this reason, it has been included to assist in expanding the understanding of competitiveness in EKZNW PAs.

Internal management of individual tourism destinations is liable to affect the overall profitability and desirability of the destination (Ritchie & Crouch, 1999). Within this study, however, EKZNW parks are all managed from a central location, with PA conservation managers also managing the tourism aspect of the destination. The sales are managed through a central hub, and advertising is done on the same EKZNW web site, and through the same type of pamphlets. A few external adverts are run through magazines and newspapers; however, they are not recorded as specific to a destination as they cannot be attributed to a specific PA. Additionally, no cost estimates can be made because they are done on a 'trade' basis, where for a certain number of adverts, a number of complementary rooms are given out. Other adverts are generally limited to last minute weekend specials sent through e-mail to members of a EKZNW loyalty club (Pers. Comm. Mahabeer, 2013). Because the structure of the internal workings of EKZNW focus on conservation rather than tourism, and the input into tourism is the same and spread throughout the organisation, management aspects are omitted.

Two aspects included in the Occ% and RevPAR analyses but not in the price analysis are whether destinations are paraplegic friendly (i.e. wheel-chair friendly) and whether they are joint ventures (explained below). Whether an accommodation code is paraplegic friendly is captured by a binary variable, Pa (=1 for paraplegic-friendly, and 0 otherwise). It is expected that Pa will have no specific relationship with P (thus is not included in the price regression) but that it will be negatively related with Occ% and RevPAR. This is expected because where there are a limited number of paraplegic destination codes in a resort, they will be 'held' back from early rental in case there is a booking by a paraplegic. Thus, although Pa should technically allow for increased customers, it is expected that they are utilised less.

Joint ventures refer to destination codes that have partnerships with private investors or communities outside of EKZNW. These were captured by a binary variable, Inc (=1 for joint venture codes and, 0 otherwise). Joint venture codes would be expected to out-perform non-joint venture codes because of possible added publicity or investment (Powell, 1992; Jamal & Getz, 1995). However, the booking and advertising still is undertaken through EKZNW channels. There is no specific note made, or special features of joint venture accommodation codes in the advertising of the destinations. The knowledge that destinations are joint ventures was provided only by EKZNW management; there is no mention in the public tourism advertising of such partnerships. Thus, there is no expectation for a different price and as a result this variable is omitted from the price analysis.

As a result of poor communication of joint ventures to tourists, there are varying expectations of relationships between Inc and the dependent variables. Despite the theoretical advantage of joint ventures (see paragraph above), Occ% and RevPAR are expected to display either non-significant or negative relationships with Inc. The reason for this is that they are either not managed differently by EKZNW compared to alternative accommodation codes, and thus, should experience similar occupancy as alternative codes that are not joint-ventures. Or, EKZNW offices may (intentionally or un-intentionally) rent out accommodation codes that are 100% EKZNW preferentially to joint-venture codes. If this was the case, Inc would be negatively related to Occ% and RevPAR.

A summary of the selected independent variables is tabulated (Table 1 on page 44-45) and expected responses are predicted with reference to the different models.

Table 1. Descriptions and literature sources for price explanatory model variables

Variable Name	Description	Variable measurement	Unit	Expected relationship with:		
				P	Occ%	RevPAR
Accessibility						
DJ	Distance, Johannesburg	Continuous	Hours of travel	Negative	Negative	Negative
DD	Distance, Durban	Continuous	Hours of travel	Negative	Negative	Negative
UP	Urban Proximity	Binomial=1 if the PA is in close proximity to an urban area, 0 otherwise	Position	Negative	Negative	Negative
Activities						
B	Birding	Binomial= 1 if protected area has birding, 0 if not	Present/ Absent	Positive	Positive	Positive
EB	Exceptional birding	Binomial= 1 if protected area has exceptional birding, 0 if not	Present/ Absent	Positive	Positive	Positive
EG	Exceptional game viewing noted	Binomial= 1 if protected area has exceptional game viewing, 0 otherwise	Present/ Absent	Positive	Positive	Positive
SCG	Small or common game	Binomial= 1 if protected area has small or common game, 0 otherwise	Present/ Absent	Positive	Positive	Positive
EF	Exceptional fishing noted	Binomial= 1 if protected area has exceptional fishing, 0 otherwise	Present/ Absent	Positive	Positive	Positive
NBF	Number of big 5 present	Ordinal, 1-5.	Number	Positive	Positive	Positive
BF	The presence/ absence of the Big 5	Binomial= 1 if the protected area contains the big 5, 0 otherwise	Present/ Absent	Positive	Positive	Positive
HC	Historical/ Cultural activity in close proximity	Binomial= 1 if protected area has a historical or cultural significance, 0 otherwise	Present/ Absent	Positive	Positive	Positive
Physiography						
Oc	Ocean	Binomial= 1 if protected area is an ocean resort, 0 otherwise	Present/ Absent	Unknown	Unknown	Unknown
GR	Game Reserve	Binomial= 1 if protected area is a game reserve resort, 0 otherwise	Present/ Absent	Unknown	Unknown	Unknown
DL	Dam or Lake	Binomial= 1 if protected area is a dam or lake resort, 0 otherwise	Present/ Absent	Unknown	Unknown	Unknown
M	Mountains	Binomial= 1 if protected area is a mountain resort, 0 otherwise	Present/ Absent	Unknown	Unknown	Unknown
S	Size of protected area :Small	Binomial= 1 if the protected area is small (less than 3000ha), 0 otherwise	Present/ Absent	Negative	Negative	Negative
V	View or beauty notes	Binomial= 1 if present, 0 otherwise	Present/ Absent	Positive	Positive	Positive

References from which principles are drawn for variables include: Nicolau & Mas, 2008; Nicolau & Mas, 2006; Hamilton, 2007; Ritchie & Crouch, 2003; and Lindsey *et al.*, 2007

Table 1 Cont. Descriptions and literature sources for price explanatory model variables

Variable Name	Description	Variable measurement	Unit	Expected relationship with P		
				P	Occ%	RevPAR
Facilities						
Ch	Chalets	Binomial=1 for chalets, 0 otherwise	Present/ Absent	Positive	Unknown	Unknown
LC	Log Cabin	Binomial=1 for log cabin, 0 otherwise	Present/ Absent	Positive	Unknown	Unknown
C	Camp site only	Binomial= 1 if the site is for camping, 0 otherwise	Present/ Absent	Default therefore nil	Default therefore nil	Default therefore nil
Ca	Caravan site only	Binomial= 1 if the site is for caravans only, 0 otherwise	Present/ Absent	Positive	Positive	Positive
CaC	Camp and Caravan site	Binomial= 1 if the site is for both caravans and camps, 0 otherwise	Present/ Absent	Positive	Positive	Positive
Z	Electricity plug	Binomial= 1 if plug is present, 0 otherwise	Present/ Absent	Positive	Positive	Positive
US	Unit Size	Continuous= number of beds per unit	Present/ Absent	Negative	Positive	Positive
TU	Total unit number	Continuous	Count	Negative	Negative	Negative
NSC	Non-Self Catering	Binomial= 1 if chalet has no self-catering facilities, 0 otherwise	Present/ Absent	Negative	Unknown	Negative
Tourism Superstructure						
R	Restaurant	Binomial= 1 if a restaurant is present, 0 if otherwise	Present/ Absent	Positive	Positive	Positive
TSR	Three Star Rating	Binomial= 1 if the resort is 3 star rated, 0 otherwise	Present/ Absent	Positive	Positive	Positive
Inc	Joint venture chalets	Binomial= 1 if present, 0 otherwise	Present/ Absent		Positive	Positive
Services						
BB	Bed and breakfast	Binomial= 1 if present, 0 otherwise	Present/ Absent	Positive	Positive	Positive
Pa	Paraplegic friendly	Binomial- 1 if paraplegic friendly, 0 otherwise	Presence/Absence		Negative	Negative
Special Events						
WC	World Cup, event dummy	Binomial= 1 if World Cup, 0 otherwise	Present/ Absent	Positive	Positive	Positive

References from which principles are drawn for variables include: Nicolau & Mas, 2008; Nicolau & Mas, 2006; Hamilton, 2007; Ritchie & Crouch, 2003; and Lindsey *et al.*, 2007

3.3.4 The specified econometric equations

Given the variables selected for economic analysis (Section 3.3.2 and 3.3.3) which were summarised (Tables 1 & 2), three sets of econometric analyses were proposed. For the analysis of the P variable:

$$
\begin{aligned}
P_{it} = c &+ \beta_1 Oc_{it} + \beta_2 GR_{it} + \beta_3 DL_{it} + \beta_4 DJ_{it} + \beta_5 DD_{it} + \beta_6 UP_{it} + \beta_7 S_{it} + \beta_8 B_{it} \\
&+ \beta_9 EB_{it} + \beta_{10} EG_{it} + \beta_{11} SCG_{it} + \beta_{12} EF_{it} + \beta_{13} NBF_{it} + \beta_{14} BF_{it} \\
&+ \beta_{15} HC_{it} + \beta_{16} Ch_{it} + \beta_{17} LC_{it} + \beta_{18} Z_{it} + \beta_{19} V_{it} + \beta_{20} R_{it} + \beta_{21} TSR_{it} \\
&+ \beta_{22} BB_{it} + \beta_{23} NSC_{it} + \beta_{24} US_{it} + \beta_{25} TU_{it} + \beta_{26} WC_{it} + e
\end{aligned}
\tag{3.2}
$$

Where $\beta_1 - \beta_{26}$ represent the coefficient estimates of the explanatory variables described previously. The *c* represents the constant in the equation and *e* captures the error term.

The econometric models proposed for the analysis of Occ% and RevPAR is:

$$
\begin{aligned}
&Occ\%_{it} \text{ or } RevPAR_{it} \\
&\quad = c + \beta_1 Oc_{it} + \beta_2 GR_{it} + \beta_3 DL_{it} + \beta_4 DJ_{it} + \beta_5 DD_{it} + \beta_6 UP_{it} + \beta_7 S_{it} \\
&\quad + \beta_8 B_{it} + \beta_9 EB_{it} + \beta_{10} EG_{it} + \beta_{11} SCG_{it} + \beta_{12} EF_{it} + \beta_{13} NBF_{it} + \beta_{14} BF_{it} \\
&\quad + \beta_{15} HC_{it} + \beta_{16} Ch_{it} + \beta_{17} LC_{it} + \beta_{18} V_{it} + \beta_{19} Z_{it} + \beta_{20} US_{it} + \beta_{21} TU_{it} \\
&\quad + \beta_{22} R_{it} + \beta_{23} TSR_{it} + \beta_{24} BB_{it} + \beta_{25} NSC_{it} + \beta_{26} WC_{it} + \beta_{27} Pa_{it} \\
&\quad + \beta_{28} Inc_{it} + e
\end{aligned}
\tag{3.3}
$$

Note that the variables *C*, *Ca* and *CaC* were all combined into the one category, *CaC*, as camp and/or caravan sites at the same destination are sometimes advertised differently, i.e. the internet source may advertise a camp site (only) where the pamphlet may advertise a camp or caravan site at the same destination. Additionally, there was no clear differentiation in price between the categories and so they were merged. Accommodation types are exhaustive within the data set (i.e. all accommodation types are either LC, Ch or CaC). Because of this, the *CaC* variable is intentionally omitted from the equations (3.2 and 3.3) in order to prevent the dummy variable trap associated with perfect collinearity between variables. Similarly, the physiography types (Oc, DL, M and GR) are potentially collinear dummy variables, thus the *M* variable was omitted.

The explanatory variables are selected based on the theoretical research with regard to factors affecting the attractiveness of a tourism destination (Papatheodorou, 2001; Stabler *et. al.* 2010), and factors affecting competitiveness (Ritchie & Crouch, 1999; 2003; Enright & Newton, 2004; 2005). The independent variables are further supported by specific empirical research and/or theoretical arguments as presented in Section 3.3.3. The way that the models are specified is consistent with methods used in other tourism competitiveness studies (e.g. Papatheodorou, 2002; Hunt *et al.*, 2005) and functionally similar hedonic studies in different fields. For example, farm property valuation (e.g. Elad *et al.*, 1994; Ma & Swinton, 2011), valuation of environmental amenities (e.g. Bastian *et al*. 2002) and valuation of remoteness (e.g. Sengupta & Osgood, 2003). Additionally, the specification fits the conceptual understanding of tourism choice as explained in the characteristics framework (Papatheodorou, 2006; Stabler *et al.*, 2010). Given these factors, and the methodology commonly used in the tourism literature to collect data on characteristics at destinations from pamphlets or adverts (e.g. Papatheodorou, 2002), the methodologies used are justified.

An important advantage in the analysis is that the sample used is from within one institution, EKZNW, but many different destinations or sites, thus policy directives and planning are centralised and constant across all sites and variations in performance can be attributed to site-specific attributes. Conversely, there may be a disadvantage that the effects of price variation are not fully captured due to pricing being set by one institution. This necessitates the use of multiple indicators of competitiveness and thus multiple analyses according to P, Occ% and RevPAR. Justification of the specific regression models and econometric problems associated with the models are addressed in Sections 3.3.5, 3.3.6 and 3.4.

3.3.5 Estimation methods for econometric panel data models

3.3.5.1 Factors to consider for selection of panel data models

In order to identify factors that affect the choice of model used in analysing panel data, the most common starting point is Ordinary Least Squares (OLS) regression (Wooldridge, 2010), the reasons being that it is widely understood in econometric circles. In panel data analysis, there are two regression analyses that can happen simultaneously or individually depending on the nature of the study. These are the *between* analysis which compares variation across groups at a number of periods in time and the *within* analysis which compares variation within groups or units over time. Thus, a key choice is whether the variables of interest in the study vary across or within groups or panels (Baltagi *et al*., 2003). In the event that a study analyses variation within groups over a period of time, the type of model used is most often the fixed effects model. This study focuses on the variability between sites (i.e. across panels), thus the choice of fixed or random effects theoretically must be the random effects model (Bartels, 2008).

Estimation techniques between the two types of model do, however, vary. In the fixed effects model, the constant term, *c* is assumed to be fixed and independent of the error term, *e*. In the event of examining between group variability, the alternative model is the random effects model. In the random effects model, the constant and error terms are correlated within the same cross-sectional unit. The errors from the different cross-sectional units are, however, independent. Because of this correlation (within the same cross-sectional units), OLS regression for the random effects models yield incorrect standard errors. In order to overcome this, Generalised Least Squares (GLS) is rather used to estimate the random effects model (Berry & Feldman, 1985).

Although the choice between random or fixed effects models are predominantly theory-based and have been chosen as outlined, there are statistical tests which can also be used to motivate the choice. The most common test used to identify whether the model applied should be fixed or random effects is the Hausman test (Hausman, 1987), which compares the fixed effects model to the random effects estimators. This is not applicable in the current case because the number of fixed variables in each panel is so large that the collinearity in the fixed effects estimators fails the asymptotic assumptions of the Hausman test. An alternative test available is the Breusch & Pagan Lagrangian Multiplier (LM) test for random effects. The null hypothesis of the LM test is that variance across entities is zero, i.e. there is no significant difference across units (no panel effects). If there is evidence that there are significant differences across panels, the null hypothesis is rejected and random effects regression by GLS is confirmed as more desirable than OLS.

A second key factor when making a choice of model, is the distribution of the dependent variables. OLS estimation models (and consequently GLS) assume that the dependent variables are continuous (i.e. $-\infty$ to $+\infty$). If this is not the case, the expectation is that GLS would yield biased coefficient estimates (Baltagi, 2002). In this study all of the dependent variables are limited. Price and RevPAR are all greater than or equal to zero, thus they have a lower limit. Occ% is a percentage, thus it is truncated at 0% and 100%. GLS yields coefficient estimates which are consistent and unbiased when distribution assumptions are met. However, Maximum Likelihood Estimation (MLE) has been shown to yield more efficient coefficient estimates (Baltagi, 2005; Wooldridge, 2010). The challenge with MLE is that when normality assumptions of the error terms are not met, it may produce inconsistent estimators of parameters (Wooldridge, 2010). The result is that GLS is preferable for more consistent results when normality assumptions are relaxed, yet MLE would produce more efficient coefficient estimates. Because of the truncation necessities in the data set, MLE is used in this study as the primary regression analysis as it is expected to produce more efficient coefficient estimates. In order to support these results, GLS estimations are also undertaken and tested. These GLS estimations are presented in the appendices and referenced in the text. The next section outlines the basics of truncated models by MLE followed by an overview of GLS.

3.3.5.2 Limited dependent variable panel data regression

The common name given to the group of models which deal with truncated dependent variables is limited dependent variable models. These include models that allow for binomial dependent variables (e.g. probit) or categorical dependent variables (e.g. multinomial logit), among others. Truncated regression models refer to models that limit the sample in such a way that they fit within boundaries. This means that the sample is not random and OLS cannot be used (Baltagi, 2002). In the event that OLS is used, coefficient estimates would be biased and inconsistent because there is no guarantee that the error term will have a mean of zero (Gujarati & Porter, 2009). A common strategy is to use MLE (Gujarati & Porter, 2009), as was done by Hausman & Wise (1977). An alternative to the MLE procedure is to perform a Heckman two-step procedure; however, MLE yields more efficient coefficient estimates (Gujarati & Porter, 2009).

For continuous data that is truncated, the logit transformation procedure has allowed for the variable to be categorised and included in a regression by creating a suitable dependent variable. The dependent variable is formed by taking the natural log of the transformed proportion variable (For example, see Wale, 2010 and Sharaunga & Wale, 2013). In the current study, it would be more advantageous to leave the dependent variables as true figures (i.e. un-transformed) within the upper and lower bounds so that they can be easily cross-compared between regressions of Occ%, P and RevPAR. Tobin (1958) designed a model, adapted by Rosett & Nelson (1975), which can truncate dependent variables at an upper and lower limit, and yet treats the variables in between as continuous. This means that the models can be easily compared across different dependent variable regressions (i.e. P, Occ% and RevPAR). Thus, the Tobit model was selected for analysis of the truncated samples. The one-limit Tobit is used for analyses of P and RevPAR, and the two-limit Tobit for Occ%. This is because P and RevPar are all expected to be greater than 0 and Occ% being a percentage will be bound between 0% and 100%.

The Tobit model specifies the latent variable y_{it}^{*} to depend on regressors, an idiosyncratic error (i.e. an error that changes across and within panels), and an individual-specific error (Cameron & Trivedi, 2010):

$$y_{it}^{*} = x_{it}'\beta + \alpha_i + \varepsilon_{it} \tag{3.4}$$

Where $\alpha_i = N(0, \sigma_\alpha^2)$ and $\varepsilon_{it} = N(0, \sigma_\varepsilon^2)$ and the regressor vector x_{it} includes an intercept.

For left censoring at L, observed y_{it} variables are such that:

$$y_{iy} = y_{it}^{*} \text{if } y_{it}^{*} > L \text{ or } L \text{ if } y_{it}^{*} \leq L \tag{3.5}$$

Because the limits in the data for this study are actual physical limits (i.e. they are not inferred), y_{iy} is always equal to y_{it}^{*}. It is however important to note that because Tobit estimation is applied to a limited dependent variable, interpretation of the coefficient estimates is undertaken with care. A common error in the interpretation of the Tobit model is that the coefficient estimates measure the correct regression coefficients for the observations within the explanatory variables limits (McDonald & Moffitt, 1980); this is however not the case. Rather, the direct coefficient estimates in the Tobit model reflect the change on the mean value of the *latent* dependent variable (i.e. the entire sample including those at and beyond the limits) as a result of a change in one unit of an independent variable (Gujarati, 2011) (for detailed derivations of this, see McDonald & Moffitt (1980), Amemiya (1973) and Tobin (1958)). The latent dependent variable is not directly observed, rather it is an underlying, or desired variable in ideal modelling situations (Gujarati, 2011). In order to estimate the marginal effect of a change in an independent variable on the *actual* observed value of dependent variable, the marginal effect of a regressand on the *latent* dependent variable must be multiplied by the probability of a unit change in the regressand actually happening (McDonald & Moffitt, 1980; Gujarati, 2011). The probability calculation utilises the coefficient estimates of all of the regressors in the model (Gujarati, 2011). *Stata* computes the marginal effects of each regressor directly (Stata Corp., 2009); these are most often measured at the mean of the independent variables for ease of estimation (Gujarati, 2011). The marginal effects estimates are expected to be smaller in magnitude than the coefficient estimates from the Tobit model because they refer to the variation only within the limits rather than at the limits, as illustrated by McDonald & Moffitt's (1980) decomposition of work done by Tobin (1958), Dagenais (1975) and Rosen (1976), among others.

In this study, results for both coefficients (i.e. the effects of a unit change in an explanatory variable on the latent dependent variable) and marginal effects (i.e. the effects of a unit change in the explanatory variable on the actual dependent variable) of the Tobit model are estimated and reported at the mean of each independent variable. Estimation of the goodness of fit, R^2, for Tobit models using panel data in Stata is calculated by (1) generating a set of predicted values for the dependent variable using the estimated Tobit model, (2) estimating the correlation coefficient between the predicted variable from (1) and the actual dependent variable, and (3) squaring the correlation coefficient to calculate R^2 (Stata Corp., 2009). The discussions focus on the marginal effects estimates as these are the values which are practically of interest for the objective of prioritising conservation.

In order to justify the estimation results of the Tobit models, regressions are also run with GLS and compared to the Tobit coefficient estimates. This is because Tobit estimation results may be less robust to disturbance if assumptions are not fully met (Cameron & Trivedi, 2010). The GLS results are accompanied by the pre- and post-estimation tests undertaken for other GLS regressions in order to show that the comparative results of the Tobit model are consistent, and thus relatively robust to the estimation procedure undertaken.

Post-estimation of the Tobit regression analysis, a likelihood ratio test is undertaken between the estimation of the panel Tobit model and the pooled Tobit maximum likelihood estimation. This is done using the –tobit- option in Stata. Significance of this test rejects the null hypothesis that there is no difference between the models and consequently justifies the use of panel Tobit for truncated maximum likelihood regression (Stata Corp., 2009).

The Tobit model in Stata is estimated by maximum likelihood using either adaptive or non-adaptive Gauss-Hermite quadrature to compute the coefficient estimates (Stata Corp., 2009). Adaptive quadrature is the default integration method and is much more accurate. Estimation results may vary depending on the number of quadrature points used in the procedure and where these points fall in the data. In order to check the sensitivity of the results to variations in the quadrature approximation, the -quadchk- procedure is used. This procedure refits the model for a range of quadrature points and compares the different solutions. This will be done for each Tobit model undertaken in order to confirm the robustness of the approximation method. Variation is desired to be less than 0.01%; however slightly higher than this is acceptable. Variation as high as 1% indicates that the quadrature approximation is not reliable and an alternative approximation method should be used (Stata Corp., 2009). Additional checks for robustness of the estimated model can be undertaken by using the model to predict estimates of the dependent variable. These estimates are subsequently compared to the actual fitted dependent variable data. An R^2 goodness of fit estimate is calculated following the Introduction to SAS (2013) where the correlation between predicted estimates and the fitted dependent variable are squared.

Robustness of results to sample bias can be undertaken by bootstrapping the estimation procedure (Drukker, 2002). This procedure takes a sub-sample of the overall sample in order to re-estimate the model and thus deals with any non-normality of the data. Bootstrapping assumes that the overall sample is indicative of the overall population (Guan, 2003). This assumption can be made for this study because the sample includes the whole population for the accommodation codes used.

3.3.5.3 Generalised least squares panel data regression

GLS regression is an adaptation of OLS regression. Original variables that would normally be used for an OLS regression are transformed in such a way that the transformed variables satisfy the assumptions of a classical model, after which OLS is applied to them (Gujarati & Porter, 2009), i.e. GLS is OLS on a set of transformed variables in such a way that the transformation maintains the empirical relationships between the dependent and explanatory variables. GLS is most often used in order to overcome problems in estimation associated with heteroscedasticity (non-zero error term) and/or a certain degree of autocorrelation, as these may cause OLS estimations to be statistically inefficient and hence give misleading inferences (Berry & Feldman, 1985). In this study, GLS is used primarily because it is the standard regression type used for panel data studies in which the random effects model is used (Section 3.3.5.1). Additionally, GLS can be used in order to deal with any potential multi-collinearity problems that may arise.

In Stata, there are two options of GLS random effects regression (StataCorp, 2009):

- The -xtreg- procedure, which assumes that the error components *u(i)* and *e(i,t),* are both normally distributed, and
- The -xtgls- procedure, which assumes that there is some structure for the distribution of the error term, *e(i,t),* and allow for conditions adjusting for heteroskedasticity and/or correlation problems.

There is, however, a limitation that the estimation using –xtgls- is preferred for 'long' panels of data (i.e. more time periods than cross-sectional units) where the number of time periods is greater than the number of panels. In 'short' panels (i.e. fewer time periods than cross-sectional units) the standard errors are under-estimated resulting in highly significant co-efficient estimates. The data for this study are in a 'short' panel and thus –xtreg- with the robust option is applied to deal with heteroskedasticity (Stata Corp., 2009; Hoechle, 2007).

3.4 Econometric problems and estimation strategies

Within both Tobit and GLS models, it is not ideal for there to be excessive collinearity between variables. It has been observed in this study that tourism research which focuses on spatial distribution of naturally endowed resources has a major disadvantage, in that there will be inherent collinearity between categories and characteristics. One such aspect is the high potential for severe collinearity between the classification of a destination as a game reserve (GR) and the probability of it definitely having small common game (SCG), exceptional game viewing (EG) and/or at least a number of the big five (NBF).

A similar difficulty presents itself with destinations that are especially marketed as birding destinations. In order for a destination to have exceptional birding, there is an inherent implication that there cannot be significant disturbance of the natural environment because birds (especially endangered species) tend to be highly sensitive to environment alterations. Thus, the fact that a destination has exceptional birding may be closely linked to the fact that it has been developed with very low intensity. The low development may thus lead to a lower price or being visited less often (low Occ% or RevPAR). This could potentially be attributed to 'high quality birding' and show a negative value when in fact the reality is that collinearity between development levels and high birding quality may distort that relationship.

Alternative sources of collinearity problems include the relationships between exceptional birding, fishing and game viewing. Because of the nature of data collection and advertising, the advertising of high quality fishing may take a significant amount of space or priority in the advertising, despite the presence of good quality game viewing. Thus, there may be a negative association with fishing when compared to game viewing simply because between two areas that have similar game viewing levels, one area's advertising may be dominated by fishing as compared to game quality.

A common solution to multicollinearity problems is the use of principal component analysis (PCA) (Jolliffe, 2004). When undertaken between highly collinear quantitative variables, PCA can decrease the number of variables in a regression analysis, while still explaining an often high percentage of variability by using the component loadings in the component estimation (Jolliffe, 2004). Within this study, there are a number of problems with the concept of using PCA because the use of PCA on dummy variables is not justified. PCA was developed using multivariate normal distribution (Hotelling, 1933; Anderson, 2003; Mardia *et al.*,1980). As a result, most of the results and interpretations of PCA implicitly use the consistency of the estimated factor loadings under normality assumptions. Filmer & Pritchet (2001) used PCA in development economics studies to summarise household wealth data; however, they were strongly criticised for the use of dummy and discrete variables as if they were continuous (Kolenikov & Angeles, 2004; 2009). Because PCA analysis can be undertaken by the use of either covariance or correlation matrices (Jolliffe, 2004), some improvements of the method have been made. Pearson (1901) introduced *tetrachoric* correlations for a two-by-two matrix as an improved measure of correlation between binary variables. Pearson & Pearson (1922) and Olsson (1979) introduced *polychoric* and *polyserial* correlations as the underlying correlations between the unobserved, normally distributed variables and their discrete versions using maximum likelihood. PCA could still be used between continuous variables in the data set if there is a need.

Kolenikov & Angeles (2004; 2009) examined the comparative performance of polychoric PCA with standard PCA assuming that the dummy variables acted as would be expected with continuous variables. They found that there was a significantly improved performance of the PCA when the polychoric function was used for correlations. In this study compilation of sets of highly correlated variables into fewer principal components will be considered using polychoric PCA.

Another estimation problem commonly associated with time series and panel data analyses is that of autocorrelation which implies that observations are correlated over time (within panels) (Gujarati & Porter, 2009). The effect of this is that typical OLS estimators of models would not display the minimum variance possible for the sample and would in turn result in inefficient coefficient estimates (Gujarati & Porter, 2009). A test for panel level serial/auto-correlation in panel-data models was developed by Wooldridge (2002) (Cited by Drukker, 2003). Drukker (2003) named the test –xtserial- and provides evidence that the test has good size and power properties in large samples. A statistically significant result for the test indicates the presence of serial correlation. Using the Stata -cluster()- command, autocorrelation can be taken into consideration in the statistical analysis to deal with the problems associated with autocorrelation (Hoechle, 2007).

3.5 Applications to conservation prioritisation

The models outlined (Section 3.3.2 - 3.3.4) focus on being explanatory models so that the factors affecting the performance of accommodation codes can be understood. In this way, the effects of a different physiography or potential activity that is reliant on natural endowment can be valued in comparison to some alternative. The price models quantify the relative value placed on attributes by a select number of consumers (i.e. those that choose to purchase the product). Thus price is largely influenced by the price set by management at a destination, and, hence, are possibly not market-related. The price analysis still effectively quantifies *perceived* value to the tourist because the consumer of a tourism product only takes into account the price that they pay, rather than the advantage gained by the overall park.

Occupancy levels are analysed as both an alternative and a comparison to the price model. Occupancies have a closer relationship to overall profitability and hence competitiveness than price (Norkett, 1985; Evans *et al.,* 1989; Russo, 1991, cited by Jeffrey *et al.,* 2002). The complication with only using occupancy is the effect of variable prices on products, and thus, the influence of price paid rather than purely the destination characteristics (Jeffrey & Barden, 2001). For this reason there is advantage of also comparing with the price model.

The RevPAR model, broadly, would be expected to present the 'best' indicator of competitiveness since it attempts to take into account the differences in prices and in occupancies and relates directly back to the attributes of the destination (Jeffrey & Barden, 2001). The reason that this is however supported by the evidence presented by the P and Occ% models is that there are few empirical illustrations of RevPAR in the literature. Occ% are more common models due to the comparative ease of data access. Thus the RevPAR model is complemented by the P and Occ% models in order to provide a number of different comparisons for prioritising conservation according to competitiveness.

By estimating the coefficient estimates for the respective characteristics in the models outlined, they can be used to predict the relative advantage gained to tourism by virtue of destination. Effectively this takes the explanatory models designed to understand the factors affecting competitiveness and uses them to rank the relative advantage at various destinations. The models rank advantage purely based on the economic income factors, rather than using typical ecological prioritisation. This does not imply that there is no place for prioritisation according to ecological features, rather competitiveness can be used to complement these previous methods. Combining economic and ecological factors into one index for prioritisation is highly complex because it implies the need for weighting systems to track individual trade-offs between incomes and biodiversity conserved. Keeping NBT and biodiversity indices separate (as is done in this study) allows the practitioner on the ground to choose their own weightings which are likely to be subjective.

The focus of the study is comparative advantage between limited sites for the purposes of conservation prioritisation. After the initial regression analyses to quantify the relevant factors affecting competitiveness, data on 10 potential conservation areas currently under consideration by EKZNW will be collected. This data will be used to demonstrate the use of the framework to prioritise potential conservation areas in terms of competitiveness of NBT possibly established in those areas. The data will be collected primarily from EKZNW prioritisation practitioners and from spatial analyses (i.e. location) of the sites under consideration. Once the attributes of a destination are identified, the overall advantage gained by virtue of location will be calculated by summing the product of the respective attributes and coefficient estimates of the destination in question. This will be done for P, Occ% and RevPAR and the resulting prioritisation orders and preferences will be discussed. This will form an example of how adding competitiveness value can be used to help prioritise conservation areas. The complications of how to include both the tourism competitiveness considerations and the ecological considerations remain in the site selection problem. This study presents the first (to the author’s knowledge) prioritisation according to prospective competitive advantage gain by tourism in conservation destinations. This competitive advantage gain, combined with the ecological level of irreplacability used by EKZNW for prioritisation of conservation areas, would attempt to address the challenges associated with the trade-offs between conservation *per se*, and cost (or -income) -effective conservation.

3.6 Summary

This chapter has outlined the sources of data and the theoretical selection of both dependent and independent variables under consideration. Three dependent variables were selected for analysis (P, Occ% and RevPAR) in order to provide different perspectives on the competitiveness of destinations. The explanatory variables were selected after reviewing previous literature and the marketing media released by EKZNW. Section 3.3.5 considered a number of different econometric estimation strategies that could be considered for this research. Panel data Tobit regression was selected as the most appropriate econometric method. The chapter concluded with Section 3.4 outlining potential econometric problems, and Section 3.5 presented how this research will be applied to a prioritisation of conservation area problem.

CHAPTER 4. RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results and discussions of the theoretical models specified in Chapter 3. This chapter begins by outlining the descriptive results of the data set, followed by collinearity statistics and alterations to the individual econometric models described previously (Section 4.2). A number of changes were made to the original econometric equations proposed (Section 3.3.4), in order to deal with problems in the data set. This chapter contains the details of such changes as well as the results and a discussion of the analyses of factors affecting Price, Occ% and RevPAR.

Section 4.3 outlines and presents a discussion of the estimation results from the econometric analysis of P, Occ% and RevPAR separately. This is followed by Section 4.4 which compares the findings of the models according to categories of interest for conservation prioritisation and competitiveness and discusses the results in depth. Section 4.5 illustrates the use of the results in prioritising conservation areas according to tourism potential and the chapter closes (Section 4.6) with a summary of the findings.

4.2 Descriptive results

4.2.1 Summary statistics

The data set compiled from financial records of EKZNW and various advertising media mentioned (Section 3.2.2) generated 93 accommodation codes spread through 24 protected areas (PAs). The 93 codes were spread through four categories of area, mountains, game reserves, ocean destinations and dams or lakes. Types of accommodation were not evenly spread throughout the types of destination; the most common accommodation type was chalets (Figure 3). Game reserve and mountain destinations contained the widest variety of chalet accommodation and game reserves had very few alternative forms of accommodation. The second widest range of accommodation codes was provided by camping.

The summary statistics of the data set (Table 2, page 60) were compiled for all of the explanatory variables, of which the majority are in a binomial form (0 or 1). On average, destinations are closer to Durban (DD) than Johannesburg (DJ), and there are fewer small destinations than large destinations, captured by a mean S of below 0.5. The low mean values for EB, EF and BF suggest there are relatively few destination codes that have exceptional quality of activities and/or the big five present. Comparatively, destinations advertising something of historical or cultural significance are more common (HC). SCG and TSR have means of about 0.5 showing that roughly half of the destination codes display these attributes. The US mean and standard deviation suggest that a typical accommodation code may contain between 2 and 7 beds. The TU variable has a very high standard deviation relative to the mean which indicates that there is a wide range of destination sizes, from very big to very small.

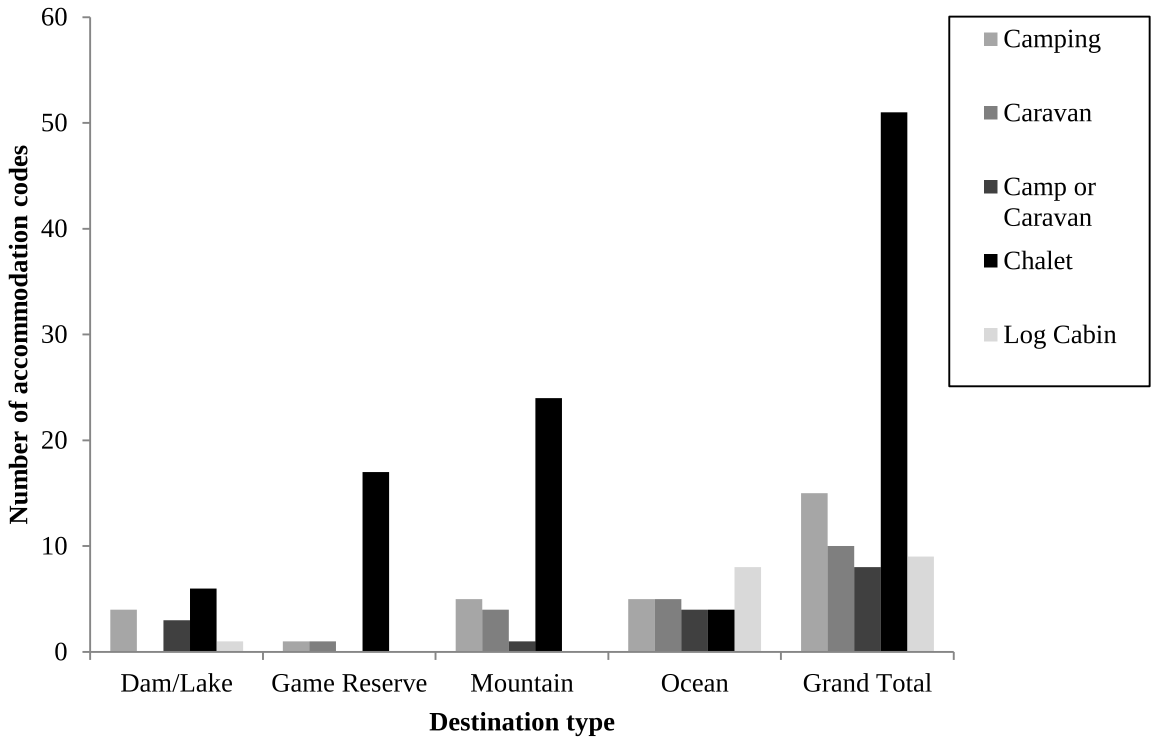

Figure 3. Number and type of accommodation codes according to physiography type

Source: Data sourced from EKZNW, 2013

Table 2. Summary statistics of the dataset

Variable	Mean	Standard deviation
DJ	5.518	1.273
DD	2.941	1.087
S	0.344	0.475
B	0.269	0.443
EB	0.043	0.203
SCG	0.452	0.500
EF	0.097	0.296
NBF	1.022	1.766
BF	0.086	0.280
HC	0.290	0.454
V	0.097	0.296
Z	0.194	0.395
US	4.591	2.273
TU	411.391	615.442
TSR	0.516	0.500
BB	0.258	0.438
NSC	0.043	0.203
WC	0.028	0.164
Pa	0.750	0.264
Inc	0.054	0.226

Source: Data from EKZNW (2013), and collected by researcher

4.2.2 Collinearity statistics and alterations to the econometric models

As outlined (Section 3.4), collinearity between explanatory variables can be an issue when dealing with a cross-section of destinations grouped into categories also affected by other variables that are of interest. Table 3 shows collinearity statistics between a number of problematic explanatory variables that were included in the original econometric models in equations 3.2 and 3.3.

Table 3. Estimated Pearson's correlation coefficients between selected explanatory variables

Explanatory Variable	NBF	BF	EG	UP	BB
GR	0.945^{***}	0.605^{***}	0.967^{***}		
DL				0.756^{***}	
NBF		0.691^{***}	0.950^{***}		
S				0.769^{***}	
R					0.899^{***}

Note: * represents significance at the 1% level**
Source: EKZNW data

As was predicted, there were a number of collinearity issues among variables. The highly correlated variables were grouped into wildlife quality (NBF, BF and EG) and a service variable (BB and R). When camps are omitted for the Occ% and RevPAR analysis, the collinearity between BB and R became almost perfect. This is because almost all destinations which have both chalets and a restaurant include breakfast in their chalet rates. An attempt to perform a tetrachoric or polychoric PCA on these variables was problematic because of the nature of the variables (binomial) and extremely high correlation. The latter causes a failure to generate results in Stata. The result is that polychoric and tetrachoric correlation matrices yield missing variables and cannot be used to estimate the PCs (for discussion on the various options available using PCA, see Section 3.4).

As a result of PCA not being useful, a number of options remain to address multicollinearity (Gujarati & Porter, 2009):

1) Obtain more data,
2) Use past information of relationships between explanatory variables,
3) Drop either of the correlated variables, and/or,
4) Leave the multicollinearity.

Obtaining more data was problematic because the data were collected from a tourist perspective, i.e. more data that could have possibly been collected (e.g. detailed species lists) would include aspects that are not readily available to prospective visitors when they are visiting a destination. For this reason, more data were not obtained. Past information on how explanatory variables are related is difficult to find because of the limited research of this specific nature undertaken in South Africa. However, certain related ecological literature aspects were taken into account when making decisions regarding potentially dropping a variable which has the disadvantage that it decreases the explanatory power of the model. However, an advantage is that it is a simple method, and if the variable dropped is carefully considered, there is a possibility that the remaining variables can be considered as proxies for more than what they actually represent. Leaving the variables in the presence of multicollinearity has the disadvantage that the collinearity may lead to spurious regression and, as a result, biased coefficient estimates. Due to the latter, the researcher chose to drop some variables. This was done in conjunction with examining additional literature specific to the variables in question.

With regard to the service level (R and BB), the researcher chose to drop the restaurant variable (R) for two reasons:

1) Although there is literature supporting the inclusion of R, some empirical studies find that the coefficients estimated are not significant (e.g. Wright, 2001). The reason suggested for this is that individuals pay for the use of the restaurant (i.e. their meal) and, thus, pay for the utility provided by the restaurant independently of their accommodation.
2) Bed and breakfast is a direct cost included in the accommodation cost thus it has a stronger theoretical basis for inclusion into the model.

Variables which captured game viewing quality, namely BF, NBF and EG, were highly correlated and were also all highly correlated with the physiography type GR (Table 3). The physiography variable GR was dropped because it was found to be non-significantly different from the M variable in the preliminary analyses. This is understandable because by the very nature of being a *Game Reserve* the value of visitors is based predominantly on the presence of game, rather than the type of surroundings. Thus, the three groups of physiography become land (L), Oc and DL, where L encompasses what was previously M and GR.

With regard to the remaining game viewing quality variables, namely BF, NBF and EG, the EG variable was dropped because NBF can act as a relevant proxy for game quality. This is because given the nature of the big five, each species requires a large area of land and consequently there is often an inclusion of other species in the parks that contribute to the wild-life. The term given to such species is 'umbrella' species because the conservation of such species ensures conservation of other species. They are also called 'key-stone' species because of the aura attached to viewing them, thus their conservation is often of public concern (e.g. the anti-rhino-poaching campaigns are largely privately supported). Despite the high correlation between BF and NBF, BF was retained because it may capture a separate premium or competitive advantage gained by having *all* of the big five species (e.g. Lindsey *et al.*, 2007) examined the effects on tourist preference of all the Big Five separately to the individual species).

The statistically significant correlations between UP and S, and UP and DL, were more problematic because although it is understandable that PAs close to urban areas would likely be small, it does not follow that all small conservation areas are close to urban areas. Similarly, although it is likely that a dam or lake near an urban area could potentially be developed as a tourism area, it does not follow that all dams and lakes are near such areas. The UP variable, constructed from relative position, captures a valuable aspect of competitiveness due to abundant alternatives in developed areas, and the factors relating to accessibility to other, city-based amenities. However, because it is a created variable rather than purely measured, and was collinear with both S and DL destinations, it was dropped.

4.3 Estimation results

4.3.1 Price regression on destination characteristics

After the adjustments due to multicollinearity, the final econometric model estimated for P was:

$$P_{it} = c + \beta_1 Oc_{it} + \beta_2 DL_{it} + \beta_3 DJ_{it} + \beta_4 DD_{it} + \beta_5 S_{it} + \beta_6 B_{it} + \beta_7 EB_{it} + \beta_8 SCG_{it} + \beta_9 EF_{it} + \beta_{10} NBF_{it} + \beta_{11} BF_{it} + \beta_{12} HC_{it} + \beta_{13} Ch_{it} + \beta_{14} LC_{it} + \beta_{15} V_{it} + \beta_{16} Z_{it} + \beta_{17} US_{it} + \beta_{18} TU_{it} + \beta_{19} TSR_{it} + \beta_{20} BB_{it} + \beta_{21} NSC_{it} + \beta_{22} WC_{it} + e \qquad (4.1)$$

The Tobit analysis estimated Wald χ^2 indicates an overall model statistically significant at lower than the 1% level (Appendix 1a; pg. 119), implying that the estimated Tobit model fits the data statistically significantly better than a model with no explanatory variables. Twelve of the estimated coefficients were statistically significant, with 11 at the 1% level and one at the 10% level. The likelihood ratio test comparing the Tobit estimation to the pooled regression model yielded a statistically significant result at lower than the 1% level, thus the Tobit model is justified. The correlation between the predicted variables and the fitted variables in the model was 0.93 yielding an R^2 goodness of fit estimate of 0.874 (Appendix 1b; pg. 119) (See Section 3.3.5.2). The guad-check procedure examines variation in results as a result of changing the number of quadratures used in the MLE (as outlined in Section 3.3.5.2). The results of the quad-check for Tobit regression of price on destination characteristics indicated that there was a difference of lower than 0.01% between estimations (Appendix 1c; pg. 120). Thus the results are robust to variations in the estimation procedure.

The bootstrapped Tobit (Appendix 1d; pg. 121) and GLS (Appendix 1e; pg. 122) models estimated with the same variables yielded almost identical results with similar statistical significances. In the GLS model, the Breusch and Pagan Lagrangian multiplier test for random effects yielded a large chi-squared value of 2469 which indicates that the random effects model is suitable for the data analysed (i.e. fixed effects model would be un-suitable) (Appendix 1f; pg. 122). The Wooldridge test for autocorrelation was highly insignificant (Appendix 1g; pg. 122) indicating that in the GLS model, autocorrelation was not a problem. Combined, all of these results indicate a highly robust estimated model and consistent results. The marginal effects for each explanatory variable were estimated at their means as per Appendix 1h (pg. 123) and are tabulated along with the coefficient estimates from the Tobit model (Table 4, pg. 66). The estimated marginal effects varied from the coefficient estimates of the Tobit model very little thus the latent dependent variable is very close to the actual observed variables. This may be because in the price regression, although prices are theoretically censored at R0 (i.e. you do not experience prices in the negative), there are none that are actually R0 thus the effect of censoring for the price below R0 has a low effect. The ensuing discussion is predominantly based on the marginal effects estimates because of their relevance to the current conservation prioritisation problem.

The positive coefficient estimate for Oc makes sense as the ocean variable embodies a set of characteristics that are typically associated with positive utility. Oc destinations have a guarantee that there will be beaches and waves and the presence of the sea. Given the size of ocean tourism (even outside of PAs) it is believable to expect that there will be a premium paid to visit such a destination, especially in pristine environmental surrounds. Given the high level of ocean-visit tourism, it's expected that a greater premium would be paid for ocean destinations when compared to DL or Land destinations. DL destinations, however, though they have boating and fishing opportunities, do not have the same "draw factor" as the ocean. The results indicate that DL destinations do not command significantly different prices from land destinations.

Location factors in the estimated model included DD, DJ and S. The estimated model appears and corresponding marginal effects estimates suggest that prices are dictated by distance from Johannesburg (DJ) rather than distance from Durban (DD) (which was not statistically significant). Of these, only the coefficient estimate for distance from Johannesburg was statistically significant (1%). The DD finding is surprising and is addressed further when it is compared to the results of the next sets of analyses (Occ% and RevPAR) (Section 4.4.2). The negative relationship of DJ with P makes economic sense when considered in conjunction with the characteristics framework. Increased time of travel would be expected to have a negative relationship with price because of the increased cost of travel. This concurs with findings by Nicolau & Mas (2006). Although their study did not directly cost the distance travelled, Jachmann *et al.* (2011), found that tourism popularity of PAs decreased with increased distance from hotels. Karanath & DeFries (2010) did not directly evaluate the effects of distance in their analysis of PA management and tourism, however, they included it as an important attribute with the expectation that increased distance would decrease popularity of a destination.

Table 4. Hedonic price analysis, summary of coefficient estimates and marginal effects

Variable Name	Expected relationship with P	β estimate	Estimated marginal effects	Explanation
Accessibility				
DJ	Negative	-76.25***	-76.25***	The price paid per bed night decreases by R76 per hour of travel from Johannesburg, *ceteris paribus*
DD	*Negative*	-1.71	-1.71	
Activities				
B	Positive	7.88	7.88	
EB	Positive	141.07***	141.07***	Exceptional birding commands a premium of R141 bed night, *ceteris paribus*
SCG	Positive	15.52	15.52	
EF	Positive	15.95	15.95	
NBF	Positive	12.84	12.84	
BF	Positive	184.60***	184.60***	The presence of all the Big Five has a cumulative value of R185, *ceteris paribus*
HC	Positive	19.47	19.47	
Physiography				
Oc	Unknown	183.22***	183.21***	Visitors to ocean destinations pay a premium of R183 per bed night compared to visitors to land regions, *ceteris paribus*
DL	Unknown	-26.11	-26.11	
S	Negative	-76.49***	-76.48***	Destinations in small protected areas receive on average R76 less per bed night, *ceteris paribus*
V	*Positive*	0.30	0.30	
Facilities				
Ch	Positive	167.82***	167.81***	Chalets on average command a price of R168 per bed night more than camping, *ceteris paribus*
LC	Positive	186.74***	186.73***	Accommodation in a log cabin commands a R187 premium per bed night compared to camping, *ceteris paribus*
Z	Positive	3.21	3.21	
US	Negative	-3.26	-3.26	
TU	Negative	-0.003	-0.003	
NSC	Positive	125.52***	125.51***	Accommodation codes which are non-self-catering command a premium of R126, *ceteris paribus*
Tourism Superstructure				
TSR	Positive	35.66**	35.66**	Three star rating increases the average bed night price by R36, *ceteris paribus*
Services				
BB	Positive	125.76***	125.76***	Destinations that include breakfast in the chalet rate generally command a premium of R126 per bed night, *ceteris paribus*
Special Events				
WC	*Positive*	-24.20***	-24.20***	Visitors during the World Cup paid R24 less than at other times, *ceteris paribus*

Notes: * and ** represent statistical significance at the 1 and 5% level respectively.**
Expected relationships with P written in *Italics* indicate potential problem areas in the results, discussed in text.
[1]Marginal effects were estimated at the means of each explanatory variable
Source: Data collected from EKZNW sales and advertising pamphlets.

The marginal effects estimate for S of –R76 indicates that PAs that are greater than 10 000 ha command price premiums. This aligns with expectations that smaller destinations would be cheaper. The theoretical basis for this is the assumption that a visitor to a destination desires some form of entertainment and/or exploring. Small destinations would possibly result in less area to hike and/or game drive and could lead to boredom of residents. It is likely that the range of wildlife present is also reduced because of the large home-range requirements of large and/or many rare species (Di Minin *et al*., 2013). No studies, to the author's knowledge, directly study the effect of PA size on P. However, a number of studies use size (or a proxy for size) as an input to an index for various natural asset base and/or tourism base indices (e.g. Cernat & Gourdon, 2012) or features of ecosystem health (e.g. Bojanic, 2011). Jachmann *et al*. (2011), found that the number of tourists was positively related with the size of the park. These studies reflect increased competitiveness/sustainability with increased size, supporting the results found in this study. Differences in magnitude of the effects are due to differences in aims of the studies and thus the methodology (unit measures) and applications of the studies.

With regard to the quality of birding, there is a small non-statistically significant premium paid for 'good' birding of about R8; however, if the birding is of an especially high quality there is a further increase of R141. The estimated low quality birding (B) coefficient is not statistically significant; however, the high quality birding (EB) estimate is statistically significant at the 1% level. This indicates that there is only an increase in value associated with high quality birding. This agrees with the current literature which predicts that devout birders will pay premiums in order to have the chance of spotting a very rare species (Jones, 2001; Vardman, 1980, 1982; Valentine, 1984 cited by Valentine & Birtles, 2004). Furthermore, this result justifies the separation of B and EB discussed in Section 3.3.3.

The quality of game viewing in a destination, as captured by SCG, BF and NBF, indicates that the most influential factor that commands a high price is the presence of all of the big five (BF), with a premium of R185. Surprisingly, the NBF coefficient estimate was not significant, which suggests that game viewing quality is not paid for unless all of the big five are present. SCG was positive which is expected, yet was not statistically significant; this may be because although increased game quality is valued, it is not the driving factor of utility. This result supports findings by Lindsey *et al.* (2007), and Di Minin *et al.* (2013), that large mammal species were the most sought after wildlife, closely followed by the presence of all of the big five. Wright (2001) found that the 'Big Seven' species (the big five plus whale and shark) commanded a premium of R60 per species. This study considered only the ‘Big Five’ because the ‘Big Seven’ were not mentioned in EKZNW advertising.

Papatheodorou (2002) describes the concept of value for money and a bargain, *ceteris paribus,* as the utility gained by virtue of the presence of a characteristic which is unpaid for. This is evident in hedonic price analysis because of product specific effects, which are at odds with the pure hedonic framework, but for which evidence has been found (Dickie *et al.,* 1997). The concept of a bargain in HPA is further explained in Section 4.4.1 because of the high relevance to the arguments in that section. At this stage, suffice to say that the presence of SCG or NBF would be regarded as a bargain, *ceteris paribus,* because the same price would be paid even in their absence; as a result their inclusion may simply offer customers more utility.

Alternatively, the presence of game other than the Big Five may offset possible disappointment when tourists are selecting destinations. This phenomenon, called loss aversion, has been found with regard to places of historic or cultural significance (Nicolau, 2011). This may explain the non-statistical-significance of coefficient and marginal effects estimates for other factors that are expected to be positively related with P, in this case HC and EF.

Variations in accommodation type and style are captured by LC, Ch, V and US. Premiums of about R187 and R168 are paid for log cabins (LC) and chalet (Ch) accommodation types above the price paid for camp or caravan accommodation per bed night. A note as to a good view (V) was expected to command a premium as rooms are priced higher; however, this was not the case. On closer inspection of the data, it is apparent that bookings with discounts are allocated to both accommodation codes with a noted view, and ones without. The result is that the variation in the average price per person is large (Figure 4). From the difference in the sizes of the standard deviations (error bars illustrated, Figure 4), the larger standard errors of destinations with no view are due to more destination codes which do not specifically have a good view.

Surprisingly, there was no significant difference in price per bed night at different unit sizes. It would be expected that the price per bed decreases as there are more beds in the unit due to decreased privacy and shared facilities. The lack of price difference may indicate destinations being more ‘family-friendly’, hence larger units being more sought after and thus having similar prices. Or, alternatively, there may be higher prices per person for larger units because there are less units available at those sizes. This possibility is supported by a negative relationship between TU and P, although the coefficient estimate was not statistically significant. The influence of discounts may also increase the variation and thus mask the effect of unit size. On average, for destinations that do not have good views, there is a trend that smaller unit sizes are more expensive (Figure 4). The presence of an electricity point (Z) was not found to statistically significantly affect price.

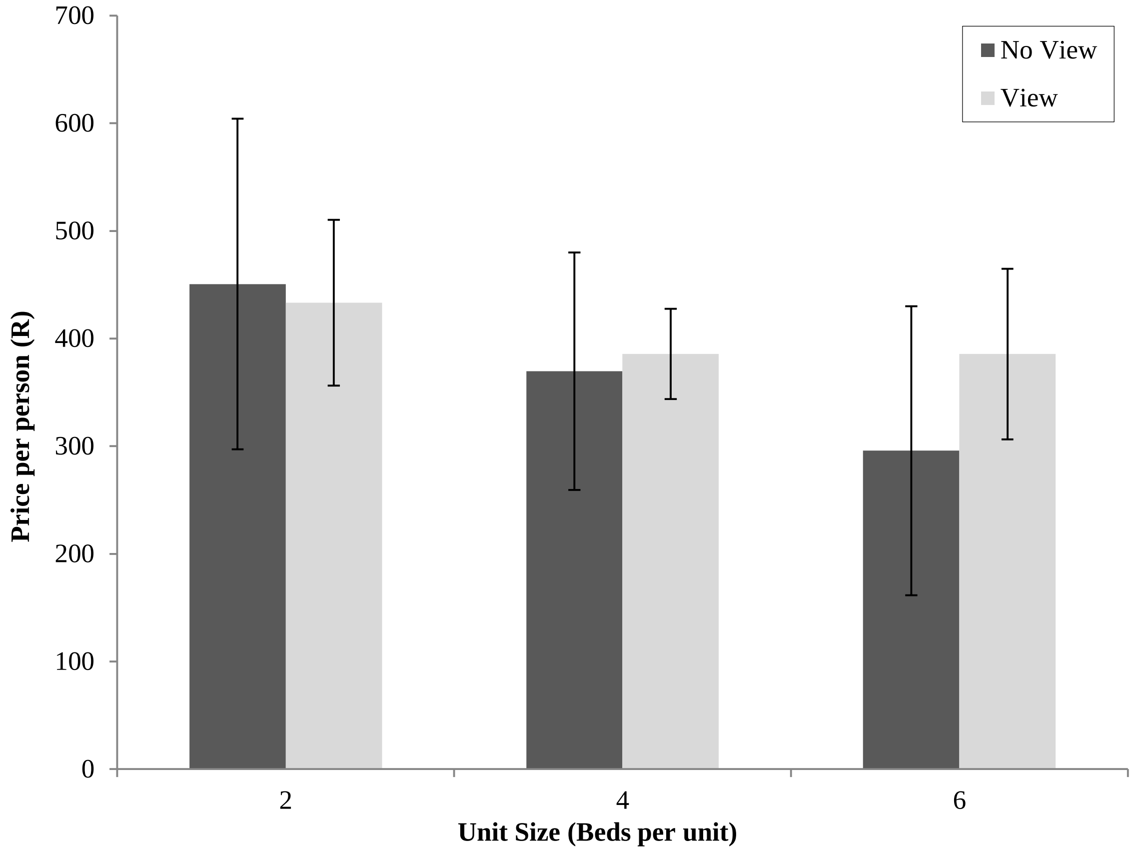

Figure 4. Price comparison between destination codes with and without a view at various unit sizes

Source: Data from EKZNW.

Service dummy variables, TSR, BB and NSC had estimated coefficients (price premiums) of R 36, R126 and R126 respectively (statistically significant at the 5%, 1% and 1% level respectively). These price premiums make economic sense in that a premium is expected to be paid in order to obtain the services associated with three star rating, as well as the premium for a meal (BB) or meals (NSC) that are consumed.

The dummy included in order to take into account for the 2010 Soccer World Cup event in South Africa had a negative estimated coefficient of about 24. This suggests that prices were lower during the World Cup. This was not expected as there is an impression that large national events should bring increased visitors to the country resulting in inflated prices. The Soccer World Cup is commonly associated with a boost for private industry (Whitson & Macintosh, 1996; Ferreira, 2011), often at the expense of the tax payer (Whitson & Macintosh, 1996; Baade & Matheson, 2004). In this case, tourism in EKZNW PAs would be expected to receive price (and possibly Occ%) premiums. On examination of the data, EKZNW ran a specific special over the time of the World Cup which may have resulted in the significantly lower incomes per night. Additionally, since most visitors for the World Cup are international, the bulk would typically be expected to book through a travel agent. Thus, the agent discount would explain the decreased price over the period. The total number of unit nights at a destination had no significant effect on the price per bed night. This is further discussed in Section 4.4.3 dealing with comparisons between the various models and competitiveness.

4.3.2 Occupancy regression on destination characteristics

Given the alterations in the explanatory variables due to collinearity (Section 4.2.2) the final model regressing Occ% on the characteristics of the destination is:

$$Occ\% = c + \beta_1 Oc_{it} + \beta_2 DL_{it} + \beta_3 DJ_{it} + \beta_4 DD_{it} + \beta_5 S_{it} + \beta_6 B_{it} + \beta_7 EB_{it} + \beta_8 SCG_{it} + \beta_9 EF_{it} + \beta_{10} NBF_{it} + \beta_{11} BF_{it} + \beta_{12} HC_{it} + \beta_{13} Ch_{it} + \beta_{14} LC_{it} + \beta_{15} V_{it} + \beta_{16} Z_{it} + \beta_{17} US_{it} + \beta_{18} TU_{it} + \beta_{19} TSR_{it} + \beta_{20} BB_{it} + \beta_{21} NSC_{it} + \beta_{22} Pa_{it} + \beta_{23} Inc_{it} + \beta_{22} WC_{it} + e \quad (4.2)$$

The Tobit regression was estimated with an upper limit of 100 and a lower limit of 0 by virtue of the nature of Occ% being a percentage between 0% and 100%. In the same way as for the price analysis, the model was also estimated using GLS and a bootstrapped Tobit model. The results of the bootstrapped Tobit model (Appendix 2a; pg. 124) were slightly different to the results of the Tobit model (Appendix 2b; pg. 125). The differences were only found in the statistical-significance levels of some coefficient estimates. The size and sign of the estimates were identical. The bootstrapped Tobit model Wald χ^2 of 652.01 was statistically significant at a less than the 1% level, again indicating a better fit than a model with no explanatory variables. The predicted dependent variables from the estimated model correlated with the actual dependent variables by 0.7267, yielding an R^2 of 0.53 (Appendix

2c; pg. 125) (for method of calculation see Section 3.3.5.2). After running the quadrature check of the Tobit regression (Appendix 2d; pg. 126), the differences as the number of quadratures increased was less than 0.001%, thus the results were robust to variations in the approximation procedure. Following Drukker (2002), it is assumed that the bootstrapped results are more accurate than the non-bootstrapped estimates. Thus, these results are reported and the bootstrapped model is used when estimating marginal effects (Appendix 2e; pg. 127) (Table 5). The signs (i.e. positive/negative) and statistical significances of the marginal effects estimates and the coefficient estimates are the same. The magnitudes of the marginal effects estimates are slightly smaller than the coefficient estimates as was expected (Section 3.3.5.2).

The GLS regression analysis of Occ% on characteristics of the destination estimated an overall model Wald χ^2 which was statistically significant below the 1% level (Appendix 2f; pg. 127). The magnitude of coefficient estimates and the majority of significances were of similar magnitude and signs. The estimated R^2 for the GLS model was 51%. The similarities in coefficient estimates across all three models indicate that the results are relatively robust to variations in estimation techniques. Post estimation tests for random effects (Breush and Pagan Lagrangian multiplier test) yielded a statistically significant result indicating that a random effects model is the correct model for estimation (Appendix 2g; pg. 128). The Wooldridge test for autocorrelation yielded a statistically non-significant F statistic as there was no autocorrelation problem (Appendix 2h; pg. 128).

Table 5. Occupancy percentage analysis, summary of coefficient estimates and marginal effects

Variable Name	Expected relationship with P	β estimate	Estimated marginal effects	Explanation
Accessibility				
DJ	Negative	-8.98*	-8.50*	Occupancy falls by 9% per hour of travel from Johannesburg, *ceteris paribus*
DD	*Negative*	-5.2	-0.50	
Activities				
B	*Positive*	-6.16	-5.83	
EB	*Positive*	-10.10	-9.56	
SCG	Positive	9.62	9.11	
EF	Positive	17.05**	16.14**	Exceptional fishing improves occupancy percentage by 16%, *ceteris paribus*
NBF	Positive	7.25***	6.87***	Occupancy increases, 7% per animal of the big five present, *ceteris paribus*
BF	*Positive*	17.38	16.45	
HC	Positive	14.85**	14.06**	Historical or cultural destinations experience a 14% higher occupancy percentage, *ceteris paribus*
Physiography				
Oc	Unknown	21.03*	19.91*	By virtue of being an ocean destination, the accommodation code retains a 20% occupancy more than inland destinations, *ceteris paribus*
DL	Unknown	-3.23	-3.06	
S	Negative	-18.21***	-17.24***	Destinations which are small in size experience lower occupancy percentages by 17%, *ceteris paribus*
V	Positive	12.88***	12.19***	Accommodation codes which experience better views are 12% more popular than other codes, *ceteris paribus*
Facilities				
Ch	Positive	33.18***	31.42***	Chalets experience 31% higher than camp occupancy, *ceteris paribus*
LC	Positive	30.69***	29.06***	Log cabins experience 29% higher occupancies than camps, *ceteris paribus*
Z	Positive	13.85***	13.11***	The presence of a plug increases the camp-site occupancy percentage by 13%, *ceteris paribus*
US	Negative	0.42	0.40	
TU	*Negative*	0.004*	0.004*	Larger destinations tend to have higher occupancy percentages by 0.004% per room night, *ceteris paribus*
NSC	Unknown	-18.81***	-17.81***	Non-self-catering destinations experience occupancy levels 18% lower than alternative destinations, *ceteris paribus*
Tourism Superstructure				
TSR	*Positive*	1.87	1.78	
Inc	*Positive*	-14.98***	-14.18***	Accommodation codes that are joint-ventures experience 14% lower occupancy percentages, *ceteris paribus*
Services				
BB	*Positive*	-23.96***	-22.68***	Bed and breakfast destinations experience occupancy levels that are 23% lower than other destinations, *ceteris paribus*
Pa	Negative	-13.36**	-12.65**	Paraplegic-friendly accommodation codes experience lower occupancy levels by 13%, *ceteris paribus*
Special Events				
WC	*Positive*	-6.38***	-6.04***	Over the period of the world cup, occupancies were 6% lower than other times, *ceteris paribus*

Notes: *, ** and * represent statistical significance at the 1, 5 and 10% level respectively.**
Expected relationships with P written in *Italics* indicate potential problem areas in the results, discussed in text.
[1]Marginal effects were estimated at the means of each explanatory variable
Source: Data collected from EKZNW sales and advertising pamphlets.

Location factors in the estimated Occ% model yielded results which generally were in line with the expectations. With regard to the Oc and DL dummy variables included, similar results were found to the P regression, with evidence that the utility derived from purely being at an ocean destination increases Occ%. However, the coefficient estimate for DL was not statistically significant. Similarly, within land destinations, the bulk of value is derived from location and wild-life viewing characteristics, as was shown by a strongly positive occupancy increase with the incremental increases of NBF (marginal effect of about 7%). The BF and SCG coefficient estimates were not statistically significant. These results are further discussed in light of findings by Lindsey *et al*. (2007), and Di Minin *et al.* (2013), and in comparison with the results of the P and RevPAR analyses in Section 4.4.1.

Other location factors influencing Occ% were the distance from Johannesburg (9% lower occupancy per hour of travel; 10% significance level) and the size of the destination PA (17% lower occupancy in small destinations significant at the 1% level). The distance variable is consistent with expectations and supports the findings of Nicolau & Mas (2006). Both the DJ and S coefficient estimates are similar to the results of the P model; hence, arguments and references from the discussion in Section 4.3.1 are relevant. Surprisingly, the DD coefficient estimate was again not statistically significant. This is consistent with the P model (Section 4.3.1) and may have some important implications for destination pricing and advertising (discussed further in Section 4.4.2).

Coefficient estimates for variables capturing the quality of birding were not statistically significant at either low (B) or high levels (EB). The lack of a statistically significant positive effect on occupancy suggests that the presence of good quality birding has no effect on the occupancy which is not expected. This presents an interesting point of comparison between the price results (positive) (Section 4.3.1) and the RevPAR result (non-significant) (Section 4.3.3 to come). Similar disparities between the P and Occ% coefficient estimates were found for EF and HC. Although both analyses estimated positive coefficient estimates for these variables, only the Occ% analysis yielded statistically significant coefficient estimates (both at the 5% level). The comparison and further discussion of these elements and supporting research from the literature is undertaken in Section 4.4.1.

Accommodation type dummy variables suggest that chalets and log cabins have higher Occ% than camps, *ceteris paribus*. The marginal effect estimate for LC (29%) was slightly lower than that for Ch (31%) which aligns with expectations. The noted presence of an exceptional view (V) and the presence of an electricity point in a camp site (Z) both yielded positive, statistically significant coefficient estimates at the 1% level (12.9% and 13.9% respectively). These findings agree with predictions, because a good view and/or a plug point are expected to increase the utility and hence the desirability of a site, *ceteris paribus.* Occupancy was un-affected by the size of each unit (US). A negative relationship between TU and Occ% was predicted because it is expected that more common destination codes would be less desireable, however, this was not the case. On average, larger destinations experienced higher Occ% of 0.004% per unit night (statistically significant at the 10% level), thus an increase in occupancy of a little under 1.5% per unit at the destination (calculated as the product of the marginal effect of one unit night and 365 days per year). This positive relationship could be because EKZNW has invested more effort in marketing larger destinations; it may also be as a result of larger accommodation codes being built at destinations with more desirable features. Regardless the cause, the implication is that the relative uniqueness of an accommodation code is not typically valued by visitors, rather, they are satisfied to stay in more common accommodation types.

Service level choices such as BB and TSR indicate that the star rating of the destination has no effect on the occupancy percentage, and that destinations selling bed and breakfast chalets have lower occupancies, *ceteris paribus.* This (BB) coefficient estimate (about -23%) is at odds with the expected relationship; it was predicted that BB would have a positive relationship with Occ%. This unexpected result may be due to the influence of the average room price and will be discussed further (Section 4.4.3). NSC destinations also showed a negative relationship with occupancy percentage (about -18%) with similar possible implications.

During the World Cup there were lower occupancy percentages by about 6%. Generally, the expectation is that large events would increase occupancies in destinations (du Plessis & Maennig, 2011). Althought the overall impact of the World Cup on South Africa tourism was lower than expected (du Plessis & Maennig, 2011), this was not to the same magnitude as that observed in this study. The possible implications of this are discussed further in Section 4.4.3.

Accommodation codes which are specifically adapted for paraplegic visitors (Pa) or are joint ventures (Inc) both experience lower occupancy rates (13 and 14%, respectively). The negative relationship between Pa and Occ% can be understood because accommodation codes which are paraplegic friendly would typically be withheld until they are requested specifically for a paraplegic visitor. The negative coefficient estimate for Inc (significant at the 1% level) disagrees with prior findings that collaboration should enhance competitiveness and hence Occ% (Powell, 1992; Ingram & Roberts, 2000; Ritchie & Crouch, 2003; Torres *et al.,* 2011). The possible reasons for this are outlined in a comparison with results estimated in the RevPAR analysis (Section 4.4.3).

4.3.3 Revenue per available room regression on destination characteristics

The final estimated econometric equation regressing RevPAR on destination characteristics was the same as that used for Occ% (Section 4.3.2). The bootsrapped Tobit analysis (Appendix 3a; pg. 129) was again presented as the most reliable of the results estimated (Table 6). The estimated regression Wald χ^2 of 803.97 was statistically significant at below the 1% level, with eleven statistically significant coefficient estimates. The calculated R^2 indicated that the model accounted for 61% of the overall variation in the sample ($(0.7786)^2$; Appendix 3b; pg. 129). The results of the bootstrapped Tobit model and the non-bootstrapped model (Appendix 3c; pg. 130) were very similar with only the effect of coefficient estimate for TSR becoming non-statistically significant. The quadrature check estimates showed that the results were relatively insensitive to the number of quadratures used to estimate the Tobit model (Appendix 3d; pg. 131). The largest changes due to quadrature number were well below 0.01%. The coefficient estimates and model fit Tobit regression were comparable in size and sign with the results estimated using GLS (Appendix 3e; pg. 132). Further tests on the GLS model yielded evidence that there was no autocorrelation (Appendix 3f; pg. 132) and that the estimation of the random effects model was preferable to the fixed effects model (Appendix 3g; pg. 132). The multiple estimations and tests show that the model was again relatively robust to estimation techniques. The marginal effects from the bootstrapped Tobit regression of RevPAR on the destination characteristics were estimated (Appendix 3h; pg. 133) (Table 6).

Table 6. Revenue per availiable room analysis, summary of coefficient estimates and marginal effects

Variable Name	Expected relationship with P	β estimate	Estimated marginal effects[1]	Explanation
Accessibility				
DJ	Negative	-102.83**	-92.47**	Revenue per available room night drops by R93 per hour of drive from Johannesburg, *ceteris paribus*
DD	Negative	20.84	18.74	
Activities				
B	Positive	-21.79	-19.59	
EB	Positive	85.50	76.89	
SCG	Positive	76.13	68.46	
EF	Positive	66.28	59.60	
NBF	*Positive*	29.43	26.46	
BF	Positive	576.04***	518.01***	The presence of all of the big five results in accommodation units generating an additional R518 per unit night, *ceteris paribus*
HC	Positive	52.55	47.25	
Physiography				
Oc	Unknown	196.61	176.80	
DL	Unknown	-98.96	-88.99	
S	Negative	-156.06***	-140.34***	Small destinations yield R140 less than alternative destinations, *ceteris paribus*
V	Positive	126.20**	113.49**	Accommodation codes with a good view (noted in charges) generates an additional R113 per unit night, *ceteris paribus*
Facilities				
Ch	Positive	365.88***	329.02***	Chalets generate an additional R329 per unit night, *ceteris paribus*
LC	Positive	429.92***	386.61***	Log Cabins generate an additional R387 per unit night, *ceteris paribus*
Z	Positive	6.47	5.82	
US	*Negative*	46.77***	42.06***	Larger units yield an additional R42 per unit night, *ceteris paribus*
TU	Negative	0.03	0.03	
NSC	Unknown	-249.90***	-224.72***	Non-self-catering accommodation codes yield R225 less per unit night, *ceteris paribus*
Tourism Superstructure				
TSR	Positive	105.74*	95.08*	Three star accommodation codes generate an additional R95 per unit night, *ceteris paribus*
Inc	*Positive*	-135.31***	-121.68***	Accommodation codes that are joint-ventures experience yield R122 less, *ceteris paribus*
Services				
BB	Positive	-59.71	-53.70	
Pa	Negative	-182.34**	-163.97**	Paraplegic-friendly accommodation codes yield R164 less than alternatives, *ceteris paribus*
Special Events				
WC	*Positive*	-81.18***	-73.00***	Over the period of the World Cup, RevPAR decreased by R73 per unit night, *ceteris paribus*

Notes: *, ** and * represent statistical significance at the 1, 5 and 10% level respectively.**
Expected relationships with P written in *Italics* indicate potential problem areas in the results, discussed in text.
[1]Marginal effects were estimated at the means of each explanatory variable
Source: Data collected from EKZNW sales and advertising pamphlets.

Note that in this section, results are only briefly discussed for the RevPAR model estimations. The reason for this is that the discussion of these values is greatly enhanced by comparison with results estimated in the P and Occ% models. These in-depth discussions comparing the marginal effects from the different analyses are undertaken in Sections 4.4.1-4.4.3.

Location factors suggest that there is no statistically significant difference between land destinations (the default), ocean destinations (Oc) and dam/lake destinations (DL) as they all do not have statistically significant coefficient estimations. Small destination PAs yield lower revenues than larger areas (by R140) which is consistent with the findings in both the P and Occ% estimations. Distance of travel factors suggest that the distance from Johannesburg is still the more important factor to consider between DD and DJ, with the marginal effect of one hour of driving from Johannesburg resulting in a R92 decrease in RevPAR.

Factors affected by location such as the quality of birding, the presence of small or common game and the presence of places of historical or cultural significance and the presence of exceptional fishing had no significant effect on RevPAR. This was surprising as it appears to indicate that there is no relationship between the relative levels of attraction factors and PA incomes. It is, however, worth noting that the BF variable for the presence of the big five had a highly statistically significant and positive coefficient estimate (R518). This indicates that although there appears to be no notable value placed on smaller species (i.e. SCG and NBF), the highly iconic big five are still highly sought after. This is in agreement with previous studies which found that the big five species are some of the top priority species for tourists to South African PAs (Lindsey *et al.,* 2007; Di Minin *et al*., 2013). Despite the high statistical significance of BF, the finding that NBF was non-statistically significant is surprising because previous studies in South Africa found that there is also utility derived from individual Big Five species (Lindsey *et al.,* 2007; Di Minin *et al*., 2013). This may indicate that there could possibly be different marketing strategies employed for different species, e.g. an area which has a lot of leopard may advertise high chances of a leopard sighting. Further discussion of the factors influencing and influenced by all of the attractant variables (i.e. BF, NBF, EF, B, EB and HC) are discussed in Section 4.4.1.

Coefficient estimates for LC and Ch were positive and statistically significant at the 1% level. This indicates that there are much higher revenues per available unit night for hutted accommodation codes than for camping accommodation codes which aligns with expectations. Interestingly, log cabin accommodation codes were shown on average to have a higher yield than chalets codes. RevPAR for accommodation codes was further enhanced by good views, shown by a positive, statistically significant coefficient estimate for V of R113. The presence of an electricity plug in camp sites had a positive, non-statistically significant coefficient estimate.

Service levels indicated by TSR had a statistically significant (at the 10% level) coefficient estimate of R95 per unit. This was expected because TSR is a widely accepted quality indicator for accommodation destinations, thus should have a significant positive relationship with RevPAR. The presence of bed and breakfast (BB) was not statistically significantly related to RevPAR, however, NSC facilities had a significant (at the 1% level) negative relationship with RevPAR with a coefficient estimate of almost –R225. Facilities that are paraplegic friendly tend to yield less than alternative accommodation codes, shown by a marginal effects estimate of -R164 (Significant at the 1% level). Joint venture destination codes also yielded lower incomes per unit night (-R122, coefficient estimate, statistically significant at the 1% level) than non-joint venture accommodation codes. This result is consistent with the P and Occ analyses; however, as noted before (Section 4.3.1 and 4.3.2) the findings are not consistent with expectations and other literature. These findings, along with coefficient estimates for TU, US and WC are best compared to findings of the P and Occ% models and thus discussed in Section 4.4.3.

4.4 Comparison between models: Implications for competitiveness and prioritisation

Competitive advantage may be gained by a destination by either having a product with a high price, or a product that is very popular and experiences high occupancies. The relationship between P, Occ% and RevPAR is typically fairly complex and thus can be difficult to understand and interpret (O'Neill & Mattila, 2006). Because of this, none of the three variables alone necessarily captures the various dimensions of competitiveness in this study. An example is clearly evident, where a destination may experience high occupancies because of high price discounting, thus overall possibly being out-performed by a destination with lower occupancies (Middleton, 1994; Moutinho & Peel, 1994).

If the competiveness of a destination is rooted in the characteristics of the product sold there (as is presented in this study), technically, the overall effects on P, Occ% and RevPAR should also be compared for the same variables. For this reason, this section compares the results across the three models outlined in Section 4.3. For ease of reading, the discussions of variables are separated into three groups: destination competitiveness factors (Section 4.4.1); location factors (Section 4.4.2); and services/product factors (Section 4.4.3).

4.4.1 Destination attribute competitiveness and prioritisation

The three models analysed regressed various indicators of competitiveness on characteristics of the product demanded. P and Occ% are the most common of these indicators in the literature, primarily because access to such information is easier than that of actual revenues captured by destinations. For this reason, although RevPAR is suggested as the more desirable of the three indicators, there is less literature on such results. Competitiveness of destinations has been said to take into consideration two important dimensions, the price paid to stay at a destination and the level of occupancy achieved by the destination in question. With specific focus on the values placed on, and the utility derived from, a tourist experience, this section highlights the influence of the relationship between P and Occ% and its influence on competitiveness.

Table 7 below shows the marginal effects estimates for the P, Occ% and RevPAR models for a number of key explanatory variables. These variables are most important in the analysis of competitiveness as factors related to the events or activities that visitors experience while at a destination. The pricing (P) of destinations that have these various characteristics is important in order to try and encourage consumers to pay the requested price in volumes (Occ%) that are sufficient in order to ensure the best possible financial incomes (RevPAR). The table shows the relevant coefficient estimates for a number of such characteristics.

Table 7. Marginal effects estimated for characteristics of attraction at destinations

Regression	P	Occ%	RevPAR
EF	15.95	16.14**	59.6
B	7.88	-5.83	-19.59
EB	141.07***	-9.56	76.89
HC	19.47	14.06**	47.25
NBF	12.84*	6.87***	26.46
BF	184.60***	16.45	518.01***
SCG	15.52	9.62	68.46

Note: *, ** and * represent statistical significance at the 1, 5 and 10% level, respectively.**
Source: Extracted from tables 4 (pg. 66), 5 (pg. 72) and 6 (pg. 76).

Exceptional fishing (EF) had no statistically significant effect on P, *ceteris paribus*, yet a statistically significant positive relationship with Occ% would indicate that exceptional fishing locations would consistently do better, *ceteris paribus.* This is, however, not the case with RevPAR yielding a non-statistically significant coefficient estimate. The result is that although there appears to be increases in Occ% when exceptional fishing is available, the effects on price may not alter the overall RevPAR. This result is surprising especially as fishing has been found to be a relatively large recreation pastime (Ditton *et al*., 2002; Bauer & Herr, 2004). This is most likely as a result of the nature of fishing as an activity. Exceptional fishing is most commonly found in relatively remote, hard to access locations, thus the accommodation type may tend to be more rustic (e.g. camping or cottages) and thus be relatively cheaper. Any overall increase in incomes as a result of good fishing may be hidden by these influences. Given these results, the inclusion of EF in conservation prioritisation decisions could be argued against (due to the failure to affect RevPAR), but could also be supported from the effect on Occ%.

Birding (B) has no statistically significant effect in any of three models; however, exceptional birding (EB) had a highly significant, positive relationship with P but a non-statistically significant, negative relationship with Occ% and an overall non-statistically significant relationship with RevPAR. This may have important implications for the relative pricing of destinations that are advertised targeting visitors deriving utility from exceptional birding. The results imply that birding is highly valued by EKZNW and a few visitors, but that the volume of visitors that value exceptional birding is not large enough to markedly affect revenue. Birding markets are generally considered a specialised niche with very low volume, high paying customers (Cordell *et al.,* 1999; Biggs, 2013). This supports findings by Di Minin *et al.* (2013), who found that birding was a favourite in parks for less than 1% of visitors. However, if a specific rare species is present, birders may potentially travel far distances and pay high prices for a chance of spotting it (Pers. Comm. Escott, 2013). Given that birding is a niche market, and that it may even be species-specific, the way in which birding is advertised may be very important. By re-visiting the advertising data collection points (EKZNW internet sites and pamphlets) about each destination, there was often mention of the number of species and occasional mention of specific species. There were, however, no links to complete bird lists for destinations, neither were there an easily found form of 'birder's guide to EKZNW parks.' Two species and destination list were found after extensive search; however, only one had links to this list and additional information. In internet search using Google for 'Birding routes, KZN,' EKZNW did not appear in the first 20 results. The overall implications of these findings are that the low RevPAR associated with exceptional birding, despite the high price associated with it, may result as a combination of (1) low occupancies due to over-pricing, and (2) poor marketing of destinations' birding benefits. This has several implications for management and competitiveness which are presented in Section 5.3.1.

Proximity to places of historical or cultural significance had no significant effect on P. However, it had a significant effect on Occ%, and once again no significant effect on RevPAR. This can be explained by Nicolau (2011) who found that the presence of a cultural attraction in a destination does not tend to influence P. Rather it has the effect of decreasing the potential regret experienced by visitors. Thus, more visitors may visit a destination because their 'fear of disappointment' is less, *ceteris paribus*, not necessarily because they *value* the cultural significance of that area more. A similar relationship may be observed for historical destinations. If this were the case, HC would not significantly affect P, or RevPAR, but it may affect Occ% which is in line with the findings of this study. Despite this possibility, there is evidence in the literature of historical and cultural factors making marked income contributions in certain instances (Silberberg, 1995; Lynch *et al.*, 2011). This implies that EKZNW staff should give more thought into how EKZNW can benefit from places of cultural or historical significance under their control. Specific mention can be made of battlefield tours which have proven successful in a number of global cases, e.g. World War II tourism (Dunkley *et al*., 2011) and many other locations (Butler & Suntikul, 2013). A recent study in South Africa found that cultural experiences in South Africa received the lowest ratings from tourists (Ivanovic, 2011). This indicates that despite a rich South African heritage, there is much more that can potentially be done by EKZNW in order to sell such products better. No clear pathways of battlefield tours or historical routes are advertised by EKZNW, despite other local agents finding this a profitable enterprise (for example, see Fugitives Drift (2014) and Isibindi Zulu Lodge (2014)).

With regard to the quality of game viewing, SCG has no significant effect on P or RevPAR, but it has a statistically significant coefficient estimate for Occ%. This may potentially be caused by a similar phenomenon as HC, where preference for the presence of SCG is expressed, but it is not the main cause of choice and is not highly valued. Papatheodorou (2002) explores such cases with a perspective of 'value for money.' He suggests that when a characteristic is expected to have a positive relationship with price, a negative or null coefficient estimate may indicate that a bundle of goods containing that particular characteristic is 'good value for money'. Conceptually, consider a case where an attribute, x_1, of a good, g, is expected to have a positive relationship with P. In HPA, as performed in this study, the coefficient estimate of *x* may be non-statistically significant, or negative, however, the product is still sold for price *P*. The implication is that the value placed on the product is a result of other characteristics, $x_{2...}x_n$, within the product. As a result, the purchaser of *g* pays for those characteristics ($x_{2...}x_n$) and yet still receives the benefits associated with x_1. Thus the purchaser receives a 'bargain', *ceteris paribus*. Taking this into consideration, the coefficient estimate for SCG in the Occ% model in light of the other two analyses would suggest that SCG is regarded as good 'value for money' or a 'bargain', *ceteris paribus.*

The number of the big five (NBF) is estimated to increase both P and Occ%. However, the positive coefficient estimate for RevPAR is not statistically significant. The implication is that although the NBF present increases value and desirability of a destination, it may not increase the overall performance (RevPAR) of the destination. Rather, the cumulative value of having all of the big five (BF) present is of more value. Note also that the high marginal effect estimated from the model for BF (R518 for RevPAR) may be closely linked to the presence of lion. Within the data set, all destinations containing lion contain all of the big five species. Given the iconic status given to lion as 'king of the beasts' and the level of publicity gained by dangerous animals, this may play a large part in the value attached to the big five. This preference of tourists to see lion was confirmed by an ex-EKZNW ecologist (Gordjin, 2013) and supports findings by Lindsey *et al*. (2007), that large predators are the most desired animal group to see in the wild, followed by the big five. Di Minin *et al.* (2013), found that lion, leopard and elephant, which are all part of the big five, were the most common favourite species. Individual species analyses suggest that the most desired predator to see in the wild is leopard, followed very closely by lion. In this study, lion is, however, likely to be the main cause for value attached to the big five because leopards are comparatively rare sightings. This value attached to lion, added to the presence of all the big five whenever lion are present, may explain the large positive coefficient associated with BF as compared to NBF.

Given the discussions regarding BF and NBF and the findings of Di Minin *et al*. (2013), outlined above, EKZNW may be able to improve the competitive performance of areas that do not have the big five by marketing specific species. For example, if a destination has comparatively high leopard sightings, this could be highlighted in marketing. Such target marketing could be replicated for destinations that have large elephant herds.

4.4.2 Location factors, competitiveness and prioritisation

Specific location factors are a small group of variables that include the actual physical characteristics of each destination. Within the three models estimated in this study, these included the distances from Durban and Johannesburg, the physical size of the destination PA and the overall physiography of the destination. The marginal effects for these variables for all three estimated models are shown below (Table 8).

Table 8. Marginal effects estimated for location specific physical factors

Regression	P	Occ%	RevPAR
S	-76.48***	-17.24***	-140.34***
DJ	-76.25***	-8.50*	-92.47**
DD	-1.71	-0.50	18.74
Oc	183.21***	19.91*	176.80
DL	-26.11	-3.06	-88.99

Note: *, ** and * represent statistical significance at the 1, 5 and 10% level, respectively.**
Source: Extracted from tables 4 (pg. 66), 5 (pg. 72) and 6 (pg. 76).

The most surprising outcome of the location factors was the consistently stronger influence of the distance from Johannesburg than the distance from Durban. A summary of some descriptive data obtained from EKZNW suggests that almost 60% of visitors are from KZN, followed by around 30% from Gauteng. A possible cause of the relatively greater influence of the distance from Johannesburg may be the presence of the country's largest international airport and population there. Thus, EKZNW may set prices according to targeting incomes from the Gauteng area. If this is the case, the rack price (base price) is set taking potential Johannesburg customers into account, and this would influence Occ% and RevPAR. Note that the 'pegging-price' (i.e. the prices set by EKZNW) would influence heavily on the results of these analyses. This is especially true given that the data are collected from one company with multiple destinations, thus may not show a 'pure' market overview of competitiveness. Given the highly statistically significant marginal effect of DJ in all analyses, this would be a key variable to consider for applications to prioritisation of conservation areas.

The size of the PA had the expected effect of decreasing income and attractiveness at destinations which are smaller in size. This was constantly observed through decreased P, Occ% and RevPAR in small destinations. This is in line with expectations outlined (Section 3.3.3). DL destinations also had negative coefficient estimates, but the lack of statistical significance suggests there are no differentials paid between land and DL destinations for the study sample. There may be potential for improving RevPAR and occupancy by varying prices charged for accommodation at such destinations.

Compared to DL or land destinations, Oc destinations perform better by virtue of their physiography. Although extra utility values are added (especially to land destinations) by the presence of quality game and/or the variations in accommodation types and services, the location of a destination near the ocean gives it a distinct advantage. The higher utility associated with Oc destinations is likely to result from the utility associated with beach-side resorts. The literature on ocean/beach tourism destinations indicates the extent to which this type of destination has been popular over the last few decades (e.g. Gray, 1974; Papatheodorou, 2004). The evidence that Oc destinations appear to out-perform inland and/or DL destinations indicates that beach access may an important characteristic to consider in prioritisation of conservation areas.

All of the variables discussed in this section are especially applicable for the prioritisation of conservation areas by EKZNW because they are relatively ‘immobile’, i.e. if a potential PA is not on the coast, there is no way to move it and place it on the coast. Similarly, if a potential PA is 5 hours drive from Johannesburg, this cannot be altered and the decision problem is whether to prioritise that area or not compared to other areas. The inherent complication in this decision arises when economic and ecological criteria may be contradictory.

4.4.3 Competitiveness of services and products

This section focuses on aspects related to the type and quality of the accommodation and the level of services available. Similar to the effects of pricing and competitiveness for location-related attractants, the comparison of results between the three models can help to identify potential changes for EKZNW management in order to enhance competitiveness. Table 9 shows the remaining marginal effects related to competitiveness in the three estimated models.

Table 9. Estimated marginal effects for service and product attributes

Regression	P	Occ%	RevPAR
LC	186.73***	29.06***	386.61***
Ch	167.81***	31.42***	329.02***
TU	-0.003	0.004*	0.03
US	-3.26	0.40	42.06***
V	0.30	12.19***	113.49**
Z	3.21	13.11***	5.82
TSR	35.66***	1.78	105.74*
BB	125.76***	-22.68***	-53.70
NSC	125.51***	-17.81***	-224.72***
Inc	-	-14.18***	-121.68***
Pa	-	-12.65**	-163.97***
WC	-24.20***	-6.04***	-73.00***

Note: Where *, ** and * represent statistical significance at the 1, 5 and 10% levels, respectively.**
Source: Extracted from tables 4 (pg. 66), 5 (pg. 72) and 6 (pg. 76).

The most obvious comparison of accommodation attributes is the type of accommodation. The model estimated large and positive coefficients for both LC and Ch. This was expected especially since the omitted dummy variable was the camping variable. Surprisingly, the LC estimation was higher than the Ch estimation. This would not normally be expected as LC are generally a more rustic accommodation form. It is possible, however, that the cause of this is that chalets, as more up-market accommodation, have been built in higher resource-endowed locations. If this is the case, part of the value of a chalet may be more closely associated with these resources. The number of units of each accommodation code (TU) had a statistically-significant coefficient estimate in only the Occ% model. This suggests that from a consumer perspective, there is currently no preference shown for more or less common accommodation codes in the study.

The estimated coefficient for size of the unit (US) was not statistically significant for either P or Occ%, however, it was statistically significant for RevPAR. This is because P is calculated on a per person basis whereas Occ% and RevPAR are compiled on a per unit basis. Thus if P per person and Occ% per unit are not statistically significantly different as unit size increases, it follows that the RevPAR should increase proportional to the size of the unit, i.e. US. Thus the statistical significance of the estimated coefficient for US in the RevPAR model is justified despite the non-significance in the P and Occ% models. The implication is that larger units generate higher revenues. EKZNW management would be advised to do a comprehensive breakdown of construction and maintenance costs for varying unit sizes in order to calculate if smaller or larger units would be more profitable overall. US provides a good example of an area where competitiveness using purely P or Occ% analysis would fall short of indicating relative competitiveness of differing products.

The presence of a preferable view within a destination code has no statistically-significant effect on P (despite a premium paid) which is possibly due to individuals visiting with various discounts, or travel agents which decrease price paid. However, the pricing structure means that codes with a view would still command a premium even if the variation makes the result non-statistically significant. The preference for chalets with good views statistically-significantly increases Occ% of these codes and thus overall increases RevPAR. This suggests that in the event of building more chalets/log cabins, it would be worth the view being taken into account as codes with good views are preferable to codes without such views. Additionally, to generate more income, it may be worth examining the currently built accommodation codes at destinations where there are no view distinctions made and considering if it would be worth grouping them into 'view' and 'non-view' groups. Thus, a small premium could be added to the chalets with a better view, and evidence suggests that visitors would be willing to pay a premium. Coefficients estimated for the presence of an electricity plug in a camp site, Z, were not statistically-significant for P or RevPAR; however, the statistically significant coefficient estimate for the Occ% model shows that there is definite preference for destinations containing plug points.

Service levels and choices of additional accommodation options are captured by TSR, BB and NSC. TSR findings indicate that although there is a price premium paid for TSR destinations, there is no statistically significant effect on Occ% and consequently the effect on RevPAR is only statistically significant at the 10% level. Thus, although the set price by EKZNW indicates that there is a higher value product, this is not clearly displayed by visitors to the destination. This is shown by no improvement in Occ%, and thus no improvement in RevPAR. These results could be attributed to two possible causes: Firstly, if the price premium paid for TSR accurately reflects the utility gained on average by customers from staying at a TSR resort, *ceteris paribus*, then the potential tourist may be indifferent with regard to choice of TSR accommodation when compared to alternative options. This would be because the loss of utility due to an increase in price is almost exactly off-set by the utility gained from the benefits associated with TSR codes and, as a result, the more expensive destination is equally attractive as a cheaper, less luxurious destination. The second possible cause is the lack of advertising of the destinations. As noted in Section 3.3.3, there was very little or no mention of the star rating of the resorts on the bulk of EKZNW marketing media.

There was one pamphlet, and one separate web-site that advertised them and referred to the star rating. As a result, potential visitors may not be aware of the possible utility gains as a result of TSR and thus do not make purposeful choices to visit such destination codes.

The BB variable capturing the presence of bed-and-breakfast services had a positive relationship with price which was expected as there is additional utility associated with an extra meal. There was, however, a negative association with Occ% and non-statistically significant, negative coefficient estimate in the RevPAR model. The implication is that from a tourist perspective in this sample, the balance between price and utility gain in BB accommodation codes is directed in such a way that the price increase is more than the overall utility increase, and as a result BB destinations are viewed as less preferable. The overall non-statistically significant change in RevPAR indicates that from the destination (EKZNW) perspective, the decrease in Occ% is offset by the increase in P. Another perspective may be that consumer preference is to provide their own meals, as this could be a source of more family time together and holiday enjoyment. The implication is that although there is no difference with RevPAR, there is lower overall profitability associated with BB destinations because there is additional cost associated with BB services. This would support studies of hotel performance where full service rooms are less profitable than non-service rooms (O'Neill & Mattila, 2006). There is also possibly large under-utilised capacity at the destination (as a result of low Occ%). This suggests that there are possible improvements in RevPAR available through improved marketing of the benefits associated with BB, possibly the quality of the meal, flexible meal times or additional package deals or discounts that could alter Occ% without markedly decreasing price.

The non-self-catering (NSC) codes had a large positive estimated coefficient with P, and negative coefficients associated with Occ% and RevPAR. The most probable reason relates to the price differential associated with purchasing food, or the difficulty of self-organised meals in a NSC destination code. Tourism budget and time are said to be the two primary conflicting factors (Stabler *et al.*, 2010). NSC presents a trade-off between budget and effort associated with 'home' produced meals, thus it is possible that for the majority of tourists visiting EKZNW PAs in the sample, there is a stronger association with budget constraint than the effort involved. It is also possible that tourists prefer self-catering facilities as it adds flexibility to meal times and/or choices and in most cases, when desired, an option of a visit to the restaurant would still be available.

Accommodation codes which are paraplegic friendly, (Pa), show a negative relationship with Occ% and RevPAR. This is not surprising as they are expected to be 'with-held' from the bulk of tourists in order to be available for paraplegic individuals. The more worrying result, however, is the Inc variable for joint-venture accommodation codes. The negative association with Occ% and RevPAR suggests that they are treated as less preferred codes. If this was known to potential investors or partners, it could form a serious dis-incentive to invest or partner with EKZNW. Where joint-ventures or market linkages are expected to improve profitability and marketing (Powell, 1992; Ingram & Roberts, 2000; Ritchie & Crouch, 2003; Torres *et al.*, 2011), this is not the case. The nature in which joint ventures are undertaken and the type of accommodation codes which are established through them may need to be re-thought. Marketing strategies could allow for the public to observe that there is a partnership with external entities in order to promote tourism and through that, conservation. Evidence of this, depending on how it is marketed, can allow the public to feel that they are an integral part of the conservation initiative and thus make them more willing to pay for an experience in the PA that they are assisting in conserving. This is supported by empirical research (Ballantyne *et al.*, 2009) showing that wildlife tourism management practices that enlist tourists as conservation partners are most likely to succeed in attempting to meet both the needs of tourists and conservation. This includes communicating the reasons for tourist or conservation constraints, and keeping tourists informed with regard to best interactions with wildlife.

The last variable is WC, specified to capture the effects of the 2010 World Cup as a national event. The WC time period was associated with lower prices, lower occupancies and statistically significantly lower incomes per room. This is surprising as the predictions associated with such events are predominantly of increased incomes due to increased visitors. Although the overall effect of the 2010 World Cup in South Africa was lower than expected (du Plessis & Maennig, 2011), such a negative result is surprising. International tourists that would usually travel to game reserves were possibly either put off by the perceived increased prices of travel at the time (e.g. air flights) or they chose rather to spend their money on soccer-related expenses such as mementoes and attending matches. For South Africans, they may have spent time and money focussed more on the soccer festivities of the time than on typical, South African PA holidays. These effects are all combined with a special promotion which was run by EKZNW over the period which could account for the decreased prices. A possible criticism of the use of this variable is that the scale of event was impractical for site specific competitiveness of these destinations. Events can scale from an international level such as was used in this instance, to much smaller, such as weddings and conferences. This study shows that national events may not have the positive impact commonly quoted, however it does not consider smaller scale events. This may be an area of future research where the timing of small events such as weddings and conferences are analysed in relation to competitiveness.

4.5 Ordering of conservation priorities

4.5.1 Application of the models to the prioritisation problem

Given the findings of the three models, the variables for prediction of tourism potential were ranked into three groups. The first grouping was according to RevPAR, the second was according to Occ% and the third was according to P. Each rank was constructed by summing the products of the attributes of the potential destination and the marginal effects for those attributes from the model in question. Mathematically, for each potential conservation area, *p*, according to RevPAR rank, *r*, the conservation rank C_{rp} is given by:

$$C_{rp} = \sum_{i=1}^{i=n} \Delta\beta_{rn} X_{ip} \tag{4.3}$$

where the number of attributes (*X*) taken into consideration is *n*, for each potential conservation area, *p* and $\Delta\beta_{rn}$ is the marginal effect calculated for the estimated RevPAR model for each characteristic. This study suggests that conservation areas should be prioritised according to their natural and location advantages; this implies that after a destination is selected, any combination of man-made capital could be invested, i.e. different accommodation types or facilities. In order to compare only relative site advantage, all facility and/or service coefficients (namely Ch, LC, V, Z, US, TU, TSR, BB, NSC, WC, Pa, and Inc), were set to 0. It is noted that V is technically a site attribute; however, the decision of where to construct accommodation within the destination is a micro-decision, whereas this is a macro-prediction of relative priority. As a result, the equation to calculate conservation rank, C_{rp}, for destination *p* is:

$$\begin{aligned} C_{rp} = 176.80Oc_p - 88.99DL_{rp} - 92.47DJ_p + 18.74DD_p - 140.34S_p - 19.59B_p \\ + 76.89\, EB_p + 68.46SCG_p + 59.60EF_{rp} + 26.46NBF_p + 518.01BF_p \\ + 47.25HC_P \end{aligned} \tag{4.4}$$

And the equivalent equation for the second Occ% (O) rank, C_{op}, is:

$$C_{op} = 19.91Oc_p - 3.06DL_p - 8.50DJ_p - 0.50DD_p - 17.24S_p - 5.83B_p - 9.56\,EB_p + 9.62SCG_p + 16.14EF_p + 6.87NBF_p + 16.45BF_p + 14.06HC_P \quad (4.5)$$

The final equation, for conservation ranking according to RevPAR, C_{pp}, is:

$$C_{pp} = 183.21Oc_p - 26.11DL_p - 76.25DJ_p - 1.71DD_p - 76.48S_p - 7.88B_p + 141.07\,EB_p + 15.52SCG_p + 15.95EF_p + 12.84NBF_p + 184.60BF_p + 19.47HC_P \quad (4.6)$$

where symbols for all of the equations in question have been defined (Table 1, Section 3.3.3, pg. 44-45).

Data were collected on the characteristics of ten potential conservation areas currently under consideration by EKZNW. The marginal effects estimates for each attribute under consideration, along with the specific attributes of each site are presented in Table 10 (overleaf). Variables that are exact and measured include the distance measures, DJ and DD, and the size measure (Ha), which is used to allocate the binomial size variable for small destinations (S). DJ and DD were calculated in the same way as in the previous models using Google Earth estimated travel times. Size estimates of the potential conservation areas were collected from geographical information system (GIS) maps of the areas. These were provided by the research department at EKZNW. Variables such as B, EB, SCG, EF, NBF, BF and HC are allocated according to:

1) Proximity to parks of similar species/capacity that could potentially assist in translocation; closer location to such parks implies increased ease of translocation and thus higher potential of containing these species.
2) Size (small destinations cannot contain the big five purely due to size restrictions), thus destinations classed as small have a disadvantage.

3) Physical features such as dams that could potentially be developed as fishing destinations; these features increase the potential profitability of a prospective conservation area.
4) Proximity or relative involvement expected from communities given their location to the PA as well as proximity to places of historical significance; closer proximity to collaborative communities and areas of historical significance increases the potential for activities related to historical or cultural attractions.

These aspects were considered in consultation with EKZNW assessment officers who begin the consideration of potential conservation sites. Relevant data collected for these sites are shown (Table 10). Data were collected through personal communication with professionals directly involved with securing conservation areas and agreements in EKZNW (Pers. Comm. Martindale, 2013).

Given the characteristics outlined and the equations presented, the ten potential conservation areas were given a score (Table 11) after which they were ordered from first to last priority and plotted on a radar chart (Figure 5 overleaf). Note that the magnitude of the conservation scores (Table 11) are not indicative of actual P, Occ% or RevPAR values of the prospective destination because there are no facility values and no constant included in the equation. The values represent a relative rank which can allow ordering of conservation priorities.

Table 10. Attribute table for potential conservation areas under consideration

Item	Name	DD	DJ	S	NBF	BF	EF	B	EB	Oc	DL	HC	SCG
Potential conservation area	A	3.25	6.75	0	1	0	1	1	0	0	0	0	1
	B	3	4	1	5	1	0	1	0	0	0	0	1
	C	2	4.25	1	2	0	1	1	0	0	0	0	1
	D	3.75	5.5	1	2	0	0	1	0	0	0	0	1
	E	5.25	7	1	2	0	0	1	1	0	0	0	1
	F	5	6.5	1	1	0	0	1	1	0	0	0	1
	G	3.25	5.5	1	5	1	0	1	1	0	0	1	0
	H	2	5.25	1	0	0	1	1	1	0	1	0	1
	I	3	3.75	1	1	0	1	1	1	0	0	1	1
	J	2.25	6.25	1	0	0	0	1	1	0	0	1	1
Applicable marginal effects coefficients	Price	-1.71	-76.3	-76.5	12.84	184.6	15.95	7.88	141.1	183.2	-26.1	19.47	15.52
	Occ%	-0.5	-8.5	-17.2	6.87	16.45	16.14	-5.83	-9.56	19.91	-3.06	14.06	9.11
	RevPAR	18.74	-92.5	-140	26.46	518	59.6	-19.6	76.89	176.8	-89	47.25	68.46

Source: Data collected from EKZNW.

Table 11. Scores for each potential conservation area according to occupancy, price and revenue per available room

Conservation area	Final score		
	Occ%	**P**	**RevPAR**
A	-48.33	-544.54	-568.68
B	20.08	-37.93	385.52
C	-20.21	-338.93	-334.47
D	-29.73	-376.71	-336.52
E	-69.28	-429.06	-510.57
F	-71.90	-403.35	-495.48
G	2.72	-7.71	307.18
H	-55.07	-325.90	-491.96
I	-1.09	-78.34	-31.47
J	-62.59	-372.95	-503.10

Source: Calculated from estimation results extracted from tables 4 (pp. 66), 5 (pp. 72), 6 (pp. 76) and 10.

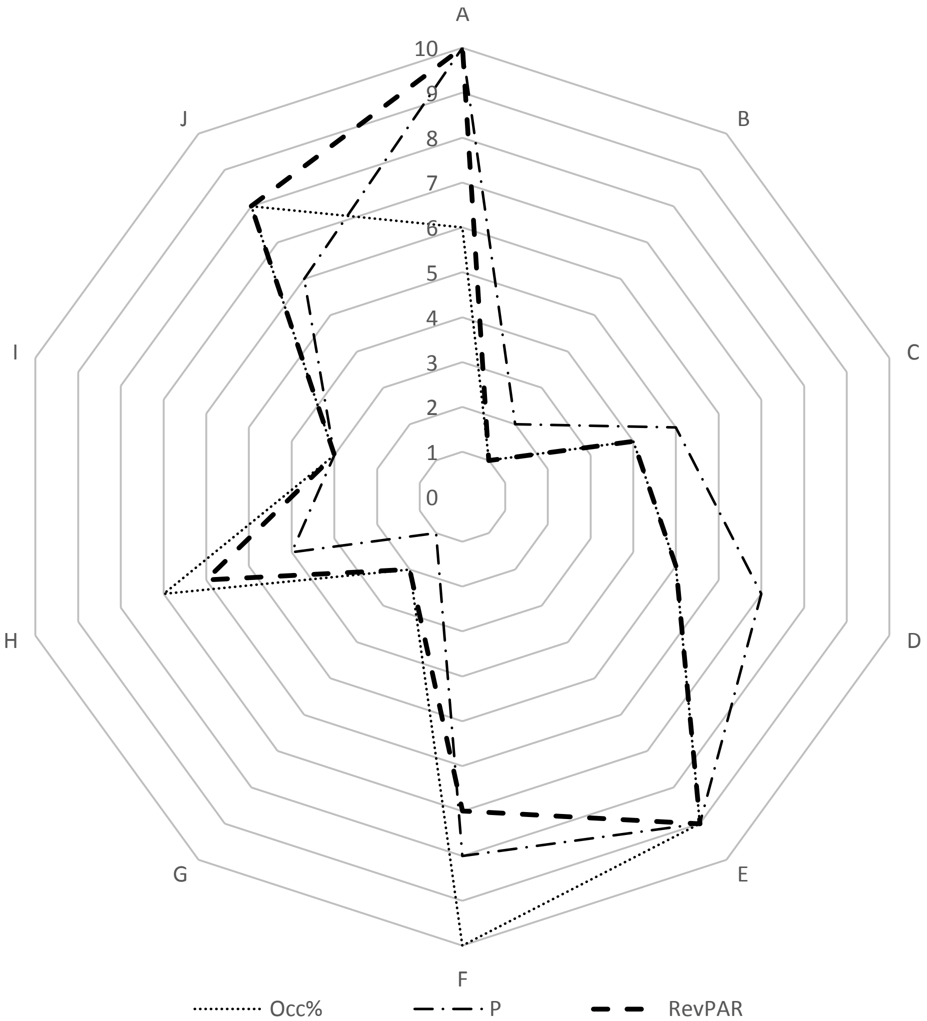

Figure 5. Priority ranking for potential conservation areas according to different models
Source: Extracted from Table 11.

The results in Figure 5 indicate that the order of priority of conservation areas varies depending on the competitiveness indicator used. The variation is, however, not very large, with the top three priorities (those closest to the centre of the chart) being the same priorities across the board albeit a slightly varied order. Slightly more variation in order is observed from the fourth priority; however, priorities 4-6 are again predominantly only three destinations (C, D and H). Given the direct relationship with incomes, RevPAR probably gives the most reliable result, and in this case is especially important because it illustrates which destinations are liable to have positive incomes and hence potentially be viable (Table 11) as compared to some that may perform very poorly. It may only be advisable to develop tourism resorts in destinations B and G if they are conserved because they display substantial RevPAR advantages over the next best alternative (I). Note also that this analysis does not guarantee a successful tourism destination development and neither does it limit a successful destination in potential conservation areas which are ranked low. However, it does reduce the work load related to in-depth cost/benefit analyses of potential areas. Thus, given this result, the first priority in-depth analysis of tourism viability would be most sensibly allocated to potential conservation area B and then G as these are consistently predicted to be the most competitive.

The variation in order of priorities is very low between Occ% and RevPAR, with discrepancies only seen on priority positions 6, 7, and 10. The difference of order is much greater between P and either of these two indicators. This supports past findings that Occ% is a strong indicator of overall performance of a destination (Jeffrey & Barden, 2000; 2001) and indicates the importance of competitiveness analysis or prioritisation according to expected destination performance rather than price.

4.5.2 Challenges with implementation of the prioritisation solution

The results and implications outlined in Section 4.5.1 apply directly to the conservation problem. However, a number of challenges may appear with implementation of this perspective. In a parastatal conservation agency such as EKZNW, there is a continuous trade-off between the public and the private benefit, in this case, conservation outcome and profitability, respectively. A bias towards the private benefit has been presented most evidently in this study (See Section 2.1.2), and thus the results in Section 4.5.1 are directed towards prioritising cost-effective conservation. However, from a public perspective, these models may be applied differently.

In the event that the potential conservation areas outlined all had highly valuable and irreplaceable biodiversity, the public (conservation) incentive is to conserve the *least profitable* first! The rationale behind this is that areas that are potentially profitable as a tourism destination are more likely to get purchased and used for tourism in the private market; as a result conservation may happen as a positive spin-off of such investment. However, if the area will make no money in tourism, the incentive is for the private market to use the potential conservation area for another, more profitable use, for example agriculture. If this were the case, in the public interest, destinations that are small, with low attraction characteristics should be conserved first in order to prevent them being destroyed by alternative development.

This is well depicted in a case where a small, biodiversity rich region near to a town is a prospective site. Because of urban development and the premiums paid for accessible farmland, among other things, such a property is likely to be a 'high-risk' loss for biodiversity, even though in tourism it may make no money. This is compared to a destination that is far away and may command significant incomes, but there is no immediate risk of development or large-scale land-use change. Ultimately, the choice is made by conservation practitioners. As an economist, the arguments in this thesis have been outlined (Section 2.1.2) and generally favour a private approach, whereby the choice of prioritisation is made taking into consideration the potential business incomes from the site. This would promote the sustainability of the investment. However, it is important to keep various prospective uses of results in mind when addressing the results outlined.

4.6 Summary

Chapter 4 has presented the results for three models which regress various proxies of competitiveness of a destination on the characteristics of the destination. The results of these regressions were discussed in light of competitiveness and prioritisation of conservation areas. Though the better indicator of competitiveness is usually RevPAR, in this case deductions were made by comparing P, Occ% and RevPAR. The empirical results and discussions effectively outline a number of potential changes that could be undertaken by EKZNW management in order to improve the competitiveness of the destinations in question. These are expanded on in the conclusion (Chapter 5), where the implications for policy, competitiveness and future research are presented.

The primary aim of this thesis, to prioritise conservation according to tourism potential competitiveness, was enacted and discussed. Ten potential conservation areas were ranked according to competitiveness and hence prioritisation importance for conservation. These ranks were presented within a discussion of the differing applications of the rank depending on the decision maker. There are aspects of both public and private interest involved in any parastatal conservation initiative and thus there are sometimes conflicting views of priority.

CHAPTER 5. CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Conclusions

This study contributes to the existing literature in two ways. Firstly, it illustrates prioritisation of conservation areas according to competitiveness gain by destinations according to their naturally endowed resources. This was done by using Tobit regression analysis to quantify the marginal effects of destination attributes on P, Occ% and RevPAR. A prioritisation example was then presented for a number of potential conservation areas currently under consideration by EKZNW. This prioritisation ranking was done by calculating a score for each area according to competitiveness based on P, Occ% and RevPAR. The values of the attributes of the destinations under consideration were multiplied by the respective estimated marginal effects for each attribute. These products were then summed for each destination. The result is that for destinations that are biologically equally important for conservation, the more advantageous (from a competitiveness perspective) could be selected as priorities. Because most of South African conservation activities depend on government funding, this is especially applicable in the future given expected government funding constraints.

Secondly, the study compares the use of P, Occ% and RevPAR as proxies for competitiveness and how these influence conservation priority choices. Previous studies tend to use only one of the three competitiveness proxies; however, this was shown to omit important information that may be inferred with regard to the relationships between them. This study compares the P, Occ% and RevPAR models and suggests how competitiveness can be better analysed by use of multiple models. This use of a combination of indicators is relatively scarce in the literature.

The study identified and quantified site attributes that contribute to the competitiveness of Nature Based Tourism (NBT) in KZN. Spatially, the most influential of the factors analysed were the size and location of the park relative to Johannesburg. Larger parks in the sample were more competitive than smaller parks and so their conservation could be prioritised. Additionally, ocean destinations were found to be more competitive than inland destinations by virtue of their physiography. For inland destinations, the main factor that affects the overall incomes of the destination is whether or not the destination contains the ‘Big Five’.

There are a number of policy implications from the study specific to EKZNW that may potentially improve the organisation’s competitiveness in the long-term. These are addressed in Section 5.2. The most influential aspects identified that EKZNW management can address to improve competitiveness are with regard to balancing pricing with expected customer utility and by improving the marketing of the destinations. Areas for future research are outlined in Section 5.3.

5.2 Policy implications

5.2.1 Pricing and utility

Pricing policy within EKZNW in the past has not been regularly updated and may have become less competitive compared to surrounding competitors. Additionally, because of the emphasis of the mandate of EKZNW on conservation, it is possible that attractants (primary reasons for destination appeal) that are also conservation priorities are over-valued by the 'supplier' compared to the value of the attractant to the tourist. One example where such a relationship has been relevant is with regard to the availability of exceptional birding. Birding is highly regarded by EKZNW because (1) a high diversity in a destination represents a conservation success, (2) bird life is a common indicator of overall biodiversity richness and isolation, because birds tend to be sensitive to disturbance, and (3) there is awareness that birding is a niche market with high revenue potential. As a result the EKZNW destinations with good birding have a premium charge. On the other side of the market, the tourists (demand) may not value birding as highly, or in the quantity available and are less willing to pay price premiums and hence occupancy decreases and overall benefit for EKZNW from birding decreases. This implies that it is imperative that there is a balance between the understandings of value from a conservation perspective, and utility from a tourist perspective. Management at EKZNW may need to consider a number of options in order to take advantage of the potential competitive edge that could be gained via exceptional birding destinations, such as:

1) The price associated with destinations yielding good birding could be lowered to make them more affordable for more customers, and
2) Marketing may be improved by advertising different aspects of the destination, i.e. destinations containing exceptional birding are highly unlikely to have birding as a 'stand-alone' product. However, more visitors may be attracted by marketing focussed on large mammals or ocean environment in the event that those are available at the destination in question.

The challenge with the possible alterations suggested in (1) is that birding is a fairly specialised pastime; as a result, the demand is likely to be relatively price in-elastic. If this is the case, a 1% decrease in price is likely to cause a less than 1% increase in the quantity of that product demanded *ceteris paribus*, hence an overall loss of revenue. If it was possible to do effective split marketing, birding could be marketed as a high value product to known birders, and a cheaper, alternative product to other potential customers.

Another recommendation is that the pricing premiums paid for birding quality be decreased. The provision of bed and breakfast at select destinations should also be re-considered. Potentially, bed and breakfast could become an optional add-on. Thus, the decrease in occupancy associated with bed and breakfast destinations could possibly be changed. Alternatively, the price premiums paid could be decreased thus increasing willingness to pay.

5.2.2 Marketing of destinations

Given the importance of reconciling pricing and the utility derived from an experience in a destination, marketing must align well with the experience in that destination. This is important from two perspectives. Firstly, good marketing of characteristics that people demand could entice more first time visitors (e.g. in a birding and wildlife destination, wildlife should be marketed prominently). Secondly, expectations that are generated by advertising must be met (and possible exceeded) so that the utility derived is equal to or greater than what was expected. In this way, visitors are more likely to desire a repeat visit. A number of specific changes in marketing could include:

- Attributes such as three star rating that reflect the higher quality of the destination accommodation should be prominently advertised, possibly even highlighting specific attributes associated with that rating.
- Experiences such as viewing the big five should be more prominently marketed on pamphlets and the web.
- Niche experiences such as birding should be marketed in such a way as to complement alternative marketing. For example, a pamphlet called "Birder's guide to KZN parks" could outline birding areas and be along-side park specific adverts that focus more on wildlife (due to increased volumes). Similar techniques could be employed for sale of battle field tours and/or cultural experiences. Internationally and nationally, such enterprises have been found to be successful (Discussed in Section 4.4.1).

- Adding a ‘search by activity’ or ‘search by price’ function to the internet web marketing site may assist potential visitors in deciding between the many potential destinations. Currently the EKZNW web-based advertising is predominantly on a ‘browse by park’ basis, and bookings cannot be made directly online.
- Use of social media marketing such as Twitter and/or Facebook may widen the range of people that are reached when compared to the current marketing methods.

These recommendations are a range of possibilities, the cost/benefit of such implementations would have to be evaluated and could be one of a number of directions for further research (Section 5.3).

5.3 Directions for further research

Drawing from the implications for management (Section 5.2) and the limitations of the study (Section 1.5), this study can also provide a platform for further research into the factors affecting competitiveness and prioritisation of conservation. It is apparent that more research on tourist preferences within EKZNW PAs is required. In order to further understanding of tourist choices, studies of displayed preference presented here can be complemented by stated preference methods. This could potentially also inform the type of communication that tourist’s desire from the management of the PAs with specific regard to conservation. It may also identify relevant marketing communication strategies to use for target marketing.

A study which simultaneously considers the prices of various alternative destinations in close proximity to the PAs in question could possibly help guide in choices regarding the price of products. In this way, the causes of variations observed in this study could be validated with respect to the influence of price, possible alternatives and the factors driving the final tourist choice. A survey of a wider variety of destinations (competitors) would potentially assist in establishing clear elasticities of demand for various attributes of a tourist product.

Research into the effect of current marketing strategies within EKZNW, coupled with attempts to distinguish the most appropriate marketing methods of marketing to target different demographic groups of the public, and could improve the tourist influx to parks. This could also consider customer loyalty to EKZNW parks, and the factors affecting such loyalties as this would influence re-visit decisions. Similarly, marketing channels and the ease with which bookings could be made may improve willingness of tourists to deal directly with EKZNW rather than operating through agents or other private parks.

This study has attempted to begin the development of prioritisation of conservation areas from a potential ecotourism perspective, that is, a competitiveness perspective. In order to advance this prioritisation method, developments specifically pertaining to the community factors affecting ecotourism success could be included. If these factors, or some of them, can be identified prior to investment, then there may be a much higher success rate in the future for ecotourism enterprises. Similarly, this study presents a prioritisation method that can be used alongside prioritisation using irreplaceability, however combining the two methods into one index may assist decision making in the future.

Another element of prioritisation and tourism competitiveness to research would be an analysis of factors affecting the running costs of PAs. Although this study has addressed some of the spatial factors affecting incomes to destinations, it has not taken into account the spatial effects of running costs. This may be a key element to distinguish the most influential links between location and profitability of destinations.

CHAPTER 6. SUMMARY

Prioritisation of conservation areas is changing from being based on an almost entirely ecological focus to a combined economic and ecological focus. The economic aspects of prioritisation have primarily aimed at least cost conservation. NBT is the most preferred method that EKZNW desire to use to fund their conservation; for this reason, this study suggested and demonstrated a way that the competitiveness of NBT destinations could be used for prioritisation. To do this, the study undertook to understand the factors that contribute to tourism potential, and ultimately, competitive advantage. The Tourism Competitiveness Framework (Ritchie & Crouch, 1999) formed the basis for understanding the factors influencing competitiveness. Empirical research was based on the Characteristics Framework which is based on the same concept as hedonic price analysis.

With consultation of a wide range of tourism research, three dependent variables were selected for analysis in order to provide different perspectives on the competitiveness of destinations. These were price (P), occupancy percentage (Occ%) and revenue per available room (RevPAR). P provides the most widely used measure of perceived value for those partaking in the tourism, whereas Occ% provides a measure of popularity given a specific set of characteristics of the destination, and RevPAR captures the proxy of income value of certain characteristics to the management of a destination in question. Characteristiscs of the destinations in question were selected from marketing media released by EKZNW with consultation of other literature. This was used as a source of the characteristics of the destination because tourist visiting decisions are most often made "sight-unseen," i.e. the tourists may decide to visit a certain destination although they have never seen the product offered; their decisions and expectations are shaped by the advertising media presented to them. Originally 32 explanatory variables were selected. In order to decrease multicollinearity problems in the data set, taking into consideration previous research, six explanatory variables were later dropped. This took the total of explanatory variables to 26 of which two were omitted from the analysis to prevent perfect collinearity associated with the 'dummy-variable' trap.

After examining a number of econometric models of panel data utilising both OLS and MLE techniques, panel data Tobit regression was selected as the most appropriate econometric model. This allowed estimation taking into consideration the censoring of Occ% at 0 and 100% and P and RevPAR at 0. Supporting models were estimated using bootstrapping and panel data GLS in order to observe if the estimated results were robust to changes in the estimation technique. Post estimation test for heteroskedasticity, autocorrelation and to identify if a fixed or random effects models were more appropriate were also estimated. It was found that all of the results were relatively robust to estimation techniques and there were no reasons identified from post-estimation tests to reject the validity of the estimated results.

Although the better indicator of competitiveness is usually RevPAR, deductions were made by comparing P, Occ% and RevPAR. Marginal effects were estimated at the means of all of the explanatory variables for each of the three models. It was found that the most influential aspects affecting competitiveness which are also related to prioritisation of conservation areas included:

1) Location beside the ocean (Oc); the coefficient estimates for this variable where strongly positive and in most cases highly significant. Thus conservation areas should be prioritised, where possible, on the coast-line. None of the ten potential conservation areas that prioritisation was applied to had this attribute;
2) Small destination (S); coefficient estimates for S were consistently large, negative and highly statistically significant. Prioritisation, where possible should incorporate larger areas, or be small areas which are linked to an already conserved, larger area;
3) The distance from Johannesburg (DJ) consistently showed a negative relationship with all of the competitiveness variables indicating that potential conservation areas are relatively worse off for prioritisation the further they are from Johannesburg; and,
4) The presence of the Big Five (BF) and the number of the Big Five present (NBF) both were both positively related to the various proxies for competitiveness (significant at varying degrees). Competitiveness of land destinations is thus largely driven by aspects of what is 'on' the land rather than just the scenery and wildness itself.

A number of competitiveness conclusions are drawn from exceptional birding destinations (EB) which yielded slightly conflicting results. EB appears to be highly valued by individuals (hence positive relationship with price), and yet they are negatively related with Occ%. This may indicate that EKZNW management is either:

1) Over-pricing aspects of birding, and/or,
2) Under-advertising the beneficial aspects of birding in the destinations in question.

A study with specific regard to marketing birding may yield valuable insights for EKZNW management with regard to their pricing and marketing strategies for destinations selling EB aspects. Similar studies may be advised for destinations selling exceptional fishing (EF) which are relatively popular (high coefficient estimate for Occ%) but have no significant effect on RevPAR.

With regard to service levels and destination management characteristics, three star resorts and accommodation which had self-catering were found to be consistently more competitive than un-rated or non-self-catering resorts. Accommodation codes which included the price of breakfast in the accommodation fee (BB) were found to be less popular (Occ%); however, the relationship with RevPAR was non-significant (probably due to the relatively higher prices as captured by positive relationship between BB and P).

In order to illustrate the concept of prioritisation according to destination competitiveness, the results were used to rank 10 potential conservation areas in order of competitiveness, and thus conservation priority. The first three destinations were prioritised relatively consistently, after which there was more variation in the order of prioritisation order (when comparing between prioritisation using P, Occ% and RevPAR). The variation in order was smaller between Occ% and RevPAR than comparisons with P, which confirms past findings that Occ% may be used as a research alternative when RevPAR is unavailable.

This study successfully illustrated a way in which conservation areas can be prioritised according to relative competitiveness of the location. A number of competitiveness attributes within destinations were also identified and discussed. Ten potential conservation areas were ranked according to competitiveness and hence priority for conservation. The variations in the ranking order were discussed in light of varying priorities of a decision maker.

To the author's knowledge, this study is the first of its kind to apply aspects of competitiveness of potential tourism destinations to the problem of prioritisation of conservation areas. As such there are many potential improvements in the process undertaken as well as a number of further applications that can be applied using the current study. The most apparent of these is the future combination of the financial potential with the ecological prioritisation already used by EKZNW. At present the current methodology could be used to identify between relatively equal (in terms of irreplaceability) potential conservation areas; however, this does not consider potential conservation areas of varying ecological importance which was beyond the scope of the current study.

This study has achieved its objectives of identifying and quantifying spatial aspects that give NBT destinations within EKZNW competitive advantage. The study went on to illustrate the potential for conservation areas to prioritise at least in part according to the competitiveness of a possible tourism resort established in that destination. In order to aid conservation areas in becoming financially sustainable in the long term with only NBT incomes, it is advised that competitiveness of a potential tourism resort in that destination be taken into consideration.

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APPENDICES

Appendix 1a. Results for Tobit regression of price on destination characteristics

```
. xttobit P Oc DL DJ DD S B EB SCG EF BF NBF HC Ch LC V Z US TU TSR BB NSC WC, ll(0) tobit

Fitting comparison model:

Fitting constant-only model:

Iteration 0:   log likelihood = -20364.862
Iteration 1:   log likelihood = -20364.862

Fitting full model:

Iteration 0:   log likelihood = -17170.964
Iteration 1:   log likelihood = -17170.921
Iteration 2:   log likelihood = -17170.921

Obtaining starting values for full model:

Iteration 0:   log likelihood = -16885.089
Iteration 1:   log likelihood = -16884.378
Iteration 2:   log likelihood = -16884.374

Fitting full model:

Iteration 0:   log likelihood = -16884.374
Iteration 1:   log likelihood = -16884.374

Random-effects tobit regression                 Number of obs      =      3084
Group variable: CodeNumber                      Number of groups   =        93

Random effects u_i ~ Gaussian                   Obs per group: min =         8
                                                               avg =      33.2
                                                               max =        36

                                                Wald chi2(22)      =   2557.77
Log likelihood  = -16884.374                    Prob > chi2        =    0.0000
```

P	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Oc	183.2206	36.03516	5.08	0.000	112.593	253.8483
DL	-26.10725	19.59738	-1.33	0.183	-64.51742	12.30291
DJ	-76.25487	13.43791	-5.67	0.000	-102.5927	-49.91706
DD	-1.708053	6.164477	-0.28	0.782	-13.79021	10.3741
S	-76.4855	16.10384	-4.75	0.000	-108.0484	-44.92256
B	7.880719	17.19373	0.46	0.647	-25.81837	41.57981
EB	141.0768	34.0336	4.15	0.000	74.37219	207.7815
SCG	15.51814	14.83516	1.05	0.296	-13.55824	44.59452
EF	15.94688	23.6652	0.67	0.500	-30.43605	62.32981
BF	184.6026	34.82649	5.30	0.000	116.344	252.8613
NBF	12.8398	6.76217	1.90	0.058	-.4138067	26.09341
HC	19.47082	20.64912	0.94	0.346	-21.0007	59.94235
Ch	167.8168	13.26019	12.66	0.000	141.8273	193.8063
LC	186.7364	17.44558	10.70	0.000	152.5437	220.9291
V	.301615	14.66344	0.02	0.984	-28.4382	29.04143
Z	3.209773	13.45603	0.24	0.811	-23.16357	29.58312
US	-3.257545	2.12384	-1.53	0.125	-7.420195	.9051044
TU	-.002838	.0071012	-0.40	0.689	-.0167561	.0110801
TSR	35.65672	12.7001	2.81	0.005	10.76498	60.54846
BB	125.7608	18.25783	6.89	0.000	89.97612	161.5455
NSC	125.5169	18.9074	6.64	0.000	88.45912	162.5748
WC	-24.20323	6.483944	-3.73	0.000	-36.91153	-11.49494
_cons	462.5472	61.19099	7.56	0.000	342.6151	582.4794
/sigma_u	30.4166	2.464366	12.34	0.000	25.58653	35.24666
/sigma_e	55.71147	.7202689	77.35	0.000	54.29977	57.12317
rho	.2296311	.0291017			.1766845	.290457

```
Likelihood-ratio test of sigma_u=0: chibar2(01)=   573.09 Prob>=chibar2 = 0.000

  Observation summary:         0  left-censored observations
                            3084     uncensored observations
                               0 right-censored observations
```

Appendix 1b. Predicted results from Tobit regression of price on destination characteristics

```
. predict yhatlin
(option xb assumed; fitted values)
(15 missing values generated)

. summarize yhatlin P
```

Variable	Obs	Mean	Std. Dev.	Min	Max
yhatlin	3348	259.3001	167.8045	-19.27509	697.1799
P	3084	267.4127	178.5049	7.935303	1618.581

```
. correlate yhatlin P
(obs=3084)
```

	yhatlin	P
yhatlin	1.0000	
P	0.9347	1.0000

Appendix 1c. Results of the quadrature check estimation procedure for Tobit regression price on destination characteristics

Quadrature check

	Fitted quadrature 12 points	Comparison quadrature 8 points	Comparison quadrature 16 points	
Log likelihood	-16884.374	-16884.374	-16884.374	
		-3.638e-12	0	Difference
		2.155e-16	0	Relative difference
P: OC	183.22065	183.22065	183.22065	
		-2.842e-14	-2.842e-14	Difference
		-1.551e-16	-1.551e-16	Relative difference
P: DL	-26.107251	-26.107251	-26.107251	
		-8.882e-14	-2.487e-14	Difference
		3.402e-15	9.526e-16	Relative difference
P: DJ	-76.254867	-76.254867	-76.254867	
		-5.684e-14	-1.421e-14	Difference
		7.454e-16	1.864e-16	Relative difference
P: DD	-1.708053	-1.708053	-1.708053	
		-3.841e-14	-9.548e-15	Difference
		2.249e-14	5.590e-15	Relative difference
P: S	-76.485499	-76.485499	-76.485499	
		-4.263e-14	-1.421e-14	Difference
		5.574e-16	1.858e-16	Relative difference
P: B	7.8807187	7.8807187	7.8807187	
		-1.501e-13	-3.819e-14	Difference
		-1.905e-14	-4.846e-15	Relative difference
P: EB	141.07683	141.07683	141.07683	
		-1.421e-13	-2.842e-14	Difference
		-1.007e-15	-2.015e-16	Relative difference
P: SCG	15.518138	15.518138	15.518138	
		1.261e-13	3.020e-14	Difference
		8.127e-15	1.946e-15	Relative difference
P: EF	15.946876	15.946876	15.946876	
		3.713e-13	9.415e-14	Difference
		2.328e-14	5.904e-15	Relative difference
P: BF	184.60264	184.60264	184.60264	
		-8.527e-14	-2.842e-14	Difference
		-4.619e-16	-1.540e-16	Relative difference
P: NBF	12.839802	12.839802	12.839802	
		5.507e-14	1.243e-14	Difference
		4.289e-15	9.684e-16	Relative difference
P: HC	19.470822	19.470822	19.470822	
		-1.776e-14	-3.553e-15	Difference
		-9.123e-16	-1.825e-16	Relative difference
P: Ch	167.81681	167.81681	167.81681	
		-5.684e-14	0	Difference
		-3.387e-16	0	Relative difference
P: LC	186.7364	186.7364	186.7364	
		-1.421e-13	-2.842e-14	Difference
		-7.610e-16	-1.522e-16	Relative difference
P: V	.30161505	.30161505	.30161505	
		1.593e-14	3.941e-15	Difference
		5.282e-14	1.307e-14	Relative difference
P: Z	3.2097729	3.2097729	3.2097729	
		2.043e-14	5.329e-15	Difference
		6.364e-15	1.660e-15	Relative difference
P: US	-3.2575453	-3.2575453	-3.2575453	
		-1.110e-14	-2.665e-15	Difference
		3.408e-15	8.180e-16	Relative difference
P: TU	-.00283802	-.00283802	-.00283802	
		-4.424e-17	-1.128e-17	Difference
		1.559e-14	3.973e-15	Relative difference
P: TSR	35.65672	35.65672	35.65672	
		-7.105e-15	-7.105e-15	Difference
		-1.993e-16	-1.993e-16	Relative difference
P: BB	125.7608	125.7608	125.7608	
		1.421e-14	1.421e-14	Difference
		1.130e-16	1.130e-16	Relative difference
P: NSC	125.51695	125.51695	125.51695	
		-1.421e-14	-1.421e-14	Difference
		-1.132e-16	-1.132e-16	Relative difference
P: WC	-24.203232	-24.203232	-24.203232	
		-1.776e-14	-3.553e-15	Difference
		7.339e-16	1.468e-16	Relative difference
P: _cons	462.54722	462.54722	462.54722	
		3.979e-13	1.137e-13	Difference
		8.602e-16	2.458e-16	Relative difference
sigma_u: _cons	30.416596	30.416596	30.416596	
		-3.254e-12	-8.136e-13	Difference
		-1.070e-13	-2.675e-14	Relative difference
sigma_e: _cons	55.711473	55.711473	55.711473	
		-7.105e-15	0	Difference
		-1.275e-16	0	Relative difference

Appendix 1d. Results for the bootstrapped Tobit regression of price on destination characteristics

```
. xttobit P Oc DL DJ DD S B EB SCG EF BF NBF HC Ch LC V Z US TU TSR BB NSC WC, ll(0) tobit vce(bootstrap)
(running xttobit on estimation sample)

Bootstrap replications (50)
----+--- 1 ---+--- 2 ---+--- 3 ---+--- 4 ---+--- 5
.....x........................x............x......    50

Random-effects tobit regression                 Number of obs      =      3084
Group variable: CodeNumber                      Number of groups   =        93

Random effects u_i ~ Gaussian                   Obs per group: min =         8
                                                               avg =      33.2
                                                               max =        36

                                                Wald chi2(22)      =   2746.54
Log likelihood  = -16884.374                    Prob > chi2        =    0.0000

                             (Replications based on 93 clusters in CodeNumber)
```

P	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
Oc	183.2206	56.30441	3.25	0.001	72.86603	293.5753
DL	-26.10725	34.98944	-0.75	0.456	-94.68528	42.47078
DJ	-76.25487	21.37324	-3.57	0.000	-118.1457	-34.36408
DD	-1.708053	9.613832	-0.18	0.859	-20.55082	17.13471
S	-76.4855	15.43165	-4.96	0.000	-106.731	-46.24003
B	7.880719	26.40344	0.30	0.765	-43.86908	59.63052
EB	141.0768	54.69559	2.58	0.010	33.87544	248.2782
SCG	15.51814	26.37449	0.59	0.556	-36.17492	67.21119
EF	15.94688	51.62255	0.31	0.757	-85.23146	117.1252
BF	184.6026	63.48759	2.91	0.004	60.16926	309.036
NBF	12.8398	14.09574	0.91	0.362	-14.78735	40.46695
HC	19.47082	29.8982	0.65	0.515	-39.12857	78.07021
Ch	167.8168	20.83908	8.05	0.000	126.973	208.6607
LC	186.7364	27.72002	6.74	0.000	132.4062	241.0666
V	.3016151	19.08907	0.02	0.987	-37.11228	37.71551
Z	3.209773	14.83916	0.22	0.829	-25.87444	32.29399
US	-3.257545	3.954455	-0.82	0.410	-11.00814	4.493045
TU	-.002838	.0083637	-0.34	0.734	-.0192305	.0135545
TSR	35.65672	16.87345	2.11	0.035	2.585356	68.72808
BB	125.7608	31.57944	3.98	0.000	63.86624	187.6554
NSC	125.5169	45.55305	2.76	0.006	36.23461	214.7993
WC	-24.20323	7.813567	-3.10	0.002	-39.51754	-8.888921
_cons	462.5472	97.6204	4.74	0.000	271.2147	653.8797
/sigma_u	30.4166	3.83801	7.93	0.000	22.89423	37.93896
/sigma_e	55.71147	6.983251	7.98	0.000	42.02455	69.39839
rho	.2296311	.0707146			.1156697	.3885083

```
Likelihood-ratio test of sigma_u=0: chibar2(01)=  573.09 Prob>=chibar2 = 0.000

  Observation summary:        0  left-censored observations
                           3084     uncensored observations
                              0 right-censored observations
```

Appendix 1e. Generalised least squares regression of price on destination characteristics

```
. xtreg P Oc DL DJ DD S B EB SCG EF BF NBF HC Ch LC V Z US TU TSR BB NSC WC, re robust theta

Random-effects GLS regression                   Number of obs      =      3084
Group variable: CodeNumber                      Number of groups   =        93

R-sq:  within  = 0.0046                         Obs per group: min =         8
       between = 0.9650                                        avg =      33.2
       overall = 0.8737                                        max =        36

Random effects u_i ~ Gaussian                   Wald chi2(22)      =   4524.44
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000

------------------- theta --------------------
  min      5%       median        95%      max
0.4963   0.6540     0.7349     0.7349   0.7349

                               (Std. Err. adjusted for 93 clusters in CodeNumber)
------------------------------------------------------------------------------
             |               Robust
           P |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          Oc |   183.2786   33.97962     5.39   0.000     116.6797    249.8774
          DL |  -26.03065   20.14945    -1.29   0.196    -65.52284    13.46154
          DJ |  -76.20965   13.97874    -5.45   0.000    -103.6075   -48.81181
          DD |  -1.688259    7.08172    -0.24   0.812    -15.56817    12.19166
           S |  -76.45605   11.98846    -6.38   0.000    -99.95301   -52.95909
           B |   8.031004   18.05114     0.44   0.656    -27.34858    43.41059
          EB |   141.2074   31.91499     4.42   0.000     78.65516    203.7596
         SCG |   15.41253   18.04063     0.85   0.393    -19.94645    50.77151
          EF |   15.60108    30.1794     0.52   0.605    -43.54945    74.75161
          BF |   184.7094   33.45869     5.52   0.000     119.1316    250.2872
         NBF |   12.78598   6.816038     1.88   0.061    -.5732109    26.14517
          HC |   19.45302   18.91204     1.03   0.304    -17.61389    56.51993
          Ch |   167.8307   12.88594    13.02   0.000     142.5747    193.0867
          LC |   186.8115    17.1474    10.89   0.000     153.2032    220.4198
           V |    .292226   13.63265     0.02   0.983    -26.42728    27.01173
           Z |   3.178006   9.679978     0.33   0.743     -15.7944    22.15041
          US |  -3.252035   2.660566    -1.22   0.222     -8.46665    1.962579
          TU |  -.0028166    .005002    -0.56   0.573    -.0126203     .006987
         TSR |   35.65175   11.51796     3.10   0.002     13.07696    58.22655
          BB |   125.7727   18.02561     6.98   0.000     90.44316    161.1022
         NSC |   125.5333   29.28118     4.29   0.000     68.14319    182.9233
          WC |    -24.162   7.499778    -3.22   0.001     -38.8613   -9.462708
       _cons |   462.2711   65.01398     7.11   0.000     334.8461    589.6962
-------------+----------------------------------------------------------------
     sigma_u |  33.789834
     sigma_e |   55.73191
         rho |  .26878696   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Appendix 1f. Results for Breusch and Pagan Lagrangian multiplier test for random effects, price analysis

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        P[CodeNumber,t] = Xb + u[CodeNumber] + e[CodeNumber,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                       P |     31864       178.5049
                       e |  3106.046       55.73191
                       u |  1141.753       33.78983

        Test:   Var(u) = 0
                             chibar2(01) =   2468.78
                          Prob > chibar2 =    0.0000
```

Appendix 1g. Test results for Wooldridge test for autocorrelation, price analysis

```
. xtserial P Oc DL S B EB SCG EF NBF BF HC Ch LC Z V TSR BB NSC US TU DJ DD WC

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      91) =      0.352
           Prob > F =      0.5544
```

Appendix 1h. Marginal effects estimates from bootstrapped Tobit regression of price on destination characteristics

```
. margins, predict(ystar(8,1619)) dydx(Oc DL DJ DD S B EB SCG EF BF NBF HC Ch LC V Z US TU TSR BB NSC WC ) atmeans

Conditional marginal effects                    Number of obs   =       3084
Model VCE    : Bootstrap

Expression   : E(P*|8<P<1619), predict(ystar(8,1619))
dy/dx w.r.t. : Oc DL DJ DD S B EB SCG EF BF NBF HC Ch LC V Z US TU TSR BB NSC WC
at           : Oc              =    .2743191 (mean)
               DL              =    .1433204 (mean)
               DJ              =    5.533658 (mean)
               DD              =    2.945363 (mean)
               S               =    .3203632 (mean)
               B               =    .2649157 (mean)
               EB              =    .0440986 (mean)
               SCG             =    .4448768 (mean)
               EF              =    .1034371 (mean)
               BF              =    .0933852 (mean)
               NBF             =     1.05415 (mean)
               HC              =    .3031777 (mean)
               Ch              =    .5774968 (mean)
               LC              =    .0963035 (mean)
               V               =    .1014916 (mean)
               Z               =    .1919585 (mean)
               US              =    4.538262 (mean)
               TU              =    423.9938 (mean)
               TSR             =     .535668 (mean)
               BB              =     .266537 (mean)
               NSC             =    .0466926 (mean)
               WC              =    .0246433 (mean)
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf.	Interval]
Oc	183.2169	56.33076	3.25	0.001	72.81068	293.6232
DL	-26.10672	34.98626	-0.75	0.456	-94.67853	42.46509
DJ	-76.25332	21.38999	-3.56	0.000	-118.1769	-34.32972
DD	-1.708018	9.613563	-0.18	0.859	-20.55026	17.13422
S	-76.48395	15.42197	-4.96	0.000	-106.7104	-46.25745
B	7.880559	26.4043	0.30	0.765	-43.87092	59.63204
EB	141.074	54.74754	2.58	0.010	33.77078	248.3772
SCG	15.51782	26.37729	0.59	0.556	-36.18072	67.21637
EF	15.94655	51.62131	0.31	0.757	-85.22935	117.1225
BF	184.5989	63.5365	2.91	0.004	60.06965	309.1282
NBF	12.83954	14.0936	0.91	0.362	-14.78341	40.4625
HC	19.47043	29.89804	0.65	0.515	-39.12866	78.06952
Ch	167.8134	20.8573	8.05	0.000	126.9339	208.693
LC	186.7326	27.75984	6.73	0.000	132.3243	241.1409
V	.3016089	19.08866	0.02	0.987	-37.11148	37.7147
Z	3.209708	14.83837	0.22	0.829	-25.87297	32.29239
US	-3.257479	3.954345	-0.82	0.410	-11.00785	4.492895
TU	-.002838	.0083626	-0.34	0.734	-.0192284	.0135525
TSR	35.656	16.87071	2.11	0.035	2.590014	68.72198
BB	125.7583	31.61665	3.98	0.000	63.79076	187.7258
NSC	125.5144	45.55012	2.76	0.006	36.23782	214.791
WC	-24.20274	7.809206	-3.10	0.002	-39.50851	-8.896979

Appendix 2a. Results for the bootstrapped Tobit regression of occupancy percentage on destination characteristics

```
. xttobit Occ Oc DL DJ DD S B EB SCG EF NBF BF HC Ch LC V Z US TU TSR BB NSC WC Pa Inc, ll(0) ul(100) tobit vce(bootstrap)
(running xttobit on estimation sample)

Bootstrap replications (50)
----+--- 1 ---+--- 2 ---+--- 3 ---+--- 4 ---+--- 5
..............x....x............x..............     50

Random-effects tobit regression                 Number of obs      =      3294
Group variable: CodeNumber                      Number of groups   =        93

Random effects u_i ~ Gaussian                   Obs per group: min =        22
                                                               avg =      35.4
                                                               max =        36

                                                Wald chi2(24)      =    652.01
Log likelihood  = -13087.863                    Prob > chi2        =    0.0000

                                 (Replications based on 93 clusters in CodeNumber)
```

Occ	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
Oc	21.03292	12.73046	1.65	0.098	-3.918311	45.98416
DL	-3.229037	7.700986	-0.42	0.675	-18.32269	11.86462
DJ	-8.984978	5.403929	-1.66	0.096	-19.57648	1.606527
DD	-.5235205	1.965728	-0.27	0.790	-4.376276	3.329235
S	-18.21109	6.40411	-2.84	0.004	-30.76292	-5.659267
B	-6.162406	5.245048	-1.17	0.240	-16.44251	4.117699
EB	-10.10012	13.38619	-0.75	0.451	-36.33656	16.13632
SCG	9.622572	6.377276	1.51	0.131	-2.876658	22.1218
EF	17.04659	7.286726	2.34	0.019	2.764865	31.32831
NBF	7.253342	2.609939	2.78	0.005	2.137956	12.36873
BF	17.37585	13.50548	1.29	0.198	-9.094412	43.8461
HC	14.84501	6.885043	2.16	0.031	1.350571	28.33944
Ch	33.18374	4.674324	7.10	0.000	24.02224	42.34525
LC	30.68824	7.090896	4.33	0.000	16.79034	44.58614
V	12.87501	4.931392	2.61	0.009	3.209658	22.54036
Z	13.85037	4.140366	3.35	0.001	5.735396	21.96533
US	.42191	.6550995	0.64	0.520	-.8620614	1.705881
TU	.0037241	.0020648	1.80	0.071	-.0003228	.0077711
TSR	1.87049	4.048027	0.46	0.644	-6.063497	9.804477
BB	-23.95542	7.36629	-3.25	0.001	-38.39309	-9.51776
NSC	-18.81298	6.084972	-3.09	0.002	-30.73931	-6.886656
WC	-6.383182	1.570989	-4.06	0.000	-9.462265	-3.3041
Pa	-13.36058	5.789069	-2.31	0.021	-24.70694	-2.014208
Inc	-14.97593	3.801702	-3.94	0.000	-22.42713	-7.524735
_cons	42.61663	24.72872	1.72	0.085	-5.850774	91.08404
/sigma_u	8.127042	.7588328	10.71	0.000	6.639757	9.614327
/sigma_e	15.6663	.6374236	24.58	0.000	14.41697	16.91563
rho	.2120471	.0355622			.1492131	.2881278

```
Likelihood-ratio test of sigma_u=0: chibar2(01)=  561.21 Prob>=chibar2 = 0.000

  Observation summary:       210  left-censored observations
                            3065     uncensored observations
                              19 right-censored observations
```

Appendix 2b. Results for Tobit regression of occupancy percentage on destination characteristics

```
                                 19 right-censored observations

. xttobit Occ Oc DL DJ DD S B EB SCG EF NBF BF HC Ch LC V Z US TU TSR BB NSC WC Pa Inc, ll(0) ul(100) tobit

Fitting comparison model:

Fitting constant-only model:

Iteration 0:   log likelihood = -14624.211
Iteration 1:   log likelihood = -14612.245
Iteration 2:   log likelihood = -14612.236
Iteration 3:   log likelihood = -14612.236

Fitting full model:

Iteration 0:   log likelihood = -13389.009
Iteration 1:   log likelihood = -13368.474
Iteration 2:   log likelihood = -13368.468
Iteration 3:   log likelihood = -13368.468

Obtaining starting values for full model:

Iteration 0:   log likelihood = -13682.055
Iteration 1:   log likelihood = -13681.871
Iteration 2:   log likelihood = -13681.871

Fitting full model:

Iteration 0:   log likelihood = -13097.844
Iteration 1:   log likelihood = -13087.909
Iteration 2:   log likelihood = -13087.863
Iteration 3:   log likelihood = -13087.863

Random-effects tobit regression                 Number of obs      =      3294
Group variable: CodeNumber                      Number of groups   =        93

Random effects u_i ~ Gaussian                   Obs per group: min =        22
                                                               avg =      35.4
                                                               max =        36

                                                Wald chi2(24)      =    466.07
Log likelihood  = -13087.863                    Prob > chi2        =    0.0000

------------------------------------------------------------------------------
         Occ |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          Oc |   21.03292   9.795587     2.15   0.032     1.833925    40.23192
          DL |  -3.229037   5.230862    -0.62   0.537    -13.48134    7.023263
          DJ |  -8.984978   3.693364    -2.43   0.015    -16.22384   -1.746119
          DD |  -.5235205   1.650163    -0.32   0.751    -3.757781     2.71074
           S |  -18.21109   4.384198    -4.15   0.000    -26.80396   -9.618221
           B |  -6.162406   4.603265    -1.34   0.181    -15.18464    2.859828
          EB |  -10.10012   9.284642    -1.09   0.277    -28.29768    8.097443
         SCG |   9.622572   3.988674     2.41   0.016     1.804916    17.44023
          EF |   17.04659   6.332902     2.69   0.007     4.634326    29.45884
         NBF |   7.253342   1.827396     3.97   0.000     3.671712    10.83497
          BF |   17.37585   9.329426     1.86   0.063    -.9094926    35.66118
          HC |   14.84501   5.598189     2.65   0.008     3.872758    25.81725
          Ch |   33.18374   3.521078     9.42   0.000     26.28256    40.08493
          LC |   30.68824   4.678766     6.56   0.000     21.51803    39.85846
           V |   12.87501   3.938095     3.27   0.001     5.156484    20.59353
           Z |   13.85037   3.565264     3.88   0.000     6.862576    20.83815
          US |     .42191   .5730296     0.74   0.462    -.7012074    1.545027
          TU |   .0037241   .0019408     1.92   0.055    -.0000798    .0075281
         TSR |    1.87049   3.407924     0.55   0.583    -4.808918    8.549898
          BB |  -23.95542   5.034234    -4.76   0.000    -33.82234   -14.08851
         NSC |  -18.81298   5.081006    -3.70   0.000    -28.77157   -8.854394
          WC |  -6.383182   1.737389    -3.67   0.000    -9.788401   -2.977963
          Pa |  -13.36058   3.860163    -3.46   0.001    -20.92636   -5.794795
         Inc |  -14.97593   4.416732    -3.39   0.001    -23.63257     -6.3193
       _cons |   42.61663   16.85773     2.53   0.011     9.576098    75.65717
-------------+----------------------------------------------------------------
    /sigma_u |   8.127042   .6606293    12.30   0.000     6.832232    9.421852
    /sigma_e |    15.6663   .2049632    76.43   0.000     15.26458    16.06802
-------------+----------------------------------------------------------------
         rho |   .2120471   .0275479                      .1621598    .2699194
------------------------------------------------------------------------------
Likelihood-ratio test of sigma_u=0: chibar2(01)=   561.21 Prob>=chibar2 = 0.000

  Observation summary:        210   left-censored observations
                             3065      uncensored observations
                               19 right-censored observations
```

Appendix 2c. Predicted results from Tobit regression of occupancy percentage on destination characteristics

```
. summarize yhatlin Occ

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     yhatlin |      3348    28.29094    18.96955  -15.10787   78.08652
         Occ |      3294    29.25584     24.6304          0        100

. correlate yhatlin Occ
(obs=3294)

             |  yhatlin      Occ
-------------+------------------
     yhatlin |   1.0000
         Occ |   0.7267   1.0000
```

Appendix 2d. Quadrature check procedure for Tobit regression of occupancy percentage on destination characteristics

Quadrature check

	Fitted quadrature 12 points	Comparison quadrature 8 points	Comparison quadrature 16 points	
Log likelihood	-13087.863	-13087.863	-13087.863	
		-8.602e-09	4.275e-10	Difference
		6.573e-13	-3.266e-14	Relative difference
Occ: Oc	21.032923	21.032945	21.032945	
		.00002217	.00002243	Difference
		1.054e-06	1.067e-06	Relative difference
Occ: DL	-3.2290374	-3.2290311	-3.2290309	
		6.337e-06	6.475e-06	Difference
		-1.962e-06	-2.005e-06	Relative difference
Occ: DJ	-8.9849783	-8.9849867	-8.9849868	
		-8.385e-06	-8.477e-06	Difference
		9.333e-07	9.435e-07	Relative difference
Occ: DD	-.5235205	-.52351645	-.52351641	
		4.046e-06	4.090e-06	Difference
		-7.728e-06	-7.813e-06	Relative difference
Occ: S	-18.211092	-18.211084	-18.211084	
		7.812e-06	7.809e-06	Difference
		-4.290e-07	-4.288e-07	Relative difference
Occ: B	-6.1624059	-6.1624001	-6.1624001	
		5.763e-06	5.786e-06	Difference
		-9.352e-07	-9.389e-07	Relative difference
Occ: EB	-10.100121	-10.100103	-10.100103	
		.00001773	.00001785	Difference
		-1.755e-06	-1.767e-06	Relative difference
Occ: SCG	9.6225721	9.6225722	9.6225723	
		1.476e-07	1.718e-07	Difference
		1.534e-08	1.786e-08	Relative difference
Occ: EF	17.046585	17.046578	17.046578	
		-7.429e-06	-7.491e-06	Difference
		-4.358e-07	-4.395e-07	Relative difference
Occ: BF	17.375846	17.375858	17.375858	
		.00001274	.00001284	Difference
		7.330e-07	7.390e-07	Relative difference
Occ: NBF	7.2533421	7.2533421	7.2533421	
		1.657e-08	2.670e-08	Difference
		2.284e-09	3.681e-09	Relative difference
Occ: HC	14.845006	14.84501	14.845011	
		4.039e-06	4.116e-06	Difference
		2.721e-07	2.773e-07	Relative difference
Occ: Ch	33.183744	33.183726	33.183726	
		-.00001766	-.00001778	Difference
		-5.320e-07	-5.357e-07	Relative difference
Occ: LC	30.688243	30.688229	30.688229	
		-.00001464	-.00001474	Difference
		-4.769e-07	-4.804e-07	Relative difference
Occ: V	12.875009	12.875011	12.875011	
		2.204e-06	2.217e-06	Difference
		1.712e-07	1.722e-07	Relative difference
Occ: Z	13.850365	13.850348	13.850348	
		-.000017	-.00001713	Difference
		-1.227e-06	-1.237e-06	Relative difference
Occ: US	.42190997	.42191019	.42191019	
		2.175e-07	2.170e-07	Difference
		5.155e-07	5.144e-07	Relative difference
Occ: TU	.00372415	.00372415	.00372415	
		-3.986e-10	-4.307e-10	Difference
		-1.070e-07	-1.156e-07	Relative difference
Occ: TSR	1.8704901	1.8704897	1.8704897	
		-3.856e-07	-3.988e-07	Difference
		-2.061e-07	-2.132e-07	Relative difference
Occ: BB	-23.955424	-23.955418	-23.955418	
		5.355e-06	5.375e-06	Difference
		-2.235e-07	-2.244e-07	Relative difference
Occ: NSC	-18.812983	-18.812985	-18.812985	
		-2.452e-06	-2.453e-06	Difference
		1.303e-07	1.304e-07	Relative difference
Occ: WC	-6.3831822	-6.3831822	-6.3831822	
		-1.662e-08	-1.636e-08	Difference
		2.603e-09	2.564e-09	Relative difference
Occ: Pa	-13.360575	-13.360568	-13.360569	
		6.856e-06	6.840e-06	Difference
		-5.131e-07	-5.120e-07	Relative difference
Occ: Inc	-14.975935	-14.975932	-14.975932	
		2.450e-06	2.440e-06	Difference
		-1.636e-07	-1.629e-07	Relative difference
Occ: _cons	42.616634	42.61667	42.616671	
		.00003611	.00003647	Difference
		8.473e-07	8.557e-07	Relative difference
sigma_u: _cons	8.1270419	8.1270599	8.1270599	
		.00001802	.00001803	Difference
		2.218e-06	2.218e-06	Relative difference
sigma_e: _cons	15.666301	15.666301	15.666301	
		6.554e-08	6.578e-08	Difference
		4.184e-09	4.199e-09	Relative difference

Appendix 2e. Marginal effects estimates for bootstrapped Tobit regression of occupancy percentage on destination characteristics

```
. margins, predict(ystar(0,100)) dydx(Oc DL DJ DD S B EB SCG EF NBF BF HC Ch LC V Z US TU TSR BB NSC WC Pa Inc) atmeans

Conditional marginal effects                      Number of obs   =       3294
Model VCE    : Bootstrap

Expression   : E(Occ*|0<Occ<100), predict(ystar(0,100))
dy/dx w.r.t. : Oc DL DJ DD S B EB SCG EF NBF BF HC Ch LC V Z US TU TSR BB NSC WC Pa Inc
at           : Oc              =    .2677596 (mean)
               DL              =    .1530055 (mean)
               DJ              =    5.493989 (mean)
               DD              =     2.94065 (mean)
               S               =    .3412265 (mean)
               B               =    .2647237 (mean)
               EB              =    .0437158 (mean)
               SCG             =    .4505161 (mean)
               EF              =    .0983607 (mean)
               NBF             =    1.029751 (mean)
               BF              =    .0874317 (mean)
               HC              =     .295082 (mean)
               Ch              =     .557377 (mean)
               LC              =    .0904675 (mean)
               V               =    .0983607 (mean)
               Z               =    .1924712 (mean)
               US              =    4.576199 (mean)
               TU              =    418.1351 (mean)
               TSR             =    .5245902 (mean)
               BB              =    .2622951 (mean)
               NSC             =    .0437158 (mean)
               WC              =    .0270188 (mean)
               Pa              =    .0765027 (mean)
               Inc             =    .0546448 (mean)
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf.	Interval]
Oc	19.91399	12.04738	1.65	0.098	-3.698437	43.52642
DL	-3.057256	7.290708	-0.42	0.675	-17.34678	11.23227
DJ	-8.506987	5.118306	-1.66	0.096	-18.53868	1.524709
DD	-.4956697	1.860244	-0.27	0.790	-4.14168	3.150341
S	-17.24228	6.027714	-2.86	0.004	-29.05638	-5.428178
B	-5.834572	4.98107	-1.17	0.241	-15.59729	3.928145
EB	-9.562804	12.67219	-0.75	0.450	-34.39985	15.27424
SCG	9.110661	6.033363	1.51	0.131	-2.714513	20.93583
EF	16.13972	6.930896	2.33	0.020	2.555418	29.72403
NBF	6.867472	2.482454	2.77	0.006	2.001951	11.73299
BF	16.45147	12.79694	1.29	0.199	-8.630074	41.53301
HC	14.05527	6.513528	2.16	0.031	1.288986	26.82155
Ch	31.4184	4.445246	7.07	0.000	22.70588	40.13092
LC	29.05566	6.698005	4.34	0.000	15.92781	42.18351
V	12.19007	4.672928	2.61	0.009	3.0313	21.34884
Z	13.11354	3.928478	3.34	0.001	5.413865	20.81321
US	.3994648	.620343	0.64	0.520	-.8163851	1.615315
TU	.003526	.0019513	1.81	0.071	-.0002985	.0073506
TSR	1.770982	3.830655	0.46	0.644	-5.736964	9.278928
BB	-22.68102	6.963596	-3.26	0.001	-36.32942	-9.032622
NSC	-17.81215	5.80408	-3.07	0.002	-29.18794	-6.436364
WC	-6.043603	1.484825	-4.07	0.000	-8.953808	-3.133399
Pa	-12.64981	5.490677	-2.30	0.021	-23.41134	-1.888277
Inc	-14.17923	3.623106	-3.91	0.000	-21.28039	-7.078074

Appendix 2f. Results for generalised least squares regression of occupancy percentage on destination characteristics

```
. xtreg Occ Oc DL DJ DD S B EB SCG EF NBF BF HC Ch LC V Z US TU TSR BB NSC WC Pa Inc, re robust theta

Random-effects GLS regression                   Number of obs      =      3294
Group variable: CodeNumber                      Number of groups   =        93

R-sq:  within  = 0.0035                         Obs per group: min =        22
       between = 0.8246                                        avg =      35.4
       overall = 0.5306                                        max =        36

                                                Wald chi2(24)      =    569.62
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000

------------------- theta --------------------
  min      5%       median        95%      max
0.6770   0.7422     0.7422     0.7422   0.7422

                             (Std. Err. adjusted for 93 clusters in CodeNumber)
```

Occ	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
Oc	25.13718	8.672214	2.90	0.004	8.139949	42.1344
DL	-1.601293	5.323238	-0.30	0.764	-12.03465	8.832062
DJ	-10.41269	3.543005	-2.94	0.003	-17.35686	-3.468532
DD	.2839412	1.485708	0.19	0.848	-2.627993	3.195876
S	-16.76355	5.164228	-3.25	0.001	-26.88525	-6.641846
B	-5.209356	3.963457	-1.31	0.189	-12.97759	2.558877
EB	-7.181968	9.283358	-0.77	0.439	-25.37702	11.01308
SCG	9.471634	3.596324	2.63	0.008	2.422968	16.5203
EF	15.18131	5.930438	2.56	0.010	3.557867	26.80476
NBF	7.213648	2.034105	3.55	0.000	3.226874	11.20042
BF	19.75191	10.08317	1.96	0.050	-.0107472	39.51457
HC	15.4391	5.244089	2.94	0.003	5.160872	25.71732
Ch	29.2156	2.830849	10.32	0.000	23.66724	34.76396
LC	27.22174	4.791711	5.68	0.000	17.83016	36.61332
V	13.22737	4.306607	3.07	0.002	4.786573	21.66816
Z	10.28038	3.406008	3.02	0.003	3.604727	16.95603
US	.4116658	.5495895	0.75	0.454	-.6655099	1.488841
TU	.003033	.0016629	1.82	0.068	-.0002261	.0062922
TSR	1.716346	3.038128	0.56	0.572	-4.238276	7.670968
BB	-22.87171	5.410715	-4.23	0.000	-33.47652	-12.26691
NSC	-19.13509	4.642969	-4.12	0.000	-28.23514	-10.03503
WC	-4.989065	1.357952	-3.67	0.000	-7.650602	-2.327527
Pa	-12.31632	4.648685	-2.65	0.008	-21.42757	-3.205063
Inc	-14.57357	3.829783	-3.81	0.000	-22.07981	-7.067334
_cons	49.70933	16.99732	2.92	0.003	16.3952	83.02346
sigma_u	9.2954459					
sigma_e	14.87918					
rho	.2807233	(fraction of variance due to u_i)				

Appendix 2g. Breusch and Pagan Lagrangian multiplier test for random effects, occupancy analysis

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        Occ[CodeNumber,t] = Xb + u[CodeNumber] + e[CodeNumber,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                     Occ |   606.6564       24.6304
                       e |     221.39      14.87918
                       u |   86.40531      9.295446

        Test:   Var(u) = 0
                             chibar2(01) =   2813.86
                          Prob > chibar2 =    0.0000
```

Appendix 2h. Results for Wooldridge test for autocorrelation, occupancy analysis

```
. xtserial Occ Oc DL S B EB SCG EF NBF BF HC Ch LC Z V TSR BB NSC US TU DJ DD WC Pa Inc

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      92) =      2.052
           Prob > F =      0.1554
```

Appendix 3a. Results for the bootstrapped Tobit regression of revenue per availiable room on destination characteristics

```
. xttobit RevPAR Oc DL DJ DD S B EB SCG EF NBF BF HC Ch LC V Z US TU  TSR BB NSC WC Pa Inc, ll(0) tobit vce(bootstrap)
(running xttobit on estimation sample)

Bootstrap replications (50)
----+--- 1 ---+--- 2 ---+--- 3 ---+--- 4 ---+--- 5
..........x......................x............x    50

Random-effects tobit regression                 Number of obs      =      3294
Group variable: CodeNumber                      Number of groups   =        93

Random effects u_i ~ Gaussian                   Obs per group: min =        22
                                                               avg =      35.4
                                                               max =        36

                                                Wald chi2(24)      =    803.97
Log likelihood  = -20755.435                    Prob > chi2        =    0.0000

                               (Replications based on 93 clusters in CodeNumber)
```

RevPAR	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
Oc	196.6055	140.6692	1.40	0.162	-79.10099	472.312
DL	-98.96168	74.68851	-1.32	0.185	-245.3485	47.42511
DJ	-102.8306	53.18345	-1.93	0.053	-207.0682	1.40709
DD	20.84025	25.42744	0.82	0.412	-28.99663	70.67712
S	-156.0574	62.54453	-2.50	0.013	-278.6424	-33.47236
B	-21.7845	80.05561	-0.27	0.786	-178.6906	135.1216
EB	85.50216	133.0032	0.64	0.520	-175.1793	346.1836
SCG	76.13097	66.3681	1.15	0.251	-53.94812	206.2101
EF	66.28063	104.9784	0.63	0.528	-139.4732	272.0345
NBF	29.42618	32.66923	0.90	0.368	-34.60432	93.45669
BF	576.0396	167.576	3.44	0.001	247.5968	904.4825
HC	52.5484	95.76595	0.55	0.583	-135.1494	240.2462
Ch	365.8755	50.31908	7.27	0.000	267.2519	464.4991
LC	429.9189	90.62241	4.74	0.000	252.3022	607.5355
V	126.2035	64.73599	1.95	0.051	-.6766815	253.0837
Z	6.466784	44.83785	0.14	0.885	-81.41379	94.34736
US	46.772	14.77642	3.17	0.002	17.81074	75.73326
TU	.0299227	.0295332	1.01	0.311	-.0279613	.0878066
TSR	105.7363	60.58474	1.75	0.081	-13.00762	224.4802
BB	-59.71066	109.1632	-0.55	0.584	-273.6666	154.2453
NSC	-249.8952	81.03706	-3.08	0.002	-408.7249	-91.06548
WC	-81.17966	18.06448	-4.49	0.000	-116.5854	-45.77392
Pa	-182.3374	87.99036	-2.07	0.038	-354.7954	-9.879484
Inc	-135.3124	51.46876	-2.63	0.009	-236.1893	-34.43553
_cons	166.6175	252.9989	0.66	0.510	-329.2511	662.4862
/sigma_u	100.195	10.44098	9.60	0.000	79.73102	120.6589
/sigma_e	186.6023	24.3983	7.65	0.000	138.7825	234.4221
rho	.2237885	.0545389			.132003	.3438609

```
Likelihood-ratio test of sigma_u=0: chibar2(01)=  603.99 Prob>=chibar2 = 0.000

  Observation summary:        210  left-censored observations
                             3084     uncensored observations
                                0 right-censored observations
```

Appendix 3b. Predicted results from Tobit regression of revenue per availiable room on destination characteristics

. summarize yhatlin RevPAR

Variable	Obs	Mean	Std. Dev.	Min	Max
yhatlin	3348	268.2447	265.8063	-206.9434	979.7074
RevPAR	3294	280.3539	327.3799	0	4181.065

. correlate yhatlin RevPAR
(obs=3294)

	yhatlin	RevPAR
yhatlin	1.0000	
RevPAR	0.7786	1.0000

Appendix 3c. Results for Tobit regression of revenue per available room on destination characteristics

```
. xttobit RUNTTourism WC2 Oc DL SCG EB B HC EF DD DJ TSR US S NBF BF Ch LogCabin Z BB NSC V UNTotal Pa Inc, ll(0) tobit

Fitting comparison model:

Fitting constant-only model:

Iteration 0:   log likelihood = -22605.654
Iteration 1:   log likelihood = -22596.101
Iteration 2:   log likelihood = -22596.097
Iteration 3:   log likelihood = -22596.097

Fitting full model:

Iteration 0:   log likelihood = -21078.064
Iteration 1:   log likelihood = -21057.434
Iteration 2:   log likelihood = -21057.429
Iteration 3:   log likelihood = -21057.429

Obtaining starting values for full model:

Iteration 0:   log likelihood = -21883.253
Iteration 1:   log likelihood = -21883.103
Iteration 2:   log likelihood = -21883.102

Fitting full model:

Iteration 0:   log likelihood = -20762.778
Iteration 1:   log likelihood = -20755.511
Iteration 2:   log likelihood = -20755.435
Iteration 3:   log likelihood = -20755.435

Random-effects tobit regression                 Number of obs      =      3294
Group variable: CodeNumber                      Number of groups   =        93

Random effects u_i ~ Gaussian                   Obs per group: min =        22
                                                               avg =      35.4
                                                               max =        36

                                                Wald chi2(24)      =    605.17
Log likelihood  = -20755.435                    Prob > chi2        =    0.0000

------------------------------------------------------------------------------
 RUNTTourism |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         WC2 |  -81.17966   20.85346    -3.89   0.000    -122.0517   -40.30763
          Oc |   196.6055   120.4015     1.63   0.102     -39.3772    432.5882
          DL |  -98.96168    64.2918    -1.54   0.124    -224.9713    27.04794
         SCG |   76.13097   49.01801     1.55   0.120    -19.94256    172.2045
          EB |   85.50216    114.112     0.75   0.454    -138.1533    309.1577
           B |   -21.7845   56.58516    -0.38   0.700    -132.6894    89.12038
          HC |    52.5484   68.81057     0.76   0.445    -82.31784    187.4146
          EF |   66.28063    77.8176     0.85   0.394    -86.23907    218.8003
          DD |   20.84025   20.28036     1.03   0.304    -18.90853    60.58903
          DJ |  -102.8306   45.38849    -2.27   0.023    -191.7904   -13.87075
         TSR |   105.7363   41.88698     2.52   0.012     23.63931    187.8332
          US |     46.772   7.040485     6.64   0.000      32.9729     60.5711
           S |  -156.0574   53.90729    -2.89   0.004    -261.7137   -50.40105
         NBF |   29.42618   22.45662     1.31   0.190    -14.58798    73.44035
          BF |   576.0396   114.6626     5.02   0.000      351.305    800.7742
          Ch |   365.8755   43.27649     8.45   0.000     281.0551    450.6958
    LogCabin |   429.9189   57.50044     7.48   0.000     317.2201    542.6176
           Z |   6.466784   43.83395     0.15   0.883    -79.44617    92.37974
          BB |  -59.71066   61.87084    -0.97   0.335    -180.9753    61.55397
         NSC |  -249.8952   62.44492    -4.00   0.000     -372.285   -127.5054
           V |   126.2035   48.40169     2.61   0.009     31.33797    221.0691
     UNTotal |   .0299227   .0238148     1.26   0.209    -.0167534    .0765988
          Pa |  -182.3374   47.44118    -3.84   0.000    -275.3204   -89.35442
         Inc |  -135.3124   54.28686    -2.49   0.013    -241.7127   -28.91215
       _cons |   166.6175   207.1772     0.80   0.421    -239.4424    572.6775
-------------+----------------------------------------------------------------
    /sigma_u |    100.195   8.085727    12.39   0.000     84.34724    116.0427
    /sigma_e |   186.6023   2.419406    77.13   0.000     181.8604    191.3443
-------------+----------------------------------------------------------------
         rho |   .2237885    .028432                      .1721158    .2832939
------------------------------------------------------------------------------
Likelihood-ratio test of sigma_u=0: chibar2(01)=  603.99 Prob>=chibar2 = 0.000

  Observation summary:        210  left-censored observations
                             3084     uncensored observations
                                0 right-censored observations
```

Appendix 3d. Quadrature check procedure for Tobit regression of revenue per available room on destination characteristics

Quadrature check

	Fitted quadrature 12 points	Comparison quadrature 8 points	Comparison quadrature 16 points	
Log	-20755.435	-20755.435	-20755.435	
likelihood		-9.586e-09	2.459e-09	Difference
		4.619e-13	-1.185e-13	Relative difference
RevPAR:	196.60549	196.60609	196.60609	
Oc		.00060033	.00060469	Difference
		3.053e-06	3.076e-06	Relative difference
RevPAR:	-98.961683	-98.961491	-98.961489	
DL		.00019196	.00019428	Difference
		-1.940e-06	-1.963e-06	Relative difference
RevPAR:	-102.83056	-102.83078	-102.83078	
DJ		-.00021641	-.00021795	Difference
		2.104e-06	2.120e-06	Relative difference
RevPAR:	20.840249	20.840372	20.840373	
DD		.00012328	.00012402	Difference
		5.915e-06	5.951e-06	Relative difference
RevPAR:	-156.05739	-156.05714	-156.05714	
S		.00025519	.00025517	Difference
		-1.635e-06	-1.635e-06	Relative difference
RevPAR:	-21.784496	-21.784371	-21.784371	
B		.00012421	.0001246	Difference
		-5.702e-06	-5.720e-06	Relative difference
RevPAR:	85.502163	85.5026	85.502602	
EB		.0004369	.00043895	Difference
		5.110e-06	5.134e-06	Relative difference
RevPAR:	76.130967	76.130937	76.130937	
SCG		-.00003033	-.00002994	Difference
		-3.984e-07	-3.932e-07	Relative difference
RevPAR:	66.280629	66.2804	66.280399	
EF		-.00022829	-.00022937	Difference
		-3.444e-06	-3.461e-06	Relative difference
RevPAR:	576.03963	576.03996	576.03996	
BF		.00032813	.00032991	Difference
		5.696e-07	5.727e-07	Relative difference
RevPAR:	29.426184	29.426185	29.426185	
NBF		1.497e-06	1.662e-06	Difference
		5.088e-08	5.648e-08	Relative difference
RevPAR:	52.548403	52.548506	52.548507	
HC		.00010284	.00010412	Difference
		1.957e-06	1.981e-06	Relative difference
RevPAR:	365.87548	365.87489	365.87489	
Ch		-.00058783	-.00058991	Difference
		-1.607e-06	-1.612e-06	Relative difference
RevPAR:	429.91886	429.91835	429.91834	
LC		-.00051133	-.00051314	Difference
		-1.189e-06	-1.194e-06	Relative difference
RevPAR:	126.20353	126.20359	126.20359	
V		.00005985	.00006006	Difference
		4.742e-07	4.759e-07	Relative difference
RevPAR:	6.4667843	6.4662619	6.4662598	
Z		-.0005224	-.00052458	Difference
		-.00008078	-.00008112	Relative difference
RevPAR:	46.771999	46.772003	46.772003	
US		3.198e-06	3.189e-06	Difference
		6.838e-08	6.819e-08	Relative difference
RevPAR:	.02992266	.02992258	.02992258	
TU		-7.717e-08	-7.773e-08	Difference
		-2.579e-06	-2.598e-06	Relative difference
RevPAR:	105.73628	105.73626	105.73626	
TSR		-.00001835	-.00001858	Difference
		-1.736e-07	-1.757e-07	Relative difference
RevPAR:	-59.710656	-59.710514	-59.710514	
BB		.00014177	.00014212	Difference
		-2.374e-06	-2.380e-06	Relative difference
RevPAR:	-249.89519	-249.89525	-249.89525	
NSC		-.00005545	-.00005546	Difference
		2.219e-07	2.219e-07	Relative difference
RevPAR:	-81.179656	-81.179655	-81.179655	
WC		9.236e-07	9.295e-07	Difference
		-1.138e-08	-1.145e-08	Relative difference
RevPAR:	-182.33743	-182.33725	-182.33725	
Pa		.0001828	.00018252	Difference
		-1.003e-06	-1.001e-06	Relative difference
RevPAR:	-135.31244	-135.31237	-135.31237	
Inc		.00007186	.00007169	Difference
		-5.310e-07	-5.298e-07	Relative difference
RevPAR:	166.61754	166.61859	166.61859	
_cons		.00104195	.00104801	Difference
		6.254e-06	6.290e-06	Relative difference
sigma_u:	100.19497	100.1955	100.1955	
_cons		.00052928	.00052934	Difference
		5.283e-06	5.283e-06	Relative difference
sigma_e:	186.60234	186.60234	186.60234	
_cons		1.712e-06	1.714e-06	Difference
		9.176e-09	9.187e-09	Relative difference

Appendix 3e. Results for generalised least squares regression of revenue per avaliliable room analysis on destination characteristics

```
. xtreg RevPAR Oc DL DJ DD S B EB SCG EF BF NBF HC Ch LC V Z US TU TSR BB NSC WC Pa Inc, re robust theta

Random-effects GLS regression                   Number of obs      =      3294
Group variable: CodeNumber                      Number of groups   =        93

R-sq:  within  = 0.0032                         Obs per group: min =        22
       between = 0.8612                                        avg =      35.4
       overall = 0.6093                                        max =        36

Random effects u_i ~ Gaussian                   Wald chi2(24)      =    819.74
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000

------------------- theta -------------------
  min      5%       median        95%      max
0.6838   0.7478     0.7478     0.7478   0.7478

                               (Std. Err. adjusted for 93 clusters in CodeNumber)
------------------------------------------------------------------------------
             |               Robust
      RevPAR |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          Oc |   246.2558    100.031     2.46   0.014     50.19862     442.313
          DL |   -79.0422   57.50027    -1.37   0.169    -191.7407    33.65626
          DJ |   -119.385   35.45903    -3.37   0.001    -188.8834   -49.88658
          DD |   31.28061     15.547     2.01   0.044     .8090573    61.75216
           S |  -135.6972   43.13857    -3.15   0.002    -220.2472   -51.14713
           B |  -11.97992   45.35144    -0.26   0.792    -100.8671    76.90727
          EB |   118.3669   89.30339     1.33   0.185    -56.66448    293.3984
         SCG |   72.06983    42.1922     1.71   0.088    -10.62535     154.765
          EF |   42.23668   62.04441     0.68   0.496    -79.36812    163.8415
          BF |   603.8829   95.49731     6.32   0.000     416.7116    791.0542
         NBF |   29.00524   19.73507     1.47   0.142    -9.674775    67.68526
          HC |    59.3441   60.66248     0.98   0.328    -59.55218    178.2404
          Ch |   312.5629   30.79404    10.15   0.000     252.2077    372.9181
          LC |   382.2177   64.91553     5.89   0.000     254.9856    509.4498
           V |   130.6251   56.84776     2.30   0.022     19.20553    242.0446
           Z |  -39.47792   29.93015    -1.32   0.187    -98.13993     19.1841
          US |   46.58481   9.795208     4.76   0.000     27.38655    65.78306
          TU |   .0182811   .0187231     0.98   0.329    -.0184156    .0549777
         TSR |   103.1969   38.17785     2.70   0.007     28.36967    178.0241
          BB |  -47.07996   64.53044    -0.73   0.466    -173.5573    79.39737
         NSC |  -253.0605    53.9481    -4.69   0.000    -358.7968   -147.3241
          WC |  -61.05471   14.09614    -4.33   0.000    -88.68264   -33.42678
          Pa |  -170.0288   65.02744    -2.61   0.009    -297.4802   -42.57734
         Inc |  -130.1483   36.89751    -3.53   0.000     -202.466   -57.83048
       _cons |   254.7447   164.3999     1.55   0.121     -67.4731    576.9626
-------------+----------------------------------------------------------------
     sigma_u |  114.75764
     sigma_e |  179.42905
         rho |  .29030261   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Appendix 3f. Results for Wooldridge test for autocorrelation, revenue per available room analysis

```
. xtserial  RevPAR Oc DL S B EB SCG EF NBF BF HC Ch LC Z V TSR BB NSC US TU DJ DD WC Pa Inc

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      92) =      0.001
           Prob > F =      0.9786
```

Appendix 3g. Breusch and Pagan Lagrangian multiplier test for random effects, revenue per available room analysis

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        RevPAR[CodeNumber,t] = Xb + u[CodeNumber] + e[CodeNumber,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                  RevPAR |   107177.6       327.3799
                       e |   32194.78       179.4291
                       u |   13169.32       114.7576

        Test:   Var(u) = 0
                             chibar2(01) =   3066.69
                          Prob > chibar2 =    0.0000
```

Appendix 3h. Marginal effects estimates for bootstrapped Tobit regression of occupancy percentage on destination characteristics.

```
. margins, predict(ystar(0,4181)) dydx(Oc DL DJ DD S B EB SCG EF NBF BF HC Ch LC V Z US TU  TSR BB NSC WC Pa Inc) atmeans

Conditional marginal effects                      Number of obs   =       3294
Model VCE    : Bootstrap

Expression   : E(RevPAR*|0<RevPAR<4181), predict(ystar(0,4181))
dy/dx w.r.t. : Oc DL DJ DD S B EB SCG EF NBF BF HC Ch LC V Z US TU TSR BB NSC WC Pa Inc
at           : Oc              =    .2677596 (mean)
               DL              =    .1530055 (mean)
               DJ              =    5.493989 (mean)
               DD              =     2.94065 (mean)
               S               =    .3412265 (mean)
               B               =    .2647237 (mean)
               EB              =    .0437158 (mean)
               SCG             =    .4505161 (mean)
               EF              =    .0983607 (mean)
               NBF             =    1.029751 (mean)
               BF              =    .0874317 (mean)
               HC              =     .295082 (mean)
               Ch              =     .557377 (mean)
               LC              =    .0904675 (mean)
               V               =    .0983607 (mean)
               Z               =    .1924712 (mean)
               US              =    4.576199 (mean)
               TU              =    418.1351 (mean)
               TSR             =    .5245902 (mean)
               BB              =    .2622951 (mean)
               NSC             =    .0437158 (mean)
               WC              =    .0270188 (mean)
               Pa              =    .0765027 (mean)
               Inc             =    .0546448 (mean)

------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          Oc |   176.7989   126.6359     1.40   0.163     -71.4029    425.0008
          DL |  -88.99203   67.38199    -1.32   0.187    -221.0583    43.07424
          DJ |  -92.47115   48.05011    -1.92   0.054    -186.6476    1.705339
          DD |   18.74075   22.88594     0.82   0.413    -26.11488    63.59638
           S |  -140.3358   55.84458    -2.51   0.012    -249.7891   -30.88241
           B |  -19.58987   71.99137    -0.27   0.786    -160.6904    121.5106
          EB |   76.88846   120.3764     0.64   0.523     -159.045     312.822
         SCG |   68.46134   60.22138     1.14   0.256     -49.5704    186.4931
          EF |   59.60335   94.31418     0.63   0.527     -125.249    244.4557
         NBF |   26.46172   29.19677     0.91   0.365    -30.76291    83.68634
          BF |   518.0079   157.3256     3.29   0.001     209.6554    826.3605
          HC |   47.25454   86.08188     0.55   0.583    -121.4628    215.9719
          Ch |   329.0163   45.23247     7.27   0.000     240.3622    417.6703
          LC |   386.6077   84.38398     4.58   0.000     221.2182    551.9973
           V |   113.4895   58.21359     1.95   0.051    -.6070653     227.586
           Z |   5.815304   40.30733     0.14   0.885    -73.1856     84.81621
          US |   42.06007   13.18277     3.19   0.001     16.22231    67.89783
          TU |   .0269082   .0265944     1.01   0.312    -.0252158    .0790322
         TSR |   95.08414   54.19406     1.75   0.079    -11.13427    201.3025
          BB |  -53.69525   97.92221    -0.55   0.583    -245.6193    138.2288
         NSC |  -224.7201   71.33745    -3.15   0.002    -364.5389   -84.90129
          WC |  -73.00141   15.41777    -4.73   0.000    -103.2197   -42.78313
          Pa |  -163.9683   78.22581    -2.10   0.036    -317.2881   -10.64853
         Inc |  -121.6807   45.62796    -2.67   0.008    -211.1099   -32.25155
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