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ABSTRACT

The travel-cost technique in its current perspective was used to value three recreational facilities in Nigeria—the Agodi Gardens, Ibadan, the University of Ibadan Zoological Garden, Ibadan, and the Luna Amusement Park, Lagos. Two measures of monetary value were employed—the total benefit value and the nondiscriminating monopolist or the maximum collectable gate taking value. Total benefits for the respective centers were ₦57,297[1]; ₦479,906; and ₦1,146,643. The nondiscriminating monopolist values were ₦13,248; ₦177,212; and ₦382,458, respectively. These values are not considered insignificant to the economies of the two cities concerned. For comparisons with values of the land in alternative uses, the respective centers generated a gross market value per hectare of ₦380; ₦50,632; and ₦191,229.

INTRODUCTION

Since Clawson's seminal work[2] and Davis' relatively unknown but imaginative study,[3] there has been a growing interest in recreation research among many research groups, economists in particular. In the United States, for instance, van der Smissen and Donald reported nearly 4,000 theses and dissertations in the recreation field,[4] a figure which showed an increase from 1,300 to 4,000 in about six years.[5] This, in general,

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1. Naira (₦) is the monetary unit of Nigera. $1 = ₦4.1960 as of September 9, 1987.

2. M. CLAWSON, METHODS OF MEASURING THE DEMAND FOR AND VALUE OF OUTDOOR RECREATION (Resources for the Future Inc., Reprint No. 10, 1959).

3. R. Davis, The Demand for Outdoor Recreation: An Economic Study of the Maine Woods (1963) (Ph.D. Dissertation, Harvard University).

4. NATIONAL RECREATION AND PARK ASSOCIATION, BIBLIOGRAPHY OF THESES AND DISSERTATIONS IN RECREATION PARKS, CAMPING, AND OUTDOOR EDUCATION (B. van der Smissen & J. Donald eds. 1970).

5. Gearing, Swart, & Turgut, *An Overview of Quantitative Techniques Applied to Tourism Planning Decisions*, in PLANNING FOR TOURISM DEVELOPMENT: QUANTITATIVE APPROACHES (G. Gearing, W. Swart, & V. Turgut eds. 1976).

confirms Clawson's forecast that "we shall see in the next several years a great increase in the amount and professional competence of research on economic aspects of outdoor recreation."[6]

As expected, the economists' interest has focused on the valuation of monetary benefits of recreational facilities.[7] This interest derives from three major sources: (1) the need to evaluate monetary values of recreation centers as a touchstone for allocating resources to them, (2) the need to demonstrate the contributions of recreation centers to the economies of cities or states wherein they are located, and (3) the need to assess the relative economic importance of several alternative, and sometimes incompatible, uses to which the land may be put. All this is geared toward enhancing the quality of decisionmaking with respect to the allocation of resources either by politicians, government agencies, or private citizens. Much remains to be done, however, for very few recreation participation studies in the United States have estimated the benefits associated with existing or prospective recreation sites or areas.[8]

The interest of researchers in recreation studies in the developing nations is far worse. The reasons for this are many, but in essence, there are few recreation studies because of government's lukewarm attitude towards recreation. This attitude is reflected in the low level of investment in recreational facilities and recreation research. There is also general apathy toward the need for recreational services among the people. This is reflected in the relative inactivity or complete absence of special interest groups with concern for recreation.[9] To our knowledge, no study has been done to quantify the monetary benefits associated with any recreation center in Nigeria.[10] Yet Nigeria's resource allocation problems are not, by any stretch of the imagination, insignificant.

This study therefore represents a "first-generation" effort at the valuation of recreational facilities in Nigeria from a consumer benefit point of view. The first section presents the theoretical framework for the study; the second section presents the empirical analysis for the selected rec-

6. Clawson, *Measuring Outcomes in Terms of Economic Implications for Society*, in AMERICAN ASSOCIATION in RECREATION RESEARCH (American Association for Health, Physical Education, and Recreation, 1966).

7. *See, e.g.*, Burt & Brewer, *Estimation of Net Social Benefits from Outdoor Recreation*, 39 ECONOMETRICA 813–27 (1971); Siden, *A Utility Approach to the Valuation of Recreational and Aesthetic Experiences*, 56 AM. J. AGRIC. ECON. 61–72 (1974); Martin & Gum, *Economic Value of Hunting, Fishing, and General Rural Outdoor Recreation*, 6 THE WILDLIFE SOC. BULL. 3–7 (1978).

8. For a critique of this situation, see C. HOWE, NATURAL RESOURCE ECONOMICS: ISSUES, ANALYSIS, AND POLICY 322 (1979).

9. The only conservation organization in Nigeria, the Nigerian Conservation Foundation, was founded as recently as 1982.

10. Some studies on other aspects of recreation have, however, emerged. *See, e.g.*, O. Obateru, Outdoor Recreational Behaviour of Ibadan Residents—A Geographical Analysis (1981) (Ph.D. Dissertation, University of Ibadan, Ibadan, Nigeria).

reation centers; and the final section presents conclusions and policy implications of the analysis.

THEORETICAL BACKGROUND

The travel-cost approach as outlined by Clawson and Knetsch and put in its current perspective by several researchers was adopted for the study.[11] In the first of this two-stage technique, the general equation for predicting household visits to recreation centers was specified as:

$$V_{ij} = f(TC_{ij}, D_{ij}, D_{ik}, S_i, A_j, PF_{ij}, W_{ij}) \qquad (1)$$

where:

- V_{ij} = the number of recreation trips taken by household i to recreation center j during the year prior to the year of interview,
- TC_{ij} = average recreation expenditure (transportation costs, entry fees, and miscellaneous expenses) incurred by household i per trip to center j,
- D_{ij} = two-way distance from household i's residence to center j,
- D_{ik} = two-way distance from household i's residence to an alternative center k,
- S_i = the socio-economic status of the head of household i, defined by age, education in years, occupation, place of residence, and income bracket.
- A_j = attraction index of center j, defined as the percentage of recreational activities offered by a center relative to total activities offered by all centers, to reflect imperfect substitutability among centers,
- PF_{ij} = preference for center j by household i, defined as the percentage of trips taken to the center relative to all recreation trips,
- W_{ij} = the maximum amount of money household i would be willing to spend per annum on the type of recreation offered by center j.

This recreation demand equation was statistically estimated with data gathered from a field survey of visitors to the selected centers.

The second stage of the travel-cost approach requires the derivation of

11. M. CLAWSON & J. KNETSCH, ECONOMICS OF OUTDOOR RECREATION (1966); *see also* Brown & Nawas, *Impact of Aggregation on the Estimation of Outdoor Recreation Demand Functions*, 55 AM. J. AGRIC. ECON. 246–99 (1973); Knetsch, Brown, & Hansen, *Estimating Expected Use and Value of Recreation Sites*, in PLANNING FOR TOURISM DEVELOPMENT: QUANTITATIVE APPROACHES (G. Gearing, W. Swart, & V. Turgut eds. 1976); Gum & Martin, *Problems and Solutions in Estimating the Demand for and Value of Rural Outdoor Recreation*, 57 AM. J. AGRIC. ECON. 558–66 (1975); Menz & Wilton, *Alternative Ways to Measure Recreation Values by the Travel Cost Method*, 65 AM. J. AGRIC. ECON. 332–36 (1983).

demand schedules for individual households in the sample by using the estimated expenditure coefficients as measures of a household's sensitivity to an increase in entry fees at the centers. The demand schedules derived were aggregated and expanded by appropriate response rates, defined as the ratio of actual visits to sample visits, to obtain an aggregate demand schedule for each center from which the monetary value of the recreation experience was calculated by both the consumers' surplus and the non-discriminating monopolist methods. These two methods are generally conceded by economists to be conceptually valid.[12]

The limitations of the travel-cost approach have been discussed in detail elsewhere.[13] One of these limitations is the assumption of equal tastes and preferences among center users. Including socio-economic variables in the model should partially correct for this limitation since sociological studies have established a positive relationship between these variables and tastes and actions of individuals.[14]

The effect of time, both in travel and on-site, on the demand for recreation centers and the benefits derived from such centers has been analyzed in detail by several researchers.[15] In general, failure to include travel time costs would lead to the over-estimation of true demand elasticity and the under-estimation of benefits, while failure to include on-site time costs would have the opposite effects.

To account for travel time costs, a rectangular hyperbola function between time and money costs was used as a basis for replacing the expenditure term in the general equation for predicting household visits to recreation centers. This was done by relating a recreational trip or visit to a new variable defined as MT, where M is monetary cost and T time cost, such that the new general equation for predicting household visits to recreation centers now becomes

$$V_{ij} = f(MT_{ij}, D_{ij}, D_{ik}, S_i, A_j, PF_{ij}, W_{ij}) \qquad (2)$$

Thus, for a visit associated with one hour and ₦1 costs, the value of

12. M. CLAWSON, J. KNETSCH, *supra* note 11. Consumers' surplus is the area between the demand curve for a commodity and the horizontal line indicating the price paid for the commodity. The notion of nondiscriminating monopoly centers around the inability of a firm to charge different prices to different consumers for the same commodity or service. The nondiscriminating monopolist value therefore equals the maximum revenue obtainable by a firm if it charges all its customers the same price. This is usually at the point where demand elsticity equals unity.

13. *See, e.g.*, Siden, *The Evaluation of Extra-Market Benefits: A Critical Review*, in 59 WORLD AGRIC. ECON. AND RURAL SOC. ABSTRACT 1–16 (1967); Cesario, *Value of Time in Recreation Benefit Studies*, 52 LAND ECON. 32–41 (1976).

14. *See, e.g.*, Mead, *The Patterns of Leisure in Contemporary American Culture*, 313 ANNALS OF AM. ACAD. OF POL. AND SOC. SCI. 11–15 (1957); Williams, *Individual and Group Values*, 371 ANNALS OF AM. ACAD. OF POL. AND SOC. SCI. 20–37 (1967).

15. *See* Cesario & Knetsch, *The Time Bias in Recreation Benefit Estimates*, 6 WATER RES. 700–704 (1970); Knetsch, Brown, & Hansen, *supra* note 11; M. FREEMAN III, THE BENEFITS OF ENVIRONMENTAL IMPROVEMENT: THEORY AND PRACTICE (1979).

TABLE 1.
Number of individuals who visited Agodi Gardens, University of Ibadan Zoological Garden, and Luna Amusement Park, 1979–1983.

	Agodi Gardens		U.I. Zoo		Luna Amusement Park	
	Adults	Children	Adults	Children	Adults	Children
1979	20,003	21,362	165,190	68,439	112,792	55,591
1980	15,545	22,089	177,763	68,907	126,135	70,645
1981	14,745	18,303	200,341	73,012	141,771	85,454
1982	21,186	17,676	162,017	85,125	99,411	71,541
1983	17,797	11,533	101,268	57,131	66,495	54,990

Source: Durojaiye (1985)

the new expenditure term can be taken as (1 × 1) or 1. This method permits an estimation of visit rate for any additional money cost simply by changing M, without changing T, and then calculating the new visit rate.[16]

EMPIRICAL ANALYSIS

The Selected Centers

The methodology discussed above was used for valuing the benefits associated with three urban recreation centers in Nigeria—Agodi Gardens and the University of Ibadan Zoological Garden (U.I. Zoo), both located in Ibadan; and Luna Amusement Park, Lagos. Ibadan and Lagos, with estimated populations of 2 million and 3 million respectively, are important cities in Nigeria. Ibadan is the hub of commercial activities in the western part of Nigeria, and Lagos is the Federal Capital. Both cities, however, have inadequate recreational facilities, a situation succinctly described by Obateru.

> Ideally, Ibadan should have at least 500 children playgrounds but has none; 125 neighbourhood playgrounds but has only a miniature one . . . ; 125 neighbourhood parks but none; 31 district parks but none. Of the 10 city parks it should have, it possesses only two; . . . The city has two stadia . . . although one expects . . . to have at least 10 . . .[17]

The centers were chosen based on their importance as recreation centers in the two cities. The two centers selected in Ibadan offer the most popular recreational activity-zoological gardens and parks—among the residents. The Luna Amusement Park is popular among Lagos residents, particularly children, because it is unique in that it has many and various types of amusement games. Table 1 shows the number of individuals who visited these centers between 1979 and 1983 and attests to their popularity.

16. For details, see Knetsch, Brown, & Hansen, *supra* note 11. On-site time was neglected in the analysis because of little dependence between on-site time and distance, following Freeman's conclusions, *supra* note 15, about the relationship between the two variables.

17. O. Obateru, *supra* note 10.

The Sampling Procedure and Data

A survey of households using the three recreation centers was conducted between June and October, 1983.[18] Households, as used in the study, refers to a recreation group, members of which may or may not be blood relations. Members of households were interviewed as they were leaving the center so that they had a "feel" for the center. Data were collected for each household regarding the household's socio-economic characteristics, recreation activities, and opinions of the center.

The sampling technique employed was systematic random sampling. Interviews were conducted three days a week including weekends and public holidays. Once the days on which interviews were to be held had been determined, the time period during each day in which interviews would be conducted was randomly chosen. On the days when the number of households using the recreation center was high, a count of all households coming out of the center was made and one out of every ten was interviewed. But on the days when the number of households using the recreation center was ten or less, each household was interviewed. Any given household was not interviewed more than once a month because the users' views were not likely to change within such a short period of time. When a recently interviewed household fell into the sample, it was replaced with the next qualifying household. Even when a previously interviewed household was acceptable and was interviewed over a month ago, the household was asked only a part of the questions on the questionnaire. Due to time limitations, no more than 10 to 15 interviews were conducted at a center on any day. This sampling approach follows closely the one employed by Martin, Garifo, and Gum.[19]

Usable Responses

Of the visiting households interviewed at Agodi Gardens in 1982, 60 were from Ibadan.[20] These 60 households consisted of 456 adults and 246 children, representing 2.15 percent and 1.39 percent of the total number of adults and children, respectively, visiting the center in 1982. Of the 1982 U.I. Zoo sample, 70 households were from Ibadan. These 70 households consisted of 457 adults and 437 children, representing 0.28 percent and 0.51 percent of the total number of adults and children, respectively, visiting the center in 1982. Fifty-one households from Lagos

18. O. Durojaiye, Economics of Recreation Resources in Nigeria: A Case Study of Ibadan and Lagos (1985) (Ph.D. Dissertation, University of Ibadan, Ibadan, Nigeria).

19. Martin, Garifo, & Gum, *City Fish: An Analysis of Demand for and Value of Urban Sport Fishing in Tucson and Scottsdale, Arizona*, 240 TECHNICAL BULL. (1980).

20. Households residing outside the city were excluded because they did not travel to the city for the specific purpose of recreating at the center.

and its suburbs visited Luna Amusement Park in 1982 and were interviewed. These 51 households consisted of 559 adults and 253 children, representing 0.56 percent and 0.35 percent of the total number of adults and children, respectively, visiting the center in 1982.

Computational Considerations

In the analysis, equation (1) was expressed in four forms: linear, quadratic, exponential, and log-linear equations.[21] However, only the results of the quadratic form are presented here because it gave the most conservative, that is the minimum, value estimates. Thus, values are "at least as high as" provided by this functional form.

The quadratic form can be expressed as:

$$V_{ij} = a + b_1 (TC_{ij}) + b_2 (TC_{ij})^2 + \sum_{m=3}^{n} b_m X_{ijm} + U_{ij} \qquad (3)$$

where:

V_{ij} = household trips taken at the 1982 entry fees (zero additional cost) by household i to center j,
a = regression intercept,
b_1 = regression coefficient for TC_{ij}
TC_{ij} = average expenditure per trip by household i to center j,
b_2 = regression coefficient for $(TC_{ij})^2$,
$\sum_{m=3}^{n} b_m X_{ijm}$ = the sum of other independent variables' effects, and
U_{ij} = error term.

This demand equation for recreation experience was statistically estimated for each center with ten alternative selections of independent variables as shown in Table 2, using the ordinary least squares (OLS) regression method.[22] From the ten estimated demand equations, the one wherein the expenditure coefficients were relatively stable, correctly signed, and statistically significant was picked as the "optimum" and used for computing economic value estimates.

From the "optimum" demand equation for recreation experience thus selected, demand schedules for individual households in the sample were derived. The estimate of trips, V^c_{ij}, at an additional cost c (increase in entry fees) is given as:

$$V^c_{ij} = V_{ij} + b_1 c + 2b_2 c (TC_{ij}) + b_2 c^2 \qquad (4)$$

21. O. Durojaiye, *supra* note 18.
22. See Gum & Martin, *supra* note 11, for a full exposition of this procedure.

TABLE 2.
Variables included in each of ten equations on demand for recreation experience in each center.

Variables[a]	1	2	3	4	5	6	7	8	9	10
Dependent Variable										
Number of trips to center j by household i in 1982	+	+	+	+	+	+	+	+	+	+
Independent Variables										
1. Average expenditure per trip by household i to center j	+	+	+	+	+	+	+	+	+	+
2. (Variable 1)^2	+	+	+	+	+	+	+	+	+	+
3. Round trip distance to center j by household i	+		+	+	+	+	+	+	+	+
4. (Variable 3)^2	+			+	+	+	+	+	+	+
5. Round trip distance to alternative center k by household i	+				+	+	+	+	+	+
6. Age	+						+	+	+	+
7. Education	+					+	+	+	+	+
8. Occupation	+									
9. Place of residence	+									
10. Income (in range)	+									
11. Attraction index	+									+
12. Preference for center	+								+	+
13. Maximum amount of money a household would be willing to spend per annum on the type of recreation offered by the center.	+							+	+	+

[a]Data relate to the whole household (e.g. expenditure data) or to the head of household (e.g. age) or to the center (e.g. attraction index).

Multiples of additional cost c were inserted into this equation until the household's trips became zero or started to increase, since an increase in number of trips in response to increased cost is not expected.

Because the typical practice in the recreation centers under study is to charge an entry fee for each member of a household, the additional cost c varied from household to household, depending on the size and composition of the household.[23] Also, it became necessary to convert the number of household trips to the number of adults and children equivalent since the practice at the centers is to charge half the adult entry fee for

23. An additional cost of twenty kobo (20k) per adult member of a household and ten kobo (10k) per child was used in this study. 100k = ₦1.

a child and to compile statistics in terms of the total number of adult visitors and the total number of children visitors. For example, a household of two adults and five children visiting a center four times would be reflected as a total of eight adults and twenty children visiting the center. The estimated number of trips at each successive level of additional cost c, V^c_{ij}, was similarly converted to the number of adults and children visiting the center.

The estimates of the number of visits (adults and children treated separately) for each household in the sample were numerically aggregated at each level of additional cost and expanded by the appropriate response rates to obtain the total number of visits to the recreation center in 1982 at each level of additional cost. The associated revenue at each level of additional cost was also calculated. From these calculations, the nondiscriminating monopolist value (maximum total gate-taking) and the associated number of both adult and children visitors were determined. The gross consumer surplus value is the sum of the aggregate number of visitors, adults and children treated separately, varying the aggregate number of visitors from the 1982 level to zero at increments of ₦1.00 additional cost. Consumers' expenditures on entry costs were added to the total consumers' surplus to obtain total consumer benefits or value of the center.

Results

The regression coefficients for the optimum demand equations for the centers without considering the effect of travel time on price elasticity and benefits are shown in Table 3. When the effect of travel time was considered, another set of equations was optimum. The coefficients of average expenditure per trip (variable X_1) in this latter set are, for all centers except Agodi Gardens, absolutely smaller than those of the same variable in Table 3. That is, they are more negative when travel time is excluded. This confirms theoretical conclusions that failure to account for travel time in recreation demand analysis will generally lead to an overestimation of the true demand elasticity and consequently, an underestimation of benefits of the center. Because of the inadequacy of data reflecting the rate of traffic flow of the two cities concerned, however, the optimum coefficients determined without regard to travel time were considered adequate for further analysis. The benefits of the centers studied may, therefore, have been slightly underestimated.[24]

From Table 3, and as observed by Brown and Nawas,[25] it can be seen

24. In the absence of any known study of travel time within the two cities concerned, a rate of 15 km per hour, arrived at after some rudimentary trials, was used in the study.

25. Brown & Nawas, *supra* note 11.

TABLE 3.

"Optimum" per household demand functions for recreation experience at the center from quadratic functional form of the demand equation, estimated without regard to the time effect, 1982.

		Independent Variable[a]										
Center	Constant	Average expenditure per trip[b] (X_1)	Average expenditure per trip squared $(X_1)^2$	Distance (X_2)	Distance squared $(X_2)^2$	Distance to alternative Center[c] (X_5)	Age (X_6)	Education (X_7)	Preference (X_{12})	Willingness to spend (X_{13})	R^2 (%)	N
Agodi Gardens	0.831	−2.180*[d]	0.177*	0.546	−0.018	0.125	−0.027	0.130	0.004	0.005	28	60
		(−2.910)	(2.092)	(1.550)	(−1.288)	(1.241)	(−0.382)	(0.914)	(0.205)	(1.499)		
U.I. Zoo	2.503	−0.594***	0.076**	−0.079	−0.004	−0.097	0.016	0.141	0.005	−0.006	11	70
		(−1.176)	(1.576)	(−0.771)	(−1.049)	(−1.097)	(0.343)	(1.636)	(0.230)	(−0.494)		
Luna Amusement Park	2.050	−0.269***	0.003	0.323	−0.010	0.041	0.159	−0.128	0.067	−0.001	16	51
		(−1.218)	(0.813)	(0.899)	(−1.201)	(0.499)	(1.080)	(−0.466)	(1.720)	(−0.232)		

[a]The t-statistics for the variables are shown below respective coefficients in parentheses.

[b]Replaced with total entry cost per trip for U.I. Zoo because expenditure data did not give positive results with the model.

[c]Replaced with the cost of a visit to the next alternative center for Luna Amusement Park.

[d]Only the coefficients of the average expenditure and average expenditure squared variables are tested for significance. Single asterisk denotes significantly less than or greater than zero at the 97.5 percent confidence level; double asterisk denotes significantly greater than zero at the 90 percent confidence level; triple asterisk denotes significantly less than zero at the 85 percent confidence level; no asterisk denotes not significantly greater than zero at 85 percent or higher level of confidence.

that the values of R^2, the coefficient of multiple determination and a measure of the "goodness of fit" of the regression plane to the sample observations, are not high. The range and mean of the R^2 values of the estimated demand equations are as follows: Agodi Gardens—11 to 50 percent with a mean of 27 percent; U.I. Zoo—3 to 29 percent with a mean of 10 percent; Luna Amusement Park—3 to 39 percent with a mean of 13 percent. R^2 values for the demand equations selected as "optimum" are 28 percent, 11 percent, and 16 percent, respectively. The objective of estimation was, however, not to obtain high R^2 values but rather to obtain reliable estimates of the regression coefficients, particularly those of the expenditure variable.

The t-statistics for the expenditure coefficients in Table 3 are generally high. All the coefficients for the average expenditure variable are significantly less than zero at the 85 percent confidence level, while one is significantly less than zero at the 97.5 percent confidence level. Two of the three coefficients for the average expenditure squared variable are significantly greater than zero at the 90 percent confidence level, while the third is not, even at the 85 percent confidence level.[26]

The coefficients of the expenditure variable are, as expected, negative. Those of the expenditure squared variable are, as expected, positive. Except for the preference variable whose coefficients are consistently positive for all centers, the signs of the coefficients of the other variables listed in Table 2 are not consistent.

The coefficients of the distance variable for Agodi Gardens and Luna Amusement Park are unexpectedly positive. This is not too surprising, however, since Agodi Gardens and Luna Amusement Park are both situated within residential areas and, in many cases, are as close or closer to visitors' homes than are their places of work. The U.I. Zoo, on the other hand, is situated at the northern extreme of Ibadan and far from most visitors' homes.

The substitute variable, defined as the distance to the alternative center or cost of a visit to the alternative center (variable X_5), was positive for Agodi Gardens and Luna Amusement Park, as expected. For U.I. Zoo, however, the variable was unexpectedly negative. The major reason for the unexpected situation for U.I. Zoo appears to be the inappropriateness of the alternative center specified. In general, distance to the center squared, age and education of the head of household, and the maximum amount

26. One-tail test was conducted. The null hypothesis that the coefficient of the average expenditure variable equals zero was tested against the alternative hypothesis that it is less than zero, while the null hypothesis that the coefficient of the average expenditure squared variable equals zero was tested against the alternative hypothesis that it is greater than zero. One-tail test was chosen on the basis of the *a priori* sign expectation for the two variables.

TABLE 4.
Estimated direct and cross price elasticities of demand for recreation experience at Agodi Gardens, U.I. Zoo, and Luna Amusement Park.

Center	Direct	Cross
Agodi Gardens	−0.813	0.564
U.I. Zoo	−0.126	—
Luna Amusement Park	−0.593	0.111

Note: Elasticities were computed at the mean of expenditure per household trip, mean of distance to the alternative center, and the mean number of household trips taken in 1982. Cross price elasticity could not be computed for U.I. Zoo due to the perversity of the coefficient of distance to alternative center.

of money a household would be willing to spend per annum on the type of recreation offered by the center proved important in stabilizing the coefficients of the average expenditure variable.[27]

The coefficients in Table 3 were utilized to estimate the direct and cross price elasticities as shown in Table 4. The cross price elasticities were calculated using distance to the alternative center or cost of a visit to the alternative center as proxy for recreation expenditure for the alternative center.

The demand for recreational use of the three centers is basically price inelastic. One would expect higher elasticity for a center with little development affording the least satisfaction to visitors. In general, this expectation is borne out by the fact that demand is much more price elastic at Agodi Gardens, the least developed of the centers, than at the other centers.

The estimated income elasticities of demand for recreation experience at Agodi Gardens and Luna Amusement Park are 0.249 and 0.482, respectively.[28] These estimates portray recreation as a normal good[29] and indicate that, on aggregate, a 10 percent increase in income would increase demand for recreation by about 3 percent.

Table 5 shows the estimated gross economic values for the centers in 1982. Agodi Gardens generated total consumer benefits of ₦57,297 and consumer benefits per visitor of ₦1.57 and ₦1.36 for adults and children, respectively. The nondiscriminating monopolist value estimated for the center in 1982 was ₦13,248. This is the maximum amount that could

27. A stable coefficient is defined as a coefficient that remains almost constant in alternative selections of independent variables, *see* Gum & Martin, *supra* note 11. The inclusion of the noted variables contributed to the rapid attainment of this status by the coefficients of the expenditure variable.

28. The income elasticity of demand was computed as the negative of the sum of direct and cross price elasticities. See J. HENDERSON & R. QUANDT, MICROECONOMICS THEORY: A MATHEMATICAL APPROACH 30 (1980), for a proof. Income elasticity could not be computed for U.I. Zoo.

29. A good is called a normal good if the consumer's purchases increase with increase in the consumer's income.

TABLE 5.
Estimated gross economic value U.I. Zoo, and Luna Amusement Park.

Center	Non-discriminating monopolist value (₦)	Non-discriminating monopolist additional cost (₦)	
		Adults	Children
Agodi Gardens	13,248	2.20	1.10
U.I. Zoo	177,212	0	0
Luna Amusement Park	382,458	7.40	3.70

have been collected as entry fees if fees of ₦2.40 per adult and ₦1.20 per child had been charged. With these entry fees, however, only 3,113 adults and 4,814 children, or 20 percent of the 21,186 adults and 17,676 children that actually visited the center that year, would have visited the center.

The U.I. Zoo generated total consumer benefits of ₦479,906 and consumer benefits per visitor of ₦2.18 and ₦1.49 for adults and children, respectively. However, an increase of current entry fees by twenty kobo (20k) per adult and ten kobo (10k) per child would have resulted in fewer visits and lower revenue at the zoo. Likewise, a decrease of the entry fees by the same amount would not have materially affected the total number of visitors but would have led to lower revenue. Consequently, current entry fees may be considered "optimum" fees.[30]

The Luna Amusement Park generated total consumer benefits of ₦1,146,643 and consumer benefits per visitor of ₦9.69 and ₦2.56 for adults and children, respectively. The nondiscriminating monopolist value is ₦382,458 at entry fees of ₦8 per adult and ₦4 per child. Total visits associated with the nondiscriminating monopolist value is 31 percent of actual visits to the park in 1982.

The gross variable expenditures incurred by visitors to the respective centers in 1982 were ₦26,182, ₦472,655, and ₦1,027,278.[31] For all the centers, variable expenditures are greater than the nondiscriminating monopolist values. Consumer benefits value exceeds variable expenditures for Agodi Gardens where transportation costs constitute the greater portion of expenditures. Consumer benefits value and variable expenditures tend to be of the same magnitude for both the U.I. Zoo and Luna Amusement Park. At the latter two centers, entry costs and expenditures on recreational games and activities, food, etc. constitute the greater portion of variable expenditures.

30. Although the estimated demand elasticity is small, additional cost of twenty kobo (20k) per adult and ten kobo (10k) per child led to quite illogical increases in number of trips for most households.

31. Gross variable expenditures were compiled from survey data. *See* O. Durojaiye, *supra* note 18.

The Luna Amusement Park, a highly developed center in terms of investment, has the highest economic values and induces the greatest expenditures by visitors. Agodi Gardens, the least developed of the centers, has the lowest economic values and induces the smallest expenditures by visitors.

CONCLUSIONS AND POLICY IMPLICATIONS

The demand for recreational facilities was found to be price inelastic, implying that an increase in entry fees would result in a smaller number of visits and higher revenues for the centers. Only at the U.I. Zoo are the current entry fees optimum. An increase in entry fees of twenty kobo (20k) per adult and ten kobo (10k) per child, for instance, would reduce the number of visitors to the Agodi Gardens only by a small percentage and it would have no practical effect on the number of visitors to Luna Amusement Park. Accordingly, increases in entry fees of this magnitude may not be undesirable, and when combined with other management measures could provide the key to the financial solvency of the centers.

Entry fees that would generate the maximum gate-takings at the centers are not, however, necessarily the best solution. Indeed, an increase in entry fees that would lead to 80 percent reduction in the number of visitors to Agodi Gardens, for instance, may do more harm than good in a society such as Nigeria's that is just beginning to develop interest in recreation. This and many other issues should be thoroughly considered before instituting any increases in entry fees.

In terms of economic value, Luna Amusement Park was found to have a gross market value[32] of ₦382,458 or ₦191,229 per hectare and induced expenditures of over a million naira. The total benefits of the center to the visiting public was also over a million naira. The two centers studied at Ibadan have a combined market value of ₦190,460, or ₦308 per hectare and ₦50,632 per hectare for Agodi Gardens and U.I. Zoo, respectively, and induced expenditures of about half a million naira. The total benefits of the two centers to the visiting public was estimated to be ₦537,203. These values are not, by any stretch of imagination, insignificant to the economies of the two cities concerned. The results of this study therefore disprove the notion that the monetary benefits derivable from a recreation project are insignificant. Consequently, the present "little orphan" attitude to recreation adopted by the Nigerian governments cannot be justified on economic grounds.

32. The nondiscriminating monopolist value was used to represent the gross market value of a center in a year.