The Value of Hunting Package Attributes

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Abstract

Economic impacts of hunting activities reveals opportunities for landowners to capitalize on apparent market demand for fee-access hunting. This paper discusses the marginal values of hunting package attributes. The results will provide landowners the information needed to make optimal management decision.

Introduction

A survey by the United States Wildlife and Fisheries Department in 2001 estimated that 82 million residents fished, hunted, and watched wildlife. In pursuing these recreational activities, the residents spent over $108 billion dollars. These expenditures contributed to millions of jobs in related industries and businesses as well as supporting wildlife-related recreation. The money spent on licenses and taxes on hunting and fishing contribute to many conservation efforts across the United States as well as economic development in rural areas.

Per State hunting expenditures were also available in the 2001 survey. Total expenditures for hunters ages 16 and over were separated within each state. In

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Mississippi residents spent $360 million on hunting expenditures. Trip related expenses, which included food, lodging, transportation, and other were approximately $132 million or 37% of the total hunting expenditures. In that $132 million, food and lodging expenses totaled $73 million. On average, trip related expenditure per hunter was $370.

These hunting expenditures provide economic development in small communities across the nation. Local businesses, motels, small cafes, gas stations and grocery stores benefit from this source of revenue. Guide services, outfitters and bed and breakfast operations are also benefiting the local economy (Hondur et al).

The large economic impact of hunting activities reveals opportunities for landowners to capitalize on apparent market demand for fee-access hunting. Messionier and Luzar stated wildlife is considered to be owned by the state and therefore cannot be bought and sold. Access to wildlife, on the other hand, can be bought and sold. This access is controlled by private landowners who may gain additional revenue by charging a fee for access to the land. Public land is another way to gain access to wildlife but a fee cannot be charged to gain access to these lands.

Markets for access to private lands have increased over the years primarily because of overcrowding in the public land areas. As a result many hunters are willing to pay a fee to gain access to private lands, the amount of which depends on the amenities provided. Landowners currently not involved in fee access enterprises are limited by the amount of quality information on which to base decisions concerning the provision of amenities. Economic analysis can be useful in providing landowners the information they need to make an informed decision on whether or not to provide recreational access to their lands. Some results from this study may indicate what amenities hunters may

find important, which would be very useful in management decisions. A number of studies have been conducted to elicit these values.

In a study done by Gan and Luzar, a conjoint analysis was used to analyze waterfowl hunting in Louisiana. Data was collected from a survey of waterfowl hunters and ordered logit was used to estimate willingness-to-pay for recreation experience attributes. This study found that waterfowl hunters evaluate each available hunting alternative in terms of its attributes. Conjoint analysis was used to model consumer preferences for multiattribute choices, but this approach is sensitive to design, implementation and interpretation. In another study done by Green, Grijalva and Kroll, the willingness-to-pay for hunting club memberships was estimated using the contingent valuation method (CVM).

Most studies have used hypothetical methods to estimate values of these amenities. According to Lusk, research shows that subjects overstate the amount they are willing to pay for a good when hypothetical approaches are used. This study will add to the existing literature by taking a number of fee access hunting providers and examining actual market prices for hunting packages to estimate the marginal value of fee-access hunting amenities. With these market values, the land owner can then make an informed decision on how to manage their fee-access hunting enterprise.

Conceptual Framework

Fee access hunting, or hunting packages, is an important market with significant economic impacts. Consumers or hunters in this case, derive utility from the good's characteristics rather than the good itself (Lancaster). The price of these packages is a composite of all the attributes included in the package. The marginal implicit price can

be determined by taking the partial derivative of price with respect to each individual attribute. The expected service a commodity offers provides the characteristics associated with that commodity. The level of service provided is a measure of the good's utility (Louviere et al).

By examining market information on a given commodity, a price function may be estimated that provides critical information about the marginal value that consumer's place on the attributes of a good. Because provision of attributes like food, lodging, guides, etc., are expensive in fee access hunting, it is useful to understand the value that consumers place on these attributes so that lease providers can make an informed decision about whether to offer those attributes to consumers.

Methods

The data being used in this study was taken from packages offered by fee access hunting providers around Mississippi (see Appendix for listing of source finding). The data was retrieved from the Internet and advertisements given for fee based hunting. The data set consists of thirteen sample firms, which offer seventy-eight different hunting packages. The attributes contained within these packages include the number of days being hunted, bag limits, lodging, food, guide service, trophy fees, fishing, photography and species being hunted. Packages could include one species in a given package or more than one.

A hedonic model of hunting package prices was estimated using ordinary least squares. The marginal values of these attributes are estimated from a regression analysis where price is a function of these attributes. The marginal implicit prices of each

attribute can be found by taking the partial derivative of price with respect to each individual attribute. Price is a function of these attributes:

$$P = f(D, S, G, L, Food, F, TR, TF, L\alpha)$$

Where: D equals the number of days being hunted. S is the species being hunted (there may be multiple species hunts). G = 1 if whether guide services are provided; 0 otherwise. L = 1 if lodging is provided; 0 otherwise. F = 1 if food is provided; 0 otherwise. $F = 1$ if fishing is provided; 0 otherwise. TR = 1 if transportation is provided; 0 otherwise. TF = 1 if a trophy fee is present; 0 otherwise and $L\alpha$ is bag limit.

We expect that number of days in the hunt, guide service, food, lodging, fishing and transportation will have a positive impact on the price of the package. Bag limits and trophy fees should have a negative impact on price. Also, there are likely species-specific effects on the package price as well.

Species were separated into four groups, one for each of the following sets of species: deer (deer), duck/geese (DU), quail/pheasant, boar, turkey (QP), and dove (DV). Due to a high pair wise correlation between dove[2] and bag limit, the control for bag limit is dropped from the econometric model. To discern the impacts of the remaining attributes on hunting lease prices, the following equation is estimated using least squares regression:

$$P = (D, Deer, DU, QP, F, TR, TF, L, Food, G)$$

[2] Limit and doves had a correlation value of .75213, which may be related to the small number of dove hunts within the packages. To correct for these relationships limits were dropped and doves were combined with quail and pheasant as the base species category. Boar was also included in the base category along due to the small number of boar hunts in the data.

The variables used in the regression analysis are listed with their descriptive statistics in Table 1. A log-linear functional form was used to estimate the model. In a log-linear model, the slope coefficient of the regressors gives the semi-elasticity, which is the percentage change in the regressand for a one-unit change in the regressor. But this only occurs if the regressor is quantitative. In our model, all of our regressors were dummy variables. Dove (DV) was used as the base species category so that all other species marginal values were relative to the base category.

Results and Discussion

The regression results can be found in Table 2. Days, fishing and lodging were all positive and significantly different than zero. The coefficient on days (D) has a value of .3087. This suggests that an additional day of hunting will increase the package price by 30% or $25.11 on average. Adding fishing to the package would increase the package price by 25% or $20.93 on average. Lodging would also increase the package price by 84%.

The species that were used in the model all had positive coefficients suggesting that all species increased package prices relative to the base category. Quail and pheasant; the base category, impacted price the most with a coefficient value of 56%. The quail and pheasant amenity will increase package price by $46.89 on average. Deer hunting increased the package price by 53%, while ducks and geese increased the package price by 37%. Deer hunting on average will increase package price by $44.37. Deer included three amenities; bow, rifle and muzzleloader. The coefficients for food contained negative values, it was not statistically significant. Transportation, trophy fee, and guide

service were also not statically significant at the 5% and 1% levels. All of the other coefficients were significant at the 5% and 1% levels. The R-Squared Value is .8414, which suggests that 84 % of the variation in price is explained in the model.

Conclusion

Given these results a policy maker or landowner can better understand the management goals that need to be reached. With these specific attribute values one can examine the effects of their hunting packages and reevaluate the needs concerned to their business. One consideration for the landowner would be to include fishing when it is available. It increases the package prices on average by $20.93. Fishing is a low cost amenity for the landowner. The only thing that the landowner may need to provide is a guide. After analyzing the results further study must be done to look at the added value that secondary hunts give to a primary hunting package. Other studies could be done to look at the income effect of each state on these hunting package prices. The model that was derived served its purpose in telling us how these attributes affect the price of hunting packages.

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Table 1. Descriptive Statistics.

Variable	Mean	(Standard Deviation)
P (Price)	984.2307	(794.5496)
D (Number of Days being hunted)	2.6865	(1.6759)
Deer	0.5000	0.5031
DU (Ducks or geese)	0.1666	0.3751
DV (Dove)	0.0769	(0.2681)
QP (Quail or Pheasant)	0.0512	(0.222)
Food (Food is available)	0.7564	(0.4320)
L (Lodging available)	0.8589	(0.3503)
F (Fishing)	0.5384	(0.501745)
TR (Transportation)	0.8717	(0.3364)
G (Guide)	.4358	(.4991)
TF (Trophy Fee)	0.0641	(0.2465)
Lα (Limit)	4.6794	(5.9182)

Table 2. Regression Analysis Results.

Variable	Coefficient (Standard Error)	t-statistic
Constant	4.4276*	23.575
	(0.1878)	
D	.3087*	7.420
	(0.0416)	
Deer	0.5399*	4.030
	(0.1339)	
DU	0.3766**	2.395
	(0.1572)	
QP	0.5622***	1.923
	(0.2924)	
F	0.2555***	1.860
	(0.1373)	
TR	0.0508	.335
	(0.1519)	
TF	0.1895	0.867
	(0.2186)	
L	0.8463*	4.058
	(.2085)	
G	.01652	0.140
	(.1184)	
Food	-0.0338	-0.183
	(0.1854)	

* Statistically significant at the 1% level.

** Statistically significant at the 5% level.

*** Statistically significant at the 10% level.

Appendix

Bayou River Outfitters. http://www.bayouriveroutfitters.com. January 13, 2004.

Chilli Creek. http://www.chillicreek.com. January 13, 2004.

Circle Bar Ranch. http://www.circlebar.com. February 05, 2004.

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Tara Wildlife. http://www.tarawildlife.com. January 13, 2004.