POTENTIAL MONOPOLY RENTS FROM INTERNATIONAL WILDLIFE TOURISM: AN EXAMPLE FROM UGANDA'S GORILLA TOURISM

Petra Andersson, Sara Croné, Jesper Stage and Jørn Stage[*]

Abstract: The economic benefits many African countries derive from international wildlife tourism are very few, especially when viewed from existing potentials in terms of resources and uniqueness**.** African wildlife tourism has natural barriers to entry and thus is basically a monopolistic market. However, the countries have done virtually nothing to take advantage of this situation. Rather than focusing on cost recovery or revenue maximisation, the governments should therefore aim at maximising profits from international tourism. Uganda is the case study of this paper in this regard. Data collected from a travel cost survey indicates that in 1997, even under uniform pricing, Ugandan's profit from gorilla tracking in the Bwindi Impenetrable National Park alone could have been increased by between USD 30,000 and USD 220,000 (depending on assumptions about social costs). Besides, unlike most government revenue sources, monopoly prices on international tourism do not impose deadweight losses on the domestic economy.

JEL classification: H21, H42, L12, L83, Q21

Keywords: Tourism rents, travel cost method (TCM), Uganda, mountain gorillas

1. INTRODUCTION

African wildlife in its natural habitats, including the national parks, is a unique resource to the continent. This means that African wildlife tourism could be a huge market, and with its natural barriers to entry, it offers good opportunities for realising potential monopoly rents. But if these rents are not captured by the governments, through either suitable pricing or taxation policies, they are likely to be appropriated by domestic or foreign private agents, or lost entirely.

Tourism plays a significant economic role in many African countries. Revenue from international wildlife tourism accounts for a considerable portion of many African countries' GDP and foreign exchange earnings[1]. However, the issue of optimal pricing and taxation arrangements for

[*] Department of Economics, Umeå University, SE 901 87 Umeå, Sweden; email Jesper.Stage@econ.umu.se; tel. + 46 90 786 53 36; fax + 46 90 77 23 02.

international tourism has still not been properly analysed in many of the countries. Prices are often set at rates that are intended to be "competitive" with other tourist destinations, or in order to maximise the number of tourists. This sometimes brings about direct or indirect support to the tourism industry in the form of subsidies or tax breaks. Even where this is not the case, price policies usually aim only at recovering the financial costs associated with operating the parks or, at best, maximising the revenue earned from the parks.

However, in a situation where the customers of a monopolistic industry are mainly foreigners, neither financial cost recovery nor revenue maximisation would be appropriate goals. Instead, the governments' goal should be to maximise the monopoly rents earned from the industry. Furthermore, where the private sector is also involved in the wildlife tourism in government-administered parks, another important goal of governments should be to ensure that the monopoly rents from tourism go directly to the governments and that private agents have no opportunity to earn above-normal capital returns by appropriating part or all of the rents.

This study uses data from a travel cost survey carried out in 1997 to estimate international tourists' demand for visits to the Bwindi Impenetrable National Park (BINP) in Uganda. BINP is the home of roughly half of the world's mountain gorillas, and in the year 1997 it was the only park in the world where mountain gorillas could safely be seen in their natural habitat. It, therefore, provides a suitable example of a park where the government had a complete monopoly over the "good" provided. The demand curve estimated from the travel cost survey is used to determine, with reasonable assumptions about the underlying social marginal costs, the additional profits that could have been earned from monopoly pricing.

Subsequent sections of this paper are organised as follows: Section two discusses the theories of optimal pricing and the Travel Cost Method. Section Three is an overview of the BINP and gorilla tourism in Uganda. Section Four and Section Five each deal with analysis of data and econometric specification, and findings of the study. The final part, Section Six is devoted to conclusions and summarises the salient points of the paper.

2. THEORETICAL ANALYSIS

2.1 Optimal Pricing for National Park

A natural resource such as a national park can potentially create value for people in a number of ways. Generally speaking, the total value or benefit a resource provides to different members of the world community can be divided into "use values" and "non-use values" (Brännlund and Kriström 1998).

Use values stem directly from someone's use or planned future use of a resource and may be marketed or not. Examples include consumptive use values of, for instance, tourists visiting a park, products, such as timber harvested legally or illegally from the park, or the park's effects in terms of maintaining the ecosystem for the benefit of the surrounding population. At the same time, use values from a national park can also include non-consumptive use values that can be found, for instance, in people watching television documentaries filmed in the park.

Non-use values, on the other hand, are not connected to anyone actually using the resource. They can be subdivided into several different categories: option values, quasi-option values, bequest values, stewardship values and existence values (Ward and Beal 2000). Option value refers to the value people place on having a resource available for possible unplanned future use. For instance, people may value a park because they might want to visit it in the future. Quasi-option value means the value of having the resource available for new kinds of purposes that might be needed in the future. For instance, a park could be valued because there are plants in it which may have medicinal uses. Bequest value concerns the value to people of knowing that the resource is being preserved for future generations. Stewardship value denotes the value of knowing that an important natural resource is being managed responsibly. Finally, existence value is the value to a person of simply knowing that the resource exists.

Needless to say, making exact delimitations between the different non-consumptive use values and non-use values of a resource can often be difficult. However, the overall non-consumptive use values and non-use values usually occupy an important part in the rationale for maintaining a national park. They are normally values of a public good character, and it can be argued that the maintenance of the park is a responsibility that a government has towards the rest of the world. At best, the government can hope for financial support from the world community, which presumably reflects at least some of the surrounding world's willingness to pay for the public goods provided.

However, a common mistake in this regard is the assumption that this responsibility that the government owes to the rest of the world extends to and includes all aspects of the park's value. Even if a park does provide public good benefits to the entire world, it also normally provides private good benefits through the use values related to the park. When some or all of these private good benefits are isolated from other benefits stemming from the park, the provision of these private goods should be seen as a separate optimisation problem. Revenue from optimal provision of the private good benefits can help fund the provision of these benefits; but other than this, the two are not necessarily closely related.

An obvious example is the problem of setting optimal levels and optimal fees for domestic and foreign tourists visiting the park. From a

global perspective, the optimal use which a park entails is that visitors pay a fee equal to the marginal social cost. However, in view of the national composition of the visitors, a country might want to deviate from the marginal cost principle and use whatever market power it has to apply a set of different prices, depending on whether a visitor is a national resident or not.

The important pre-requisite for price discrimination**,** that it is possible to prevent resale, is fulfilled if visitors are charged different prices on the basis of nationality. For local citizens (and perhaps, foreigners residing in the country) the optimal price will still be the marginal social cost; but when it comes to foreign visitors the optimal number of visits – from the host country's perspective – should be determined as the profit maximising number.

If a country chooses the simplest price discrimination method, that of charging a uniform price within each group, the optimal number of foreign visitors and the corresponding price rate is determined by setting marginal revenue equal to marginal social cost. This will reduce the number of visits from foreign tourists, but from the host country's perspective there is no deadweight loss associated with this reduction of visits. Foreigners carry the entire deadweight burden, while the profit from the pricing scheme will accrue to the host country.

Park fees influence the demand for complementary services; so setting low fees can potentially enable tour operators or hotel owners to secure the visitors' combined willingness to pay for a visit and the associated services. If the tour operators or the hotel owners are foreign-based, this inevitably results in the host government's giving away some of its potential tourism rents to a foreign company. Even if the companies are domestic, it will still be preferable for the host government to appropriate the rents on its own. Giving part or all of the potential rents over to private agents in the domestic tourism industry will create inappropriate incentives and will ultimately lead to over-investment in the tourism sector compared to other economic sectors. This over-concentration is likely to dissipate a large part of the potential social gains from tourism rents. Moreover, the foregone government revenue will have to be replaced by other tax or revenue sources, which, unlike the tourism rents, will usually impose distortions on other parts of the domestic economy. Bird (1992) points out that tourism can be seen as a kind of service export, which is unusual in that the exported service is actually consumed within the country. However, although most developing countries tax other exports heavily, they constantly provide implicit or explicit support to the tourism "export" industry.

2.2 The Travel Cost Method

The Travel Cost Method (TCM) is the oldest environmental valuation technique, with fishing, boating and forest visits being among the most popular application areas. TCM is used to estimate visitors' demand functions for using a recreational site. This is done through analysing consumption behaviour in related markets. The underlying assumption of TCM is that the incurred costs of visiting a site (travel cost, entry fees and on-site expenditures) reflect the recreational value attached to the site. These costs show a lower bound to the willingness to pay for visiting the site. The travel costs are used to estimate a trip generating function that predicts how many visits will be undertaken by a specific individual, or from a specific zone, to the site (Clawson and Knetsch 1966; Ward and Beal 2000).

In a zonal TCM study the area surrounding the site is divided into zones based on origin of the people visiting the site. In early TCM studies these zones were often concentric rings around the site, but in more recent zonal studies, the zones are usually defined as countries or regions. This is because the zonal TCM must also include population levels and socio-economic characteristics for each zone of origin, and such data are more readily available at the national and regional levels. In an individual TCM study, each household or individual visiting the site is studied separately; and apart from travel costs, (broadly defined) socio-economic characteristics of individuals or households are also usually assumed to affect the number of visits made per period.

Questionnaires were used to ask visitors to the recreational site about the location they have travelled from, their travel costs and other relevant information. Using the responses, it is possible to estimate visitors' travel costs and other related expenditures and relate these to the number of visits made by these visitors or from that zone. A demand function can then be estimated, giving the relationship between the cost of visiting the site and the number of visits as $V = V(C, S)$, where V is the number of visits, C is the cost, and S is a vector of socio-economic variables describing the zone or individual in question. These socio-economic variables might shift the demand function. Generally, people living near the recreational site and facing lower travel costs make more visits per year, while those living a considerable distance away from the site tend to make fewer visits because of higher travel costs.

In TCM studies one implicit assumption commonly made is that the representative visitor's utility function is separable from the recreation activity being modelled (Hanley and Spash 1993). This means that the demand for the recreation activity can be estimated independently of the demand for alternative leisure activities, or alternative marketed, non-leisure goods.

The trip generating function for a zonal model can be described as $V_z = V(C_z, Pop_z, S_z)$ where V_z is the visits per time period from zone z to the site, C_z is the travel cost to the site, Pop_z is the population of zone z, and S_z is a vector of socio-economic characteristics of the zone in question (e.g. average income and age in the zone). The dependent variable V_z is often expressed as trips per capita. Similarly, the trip generating function for an individual model can be written as $V_i = V(C_i, S_i)$ where V_i is the number of visits that the individual makes per time period, C_i is the travel cost facing the person, and S_i is a vector of socio-economic characteristics of the individual in question.

Both TCM models have their own strengths. Some advantages of the zonal model are that reliable socio-economic information for the respective zones is usually readily available without the necessity of going via a survey, risking incorrect answers, and usually ensuring a reasonable degree of variation in the dependent variable. The advantage of the individual model, on the other hand, is that it can achieve a higher degree of variation in the explanatory variables.

TCM may look a relatively straightforward technique based upon the assumption that recreational value is related to the travel costs people are willing to incur. However, there are some practical problems with this method. For instance, the time spent during a long journey cannot be spent in any other engagement. Therefore, a "time cost" should be added to the travel cost as a reflection of the true cost that the visitor incurs in order to visit a site. Ignoring time cost might lead to an underestimation of the recreational value that people obtain from visiting a site. Although it is difficult to estimate the value of people's time, some attempts have been made in this regard. Using hourly wage rates or fractions of these is one method frequently applied. But in general, no real consensus has yet been reached on ways to estimate time costs.

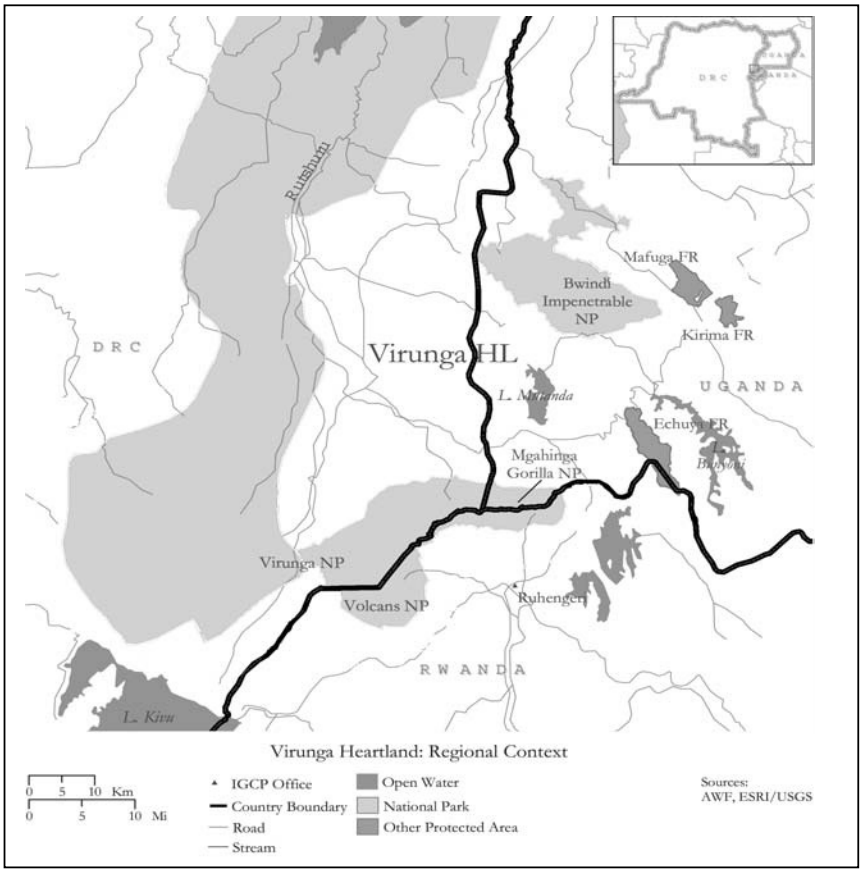
Another problem area is the issue of how analysts should apportion a visitor's travel costs between different sites when visits are made to several sites during the same trip. A portion of the total travel cost will only reflect that value of the recreational site in which the analyst is interested. The usual approach here is to use a percentage of the total travel costs, with the percentage either being set by the visitor or estimated by the analyst.

The goal of a TCM study is usually to use the estimated demand curve to determine the consumer surplus created by a public or semi-public good, such as a wildlife area, in order to be able to compare the value thus created with values which could be created if the area were put to other uses. Such valuation (Andersson and Rundquist 1999) was in fact the original rationale for collecting the survey data used in this paper. However, when the wilderness experience in question is traded as a private good, the estimated demand curve can also be used to determine the profit-maximising price levels.

3. UGANDA'S GORILLA TOURISM AND BWINDI IMPENETRABLE NATIONAL PARK (BINP)

There are only about 650 mountain gorillas left in the world. Approximately half of these live in the BINP, one of the four national parks that are home to the mountain gorillas. The other parks which are all interconnected and form part of the Virunga volcanic mountain range are the Parc des Volcanos in Rwanda, Parc des Virunga in the Democratic Republic of Congo and the Mgahinga Gorilla National Park in Uganda. Due to the political situation in the border region, during the survey, these other parks were considered unsafe for visiting tourists. Thus, BINP was the only national park where the mountain gorillas could be seen safely. BINP covers 332 square kilometres and is located about 560 km from Kampala. Figure 1 below shows the location of the parks and the layout of the area.

Figure 1. The Virunga Heartland Region



(SOURCE: African Wildlife Foundation)

The importance of BINP in conservation is exceptional. The BINP is an afromontane forest, which has the rarest vegetation types on the continent, and is one of the richest forests in East Africa in terms of types and quantities of birds, butterflies and trees. There are twelve species in the park, including the critically endangered mountain gorilla, that are recorded as species threatened to complete extinction. This tropical forest also has an important climatic function; regional and local climate changes occur when the forest industry completely clears large areas of tropical forests. Furthermore, the tropical forest binds soil and nutriment. Destruction of tropical forests contributes to erosion and causes higher levels of mud in the rivers. This can, in turn, contribute to damaging other ecosystems further down the river. The tropical forest also contains other ecosystems, such as swamplands, which will be threatened unless the forest is protected.

Conservation efforts towards BINP have historically faced a variety of problems. As in many protected areas throughout the world, obstacles to the conservation of the BINP largely emanate from conflicts of interest over land usage, specifically by the desire of local community members to utilise park resources as they have done traditionally. Management problems in BINP in the past included poaching, pit sawing for timber, mining for gold and other minerals and illegal appropriation of forest products. Lack of trained personnel, poor equipment and infrastructure, hostility of the local community towards the park and lack of sufficient ecological knowledge to run effective conservation management have also exacerbated the problem.

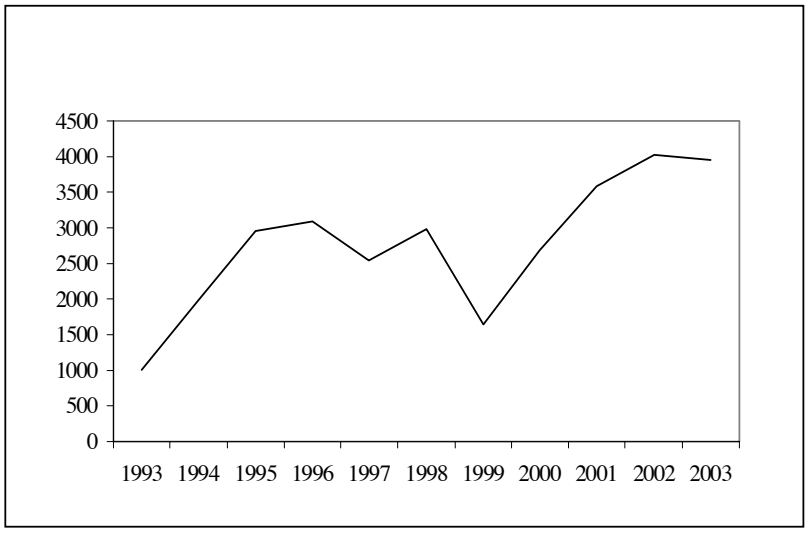
Even though many of the illegal activities have now been brought under control through improved law enforcement, there are still several serious constraining problems in conserving the park. Many of these problems can only be addressed fully through an analysis of the existing relationships between the park and its neighbouring communities (Uganda National Parks 1995). Accordingly, in order to mitigate the tension between the park management and the surrounding communities, the government of Uganda has put in place a policy of earmarking 20% of park revenue for projects aiming at the surrounding communities (Uganda Wildlife Authority 2004). Increasing the government's revenue from BINP could thus enable to provide funding for improved enforcement of park boundaries and improved government services in the vicinity. This would hopefully further improve the local support and initiative for maintaining the park, and hence, the endangered species living in their natural habitat.

Uganda's tourism has long suffered from the legacy of the Idi Amin years. During the 1960s tourism grew rapidly in parallel with tourism in neighbouring Kenya and Tanzania, and by 1970, it had become the country's third largest source of foreign exchange earnings. However, the number of tourists from 1971 onward plummeted because of the political and economic chaos in the country. Since the resumption of stability in the 1980s, tourism has begun to recover but the country is still lagging far

behind its neighbours. In the Southwestern part of the country, where BINP and Mgahinga are located, tourism has also suffered from security risks caused by the conflicts in neighbouring Rwanda and the DRC. Although Uganda still has difficulty in attracting overseas tourists, it has, unlike many other African countries, a relatively large base of regional tourism. Over half of the tourists visiting the country come from other African countries, primarily from countries in eastern and southern Africa.

Uganda started organising gorilla tracking for tourists in BINP in 1993. Tracking permits are issued for one day of tracking, with one hour to spend near the gorillas. When the present survey was conducted in 1997 there were a maximum of ten tourists per day visiting the two groups of gorillas, the Mubare group and the Katengere group. The permits are often booked a year in advance. The responsible government agency, Uganda National Parks (UNP), guarantees visitors that the tracking guides will find gorillas, but no guarantee that the gorillas will be in view. In 1997, BINP had a total of 2694 visitors, of which 2544 were international tourists (Uganda Wildlife Authority 2004). The number of international tourists has since increased to approximately 4000 per year (See Figure 2 below).

Figure 2. International tourist visits to Bwindi: 1993 - 2003



(SOURCE: Uganda Wildlife Authority 2004)

UNP receives considerable assistance from the International Gorilla Conservation Program (IGCP), which is a coalition of three conservation organisations: the African Wildlife Foundation (AWF), the Flora and Fauna Preservation Society (FFPS) and the World Wide Fund For Nature (WWF). The overall goal of IGCP is to ensure the survival and sustainable

conservation of mountain gorillas and forest habitats in Rwanda, Uganda and the Democratic Republic of Congo. The IGCP wishes to create a better regional collaboration between the three countries' conservation authorities in order to develop co-ordinated actions toward forest and gorilla conservation.

It should be noted that although IGCP assists national authorities to promote gorilla tourism, its primary goal is to maintain the non-consumptive use values and non-use values from the park, and tourism revenue is only seen as a means to reach this end. Thus, increasing government profits from gorilla tourism by raising fees, even if it leads to a decline in tourist numbers and the consumptive use values experienced by tourists, should not cause problems with IGCP[2].

There are few tourism facilities in and around BINP. There is a low cost community campground outside the entrance. Two tour operators have camps inside the park, near the park office, while two others have camps outside the park border. This implies that the tour packages purchased by tourists consist largely of the gorilla tracking – the other package items being of limited, low-cost nature in comparison – and that the different visitors can thus be seen as purchasing a largely homogeneous good.

Different categories of visitors are charged different prices for the gorilla tracking. There were foreign non-residents who paid a fee of USD 150 in 1997, foreign residents in Uganda who paid USD 120, Ugandan citizens who paid USD 40, and local citizens who paid USD 15. In addition to the tracking fee, there is a park fee of USD 40 for those who stay at least for two days, which is what nearly all tourists do. Resale between different groups, or within groups, is prohibited.

The price paid for gorilla tracking covers the cost of the trackers, and there is already an attempt to price discriminate; foreign tourists are charged substantially more than domestic residents. The stated aim of the government in this regard is that prices should be designed so that everyone can afford to track the gorillas; and that the higher rate international tourists are charged is justified by the higher income of foreign tourists, and is not intended to extract maximum profits from these tourists. As is the case with many other countries, Uganda thus voluntarily sacrifices potential profits from its international tourists.

In order to determine the profit-maximising level of tracking and park fees, it is necessary to have not only an estimate of tourists' demand function, which can be obtained from the travel cost method, but also an estimate of the social marginal costs caused by visiting tourists. The quota restriction means that in 1997 additional tourists, each paying USD190, were considered desirable up to the maximum level of 3650 for the whole year, but undesirable above that level. The marginal social cost was thus

understood to be less than USD190 for visitors up to 3650 per year, and higher than USD190 above that level.

The marginal social cost of gorilla tracking consists of opportunity costs for staff labour and eco-damage costs (for instance, from disturbing the gorillas), both of which can reasonably be assumed to be convex and non-decreasing in the relevant interval. There are of course other costs associated with operating the park, such as maintaining the limited infrastructure in terms of tracks, fences, and shelters for staff as well as opportunity costs imposed on local populations by closing the park area for traditional usages (see Adams and Infield 2003) for estimates of these opportunity costs for the Mgahinga park). However, these costs would still be there even if the park were closed off to tourists. These additional costs can thus be seen as costs for the provision of the public good aspects of the park rather than costs for the private good aspect of gorilla tracking and can therefore be ignored in this analysis. When setting the optimal tariff level for gorilla tracking, only the marginal cost of providing the private good (i.e. the gorilla tracking) needs to be considered.

We, therefore, examine the results using three different marginal cost curve alternatives. One is where the marginal cost is assumed to be constant at 190 - ε USD for visitor rates up to and including 3650 per year and 190 + εUSD thereafter, where ε can be chosen arbitrarily close to zero (alternative a). The second is where the marginal cost increases linearly from zero with visitation rate zero to USD190 with 3650 visitors per year (alternative b), and the third one, where the marginal cost is zero for up to 3650 visitors per year and infinite thereafter (alternative c). The marginal cost function for which a revenue maximising policy would coincide with the profit maximising policy is thus the best option. Many parks, including BINP, lack reliable estimates of marginal costs and marginal damages; but for parks where a visitation limit (and, hence, a marginal cost estimate for that specific number of visitors) already exists, alternative (b) can perhaps provide a reasonable guesstimate, with alternatives (a) and (c) as extremes in opposite directions. These marginal cost assumptions can be used to estimate the total variable costs for various visitation levels. The variable costs can in turn be used to estimate the net profits from tourism at various fee and visitation levels.

4. DATA AND ECONOMETRIC SPECIFICATION

For most of the international tourists visiting BINP, the visit is a once in a lifetime experience. This means that an individual travel cost model is unsuitable, as the dependent variable, i.e. the number of visits, takes the value 1 for all visitors and 0 for everyone else, making a statistical analysis rather difficult. A zonal travel cost model was, therefore, found to be more suitable.

The BINP has one main entrance at Buhoma village. By using this location, it was possible to sample all tourists who visited BINP during the sampling period. A total of 279 visitors to BINP were surveyed over a five-week period in October and November 1997, yielding 273 survey returns and six non-respondents. Of the 273 respondents, twenty-seven were Ugandan residents (and should thus be charged marginal cost fees rather than monopoly fees) and 246 were international tourists; twenty-five of the international tourists' surveys had to be dropped from the sample because the respondents did not provide complete answers in the survey. This left 221 survey responses that could be used to analyse international tourists' demand for gorilla tracking.

Respondents were asked to estimate their cost of travelling from their home countries to Bwindi and back. Those who were visiting several destinations during their tour were asked to estimate the cost shares attributable to their visits to Bwindi. No attempt was made to estimate time costs associated with the visits. As time spent in travelling is associated with the distance covered and hence the travel cost, it means that the estimated willingness to pay for visiting the site is inclined downwards and that the estimates of profit-maximising fees are, therefore, on the low side.

In a separate contingent valuation section of the survey, respondents were specifically asked how much they were prepared to pay for tracking fees. The majority responded that the current price levels were the maximum they were willing to pay, and some even responded that they were willing to pay less than the fees put in place. In reality, all respondents were clearly willing to pay at least the actual tracking and park fees, and it seems a highly unlikely coincidence that this should also be the maximum amount that most of them were willing to pay. These responses indicate strategic answers to the contingent valuation question; hence, the estimates from the travel cost method are likely to be more reliable.

The visitors were subdivided into geographic zones, and an average travel cost for each zone was calculated. The official visitor statistics were not broken down by country of origin, making it impossible to determine appropriate weights for the data for different zones. We, therefore, assume that the sample, drawn during five weeks of October and November, is representative for the entire year and that visitor numbers for the entire year can be calculated based on the shares of the sample period. Descriptive statistics for the data set are listed in Table 1.

Table 1. Distribution of visitors to BINP, by country profile

Zone	Number of visitors during survey period	Number of visitors during 1997 (estimated)	Mean travel cost (USD)	GDP per capita (USD)	Population (millions)	Visitation rate (visits / million)
USA	62	714	890	28740	268	2.663
United Kingdom	50	576	601	20710	59	9.755
Germany / Netherlands	28	322	1139	27862	98	3.289
Denmark / Sweden	16	184	634	28463	14	13.156
Austria / Switzerland	9	104	1146	35605	15	6.907
Australia / New Zealand	38	437	621	19834	23	19.019
South Africa	8	92	682	3400	38	2.423
Kenya	10	115	831	330	28	4.111

(SOURCES: International Bank for Reconstruction and Development (1998); Authors' survey)

It can be noted from the table that although other African countries provide most of Uganda's tourists, they are of limited importance for gorilla tourism. The largest tourist groups come from the United States, the United Kingdom and from the Australia/New Zealand zone. The United Kingdom alone provides almost as many visitors as the other European zones put together.

We estimated the econometric specification $V_z = V(C_z, I_z)$, where V_z is the number of visitors per thousand inhabitants in zone z, C_z is the average travel cost for visitors from zone z, and I_z is the GDP per capita in zone z in 1997.[3]

5. RESULTS

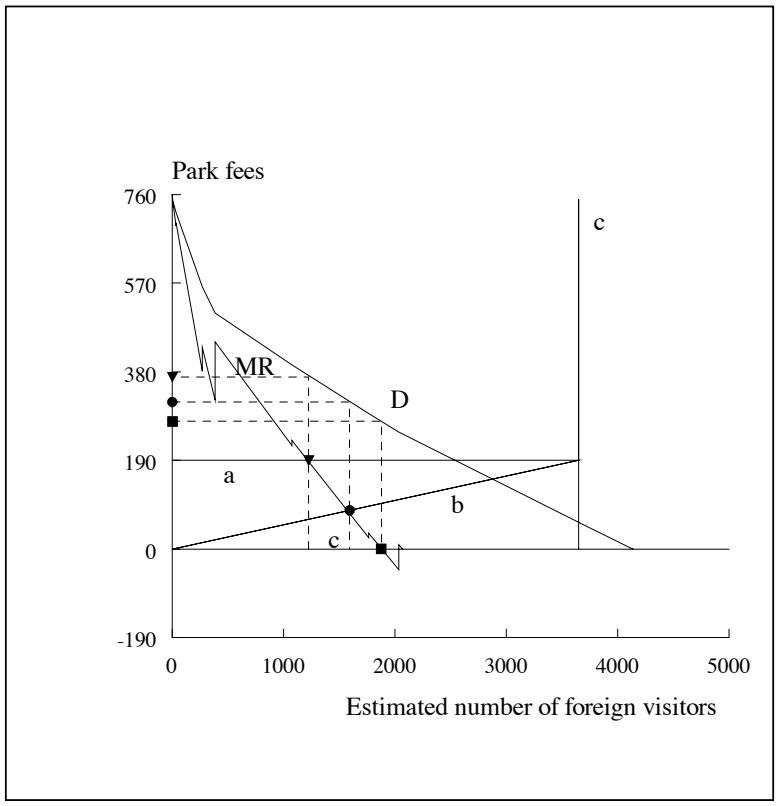
The average travel costs from a zone and the average income in a zone both have the expected signs (negative for travel cost, positive for income) and are both statistically significant at the 1% level. The regression constant is also statistically significant. The results from the estimation are presented in Table 2 below.

Table 2. Results from the weighted least squares regression

Variable	Coefficient	Robust SE	t value
Mean travel cost	-0.01543	0.00093	-16.568
GDP per capita	0.0000923	1.82E-05	5.082
Constant	15.950	0.724	22.022
$R^2 = 0.3470$			

Assuming that these estimates project the correct demand curve, the estimated coefficients can then be combined with the travel cost and income information to form a second-stage demand curve for gorilla tourism, relating the number of visitors to the level of the entrance fee. This demand curve and the corresponding marginal revenue curve,[4] together with the profit maximising entrance fees (under the three different assumptions about the shape of the marginal cost curve) are as illustrated in Figure 3 and as listed in Table 3.

Figure 3. Demand, marginal revenue, and park fees



Since we assume uniform fees for all foreign tourists, the marginal revenue from attracting an additional tourist declines faster than the fee itself. With cost alternative (a), where each additional tourist is assumed to cause an extra cost of almost USD190, profit maximisation would entail a near doubling of the fee, thereby decreasing tourist numbers to less than half of the 1997 level. Where the marginal social cost of each tourist was almost USD190, net social profits were zero with the USD190 fee actually imposed, but would have been almost USD220,000 with the profit maximising tariff.

With cost scenario (b), where the marginal social cost is assumed to increase linearly from zero for the first visitor, to USD190 with 3650 visitors per year, the optimal fee would have been lower than in alternative (a), but would nonetheless have been more than 160% of the actual fee in place. If this cost scenario is correct, then net social profits could have been approximately 40% higher than they actually were.

Table 3. Profits under the three different scenarios for marginal social costs

	Alt. (a)	Alt. (b)	Alt. (c)
Profit maximising fee	368	315	273
Profits with this fee	218804	435747	513576
Visitors number with this fee	1226	1593	1878
Profits with 1997 fees	0	314912	483360
Net social benefit foregone	218804	120834	30216

Table 3 illustrates estimates of visitor rates and total profits for the different marginal cost scenarios, assuming unchanged fees as opposed to profit-maximising fees, as well as the net social benefit foregone by not charging profit maximising fees.

Finally, it could be seen that even in scenario (c), where marginal social costs are assumed to be zero in the relevant interval, i.e. the marginal cost estimate necessary for revenue maximisation to be the appropriate policy, there would still have been some small social gains to be made from raising fees above the 1997 level.

6. CONCLUSIONS

The findings indicate that by setting profit maximising fees for entrance to the BINP the Ugandan government could have increased net benefits to Ugandan society by between USD 30,000 and 220,000 during 1997. Given that total Ugandan government revenue during 1997 was approximately USD 650 million (International Monetary Fund 2000), this would have made only a minor addition. However, it must be noted that BINP is a small park, and applying profit maximisation policies in all national parks could probably have provided considerably more revenue. Moreover, it is worth emphasising that increasing fees for international tourists would not have any distorting effects on the domestic economy. On the contrary, it would decrease the incentives for rent seeking currently facing private agents operating in the tourism industry and hence, presumably, reduce the risk of corruption among government officials charged with administering the tourist sector.

The issue, that of maximising profits from BINP, discussed in this paper is simpler than the profit maximisation problem facing many other national parks in Africa. BINP had had a world monopoly on gorilla tracking at the time of this survey, making it unnecessary to analyse the risk of losing customers to competitors. Most national parks, on the other hand, do face potential competition from other parks with similar attributes. With political stability in the Virunga region, the Ugandan government may face increasing competition from the parks in Rwanda and the DRC in the

gorilla tourism industry. Unless the three countries can reach an agreement to keep prices high, part of their potential market power will be lost.

Nonetheless, the principal issue, that the goal of governments managing national parks should be to make full use of whatever market power they have in order to maximise government profits from foreign visitors, is applicable to all other national parks. A feasible approach might be to raise fees gradually, preferably in concert with other governments managing similar parks, to determine the profit maximising price levels. National parks provide one of the few opportunities that African governments have to raise revenue without imposing deadweight losses on their own populations, and hence, they should make full use of this opportunity.

NOTES

1. See Bird (1992) about the importance tourism held for developing countries during the 1980s, or Cleverdon (2002) for a recent study of the regional growth patterns of tourism in Africa, and a detailed discussion of the importance of tourism in Southern Africa.
2. As part of a more complex price discrimination strategy, one might consider giving discounts to members of the IGCP organisations. This would subdivide the visitor groups further, making it possible to appropriate a larger part of the total willingness to pay for visits to BINP. However, analysing these issues is beyond the scope of this paper.
3. Population and GDP figures were obtained from the International Bank for Reconstruction and Development (1998), while average travel costs were calculated from the survey data. A linear version of this specification was estimated using weighted least squares, with each zone given a weight corresponding to its population.
4. Since the zonal TCM produces a segmented second stage demand curve, the marginal revenue function is discontinuous. Because of this, we see in Figure 2 that there are actually two points where marginal cost curve (c) crosses the marginal revenue curve, so that the overall profit maximum for alternative (c) can only be identified by comparing the profits corresponding to these two price levels.

Acknowledgements

Financial support from the Swedish International Development Co-operation Agency (Sida) is gratefully acknowledged. The authors are also indebted to the staff at Uganda National Parks, the Uganda Wildlife Authority, the African Wildlife Foundation and the World Wide Fund For Nature for their help with the survey and data related to this study. The usual disclaimers apply.

REFERENCES

Adams, W. M. and M. Infield. 2003. Who is on the Gorilla's Payroll? Claims on Tourist Revenue From a Ugandan National Park. *World Development* 31, no. 1: 177 – 190.

Andersson, P. and S. Rundquist (now Croné). 1999. Valuation of Bwindi Impenetrable National Park According to Travel Cost Method. B.Sc. thesis. Umeå: Department of Economics, Umeå University.

Bird, R. M. 1992. Taxing tourism in developing countries. *World Development* 20, no. 8: 1145 – 1158.

Brännlund, R. and B. Kriström. 1998. *Miljöekonomi*. Umeå: Studentlitteratur.

Clawson, M. and J. L. Knetsch. 1966. *Economics of outdoor recreation*. Washington: Johns Hopkins University Press.

Cleverdon, R. G. 2002. Tourism development in the tourism region: the opportunities and challenges. *Development Southern Africa* 19, no. 1: 7 – 28.

Hanley, N. and C. L. Spash. 1993. *Cost-benefit analysis and the environment*. Aldershot: Edward Elgar.

International Bank for Reconstruction and Development. 1998. *World development report 1998/99: Knowledge for development*. New York: Oxford University Press.

International Monetary Fund. 2000. *International financial statistics yearbook 2000*. Washington, D.C.: International Monetary Fund.

Uganda National Parks. 1995. *Bwindi Impenetrable National Park management plan*. Kampala: Government Press.

Uganda Wildlife Authority. 2004. Unpublished data.

Ward, F. A. and D. Beal. 2000. *Valuing nature with travel cost models: A manual*. Cheltenham: Edward Elgar.