Conservation Fees in the Kgalagadi Transfrontier Park between Botswana and South Africa in the Presence of Land Restitution

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Abstract

This paper estimates the visitation demand function for Kgalagadi Transfrontier Park (KTP) in order to determine the conservation fee to charge South African residents to maximise park revenue. We conducted contingent behavior experiments at KTP and three other national parks, which we assume are either substitutes or complements for visitors to KTP. Our random effects Tobit model shows that there is a wide variation in the own-price elasticities of demand between the parks but they are generally not elastic. The cross-price estimates indicate that there is limited substitutability in visitation demand among the four parks. The study uses the unitary elasticity rule to demonstrate that there is a possibility of raising conservation fees to revenue-maximising levels at KTP as well as the other parks, using methods such as a mandatory conservation fee increment or a community-bound voluntary donation above the regular conservation fee. Sharing conservation revenue with communities surrounding parks could demonstrate the link between ecotourism and local communities' economic development, promote a positive view of land restitution involving national parks, help address South Africa's heavily skewed distribution of income, and act as an incentive for the local communities to participate in conservation even more.

Keywords: Contingent behavior, conservation fee, demand, land claim, national park.

1 Introduction

The Kgalagadi Transfrontier Park (KTP) has the potential to contribute to improving the lives of surrounding communities who now have land rights inside

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the park. The aim of this paper is to estimate the visitation demand function for KTP in order to determine the conservation fee to charge South African residents to maximise park revenue. It is assumed that Kruger, Augrabies Fall and Pilanesberg National Parks function as either substitutes or complements for visitors to the KTP. To generate the required data, we conducted contingent behavior experiments at the four parks. Our random effects Tobit model shows that there is a wide variation in the own-price elasticities of demand between the parks but they are generally not elastic. The cross-price estimates indicate that there is limited substitutability in visitation demand among the four parks. The study uses the unitary elasticity rule to demonstrate that there is a possibility of raising conservation fees to revenue-maximising levels at KTP as well as the other parks. The modes of making tourists pay more can vary in practice from a mandatory conservation fee increment to a community-bound voluntary donation above the regular conservation fee. The sharing of conservation revenue with communities surrounding parks could demonstrate the link between ecotourism and local communities' economic development, in order to help promote a positive view of land restitution involving national parks and also to help address South Africa's heavily skewed distribution of income. A gesture of this nature could act as an incentive for the local communities to participate in conservation even more.

Charges for visiting protected areas in South Africa are set by statutory bodies. For example, South African National Parks (SANParks)[1] sets the fees at all the national parks that they manage. Even though the primary mandate of SANParks is conservation, it also operates a tourism business. The organization's tourism business is expected to generate revenue each year as part of the corporate budget, as national parks are only partly funded by the National Treasury through the Public Finance Management Act. According to SANParks (2010) conservation fees[2] account for approximately 23 percent of total revenue generated from tourism, retail, concession and other retail activities. It should be noted that SANParks utilizes per diem fees. Given how park pricing contributes to total revenue, it is vital that all parks are priced.

Since 1994, remedial policy has been a key priority for the post-apartheid South African government. The most important remedial policy, particularly from the point of view of the national parks agency and indigenous communities, has been that relating to land restitution. According to Fay (2009), while the duties linked with land ownership under land restitution expand considerably, the land claimants' land rights are quite limited as they do not usually include a share of tourism revenue and are merely limited to rental income in cases where contract parks are established.

In our view, for the land restitution not to compromise conservation objec-

[1] SANParks (formerly known as the National Parks Board prior to 1997) is the overarching government agency pertaining to national conservation in South Africa (Kruger Park Times, 2009).

[2] The term 'conservation fee' was officially adopted effective 2 April 2003 in place of 'admission/entrance fee' because the former better describes the park agency's mission (McKinsey, 2005).

tives, KTP should contribute to improving the lives of surrounding communities who now have land rights inside the park. The core research question is therefore to find out whether, and how, KTP can serve as a driver in generating economic benefits to land restitution beneficiaries and contribute positively to their livelihoods. One way in which the local communities could benefit from KTP is through sharing of revenues from conservation fees. Because the park agency seems to be ploughing all conservation fees currently generated back into conservation (SANParks, 2010), it would need to be able to generate additional revenues for any benefit-sharing with local communities to be possible.

In this spirit, the aim of this study is to estimate optimal conservation fees which should be charged at KTP to maximise revenue. This is done with the help of the contingent behaviour methodology. Therefore, this is a valuation study, asking those who come to the park what they would do with varying prices.

An assessment of the possibility of increasing conservation fees in the case of South Africa is essential for the development and implementation of appropriate policies that could result in sustainable resource use and poverty reduction. Furthermore, charging appropriate conservation fees at national parks could mitigate the adverse effects of the dwindling tax-based government funding for conservation.

Once it is shown that there is scope for generating more revenue, park pricing policy can be crafted to achieve a number of different objectives, which might include generating additional revenue for sharing with the local communities. Co-ownership of the park by local communities and the park agency, and the need for the park to contribute toward local communities' livelihoods, are the main reasons this paper promotes revenue maximization as the primary park pricing policy goal at the KTP. Of course, park pricing policy can also be used to achieve other objectives such as increasing environmental education and reducing congestion.[3]

To the best of our knowledge, no previous studies on optimal park pricing for national parks have been carried out in South Africa. Thus this paper contributes immensely to empirical work on optimal park pricing by expanding on this scant literature. Most importantly, in light of massive restitution of land to the original owners, particularly given that the restored land impinges on the quality of the remaining park, our study could aid policy makers with regard to developing effective pricing policies. Given the restitution, the fundamental question is how the co-ownership can be managed efficiently. The paper attempts to contribute to a topical and policy relevant question in South Africa. The results from the analysis can provide very useful input into the process of setting and reviewing conservation fees, particularly in Southern Africa, where

[3] This paper promotes revenue maximization as a basis for estimating optimal conservation fees because of the perceived need to generate benefits to share with the local communities. Obviously, such a narrow objective might ignore concerns about the ecological carrying capacity or congestion at the park that could be generated from the resultant conservation fee levels. Although environmental degradation is generally a serious challenge in the Kgalagadi area, the bulk of the area inside the park is still in a pristine state.

historical imbalances with regard to land ownership make the issue of land rights and access to benefits from use of land a pertinent policy issue. There is a strong and rising concern about the expropriation of land for national parks use, not only in South Africa, but also in the United States of America (see Jones, 1981) and elsewhere (see MacEachern, 2001; McNamee, 2010), i.e. native claims. Thus, this paper potentially fills an important research gap.

The rest of the paper is structured as follows. The next section provides background on the structure of the South African park system and KTP. The following section briefly reviews literature on pricing in national parks. Next, there is an outline of the methodology used in the study, followed by the research findings and discussion. The last section concludes.

2 Background

2.1 Structure of the South African parks system

For nature-based tourism in South Africa, there is a choice between national parks[4] managed by SANParks with reasonable charges (low prices), nature reserves managed by provincial conservation agencies, and private game reserves, which are often luxurious and offer exclusive game viewing.[5] National parks, provincial nature reserves and private game reserves co-exist within the same broad system, and are substitutes in a sense. The fundamental difference is not in conservation but rather in the tourist services they provide. This study's general focus is on national parks for a variety of reasons: they manage the majority of protected areas and get the most visitors; they get government funding, hence have social responsibilities; and they are largely the ones affected by land claims.

South Africa has experienced a significant increase in domestic and international visitors over the years, due in large part to the uniqueness and attractiveness of its national parks. This was achieved despite incremental increases in conservation fees over the years. Unlike many other African countries that boast of a relatively more significant international tourism market, South Africa has a relatively larger domestic market. As such, the domestic tourism market is SANParks' core market. South African residents account for approximately 80 percent of total number of visitors to national parks, with international visitors making up the remaining portion (SANParks, 2010). Though small, the South African international tourism market is mature, and accounts for a disproportionately large share of net revenue. According to Stevens (2013), a breakdown of the SANParks 2009/10 total conservation fee net revenue indicates that conservation fees generated from local tourists accounted for around

[4] The National Environmental Management Act (Act No. 107 of 1998) defines a national park as a protected area of national or international importance, a viable representative sample of South Africa's natural system or scenic areas, or the ecological integrity of one or more ecosystems.

[5] The latter are expensive relative to national parks and nature reserves, and therefore mainly target international and affluent local visitors (Peacock, 2009).

53.82 percent of the total revenue of R168 092 459. Revenue generated from the Southern African community (SADC) and international tourists conservation fees accounted for 0.42 percent and 36.49 percent respectfully. The remaining 9.26 percent was income generated from the Wild Card Programme[6].

The imposition of conservation fees at national parks was introduced when the first national park, Kruger National Park, was proclaimed in 1926.[7] Although conservation fees were introduced that long ago, it is only as recent as 2 April 2003 that SANParks adopted a new pricing structure (Pienaar, 1990). The recommendations of business consultants, McKinsey & Company, were adopted when implementing a new system of differential pricing for entry into all parks (McKinsey & Company, 2005).

It is unclear what criterion is used to determine conservation fees. Despite a few price increases at South African national parks, there seem to be few or no formal criteria with regard to determination of conservation fees.

2.2 The Kgalagadi Transfrontier Park

The Botswana and South African governments signed a bilateral agreement on 7 April 1999 to merge the Gemsbok National Park in Botswana with the Kalahari Gemsbok National Park in South Africa into a single ecological area now called KTP. This merger made it possible for wildlife to move freely between the two countries. KTP is located in the Kgalagadi District on the south-western border of Botswana and the Northern-Cape border of South Africa. It can be accessed through five gates in three different countries, namely South Africa, Botswana and Namibia (SANParks, 2010). The park boasts an area of 3.8 million hectares, and this makes it one of the biggest conservation areas in the world (SANParks, 2006). KTP is classified as a category 2 park according to the IUCN classification of protected areas (IUCN, 1994a; Sandwith, Shine, Hamilton and Sheppard, 2001).

KTP encompasses part of the ancestral site of the Khomani San "bushmen" community. As part of South Africa's land restitution programme, the Khomani San community, together with the adjacent Mier community, was awarded land inside and outside KTP in May 2002. The government transferred ownership of land on the South African side of KTP for heritage purposes to the Khomani San community (28 000 hectares) and the Mier community (30 000 hectares) (SANParks, 2006). SANParks was tasked with co-managing the transferred land inside the park on behalf of the local communities as contractual parks. A contract park is a protected area developed on land belonging to the government, private individuals, or a communiy. These parks are co-managed by the park authority in conjunction with the private individuals or communities through a joint management board (JMB). Contractual parks are common in South Africa and Australia (see Reid et al., 2004). Figure 1 shows the map of KTP indicating

[6] Visitors to parks in South Africa have an option to join a loyalty club known as the Wild Card. Membership of this club entitles visitors to access parks at reduced fees provided they visit for more than 5 or 6 days.

[7] The records from the park show that the three cars that visited the park in 1927 were the first to be charged conservation fees of £1 (equivalent to R2 at the time) each.

the different uses and areas of jurisdiction[8] after the restitution.

The brown area is the Khomani San contractual park; the yellow area is the Mier contractual park; the pink area is the Venture-zone (where the Khomani San have rights for preferential commercial joint ventures with SANParks); the olive area is the Symbolic-zone (where the Khomani San have rights for exercising their symbolic and cultural rites); and the white area is the rest of the park including the Botswana side.

The household income for the Khomani San is very low, with high unemployment rates. They have not really benefitted from the land restitution (Dikgang and Muchapondwa, 2013) and are heavily dependent on natural resources (Dikgang and Muchapondwa, 2012).. Therefore they can become a threat to conservation in their area by overexploiting natural resources. To discourage overexploitation, the park agency urgently needs to generate benefits to share with the Khomani San.

Despite KTP being one of the three renowned national parks in South Africa, it accounts for a small proportion of total visits – than 2 percent. The visitation rate should be understood in the context of the park's remote location. The park is probably less accessible than most other parks in South Africa, with the closest airport located in Upington, which is 260km from the park. However, the park has a landing strip for small aircraft. The park is approximately 610km from the biggest city in the province (Kimberley), 904km from Johannesburg (the city in South Africa from which most visitors, both domestic and foreign, are likely to visit the park) and around 1080km away from Cape Town (arguably the main tourist city in South Africa).

The land ownership structure in the Kgalagadi area has changed drastically as local communities are now co-owners of international parkland. The main challenge faced under these arrangements is how to achieve both conservation and development, particularly as the Khomani San are indigenous people who rely heavily on natural resource extraction and use. The primary goal is to find the optimal share of revenue. Thus, the key challenge facing the Kgalagadi area, particularly the KTP, is how to balance the integrity of conservation and beneficiaries' rights to benefit from land and natural resources.

SANParks are concerned about challenges at the post-restitution phase, and want to know how to move forward. It is clear that KTP should contribute to improving the lives of surrounding communities who now have land rights inside the park. Barring actual resource extraction and use inside the park, one way in which the local communities could benefit from KTP is through sharing of revenues from conservation fees. However, SANParks would have to generate new revenues for any benefit-sharing with local communities to be possible. In addition, charging appropriate conservation fees at KTP could mitigate the adverse effects of the dwindling tax-based government funding for conservation. Furthermore, Lee and Han (2002) argue that appropriate park pricing takes into

[8] The Khomani San people were awarded exclusive rights in the remainder of the park because they lost more land in comparison to the Mier community during the establishment of the Park. The special rights include commercial development and undertaking of cultural activities (Bosch and Hirschfeld, 2002).

account the correct economic value of park visitation because conservation fees are a proxy of the valuation placed on recreation by park visitors.

We implicitly assume that a revenue maximizing fee level is the optimal one. We are aware that, in discussions of other monopolistic behavior, we normally assume that the socially optimal price, at least for domestic consumers, is one where the price is equal to the marginal cost. In the literature on park fees, revenue (or rather profit) maximization is seen as a goal for fees facing international tourists, but usually not the domestic tourists. We are aware that increasing conservation fees for domestic residents may generate political resistance given the high level of poverty in South Africa.[9] This suggests that optimal fees are likely to impact on equity, *inter alia*. However, it should be noted that park visitors to remote sites like KTP do not ordinarily constitute poor people but middle to high-income earners.

In fact, the main reason poor domestic households do not visit remote parks such as KTP is not high conservation fees but excessive travel and accommodation costs. The profile of park visitors at remote parks is likely to remain the same until there is a significant reduction in travel and accommodation costs, which are barriers to the ability of poor people to access such recreational sites. Thus, increased income for poor people would allow them more opportunity to travel. Failure to implement an optimal fee strategy would theoretically imply that poorer domestic households would continue subsidizing those who are able and willing to pay, as poor households pay taxes which partly fund national parks that they themselves do not utilize. Thus, we argue that as long as the current travel and accommodation costs remain high, then domestic visitors who use the park should be charged optimal fees. Higher optimal fees are not a concern for the Khomani San in the Kgalagadi area because they do not have to pay conservation fees to get inside the park as they have concessionary free entry through a designated entry point.[10]

3 Literature Review

A significant number of tourist destinations face budget constraints for their maintenance and management. The budget constraints bind even more during periods characterised by sharp rises in tourist numbers (Eagles, McCool and Haynes, 2002). This is mainly because the tourist charges are usually kept quite low, leaving park agencies scrambling for more financial resources from governments to break even. There is a growing volume of literature that emphasizes the role of charging conservation fees in the management of national

[9] South African national poverty stood at 54 percent while rural poverty stood at 77 percent in 2010 (Leibbrandt et al., 2010).

[10] Even though the Mier people are also co-owners of KTP, the same privileges are not extended to them, and they are required to pay conservation fees to enter the park as tourists. Perhaps the same privileges should be extended to the Mier community as well so that any imposition of optimal fees would not impact negatively on their ability to access the park. If the Mier were also given free entry into the park by virtue of being co-owners, the estimated optimal fees would have no bearing on the local community's ability to visit the site.

parks (Chase, Lee, Schulze and Anderson, 1998). A general consensus among economists regarding how to address the significant increase in demand for recreation is to adopt appropriate pricing (Baumol and Oates, 1975; Rosenthal et al., 1984; Cullen, 1985). However, determining the appropriate pricing for park visitation is complicated because demand elasticities are often not readily available. Nevertheless, pricing is considered efficient relative to other rationing concepts such as lottery and queuing (see Fractor (1982) for a detailed discussion).

There are generally four pricing objectives that are evident in protected areas such as national parks. Charging at parks aims to impute value to visitation, manage parks at economically efficient levels, operate within ecological carrying capacity limits and achieve social equity. According to Laarman and Gradersen (1996), national parks are valued for their existence and their use. The demand for preservation is captured by the existence values, while the demand for visiting a recreational site is explained by the use values. The choice of whether or not to visit a recreational site is influenced by an individual's willingness to pay for it, bearing in mind the competing uses of a visitor's income.

Should a market exist for the good in question, then it is possible to assess the value attached to the site in monetary units (Bull, 1995). According to Hanley, Shogren and White (1997), to achieve a monetary value in the absence of a market, the consumers' willingness to pay for the site should be measured. As in a market situation, the principle behind the willingness to pay for such non-market goods and services is based on the same principles of rational choice and utility maximisation.

To emphasise this point, if a person is of the view that a change in a non-market good (for example, due to environmental improvements or co-ownership of the park) will make him better off in some way or feels that the change is justifiable, that individual may wish to pay higher amounts in order to secure this change or to reflect his endorsement of the change, and so his willingness to pay would be a reflection of his economic valuation of the good in question (Hanley et al., 1997).

Most of the studies that have being undertaken with regard to setting park fees reveal that the actual conservation fees that are currently being charged to park visitors are significantly below what visitors are willing to pay, as well as what is required to cover operational costs (e.g. Laarman and Gragersen, 1996; Schultz et al., 1998; Scarpa et al., 2000; Naidoo and Adamowicz, 2005). This implies that most parks visits are under-priced. Such a perverse outcome suggests that relatively poor countries are subsidizing visits of people from developed nations, who make up for the majority of visitors at national parks in most developing countries.

Although many studies have been undertaken on visitors' preferences for national parks, most have focused on estimating visitors' willingness to pay for the recreational experience in an attempt to measure the value assigned to national parks. However, in order to determine the "optimal" conservation fees to be charged at any national park, one needs to know the preferences of the visitors to that park and other substitute and complementary parks. This information can be extracted from the visitation demand functions of national

parks. Visitation demand functions can be estimated based on historical or experimental data. Historical data would be appropriate where the preferences of tourists are stable over time. However, the usability of historical data depends on the satisfaction of stringent conditions. The park agencies would have needed to collect the data for a sufficiently long period of time, there would have to be sufficient variation in the prices charged over that period of time, and the researcher would also need to know the income of visitors. Given such demands, it is no wonder that there have not been many studies using historical data to estimate visitation demands functions. To the best of our knowledge, it is only the study by Alpizar (2006) that used historical data to compute the "optimal" entrance fees, for national parks in Costa Rica. Alpizar (2006) found that price discrimination between residents and non-residents could successfully maximise social welfare and even meet a set revenue target.

Similarly, there have not been many studies attempting to estimate optimal conservation fees using experimental data (see Chase et al., 1998; Naidoo and Adamowicz, 2005). The Travel Cost Method (TCM) and the Contingent Valuation Method (CVM) are the primary techniques which have been used in these kinds of studies. While the TCM studies could provide useful information pertaining to the value placed on ecotourism in protected areas, they have mostly focused on estimating consumer surplus rather than estimating optimal conservation fees (Chase et al., 1998). TCM estimates a demand function when done correctly.

The Contingent Behavior (CB) approach is an alternative approach to the TCM. Grijalva, Berrens, Bohara and Shaw (2002) state that there is a growing number of studies in recreational demand models that use the CB trip data for predicting quantity under hypothetical scenarios. While potentially avoiding some criticisms levelled against CVM and measurement of non-use values, the CB approach potentially still remains controversial due to its inherent hypothetical nature.[11] A CB method asks those who come to the park what they would do under hypothetical circumstances (with varying prices). According to Alberini and Longo (2006), CB questions can be used alone or combined with observed behaviors within the TCM, to assist in placing a value on specified (non-market) public goods. In our case, we use CB questions alone to help estimate value at South African national parks.

Chase et al. (1998) used the CB approach to investigate the optimal entrance fees at the time Costa Rican national parks had introduced differentiated fees. Using a similar approach, a study by Naidoo and Adamowicz (2005) simulated fee increases and estimated entrance fees that maximized tourism revenue to Mabira Forest Reserve in Uganda. Determination of optimal fees using experimental data adds value to research on park pricing as it can be designed to mimic the real market. Furthermore, introducing substitutes embraces micro theory in a richer fashion.

Price discrimination has the potential to increase revenue as compared to

[11] One can test the validity of CB data by making use of generalized Negative Binomial and Poisson regression models. Despite the growing use of CB applications, targeted CB validity studies are rare (see Grijalva, Berrens, Bohara and Shaw, 2002).

imposing a single conservation fee, in addition to satisfying equity issues from the social point of view, and bringing about local community stability. Discriminatory pricing means two people don't pay same price. Price discrimination among users can enable resource use in different sites, among different time periods and among different user profiles (South African residents and non-residents). Discriminatory pricing as applied by SANParks is based on the fundamental principle described in detail in the context of ecotourism applications by Baldares and Laarman (1990) and Lindberg (1991). The rationale for charging different fees is based on the fact that parks are unique and have different degrees of appeal to users. This uniqueness is reflected by the visitor's preferences for some parks over others; hence some parks are more popular than others.

These differences preferences are reflected by the difference in individual visitors' visitation demand functions and demand elasticities. Own and cross price elasticity are critical components for national park pricing policy. Optimal park pricing is dependent on the reliability of the demand elasticities (Chase et al., 1998). The park agency is able to engage in price discrimination because the market can fairly easily be segmented – which enables visitors with varying elasticities of demand to be identified and subsequently treated differently.

The potential benefits of charging optimal fees to access national parks are significant. According to Mendes (2003), transferring some conservation fee revenue to local communities is an incentive for them to accept and truly adhere to conservation practices, as the transfer of fees would demonstrate that protected areas such as national parks may be synonymous with wealth rather than with lost developmental opportunities. The estimation of optimal conservation fees at the KTP is important as it may contribute toward developing effective pricing strategies in the context of South Africa's national park system. It is for this reason that this study is critical as it unravels ways in which conservation fees can be set at optimal levels to the benefit of the local communities surrounding parks, who often incur the highest cost of conservation and yet experience the least benefit.

4 Methodology

4.1 The Contingent Behaviour Method

The available historical data for South African national parks are not suitable to characterise recreational demand due to lack of sufficient variation in conservation fees over the years. Furthermore, cross-price elasticities cannot be estimated because many parks always have the same fees and fee changes in all parks are generally linearly related. This is a most common situation with parks in Africa. Accordingly, non-market valuation methods should be used to better understand the fees that park visitors should be charged to enter parks. For the purposes of this study, the CB approach is considered to be the most appropriate method due to its ability to take substitution effects into consideration

when generating experimental data for estimating visitation demand functions. This paper adopts the CB formulation by Chase et al. (1998) to estimate the optimal conservation fees at KTP as well as three other parks within a South African park system framework.

Based on previous studies,[12] aggregate demand at parks is expected to be a function of each park's conservation fee as well as fees at other substitute and complementary parks, income, socio-economic characteristics and trip related expenditure.[13] The symmetrical demand functions for each of the, say, four parks can be written as follows:

$$Q_i = f(P_1, P_2, P_3, P_4; M; Z \qquad i = 1, ...4parks \tag{1}$$

Where Q_i is the park visitation rate (e.g. days per year) by all tourists at park i; P_i is the conservation fee at park i; M is the visitors' disposable income and Z captures the socio-economic and trip-related characteristics.[14] The visitation demand functions for the parks will be estimated using experimental data generated from the CB survey conducted on visitors at KTP as well as Kruger, Augrabies Fall and Pilanesberg national parks, which were considered to be substitutes and/or complements for KTP. KTP only has two of the 'big five' large animals – dessert lions and leopards. However, it is well known for its huge population of gemsbok and arid biodiversity. Kruger has all of these animals, has the biggest accommodation facilities, tarred roads and an international airport. The Kruger national park is the flagship of SANParks managed parks and by far the largest park in South Africa. The park has a wide variety of attractions comparable only with the best in Africa. A visitor intercepted at Kruger is 1 500 km from KTP.

The close proximity of Augrabies Fall national park to the KTP is the reason its visitation is also of interest in this study. The main attraction is the 56 metre high Augrabies Falls, considered to be one of the most impressive falls in South Africa. SANParks managed parks offers a variety of lodging types, ranging from camping, huts, safari tents, bungalows, cottages, and guest houses to luxury lodges. Although Pilanesberg Game Reserve is managed by the North West Parks and Tourism Board (NWPTB), it is of interest in this study given its popularity, status, similarity and location. We will refer to it as Pilanesberg National Park. The park is located in the crater of a long extinct volcano, and is the fourth biggest park in South Africa. It is also home to the 'big five', has world class accommodation, tarred roads and an airport nearby. The visitor usually sees all the parks in a few years' time.

[12] The main approach that is applied for estimating the demand for public goods such as many environmental amenities is survey-based and was first implemented by Bergstrom et al. (1982), who estimated elasticities of demand for public schools in the United States (Khan, 2007).

[13] However, given that KTP is in a remote arid location, income is not expected to be a significant factor as visitors already incur high travel costs to visit the park.

[14] The demand function represented by equation (1) assumes that individuals allocate their disposable income between recreational goods and a composite commodity with a numeraire price.

Table 1 shows a chart similar to the one used to capture data regarding visitors' responses to actual and hypothetical own-price and cross-price scenarios at the parks.

The respondents were shown the chart, with a blank piece of paper covering all but the first block of three columns. The respondents were asked, "During your current trip, for how many days will you visit KTP at the current daily entrance fee of R45 per person per day?" The question was repeated for Kruger National Park, Augrabies National Park, and Pilanesberg National Park.

After filling out the relevant column with the appropriate number of "days visited" for each park, the interviewer explained that there would be a set of hypothetical questions next, in which the fee would be raised at only one park. The first hypothetical question raises the entrance fee at KTP only. The interviewer therefore asked, "If the fee were increased to Rw_j only at KTP, how would that affect your plans to visit KTP and the other parks (Kruger, Augrabies and Pilanesberg)?" The second hypothetical question raises the entrance fee at Kruger National Park only. The interviewer therefore asked, "If the fee were instead increased to Rx_j only at Kruger, how would that affect your plans to visit Kruger and the other parks (KTP, Augrabies and Pilanesberg)?" The third hypothetical question raises the entrance fee at Augrabies National Park only. The interviewer therefore asked, "If the fee were instead increased to Ry_j only at Augrabies, how would that affect your plans to visit Augrabies and the other parks (KTP, Kruger and Pilanesberg)?" The fourth hypothetical question raises the entrance fee at Pilanesberg National Park only. The interviewer therefore asked, "If the fee were instead increased to Rz_j only at Pilanesberg, how would that affect your plans to visit Pilanesberg and the other parks (KTP, Kruger and Augrabies)?" Even though each respondent answers visitation questions about five entrance fee plans (actual fee, hypothetical fee 1, hypothetical fee 2, hypothetical fee 3, hypothetical fee 4), there would have to be a variation in the hypothetical price plans across respondents in order to generate sufficient variability for estimable demand functions, i.e. k groups of the respondents should answer hypothetical price plan questions about the k fee levels (w_j,x_j,y_j,z_j; j=1,...,k).

4.2 Data Collection

A face-to-face questionnaire survey was conducted with randomly picked park visitors (only park goers, and those who already paid to get to the park) at the four parks. The survey was conducted during the week and over weekends during the months of March and April in 2011. Due to the vast size of the four parks, the surveys were mainly carried out at the gates, accommodation facilities and designated resting sites inside the park. A total of 385 local overnight visitors and 78 international overnight visitors were surveyed.[15]

[15] Although SANParks distinguishes between three categories of visitors, our sample only consists of domestic (i.e. South African) and international visitors. We did not get any respondents from the SADC region. This is expected, since visits from SADC residents make up a very small proportion of total visits. Furthermore, South African national parks cater

Our sample composition is in line with the visitor profile at national parks in South Africa, where domestic visitors account for an overwhelming majority. The data gathered from the CB approach consists of five observations for each of the respondents. This corresponds to the visitation vs. fee answer pairs from questions that were posed about the five entrance fee plans (i.e. actual fee, hypothetical fee 1, hypothetical fee 2, hypothetical fee 3, and hypothetical fee 4).

In addition to data from the CB approach, the survey collected data on visitor demographics, trip expenditure and duration at the park. Furthermore, data on visitors' willingness to pay either additional fees or voluntary donations over and above the current actual fees was collected.[16] On this question, respondents were informed that fee increments or voluntary donations would be a way in which the park could fulfil its social responsibility of uplifting the local communities so they could continue supporting conservation. Therefore, additional revenues from visitors were one way to facilitate the park's effort to capture and share ecotourism benefits with the local communities.[17] In this question, respondents were also asked about their willingness to pay under two different management scenarios: one, the proceeds from a fee increment would be managed by SANParks/NWPTB on behalf of the local surrounding communities; two, the proceeds from a voluntary donation would be managed by an independent organisation which would ensure that it is channelled towards development needs of the communities surrounding parks. This question was presented after the CB questions to prevent an embedding effect on the CB approach. Finally, visitor's sentiments regarding what constitutes 'a fair conservation fee' were also gathered.[18]

One of the criticisms levelled against a CB survey format such as the one in table 1 is that respondents might not know much about their intended visitation, especially when they do not know anything about the alternative parks (Cicchetti and Peck, 1989). This difficulty was not encountered in this study as a significant number of respondents were either regular visitors and/or familiar with the four parks. The interviewers also described the parks in detail to respondents who did not know other parks besides the one they were interviewed at. Thus, respondents had little difficulty in revealing their intended visitation. The fact that SANParks' fee structure does not distinguish between peak and off-peak periods means that seasonal bias due to the timing of our survey might

to both day and overnight visitors, and charge the same conservation fees for both categories. We could not get enough day visitors to do any meaningful analysis for that category.

[16] The survey used the payment card method to elicit the visitor's willingness to pay a fee increment.

[17] Assurances associated with revenue management were made to respondents to minimize protest against fee increases.

[18] Although what constitutes a 'fair' conservation fee is a political decision, it is still important that the views of visitors in this regard are known. Despite the fact that politically driven rather than economically driven decisions is often adopted, studies such as the one we have undertaken may provide policy makers with alternative strategies. It is hoped that, by providing such useful information, we can let decision makers know that sound alternative strategies exist so that they can make informed decisions.

not be a huge problem. Furthermore, most visitors visited the parks during both summer and winter.

4.3 Descriptive Statistics

The study focuses on domestic overnight visitors as we could not get significant numbers of international tourists to do any meaningful analysis for that category.

The data indicate that the majority of visitors to national parks do not make use of travel agency services. This is not surprising as the majority are domestic visitors who are more familiar with the local recreational services.

The average visitor who enjoys national parks around South Africa is approximately 50 years old, has at least a University degree and has an average household size of about 3.24. Given the average household size, the fact that an average of 2.94 of household members were on the trip during the time of the survey indicates that parks offer a great opportunity for a family vacation.

A median South African traveller spends between R3 852.76 to R7 565.51 on total trip costs at Pilanesburg and Kgalagadi respectively. Pilanesburg's lowest total trip cost is attributed to the fact that an overwhelming majority of respondents are from nearby cities, Johannesburg and Pretoria - which are an hour's drive away from the park. Augrabies's second lowest trip costs are due to the limited recreational activities at the park, which contributes to visitors staying for short periods of time. The trip costs at the two parks are significantly less than at the much physically bigger Kgalagadi and Kruger parks, which are further away and also offer a wide variety of recreational activities. A significant portion of the total trip cost goes towards accommodation inside the parks. Local visitors are spending between R217.41 to R1 008.41 on conservation fees during their visits, which account for 5.6 percent and 13 percent of total trip costs at Pilanesburg and Kruger respectively.

Although the conservation fees are fixed for each park, the variability in household size enables us to estimate the actual total daily fees incurred by each visiting household. The total amount spent during the trip on conservation fees accounts for around 10.59 percent of the domestic visitors' total trip costs. The constant terms absorb the expenses held constant, such as lodging and travel.

A general picture that emerges when looking at the annual income levels of the respondents at the four parks is that they are often visited by affluent households. Given South Africa's heavily skewed distribution of income, establishing this profile is important. Domestic visitors at the Kgalagadi Park earn significantly more than visitors at other parks. This can be attributed partly to the fact that it's the most remote park in the country and is accessible only by 4x4 cars.

The willingness to pay additional money for entering the park is significantly higher in the presence of proposed benefit-sharing with local communities than what the park visitors deem to be a fair conservation fee level. It also seems that park visitors feel strongly about the institution that manages the revenues on behalf of local communities, with visitors showing trust and willingness to contribute more when independent organisations administer the funds. A com-

parison of the means from the two ways of generating revenues for the local communities suggests that visitors prefer community-bound conservation revenues to be generated through voluntary donations.[19]

Although the variable representing race is not ordinarily expected to influence demand visitation, it is of great importance in South Africa, which still has baggage from the apartheid era. The white market is considered to be mature in South Africa, hence other race groups are seen as crucial for achieving growth in the domestic market. The descriptive statistics indeed show that more needs to be done to grow these particular segments of the domestic market, given that they account for approximately 91 percent of the South African population. The fact that SANParks has a consolidated marketing strategy targeting black, coloured and Indian races is testimony to this.

The data indicate that 96 percent of the respondents are white. The population income statistics indicate that 53 percent of white visitors earn more than R300 000 per annum. A look at the black, coloured or Indian races reveal that a mere 36 percent earn more than R300 000 per annum. Given the income distribution of park goers, and the income distribution of blacks, coloureds and Indians, we would expect an increase in the latter groups' visitation. According to SANParks (2010), there was a significant increase of 17.5 percent in black, coloured and Indian races compared to the previous period (2008/2009 financial year). This suggests that income alone does not account for the whiteness of the parks.

4.4 Estimation Technique

This section discusses the appropriate estimation technique given the nature of the data collected. Many statistical analyses involving individual data have a censored dependent variable (Greene, 2008). In a case where the dependent variable is censored for a significant proportion of the observations, parameter estimates obtained through conventional regression techniques such as the Ordinary Least Squares (OLS) are biased. In that case, the technique proposed by Tobin (1958) yields consistent estimates. In the generalised censored regression model, the dependent variable can be either left-censored, right-censored, or both left-censored and right-censored, where the lower and/or upper limit of the former variable could take any value (Henningsen, 2010):

$$Q_h^* = x_h'\beta + \varepsilon_h \qquad ; h = 1, ...N \tag{2}$$

$$Q_h = \begin{cases} a, if \quad Q_h^* \leq a \\ Q_h^* \quad if \quad a < Q_h^* < b \\ b \quad if \quad Q_h^* \leq b \end{cases} \tag{3}$$

[19] We carried out two-tailed tests assuming unequal variances and a 5 percent significance level to formally assess whether magnitudes of the stated mean willingness to pay differ between the two payment vehicles. We conclude that the difference between "fee increment" and "voluntary donation" WTP is statistically significant only for visitors in Kruger and Augrabies.

Where a indicates the lower limit and b the upper limit of the regressed variable, h refers to the observations, Q_h^* is an unobserved variable, x_h is a vector of independent variables, β is a vector of unknown parameters and ε_h is a disturbance term.[20]

Tobit models are commonly used in the context of cross sectional or panel data. Thus, autocorrelation in a Tobit model is less likely to be an issue in a case of panel data than in a univariate time series. With panel data, the model should ideally allow for individual observations that define a cross-sectional unit of data to differ systematically in the value of the dependent variable for reasons unobserved to the econometrician. In the case of the Tobit model, such individual specific observation, time-variant effects are modelled as a random effect (Wooldridge, 2002). A fixed effects model is not desirable due to problems in getting a good estimate of levels rather than changes (because you can't accurately estimate the fixed effects themselves), hence it's better to use random effects.

The random effects model using the full data set is preferred because it uses all the available information[21]. According to Hsiao (1986) and Greene (1993), the random effects model makes it possible to draw inferences about the demand preferences of the population given the observed behaviour of the sample to be made. According to Chase et al. (1998), the random effects specification estimates the correlation between the multiple observations for an individual, and thereafter uses that output to generate more efficient coefficient estimates. An assumption made in this model is that the unobserved person-specific effect is uncorrelated with the included regressors.

The random effects Tobit model is therefore used to estimate visitation demand at the four parks. In a case where the sample data is clustered over a narrow price (and visitation demand) range, a log-linear demand may be better choice than a linear model (Thomas and Maurice, 2008). This is indeed the case with our survey data; hence the log-linear model is preferred. Thus, we specify the functional form for the CB data in a double log-functional form as follows:

$$\ln Q_i = \alpha + \beta \ln P_1 + \beta \ln P_2 + \beta \ln P_3 + \beta \ln P_4 + \beta \ln Y + \varepsilon \tag{4}$$

Where Q_i is the visitation demand at park i, P_i is the conservation fee at park i, and Y is the individual's disposable income, including other socio-economic characteristics. The model depicts the duration of stay during the year at each of the four parks as a function of the park's own-price, prices at other parks and income, including other socio-economic characteristics. When the visitation demand at national parks is log-linear, the coefficient terms are simply the elasticities. The above model is therefore subsequently used to estimate own-price and cross-price elasticities of visitation demand of the four parks which

[20] In a case where $a = -\infty$ or $b = \infty$, the regressed variable is not left-censored or right-censored, respectively.

[21] Alternatively, a randomly selected observation per person could be used. While this alternative approach ensures independence of observations, it does not use all the available data. This implies that the random effects Tobit model is preferred over the standard Tobit model.

will form inputs into the computation of the optimal conservation fees that each park should charge to maximise revenue.

5 Results

5.1 Random effects Tobit model for park visitation demand by South African residents

Table 3 presents the results of the random effects Tobit model analysing factors[22] determining visitation demand at four South African parks by residents, based on the experimental data generated from the CB approach. The random effects Tobit model proved to be the best fit for our data. Given that we are running a random effects Tobit with double log function, the coefficients in the random effects Tobit model are interpreted as marginal effects[23].

The model yields expected signs at the four parks (KTP, Kruger, Augrabies and Pilanesberg). In particular, own-price coefficients are negative and significant at all the parks but generally not elastic. However, this implies that an increase in conservation fees would result in a decline in visitation. In the visitation demand function for KTP, the cross-price elasticity is positive and significant with respect to Pilanesberg, indicating that it is a substitute, albeit weak, for KTP. Interestingly, conservation fees at Kgalagadi have no bearing on visitation at Pilanesberg. While some visitors to KTP might contemplate visiting Pilanesberg instead, most visitors to Pilanesberg find it unique enough not to be substitutable by KTP. This would be rational for visitors who package Pilanesberg with the adjacent Sun City tourist resort.

In the visitation demand function for Kruger, it is only own-price which is significant. The insensitivity of visitation demand to conservation fees at the other parks confirms its uniqueness. Indeed, Kruger is by far the most visited park in South Africa, if not in Africa. It receives more than 25 times more visitors per annum than any other park in the country.

In the visitation demand function for Augrabies, all the price coefficients are significant. The responsiveness of visitation demand at Augrabies to conservation fee changes at all the other three parks is expected, given the limited size and attractions at the former. Augrabies is the only park in this set where the main attraction is a waterfall. Moreover, it does not have the "Big Five". Therefore, the positive and significant cross-price estimates imply that an increase in fees at the other three parks will result in increased visitation at Augrabies. However, changes in conservation fees at Augrabies will not affect visitation at the other three parks.

In the visitation demand function for Pilanesberg, although there appears to be insensitivity of visitation demand to conservation fee changes at the

[22] Our analyses confirm that the attitudinal variables do not add significant explanatory power, hence these are excluded from the contingent behaviour model.

[23] Our attempts to find out if logs are driving the results using box-cox transformations did not work because the dependent variables are not strictly positive.

other parks, household size positively influences visitation demand at that park. Multi-trip arrangements and respondent's age negatively influence visitation demand at Augrabies. Income positively influences visitation demand at KTP, which is perhaps not surprising given that this is the least accessible park given its remote location and aridness.

5.2 Optimal conservation fees for local visitors at KTP

The main policy objective of this paper is to estimate the optimal conservation fees necessary to maximize park revenue at KTP. Given the low magnitudes of price and cross-price elasticities estimated in this study, we propose that such fees be imposed on domestic visitors to the park. It is plausible to apply such a park pricing regime to domestic visitors because South African residents make up the bulk of visitors to local national parks. Furthermore, South Africans constitute a significant portion of international visitors in neighbouring countries, where they are charged much higher fees than currently in place in the country. Given the unique profile of South African park visitors (including their high income levels), we argue that this warrants charging them "monopoly" prices at KTP as well as other popular parks.

The Marshallian theory of price elasticity of demand can be used to determine the price-quantity points at which revenue is maximized. The standard result from economic theory is that the park agency can maximize revenue by setting the conservation fee at that point where the park visitation demand has unitary elasticity. Using the elasticities estimated in the random effects Tobit model, we solved for the revenue-maximizing daily conservation fees reported in Table 4 (see Owen (2012) for a fuller exposition of the computations).

The estimates shown in Table 4 indicate that the optimal fees could be increased at KTP as well as other parks. The conservation fees at KTP can increase by as much as 115percent, thereby almost doubling current revenue after accounting for the drop in visitation which will be triggered by the increase. It should be noted that this fee increase will not drastically reduce visitation as it is not very high. For comparison with the ultimate tolerance level of visitors, see the choke conservation fees reported in Table 4. The results suggest that an increase at, say, Pilanesburg, which has a low own and high cross elasticity, will result in an increase in revenues.

The computations reported in Table 4 suggest that there is a need to reform the current pricing strategy at KTP. This paper argues that two possibilities can be pursued to reform conservation tariffs to help communities extract more benefits for their participation in conservation. One way of doing this is for SANParks to revise the conservation fees to the revenue-maximising level and share the additional revenue with the communities. Of course, a critical concern has to do with what guarantee there is that the increased revenue following the fee increase will actually reach and benefit the adjacent communities. Alternatively, the required increase could be designed as a community-bound voluntary donation. Our results show that visitors would voluntarily give donations above the current conservation fee if they knew it would go to the local communities

as compensation for their role in conservation.

Indeed, demonstrating that conservation fees can be designed to maximize revenue from local visitors without necessarily preventing lower income people from accessing the parks is important in political debates about land use. Implementation of voluntary donations is one way to overcome any potential adverse effect that optimal fees may have either on the poor or on park visitation demand.

The sharing of conservation revenue with local communities surrounding national parks is one way to demonstrate the link between ecotourism and local communities' economic development. Given that the Kgalagadi had approximately 21 985 local visits (which excludes 6 054 Wild Card Free Guests), our proposed scheme would raise R1 135 305.40 (R51.64 per visit). This is a substantial amount of money compared to the San total income. The San do not earn enough money from the tourist spend. Furthermore, the income received from their !Xaus lodge joint venture is insufficient in comparison to the potential money that could be raise by our scheme. The current arrangement is that SANParks keeps all the revenue generated through conservation fees and yet they receive an equal share of revenues generated from the !Xaus lodge joint ventures with the communities (Khomani San and Mier). For instance, from its opening in 2007 to March 2010, the !Xaus lodge with just 24 luxury beds generated a net revenue of R130 178 (SANParks, 2010).

Introduction of such schemes which directly benefit poor local communities in South Africa is the best way to help land restitution involving national parks to be viewed positively. Clearly distinguishing the part of visitors' payments going to local communities will help visitors connect with co-owners and co-providers of ecosystem services inside national parks. A gesture of this nature could act as an incentive for the local communities to participate in conservation even more than they already do. In fact, the need to share tourism revenue with local communities surrounding parks has recently been embraced by SANParks, as evidenced by their announcement that a 1 percent levy for these purposes will be added to accommodation and activity bookings, effective 1 June 2012 (Mlongo, 2011).

6 Conclusion

Now that some of the resource rights inside the Kgalagadi Transfrontier Park have been vested in the surrounding communities, the park should contribute toward improving the lives of these communities so that land restitution will not compromise conservation objectives. Given that the park has well-established infrastructure to help communities extract more benefits for their participation in conservation, this study argues that it is important to establish the possibility of generating more revenue from conservation fees for sharing with the new but poor co-owners of international parklands. If such opportunities exist, then the modes of making tourists pay more can vary from a mandatory conservation fee increment to a voluntary community-bound donation above the regular

conservation fee.

In this spirit, the aim of this study was to estimate optimal conservation fees which should be charged at KTP to maximise revenue. This was done with the help of the contingent behaviour methodology. Our analysis, which focused on South African residents, shows that there is a wide variation in the elasticities of demand between the four national parks. The cross-price estimates indicate limited substitutability in visitation demand among the four parks.

Overall, our results suggest that there is sheer underselling of the recreational services offered by the South African park systems, which implies that there is room for improvement in the use of the conservation fee policy. Revenue could be maximized by increasing conservation fees for domestic tourists at Kgalagadi Transfrontier Park as well as the other parks without little effect on visitation. The ability to raise more revenue by the park agency opens up two possibilities: revenue sharing with local communities and more sustainable park management. Our results are consistent with other empirical studies on nature-based ecotourism which estimate higher visitors' willingness to pay for the recreational services of parks. The policy implication is that the park agencies (SANParks & NWPTB) should consider instituting mechanisms for capturing more revenues.

Moreover, our results show that revising conservation fees to optimal levels could play a positive role in redistribution of ecotourism revenue to local communities surrounding national parks. The sharing of fee revenue could address South Africa's heavily skewed distribution of income. Clearly distinguishing the part of visitors' payments going to local communities will help visitors connect with co-owners and co-providers of ecosystem services inside national parks. A gesture of this nature could act as an incentive for the local communities to participate in conservation even more.

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Table 1: Sample of contingent behavior chart with visitation questions posed to respondents

Name of Park	**Actual**		**Hypothetical Increases**[1]							
	Fee[2]	***Days***	***Fee***	***Days***	***Fee***	***Days***	***Fee***	***Days***	***Fee***	***Days***
Kgalagadi Transfrontier Park	R45		R56		R45		R45		R45	
Kruger National Park	R45		R45		R56		R45		R45	
Augrabies Fall National Park	R25		R25		R25		R31		R25	
Pilanesberg[3] **Game Reserve**	R45		R45		R45		R45		R56	

Table 2: A selection of descriptive statistics of the 385 domestic overnight visitors interviewed

Variable	**Kgalagadi Park**	**Kruger Park**	**Augrabies Park**	**Pilanesberg Park**
Annual Visitation Frequency to Park	2.48 (1.86)	2.65 (1.85)	2.69 (1.94)	2.58 (1.91)
This is First Visit to this Park	35.58% (47.92%)	14.66% (35.40%)	40.82% (49.25%)	18.10% (38.54%)
This Trip Arranged by Travel Agent	2.88% (1.68%)	6.03% (23.83%)	8.16% (27.44%)	0.86% (9.25%)
This Visit is Part of a Multi-trip	23.08% (42.17%)	9.48% (29.32%)	57.14% (49.59)	15.52% (36.24)
Household Size	3.40 (1.70)	3.31 (1.74)	3.16 (1.15)	4.03 (1.89)
Conservation Fee Paid at this Park	R45.00	R45.00	R25.00	R45.00
Daily Fees for Household [4]	R295.82 (R231.75)	R256.98 (R231.20)	R286.93 (R282.63)	R51.61 (R50.21)
Total Household Fee Expenses During this Visit	R949.62 (R982.14)	R1008.41 (1 770.60)	R320.61 (R261.69)	R217.41 (R201.19)
WTP this as "Fair Fee" for this Park[5]	R50.63 (24.54)	R71.03 (R96.62)	R36.43 (R18.14)	R 51.59 (R22.81)
WTP this "Fee Increment" at this Park	R50.48. (R89.01)	R27.37 (R42.96)	R43.75 (R70.02)	R50.86 (R84.91)
WTP this "Voluntary Donation" at this Park	R55.05 (R93.33)	R32.77 (R45.57)	R63.02 (R94.71)	R55.82 (R87.26)
Won't Visit this Park at this Fee or Higher	R116.94 (R90.14)	R169.61 (R220.40)	R85.33 (R37.97)	R106.83 (R72.75)
Accommodation costs incurred at this Park	R3 137.86 (3838.738)	R2 802.07 (R2 736.03)	R1209.29 (R1 197.17)	R 1 711.12 (R1 850.69)
Total Trip Costs	R7 565.51 (R6 263.59)	R7 521.90 (R10 037.30)	R4 635.20 (R3 779.10)	R 3 852.76 (R4 419.33)
Household Annual Income	R340 144.20 (R216 050.80)	R300 259.00 (R241 588.10)	R274 795.90 (R167 374.70)	R287 456.90 (R192 981.90)
Actual Number of Nights Spent at this Park	7.76 (9.63)	10.28 (11.12)	1.96 (1.28)	5.47 (3.79)

[1] We did not use the same range for fee increases range for all respondents (25 percent - 125 percent increase, i 25 percent intervals). These were then divided to give five blocks; allocation of respondents to a particular block was randomized.

[2] US$ 1 = South African Rand (R) 7.85 at the time the paper was written.

[3] In addition to the gate fee shown above, Pilanesberg charges R20 for each car that goes inside the reserve.

[4] All visitors ordinarily pay conservation fees. However, some within the group visiting together had "wild cards" offering discounted fees and others paid old citizens' rates. As such, daily household fees will not necessarily be Conservation Fees x Household Size.

[5] None of the 3 WTP prices (fair price, raised prices and voluntary donation) are included in our model.

Number of Nights Desired at Zero Park Fee	8.39 (10.01)	11.06 (11.62)	2.94 (3.07)	6.51 (5.02)
Number of Nights at Increased Fee[6]	7.83 (9.85)	9.57 (10.85)	1.93 (1.27)	5.44 (4.09)
Age of Respondent (in years)	49.28 (12.45	49.70 (14.70)	50.53 (13.46)	44.48 (14.65)
Respondent is Male	62.50%	67.24%	59.18%	67.24%
Respondent is Black	0.97%	7.76%	0%	1.72%
Respondent is White	97.09%	92.24%	100%	98.28%
Respondent is Coloured	1.94%	0%	0%	0%
Respondent is Indian/Asian	0%	0%	0%	0%
No. of Obs.	104	116	49	116

Standard deviation in parentheses

Table 3: Random effects Tobit model for park visitation demand by South African residents[7]

Variable:	**Kgalagadi Transfrontier Park**	**Kruger National Park**	**Augrabies National Park**	**Pilanesberg National Park**
Price – Kgalagadi (R/night)	-1.180 *** (0.0824)	-0.009 (0.082)	0.197 *** (0.072)	0.164* (0.086)
Price – Kruger (R/night)	0.0833 (0.082)	-1.032 *** (0.082)	0.194 *** (0.072)	0.138 (0.086)
Price – Augrabies (R/night)	0.0711 (0.0608)	-0.032 (0.060)	-0.366 *** (0.053)	0.092 (0.064)
Price – Pilanesberg (R/night)	0.171 ** (0.076)	-0.021 (0.075)	0.142 ** (0.067)	-0.503 *** (0.080)
Income (R)	0.102 ** (0.049)	-0.022 (0.044)	0.098 (0.060)	0.091 (0.068)
Age (years)	0.008 (0.167)	0.242 (0.150)	-0.401 ** (0.203)	-0.178 (0.230)
No of H/H members on trip	0.064 (0.020)	0.020 (0.089)	0.081 (0.120)	0.396 *** (0.136)
Multi-trip	0.116 (0.127)	0.182 (0.114)	-0.309 ** (0.154)	-0.007 (0.175)
Male dummy	0.060 (0.109)	0.083 (0.098)	-0.027 (0.132)	0.022 (0.150)

[6] The hypothetical increased fee is what we finally account for in our model. The number of nights corresponding to increased fee is generated from a question shown in table 1.

[7] Economic theory requires that the cross price elasticities be the same. Two of our results are not because one of them is insignificantly not different from 0 while the other one is statistically significant in the two cases. Bonfrer, Berndt and Silk (2006) investigate the theoretical and empirical regularity of these troublesome anomalies (negatively signed cross-elasticities, and sign asymmetries in pairs of cross elasticities). They concluded that the presence of negative cross-elasticities is theoretically possible and can be explained by the relative magnitudes of the share-weighted income elasticity, the unobserved Hicksian compensated rate of substitution, and/or the category demand effects. This implies that it is possible for parks to be simultaneously a substitute and a complement to one another.

Education (years)	-0.052 (0.040)	-0.006 (0.036)	-0.088* (0.048)	-0.099* (0.055)
Constant	3.574 *** (1.178)	5.209 *** (1.109)	0.400 (1.263)	0.839 (1.455)
Log-Likelihood	-2437.559	-2389.528	-2309.171	-2622.733
Wald chi2(10)	316.53	206.48	106.33	87.91
No. Of. Observations	1890	1890	1890	1890

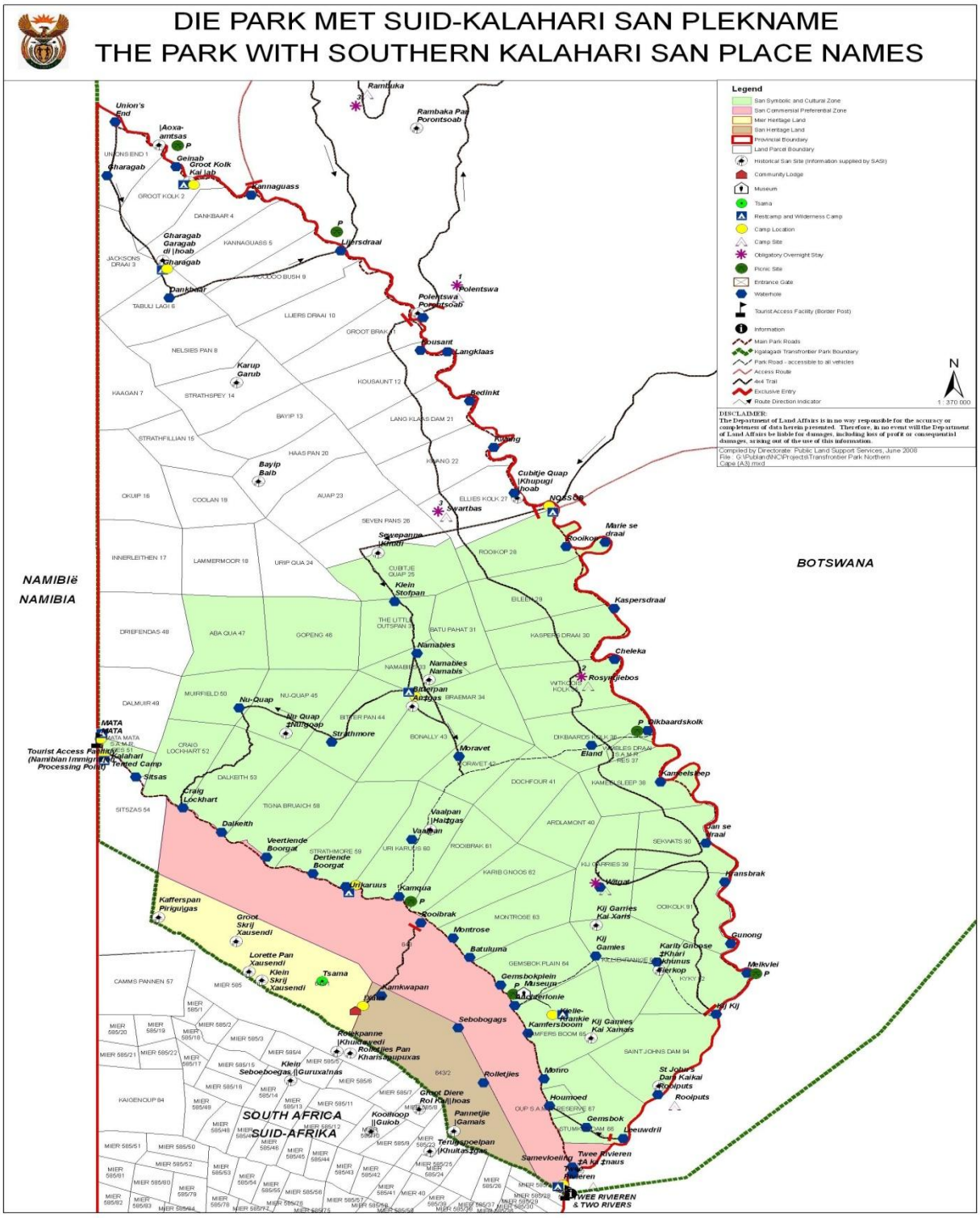
Source: Field Survey, 2011
legend: * p<0.1; ** p<0.05; *** p<0.01; SE in parenthesis

Table 4: Various conservation fee options for local visitors (in 2011 South African Rand)

	Kgalagadi Transfrontier Park	**Kruger National Park**	**Augrabies National Park**	**Pilanesberg National Park**
Revenue-Maximising Fee (ZAR) Revenue-Maximising Fee (USD)	96.64 (12.31)	95.77 (12.20)	108.26 (13.79)	103.11 (13.14)
Current Conservation Fee (ZAR) Current Conservation Fee (USD)	45.00 (5.73)	45.00 (5.73)	25.00 (3.18)	45.00 (5.73)
Choke Conservation Fees (ZAR) Choke Conservation Fees (USD)	193.29 (24.62)	191.53 (24.40)	216.53 (27.58)	206.22 (26.27)

Source: Field survey (2011) & own computation

Figure 1: Map of the Kgalagadi Transfrontier Park



Source: Hirshveld (2009).