Landowner Willingness to Accept Fee-Based Recreation and the Influence of Institutional Change in the Louisiana Delta[1]

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Abstract

Fee-based recreational access to private land for public use may be a possible revenue generating alterative for landowners in the Lower Mississippi Valley or Delta region of Louisiana. Previous studies have identified that landowners often chose not to engage in recreational leasing due to liability concerns. Thus, an institutional change that reduces liability risk to landowners may increase the amount of private land available for public recreation and reduce transaction costs associated with liability mitigation. Using primary data obtained from a mail questionnaire, the influence on landowner willingness to accept (WTA) a fee to allow fee-based recreation both pre- and post-institutional change was examined using Tobit models.

Survey results indicate that 14% of landowners indicated a willingness to allow fee-based recreation under the current institutional environment. Modifying the Louisiana recreational use statute giving greater liability protection to landowners increases the number of landowners willing to allow fee-based recreation to nearly 24%. Transaction costs associated with liability are evident and amending the recreational use statute appears to produce a reduction in WTA reflecting a transaction cost savings to landowners.

Key Words: Recreational Use Statute, Tobit, Risk Preference, Transaction Costs

Introduction

An alternative income source for Louisiana Delta[13] landowners is fee-based public recreational use of private land. Activities such as recreational hunting, fishing, and wildlife watching can provide additional income to landowners and may be an acceptable land use alternative, particularly for marginal agricultural lands. However, generating additional income by allowing recreational access introduces the possibility of legal action if bodily injury results to a recreational user of the property (Copeland, 1998). All 50 states have adopted recreational use statutes (RUS) designed to encourage landowners to allow recreational use of their land by offering landowners immunity from lawsuits related to accidental injury (Copeland, 1998). Most state RUS insulate landowners from liability provided that recreational access is granted without charge.

Wright et al. (2002) observed that researchers have clearly identified that landowners are concerned about liability but have only documented it is perceived as a problem and a better understanding is needed of how liability and various other disincentives collectively influence landowners' access decisions. Mozumder et al. (2004) suggested that the necessary institutions for hunters and landowners may not be in place to promote recreational leasing, and institutional changes that facilitate more exchanges would shift the supply curve for recreational land outward. The effects of institutional change on landowner leasing behavior can be explored by asking if landowners would allow recreational access if liability was limited by state law. During the time of the study, Louisiana's recreational use statute (La. R.S. § 9:2791) did not extend liability protection to landowners charging a fee for recreational access. It would be interesting to see how landowner access policies may change by expanding the liability protection of recreational use statutes to allow charging fees to generate a return to the landowner.

The potential for a law-suit, whether real or perceived, creates a disincentive for fee-based recreation to the landowner. To mitigate the liability disincentive the landowner may incur costs associated with seeking legal information, consulting lawyers, having contracts drafted to protect property rights and reduce liability, and/or securing commercial liability insurance. All of these actions create a transaction cost for fee-based recreation. This transaction cost could be reduced through institutional change. For example, if the Louisiana RUS was amended to allow charging an access fee and also allow retention of the liability protection accorded to free access granting landowners, then the transaction cost could be reduced. There are an increasing number of states that have amended their RUS to allow landowners to charge a fee and retain liability protection (Wright, 1989; Wright et al., 2002). Amending the Louisiana RUS would be an example of institutional change that could facilitate transactions between private landowners and recreationists and reduce transaction costs borne by landowners.

The primary objectives of this study are to investigate how landowner willingness to accept (WTA) fee-based recreational access may be influenced by risk and liability perceptions and by institutional change. An additional objective is to determine if transaction costs are reduced following an institutional change. Survey data is analyzed to examine relationships between explanatory variables and the willingness to allow fee-based recreation in both the

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[13] Louisiana Delta parishes: Catahoula, Concordia, East Carroll, Franklin, Madison, Morehouse, Richland, Tensas, and West Carroll.

current legal environment and in a hypothetical scenario that reduces landowner liability risk. The study will identify land and landowner characteristics that may have a positive or negative effect on a landowner's WTA compensation to allow fee-based recreational access both pre- and post-institutional change.

Methodology

This study utilizes primary data obtained from a mail questionnaire developed according to the tailored design method (Dillman, 2000) and sent to agricultural landowners in the Delta region of Louisiana. Questions focused on current land uses, landowner access policies, and landowner attitudes and perceptions regarding the potential for allowing fee-based recreational access. Additional questions addressed land tenure and landowner demographics. Landowners were also asked to indicate their knowledge of the Louisiana RUS and how a possible change in the use statute would impact their access decision and compensation for allowing access.

Contingent valuation questions were used to estimate landowner WTA to allow recreational access. Ultimately, the choice of elicitation technique in a contingent valuation study depends on the nature of the good being valued, survey cost, statistical technique used, and the nature of the survey respondents (Venkatachalam, 2004). Kealy and Turner (1993) found that there was no statistical difference between results derived from open-ended and dichotomous choice questions for a private good but there was a significant difference in the case of a public good. Mitchell and Carson (1989) found that open-ended questions work well in situations where respondents are familiar with paying for the good. Open-ended contingent valuation questions can be appropriate if the respondent is familiar with the good being valued and has a reasonable understanding of its value. An open-ended style question asked landowners to indicate the dollar value per acre they require to allow public recreational use of their land. The open-ended WTA question was presented twice in the survey instrument to assess WTA for allowing recreational access under the current legal environment and under a hypothetical legal environment with reduced landowner liability risk.

One factor that may influence the behavior of landowners regarding fee-based recreation is that of risk preference, given that there is an inherent element of risk associated with recreation and liability. A common method used to elicit risk preference is that of direct risk preference elicitation. A study by Fausti and Gillespie (2006) compared mail survey results for five commonly used methods to elicit risk preference and examined the consistency of the elicitation procedures. Fausti and Gillespie (2006) noted that a simpler elicitation method (such as the self-rank risk preference question) performs relatively well and may be a better choice for elicitation of risk when mail survey respondents are not offered rewards or incentives for spending time to correctly answer questions. The questionnaire used in this study attempted to assess landowner risk preference by using a self-rank risk preference elicitation method that asked respondents to indicate if they tend to avoid, take on, or neither seek nor avoid risk in their investment decisions. Information on landowner risk preference may be a useful variable in understanding recreational access decisions.

Responses to the open-ended WTA question produced a continuous variable; however, the responses were also censored since some respondents did not indicate a willingness to allow

fee-based recreational access. Thus, the survey data had a number of zero values for the WTA question since landowners not willing to allow fee-based recreation were recorded as a zero value indicating an unwillingness to allow recreational access and accept compensation.

Including censored observations as zero values in a standard OLS regression model results in biased parameter estimates and simply deleting the censored observations can result in a loss of efficiency in estimation (Franses and Paap, 2001). Thus, to avoid such problems this study employed a censored regression model.

The relationship between a censored dependent variable and explanatory variables can be investigated using a Tobit model. In the Tobit model the censored variable Y_i is 0 if the unobserved latent variable y_i* is positive. The censored regression model or Tobit model and its general formulation is represented by the following general form (Franses and Paap, 2001):

$$Y_i = X_i\beta + \varepsilon_i \ \ if \ \ y_i^* = X_i\beta + \varepsilon_i > 0$$

$$Y_i = 0 \qquad \quad if \ \ y_i^* = X_i\beta + \varepsilon_i \leq 0,$$

$$with \ \varepsilon_i \sim N(0,\sigma^2)$$

where y_i^* represents the WTA value of the ith landowner to allow recreational access. Values of zero for landowners not willing to allow recreational access are not observed. Thus the y_i is observed WTA value for landowners willing to allow recreational access which is censored at zero. Survey response to the open-ended WTA question will be modeled as a function of independent variables (X_i) representing landowner attributes and land uses. Using Tobit censored regression allows for information on landowners not willing to accept compensation for recreational access to be included in the model that would otherwise not be included.

The log-likelihood for the Tobit model is given by

$$\ln L = \sum_{y_i>0} -\frac{1}{2}[\log(2\pi) + \log\sigma^2 + \frac{(y_i - x_i\beta)^2}{\sigma^2}] + \sum_{y_i=0}\ln[1 - \Phi(\frac{x_i'\beta}{\sigma})]$$

The two terms on the right hand side of the equation correspond to the classical regression for nonlimit observations and the relevant probabilities for the limit observations, respectively (Greene, 2003). Possible independent variables hypothesized to influence a landowner's choice include current and personal land use, liability concern, distance of land from home, risk preference, past leasing, and demographic variables.

A second Tobit model was used to examine the access decision following a hypothetical institutional change. This was examined using responses to a second WTA question that included a hypothetical scenario where the Louisiana RUS would allow landowners to charge a fee for recreational access while also retaining liability protection.

Results

Survey Results

The survey response rate was 26.9%. More than half of respondents have allowed individuals outside of their immediate households to use their land for recreational purposes; however, such access was not commonly allowed for individuals that respondents do not know

181

personally. Just over 10% of respondents have allowed recreational access to individuals they do not know personally, and only 11.2% have accepted money to allow recreational use of their land.

More than 80% of respondents indicated they are very concerned about liability issues associated with allowing people on their land. This concern may explain in part why so few respondents have allowed recreational access to individuals they do not know personally. However, when asked if their liability concerns were eased would they be more inclined to allow recreational access, 36% of respondents indicated they either somewhat or strongly agreed. This indicates that, for these respondents, an institutional change may increase recreational access to private lands. However, over 40% of respondents either somewhat or strongly disagreed with allowing recreational access if their liability concerns were eased. This suggests that, for these respondents, liability concern may not be a major factor in their decision for not allowing recreational access.

The results indicated that there exists a clear need for more landowner education on land access and liability. When it came to having knowledge of liability and legal issues, the vast majority of respondents either do not know or are unsure about matters regarding written agreements between landowners and land entrants, posting of "no trespassing" signs, state recreational use statute, and the availability of liability insurance for fee-based recreation.

Another possible factor that may influence the decision to allow fee-based recreation is that of risk preference. Allowing recreational use of land introduces the risk associated with liability, and over 70% of respondents indicate they are risk averse and they tend to avoid risk in their financial decisions. The implications are that many landowners may choose not to allow fee-based recreation because of the liability risk, but it may also indicate that an institutional change reducing landowner liability may increase landowner willingness to allow fee-based recreation.

Fee-based recreation may be more attractive to respondents owning marginal agricultural land. Respondents considered 33.3% of their lands to be marginal for agricultural purposes. There seems to be potential for developing such opportunities as results indicate a high volume of marginal land. About 80% of respondents described their marginal land as forest or wooded areas, which would be ideal for certain types of wildlife associated fee-based recreation.

When asked if they would be willing to allow fee-based recreation on their land, 14.1% of respondents said yes. When presented with a hypothetical scenario describing a change to the recreational use statute that would allow charging a fee for recreational access while also retaining liability protection, 24% of respondents indicated a willingness to allow access, a 70% increase. Clearly, an institutional change that reduces the liability risk to landowners could increase the potential amount of private land that could be used for fee-based recreation.   The average amount of land that respondents would be willing to use for fee-based recreation was 256.6 acres. The potential exists to make a sizable amount of land available for public fee-based recreational use by modifying the Louisiana RUS.

The level of participation in government conservation programs was high, as indicated by 60% of respondents. This suggests that Louisiana Delta landowners may be willing to adopt non-agricultural uses of their land, such as fee-based recreation. While most are single owners, 37% of respondents indicated they owned land jointly. Such joint owners of land responding to the survey may not be comfortable with allowing fee-based recreation since they may lack autonomy in the decision process. In addition, there may be costs involved such as the costs of negotiating with co-owners. Over 55% of respondents purchased their land. Alternative land uses may not be as attractive to individuals that purchased land with the assumption that land was purchased for some specific purpose or use. However, 46% of respondents indicated that they acquired land through inheritance and may be more inclined to consider alternative uses. Also, agricultural production of row crops was indicated by 57.4% of respondents. This may suggest that those landowners might be willing to consider alternative land uses, since over 40% are not using their land for agriculture.

It was hypothesized that an institutional change that reduced the liability to landowners willing to allow fee-based recreation would reduce the transaction cost associated with liability borne by the landowner. The mean WTA values were compared by response category to examine if a hypothetical institutional change could reduce the transaction cost associated with fee-based recreation (Table 1).

Table 1. Willingness to accept (WTA) mean values by response category indicating change in WTA for respondents allowing access under both current and amended RUS and only under an amended RUS.

Variables	Observations	Mean	Std. Dev.
Current RUS WTA	64	$107.98	$187.89
Amended RUS WTA	122	$91.58	$154.35
Amended only RUS WTA	58	$61.74	$69.58
Change for Amended		-$16.40	-$33.54
Change for Amended only		-$46.24	-$118.31

That the change in mean WTA is negative may be attributable to reduced transaction costs associated with liability mitigation that is achieved by institutional change. The change was negative; however, a more telling indicator of possible reduced transaction costs is obtained by examining the change in WTA for respondents willing to allowing fee-based recreation under both the current and modified recreational use statutes (Table 2). The change in mean WTA again is negative indicating a possible reduction in transactions costs.

Table 2. Willingness to accept (WTA) mean values by response category for respondents answering both WTA questions associated with the current and amended recreational use statute indicating change in WTA.

Variables	observations	mean	Std. Dev.	t-value	p-value
Current RUS WTA	63	$109.30	$189.10	0.426	0.6709
Amended RUS WTA	63	$104.63	$166.51	0.2227	0.8241
Change in WTA		-$4.67	-$22.59		

Description of Variables

The dependent and independent variables used in the Tobit model analyses are described and their mean and standard deviation values presented in Table 3.

Tobit Model for Willingness to Accept Compensation to Allow Access

Tobit models were used to analyze the potential relationship between respondents' WTA compensation to allow fee-based recreational access and various explanatory variables under both the current and modified recreational use statute. Parameter estimates for the WTA associated with the decision to allow fee-based recreational access under the current RUS are presented in Table 4. The parameter estimates for WRITTENAGREE2 and WRITTENAGREE3 are both positive in sign and significant at the 0.01 and 0.05 levels of significance, respectively.

Table 3. Description of variables.

Variable	Description	Mean	Std. Dev.
Dependent Variable			
WTACURRENT	Willingness to accept allow under current RUS	13.918	104.066
WTAAMENDED	Willingness to accept allow under amended RUS	19.229	94.555
Independent Variable			
PERSONALUSE	Land is used for personal recreational use (1=yes)	0.588	0.493
FRIENDSFAMILY	Land is used for recreation by family or friends (1=yes)	0.563	0.496
LEASEDREC	Land has been leased for recreational use (1=yes)	0.112	0.316
LIABILITYCONCERN2	Liability concern over recreational use, disagree (1=yes)	0.106	0.308
LIABILITYCONCERN1	Liability concern over recreational use, not sure (1=yes)	0.090	0.287
LIABILITYCONCERN3	Liability concern over recreational use, agree (1=yes)	0.799	0.401
WRITTENAGREE2	Written agreement protects from liability, disagree (1=yes)	0.250	0.433
WRITTENAGREE1	Written agreement protects from liability, not sure (1=yes)	0.400	0.490
WRITTENAGREE3	Written agreement protects from liability, agree (1=yes)	0.343	0.475
CONCERNEASED2	Liability concern eased, allow recreation, disagree (1=yes)	0.405	0.491
CONCERNEASED1	Liability concern eased, allow recreation, not sure (1=yes)	0.220	0.415
CONCERNEASED3	Liability concern eased, allow recreation, agree (1=yes)	0.369	0.483
NOTRESSPASS	Protection from liability requires me to post, unsure (1=yes)	0.464	0.499
RUSPROTECTS	Protected from recreational liability if free, unsure (1=yes)	0.661	0.474
INSURACEKNOW	Insurance exists for allowing recreation, unsure (1=yes)	0.618	0.486
RISKPREFERENCE1	substantial levels of risk in my financial decisions (1=yes)	0.073	0.260
RISKPREFERENCE2	I tend to avoid risk in my financial decisions (1=yes)	0.754	0.431
RISKPREFERENCE3	I neither seek nor avoid risk in financial decisions (1=yes)	0.158	0.365
MARGINALLAND	Any land "marginal" for agricultural purposes? (1=yes)	0.446	0.497
MARGINALACRES	Number of acres marginal for agricultural purposes	46.283	127.649
LANDOWNERCOOOPER	Ever worked with your adjacent or local landowners (1=yes)	0.258	0.438
COOPERATIVE	Ever been involved with a cooperative (1=yes)	0.141	0.349
CONSERVATION	Enrolled land in a government conservation program (1=yes)	0.447	0.498
TRACTS	Number of separate tracts of non-residential land	2.066	2.077
ADJACENT	Non-residential land adjacent to primary residence (1=yes)	0.432	0.496
DISTANCE	Number of miles to nearest tract of land	70.319	238.110
TOTALACRE	Total acreage of all tracts of land	324.809	634.085
YEARSOWNERSHIP	Number of years you have been a land owner	28.010	22.637
OWNERSHIP1	Ownership of land organized as corporation (y=1)	0.011	0.105
OWNERSHIP2	Ownership of land organized as LLC (y=1)	0.034	0.181
OWNERSHIP3	Ownership of land organized as joint ownership (y=1)	0.369	0.483
OWNERSHIP4	Ownership of land organized as single ownership (y=1)	0.642	0.480
ACQUIRE 1	Acquire non-residential land by inheritance (y=1)	0.467	0.499
ACQUIRE 2	Acquire non-residential land by marriage (y=1)	0.027	0.163
ACQUIRE 3	Acquire non-residential land by purchasing (y=1)	0.552	0.498
ACQUIRE 4	Acquire majority of non-residential land by other (y=1)	0.008	0.089
ROWCROPS	land for agricultural production of row crops (y=1)	0.574	0.495
COTTON	land for cotton production (y=1)	0.457	0.499
LEASEDFORAG	leased any of your land for agricultural uses	0.674	0.469

HAYLAND	Own land for hay production (y=1)	0.222	0.416
LIVESTOCKLAND	Own land for raising livestock (y=1)	0.204	0.403
GENDER	Gender (female=1)	0.349	0.477
AGE	Age in years	61.872	13.666
ETHNIC	Ethnic background: Caucasian (1=yes)	0.945	0.229
OCUPATION1	Primary occupation: farming (1=yes)	0.140	0.347
OCUPATION2	Primary occupation: business (1=yes)	0.102	0.303
OCUPATION3	Primary occupation: self-employed (1=yes)	0.109	0.312
EDUCATION1	Education: high school graduate or less (1=yes)	0.343	0.475
EDUCATION2	Education: some college to college graduate (1=yes)	0.435	0.496
EDUCATION3	Education: graduate or professional degree (1=yes)	0.171	0.377
INCOME1	Less than $25K (1=yes)	0.117	0.322
INCOME2	Income $25K to $75K (1=yes)	0.370	0.483
INCOME3	Income $75K or more (1=yes)	0.313	0.464

Table 4. Tobit estimates for the decision to allow fee-based recreational access under the current Recreational Use Statute for Louisiana landowners.

WTACURRENT	Coef.	Std. Err.	t	P>|t|	dF/dx	Std. Err	z	P>|z|
PERSONALUSE	-25.585	51.826	-0.49	0.62	-3.204	6.447	-0.50	0.62
FRIENDSFAMILY	39.472	49.530	0.80	0.43	4.873	6.161	0.79	0.43
LEASEDREC	-71.815	69.522	-1.03	0.30	-8.396	8.648	-0.97	0.33
LIABILITYCONCERN2	-22.447	128.309	-0.17	0.86	-2.734	15.961	-0.17	0.86
LIABILITYCONCERN3	60.117	111.656	0.54	0.59	7.161	13.890	0.52	0.61
WRITTENAGREE2	**148.880†**	58.438	2.55	0.01	**20.413†**	7.270	2.81	0.01
WRITTENAGREE3	**103.216‡**	51.008	2.02	0.04	**13.404‡**	6.345	2.11	0.04
CONCERNEASED2	**-167.206‡**	72.418	-2.31	0.02	**-20.117‡**	9.009	-2.23	0.03
CONCERNEASED3	49.832	54.148	0.92	0.36	6.279	6.736	0.93	0.35
NOTRESSPASS	35.387	44.423	0.80	0.43	4.419	5.526	0.80	0.42
RUSPROTECTS	-4.850	47.362	-0.10	0.92	-0.604	5.892	-0.10	0.92
INSURACEKNOW	-33.895	48.115	-0.70	0.48	-4.251	5.985	-0.71	0.48
RISKPREFERENCE1	107.077	73.948	1.45	0.15	**14.936***	9.199	1.62	0.10
RISKPREFERENCE2	**-136.842‡**	56.809	-2.41	0.02	**-18.651†**	7.067	-2.64	0.01
MARGINALLAND	**96.698‡**	47.309	2.04	0.04	**12.183‡**	5.885	2.07	0.04
MARGINALACRES	-0.002	0.143	-0.01	0.99	0.000	0.018	-0.01	0.99
LANDOWNERCOOPER	**73.716***	45.539	1.62	0.11	**9.584***	5.665	1.69	0.09
COOPERATIVE	-36.033	58.758	-0.61	0.54	-4.347	7.309	-0.59	0.55
CONSERVATION	**80.082***	47.350	1.69	0.09	**10.049***	5.890	1.71	0.09
TRACTS	-10.551	11.412	-0.92	0.36	-1.313	1.420	-0.92	0.36
ADJACENT	**-79.818***	45.516	-1.75	0.08	**-9.822***	5.662	-1.73	0.08
DISTANCE	-0.155	0.120	-1.29	0.20	-0.019	0.015	-1.29	0.20
TOTALACREAGE	**0.059***	0.034	1.72	0.09	**0.007***	0.004	1.72	0.09
YEARSOWNERSHIP	-0.156	1.177	-0.13	0.89	-0.019	0.146	-0.13	0.89
OWNERSHIP1	-12.747	183.157	-0.07	0.95	-1.562	22.784	-0.07	0.95
OWNERSHIP2	28.171	80.412	0.35	0.73	3.618	10.003	0.36	0.72
OWNERSHIP3	-45.460	44.418	-1.02	0.31	-5.562	5.525	-1.01	0.31
ACQUIRE1	105.965	73.837	1.44	0.15	13.364	9.185	1.45	0.15
ACQUIRE2	68.442	118.502	0.58	0.56	9.225	14.741	0.63	0.53
ACQUIRE3	96.623	75.687	1.28	0.20	11.884	9.415	1.26	0.21
ROWCROPS	**-174.466‡**	88.129	-1.98	0.05	**-22.695‡**	10.963	-2.07	0.04
COTTON	**185.150‡**	82.737	2.24	0.03	**23.540‡**	10.292	2.29	0.02
LEASEDFORAG	3.668	49.322	0.07	0.94	0.456	6.136	0.07	0.94
HAYLAND	-5.387	59.055	-0.09	0.93	-0.668	7.346	-0.09	0.93
LIVESTOCKLAND	**-113.490***	65.055	-1.74	0.08	-13.134	8.093	-1.62	0.11
GENDER	-65.224	50.424	-1.29	0.20	-7.918	6.273	-1.26	0.21
AGE	1.609	1.923	0.84	0.40	0.200	0.239	0.84	0.40
ETHNIC	-19.435	86.729	-0.22	0.82	-2.469	10.789	-0.23	0.82

185

OCUPATION1	111.769*	68.859	1.62	0.11	15.405*	8.566	1.80	0.07
OCUPATION2	92.661	67.418	1.37	0.17	12.610	8.387	1.50	0.13
OCUPATION3	108.615*	61.827	1.76	0.08	15.054‡	7.691	1.96	0.05
EDUCATION1	78.418	49.501	1.58	0.11	10.076*	6.158	1.64	0.10
EDUCATION3	144.384†	57.434	2.51	0.01	20.271†	7.145	2.84	0.01
INCOME1	-76.477	80.481	-0.95	0.34	-8.882	10.012	-0.89	0.38
INCOME3	-92.757*	48.810	-1.90	0.06	-11.144*	6.072	-1.84	0.07
CONSTANT	-579.998†	227.362	-2.55	0.01	-72.151†	28.283	-2.55	0.01
SIGMA	221.144	22.448						

†, ‡, *, indicates significance at the 1, 5, and 10 percent level, respectively. N = 531; Chi-square = 120.73; Log-L= -476.95; Prob>chi2 = 0.0000; Pseudo R-squared: 0.1123

Respondents that do not believe a written agreement can protect them from liability have an expected WTA that is $20.41 greater than respondents that are not sure if a written agreement can protect them from liability. In contrast, respondents that do believe a written agreement can protect them from liability have an expected WTA that is $13.40 greater than respondents that are not sure if a written agreement can protect them from liability.

The coefficient for CONCERNEASED2 is negative in sign and significant at the 0.05 level, indicating that respondents who agree to allow fee-based recreation also indicated that they disagree with allowing recreational use of their land if their liability concerns were eased have an expected WTA that is lower by $20.12. Also, respondents that consider themselves to be risk averse have a predicted WTA that is $18.65 lower than respondents that consider themselves to be risk neutral. Owning marginal land increases expected WTA by $12.18 and is significant at the 0.05 level. The coefficient for LANDONWERCOOPER is significant at the 0.10 level and is positive in sign, indicating that respondents that have worked with adjacent or local landowners have a predicted WTA that is $9.58 greater than respondents that have not worked with adjacent or local landowners. Having land in a government conservation program has a positive effect on expected WTA and is significant at the 0.10 level indicating an increase in expected WTA of $10.05. The coefficient for ADJACENT is significant at the 0.10 level and negative in sign indicating that respondents that have their nearest tract of non-residential land adjacent to their home have an expected WTA that is $9.82 lower than respondents not having land adjacent to their homes. Each one acre increase in total acreage results in an increase in predicted WTA by $0.01, which is significant at the 0.10 level. Respondents that indicated they use their land for agricultural production of row crops reduces predicted WTA by $22.70 while having land used for cotton production increases WTA by $23.54, which are both significant at the 0.05 level of significance. The coefficient for LIVESTOCKLAND is significant at the 0.10 level and negative in sign indicating that owning land for livestock production reduces expected WTA by $13.13. Four of the demographic variables are significant. Respondents that consider their primary occupation to be either business or self-employed have an expected WTA that is $15.41 and $15.05 greater than other landowners and both are significant at the 0.10 level of significance. The coefficients for EDUCATION3 and INCOME3 are both significant at the 0.10 and 0.10 levels, respectively. This indicates that respondents that are more highly educated have a predicted WTA that is greater by $20.27 than the WTA of respondents that attended college (EDUCATION2) while respondents that have a higher annual household income have a WTA that is lower by $11.14 as compared with respondents having a annual household income in the $25 to $75 thousand range (INCOME2).

Tobit parameter estimates for WTA associated with the decision to allow fee-based recreational access under an amended RUS are presented in Table 5. The coefficient for ACCESSCUR is significant at the 0.01 level indicating that respondents allowing fee-based recreation under the current Louisiana RUS have an expected WTA that is $19.21 greater than respondents that did not allow fee-based recreation under the current RUS. The coefficient for WTACURRENT is significant at the 0.01 level of significance and positive in sign indicating that for each $1 indicated under the current RUS results in an increase of $0.17 for WTA under the modified use statute. Parameter estimates for CONCERNEASED2 is significant at the 0.05 level and negative in sign indicating that respondents that disagree with allowing recreational use of their land if their liability concerns were eased have a WTA that is $11.55 lower than respondents that are unsure about allowing recreational use of their land if their liability concerns were eased. The coefficients for RISKPREFERENCE2, DISTANCE, and OWNERSHIP3 are all negative in sign and significant at the 0.10 level of significance. Respondents considering themselves to be risk averse have an expected WTA that is $8.91 lower than risk neutral respondents. The greater the distance a respondents' nearest tract of non-residential land is from their primary residence the lower their WTA, since each one mile increase in distance results in a

Table 5. Tobit estimates for the decision to allow fee-based recreational access under the amended Recreational Use Statute for Louisiana landowners.

WTAAMENDED	Coef.	Std. Err.	t	P>|t|	dF/dx	Std. Err	z	P>|z|
ACCESSCUR	86.793†	24.927	3.48	0.00	19.2071†	4.7892	4.01	0.00
WTACURRENT	0.861†	0.099	8.66	0.00	0.1654†	0.0191	8.66	0.00
PERSONALUSE	-33.596	23.429	-1.43	0.15	-6.5607	4.5014	-1.46	0.15
FRIENDSFAMILY	22.851	22.909	1.00	0.32	4.3548	4.4015	0.99	0.32
LEASEDREC	8.672	29.536	0.29	0.77	1.6902	5.6747	0.30	0.77
LIABILITYCONCERN2	71.113	51.198	1.39	0.17	15.5626	9.8366	1.58	0.11
LIABILITYCONCERN3	69.092	43.491	1.59	0.11	12.1423	8.3559	1.45	0.15
WRITTENAGREE2	-5.329	25.154	-0.21	0.83	-1.0180	4.8328	-0.21	0.83
WRITTENAGREE3	-0.115	21.651	-0.01	1.00	-0.0221	4.1598	-0.01	1.00
CONCERNEASED2	-61.630‡	27.755	-2.22	0.03	-11.5512‡	5.3326	-2.17	0.03
CONCERNEASED3	29.113	24.595	1.18	0.24	5.6708	4.7254	1.20	0.23
NOTRESSPASS	-3.491	19.916	-0.18	0.86	-0.6703	3.8264	-0.18	0.86
RUSPROTECTS	-22.652	21.087	-1.07	0.28	-4.4199	4.0515	-1.09	0.28
INSURACEKNOW	-8.548	21.174	-0.40	0.69	-1.6484	4.0681	-0.41	0.69
RISKPREFERENCE1	-35.239	37.610	-0.94	0.35	-6.3478	7.2260	-0.88	0.38
RISKPREFERENCE2	-44.035*	24.881	-1.77	0.08	-8.9112*	4.7804	-1.86	0.06
MARGINALLAND	30.694	20.483	1.50	0.14	5.9363	3.9353	1.51	0.13
MARGINALACRES	-0.012	0.076	-0.16	0.87	-0.0023	0.0145	-0.16	0.87
LANDOWNERCOOPER	-10.107	21.931	-0.46	0.65	-1.9216	4.2137	-0.46	0.65
COOPERATIVE	-33.222	27.417	-1.21	0.23	-6.0622	5.2676	-1.15	0.25
CONSERVATION	10.744	20.142	0.53	0.59	2.0678	3.8698	0.53	0.59
TRACTS	0.528	5.205	0.10	0.92	0.1014	1.0000	0.10	0.92
ADJACENT	-15.049	19.857	-0.76	0.45	-2.8792	3.8150	-0.75	0.45
DISTANCE	-0.155*	0.091	-1.71	0.09	-0.0299*	0.0174	-1.71	0.09
TOTALACREAGE	0.013	0.017	0.79	0.43	0.0025	0.0032	0.79	0.43
YEARSOWNERSHIP	-0.359	0.487	-0.74	0.46	-0.0690	0.0936	-0.74	0.46
OWNERSHIP1	-119.011	104.503	-1.14	0.26	-18.0273	20.0779	-0.90	0.37
OWNERSHIP2	-11.295	42.616	-0.27	0.79	-2.1208	8.1877	-0.26	0.80
OWNERSHIP3	-34.806*	20.843	-1.67	0.10	-6.5355*	4.0046	-1.63	0.10
ACQUIRE1	31.918	34.277	0.93	0.35	6.1734	6.5855	0.94	0.35
ACQUIRE2	-18.500	61.634	-0.30	0.76	-3.4213	11.8417	-0.29	0.77
ACQUIRE3	31.713	35.334	0.90	0.37	6.0468	6.7886	0.89	0.37
ROWCROPS	16.762	31.525	0.53	0.60	3.2014	6.0568	0.53	0.60

COTTON	-19.640	30.014	-0.65	0.51	-3.7665	5.7664	-0.65	0.51
LEASEDFORAG	-15.250	21.581	-0.71	0.48	-2.9644	4.1463	-0.71	0.48
HAYLAND	-27.769	26.715	-1.04	0.30	-5.1647	5.1327	-1.01	0.31
LIVESTOCKLAND	-11.858	27.400	-0.43	0.67	-2.2454	5.2643	-0.43	0.67
GENDER	-1.630	21.233	-0.08	0.94	-0.3128	4.0794	-0.08	0.94
AGE	1.710‡	0.853	2.00	0.05	0.3286‡	0.1640	2.00	0.05
ETHNIC	50.611	44.289	1.14	0.25	8.8253	8.5093	1.04	0.30
OCUPATION1	33.755	29.757	1.13	0.26	6.8536	5.7171	1.20	0.23
OCUPATION2	-1.691	31.007	-0.05	0.96	-0.3239	5.9573	-0.05	0.96
OCUPATION3	-14.785	30.611	-0.48	0.63	-2.7693	5.8812	-0.47	0.64
EDUCATION1	-5.057	21.083	-0.24	0.81	-0.9681	4.0506	-0.24	0.81
EDUCATION3	-25.956	26.540	-0.98	0.33	-4.8085	5.0991	-0.94	0.35
INCOME1	16.165	31.286	0.52	0.61	3.1935	6.0109	0.53	0.60
INCOME3	12.698	21.903	0.58	0.56	2.4631	4.2081	0.59	0.56
CONSTANT	-294.720†	100.293	-2.94	0.00	-56.6241†	19.2692	-2.94	0.00
SIGMA	132.498	9.461						

†, ‡, *, indicates significance at the 1, 5, and 10 percent level, respectively. N = 531; Chi-square = 209.67; Log-L= -846.63; Prob>chi2 = 0.0000; Pseudo R-squared: 0.110

$0.03 reduction in the expected WTA. If a landowner owns land jointly and allows fee-based recreation, the effect on predicted WTA is a reduction of $6.54 as compared with respondents that are single owners. AGE is significant at the 0.05 level and positive in sign indicating that each one year increase in age increases the expected WTA by $0.33.

Discussion

Discussion of Willingness to Accept and Transaction Cost

It was hypothesized that an institutional change that reduced the potential for liability would reduce the transaction cost associated with offering fee-based recreation. If this is true, then a reduction in the WTA for respondents allowing fee-based recreation pre-and post-institutional change should reflect this transaction cost savings. The theory appears to hold. For respondents allowing fee-based recreation pre- and post-institutional change the mean WTA was reduced by $4.67 per acre per year. The results of the Tobit models discussed in the next section provide additional evidence of transaction cost.

Discussion of Econometric Results

The significant and positive effect of ACCESSCUR in the post-institutional change Tobit model indicates that respondents who choose to allow fee-based recreation under both pre- and post-institutional change environments have higher WTA values than respondents only opting to allow fee-based recreation post-institutional change. Respondents allowing fee-based recreation under the current RUS have an expected WTA that is $19.21 greater than respondents that did not allow fee-based recreation under the current RUS. This result suggests that the potential negative effect of liability may have a much higher impact on respondents choosing to allow recreation only under the post-institutional change environment as compared to those who would allow it pre- and post-institutional change. Apparently the potential transaction cost for respondents not allowing fee-based recreation pre-institutional change is perceived as being greater than it is by respondents opting to allow fee-based recreation pre-institutional change. Thus, when the effect of the transaction cost associated with liability is reduced by an

188

institutional change, the WTA of pre-institutional change non-access granting respondents is much lower than pre-institutional change access granting respondents. This implies that not only are transactions associated with liability evident but that transaction costs are perceived differently by pre-institutional change access and non-access granting respondents.

The significant and positive effect of WTACURRENT also provides indication of a reduction in transaction cost under a modified recreational use statute, since each $1 increase in WTA indicated under the current RUS results in an increase of $0.17 for expected WTA under the modified use statute. These results imply that a modification to the RUS that extended liability protection to fee-based recreational access granting landowner would reduce the transaction cost borne by landowners thus reducing the fee for recreation use of land and also potentially reducing the cost of fee-based recreation to the public.

Further possible evidence of a reduction in transaction costs can be seen in results for the variables CONCERNEASED2 and RISKPREFERENCE2 which indicates if a landowner is risk averse. The WTA of respondents that disagree with allowing recreational use of their land if their liability concerns were eased (CONCERNEASED2) have a WTA that is $20.12 lower than respondents that were unsure about allowing recreational use of their land if their liability concerns were eased. The post-institutional change WTA for CONCERNEASED2 was only $11.55 lower than unsure respondents. The reduced magnitude of the marginal effects seems to indicate that institutional change does reduce the transaction cost of fee-based recreation.

Individuals that are risk averse experience reduced utility from investments with higher returns and greater risk. Allowing fee-based recreation under the current RUS is riskier than under a modified recreational use statute that would extend liability protection to landowners charging a fee for recreational access. Therefore, it is interesting to notice that under a pre-institutional change environment that risk averse respondents have an expected WTA that is $18.65 lower than risk neutral respondents, yet after an institutional change that substantially reduces the risk of liability it is observed that risk averse respondents have an expected WTA that is $8.91 lower than respondents considering themselves to be risk neutral. This difference in magnitude of the marginal effects seems to indicate that institutional change does reduce the risk of liability and the transaction cost associated with offering fee-based recreation.

Conclusions

The primary questions to be answered by this study was whether a transaction cost exists for fee-based recreation, which is borne by delta landowners, and can transaction costs be reduced by adopting a modified RUS as has been done by many other states. When looking at the mean values reported by survey respondents it appears that the theory holds. Additionally, results for the Tobit models seem to indicate evidence of reduced transaction costs. Rather than examining simple means, the Tobit model results allow for a comparison of pre- and post-institutional expected WTA by modeling post-institutional WTA as a function of pre-institutional WTA and the decision to allow recreational access in the pre-institutional change environment. Tobit model results indicate that respondents allowing fee-based recreation both pre- and post-institutional change have an expected WTA that is $19.21 greater than respondents that did not allow fee-based recreation under the current RUS. This result implies

that perceived transaction costs are so high under the pre-institutional environment that many respondents do not allow fee-based recreation. When the transaction cost associated with liability is eliminated the expected WTA for respondents allowing recreation post-institutional change only is much lower than for respondents allowing both pre- and post-institutional change. Transaction costs are also evident in the relationship between expected WTA post-instructional change and WTA pre-institutional change. Tobit model results indicate that each $1 increase in WTA under the current RUS results in an increase of $0.17 for expected WTA under the modified use statute. This implies that there is a transaction cost savings resulting from the institutional change.

Amending the Louisiana recreational use statute can increase the number of private landowners willing to use their land for fee-based recreational use. About 14% of respondents indicated they would be willing to allow fee-based recreation under the current institutional environment. If the Louisiana RUS were amended giving greater liability protection to landowners, the number of respondents willing to allow fee-based recreation would increase by 0% to nearly 24% of respondents. Clearly, an institutional change that reduces the liability risk to landowners could increase the potential amount of private land available for fee-based recreation.

A fee-based recreational enterprise under a traditional RUS environment caries with it the risk of liability; thus, as expected, risk preference was a significant predictor of the decision to allow fee-based recreation. Risk averse respondents were more unlikely to allow fee-based recreation under the current institutional environment. Following an institutional change, risk preference was no longer a significant predictor of the willingness to allow fee-based recreation indicating that the element of risk was diminished.

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