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The Risk Averting WTP of Visitors to the East Coast of Korea

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Ⅰ. Introduction

The natural environments of Gangwon province are well known in Korea. Of the total land area of the province, 81.6% is covered with forests, and of the coast there are numerous protected inland areas. The coastline of 212 ㎞ (in the eastern areas of the province) is known for its cleanness and beauty. Also, Gangwon people are renowned for friendliness.

The attractive seashore and beaches in Gangwon province are nominated every year as the most preferred sightseeing places in Korea. This has resulted in a sharp increase in the number of visitors to the province and local and provincial governments are expected numbers to increase and to bring with them increasing economic prosperity for the region.

The increase in visitor numbers, however, also has created an increase in external costs such as congestion, waste and untidiness, abnormal price rises, etc., which is putting the increase in economic prosperity through tourism at risk. The pressure of these externalities may put tourists off from coming to the area for recreational purposes. In some cases these tourists will look for substitute sites outside the province and this will lead to a loss for Gangwon province.

The externalities will not only have negative financial impacts on local and provincial governments, but also will be harmful to the area attaining sustainable development. Few studies have been conducted linking the external costs with people's attitudes. Through the use of revealed and stated preference approaches, the purpose for this study, therefore, is to show evidence of the willingness to pay by visitor to avoid these externalities.

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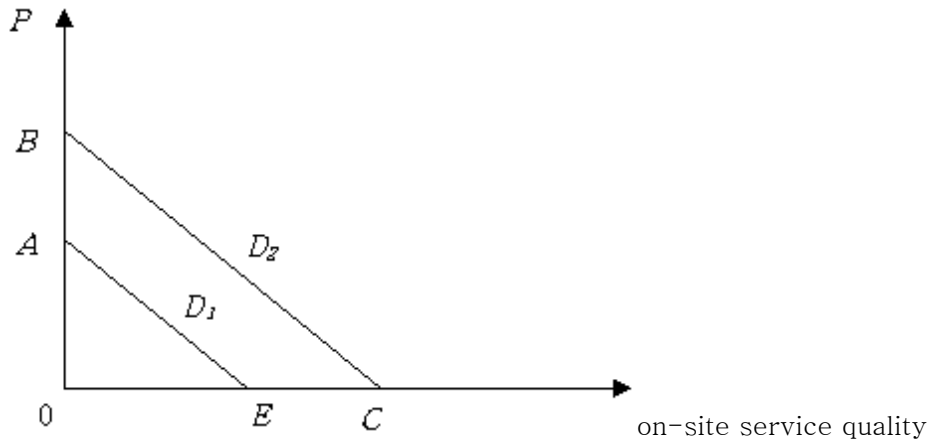
Ⅱ. Theoretical Backgrounds

Change in the level of service at recreation sites can conceptually be explained by the demand shifter (Deaton and Muellbauer, 1980). Suppose the introduction of new programs such as traffic congestion fees and beach entrance fees effectively reduces the risk factors [2] such as traffic congestion, abnormal price rise, untidiness and inconvenience, and safety. This reduction in risk factors increases the utility from recreation activities at the beaches. Figure 1 presents total demand for the current beach recreation as D_1. With risk factors decreased the demand curve shifts to D_2.

It is proposed to use the Contingent Valuation Method (CVM) and the Travel Cost Method (TCM) to measure this WTP to reduce the risk factors identified.

Figure 1: Consumer surplus effect of improvement in service quality



The reduction of risk factors on the site would increase the consumer surplus by area ABCE. It is a measure of on-site user's maximum WTP for the welfare improvement.

The TCM assumes that weak complementary conditions hold. According to Mäler (1974), a public good and a private good are weak complementary if marginal value or marginal WTP for the public good is zero when no consumption of the private good is made. In this case, the reduction of risk factors at beaches is public goods and all recreation-related inputs are private goods.

Weak complementarity will hold if on-site users obtain utility from the level of

[2] The words of 'risk factors' are adopted in this study because if they exist on a specific beach, on-site users would be looking for the substitute, which would threaten the beach-related economy.

reduction of risk factors by the visiting site only.[3] With the assumption of weak complementarity, the change in consumer surplus from on-site service quality improvement can be calculated from the newly derived demand function (Sutherland, 1982).

Ⅲ. Elicitation of Risk Averting WTP

1. Socio-Economic Characteristics

On-site interviews were conducted in three zones, northern part (NP), central part (CP), and southern part (SP). Each zone includes its most popular beach. Sample sizes are, respectively, 378, 358, and 203, summing up to 939. Of those, interviewed, 79.16% came from the metropolitan areas of Seoul, Inchon, and Gyunggi-Do (82.86% at NP, 79.15% at CP, and 72.73% at SP).

Those interviewed gave a very high score to the natural environment of Gangwon (4.31 out of 5) with those in NP giving the highest score of 4.54 and with CP at 4.11. and at SP 4.23. Their satisfaction with services and activities at the recreation sites was, however, less at 4.31. 3.91, and 4.00, respectively, with an average of 4.09.

With an average of 13.82 years of education, 97.34% of respondents were highly educated, and this is about the same in three zones, 97.36% of NP, 97.20% of CP, and 97.53% of SP. Most visitors were between the ages of 20 and 40, with the average age of those interviewed being 32.62.

Annual average income of respondents was NZ$ 31,500[4] with NP of NZ$ 41,338, CP NZ $25,288, and SP NZ$ 24,688. Annual average income in the NP is much greater than in the other two zones, which is consistent with the statistics of the other socio-economic variables. It could be interpreted that visitors with more income prefer more tidiness and attractiveness[5], which means they would be willing to pay more for better utility.

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[3] However, weak complementarity condition does not hold if the positive utility is obtained from merely knowing that risk factors in a specific beach exist less than in any other place even though no recreation activity in the beach occurs. Then, the value of its quality change would be underestimated by the smaller area ABCE.

[4] It was calculated based on the exchange rate of NZ dollar : Korean Won = $1 : ₩800.

[5] Northern district in the each coast is evaluated as to have the best attraction points in inland of Korea.

Table 1: Statistics : Major socio-economic variables

	age (year)	education (year)	annual income (Korean Won)
mean	32.62 (10.41)*	13.82 (2.25)	25,232,258 (22,850,718)
median	30	14	20,000,000
min	16	6	480,000
max	74	21	240,000,000
sample size	939		

* The numbers in parenthesis are standard deviation.
source : Shin (2003)

2. Risk Factors

Likely risk factors at the sites were presented in the survey and respondents were asked to rank them. While most risk factors related to on-site matters, traffic congestion, an off-site risk factor, appeared to be the most risky factor among all the risk factors. Traffic congestion is the result of the sharp increase in visitor numbers. The east coast of Gangwon province has good access conditions with two four lane expressways (charged) and two state highways with four lanes (free), coming into the region. It normally takes less than four hours to drive from Seoul to the east coast, but approximately twenty hours during the summer holiday season.

When asked about traffic congestion, some people wanted to see more roads or an expansion of existing roads. Others (32.80%) wanted to see a user fee such as traffic congestion fee (TCF) to restrict traffic. 59.26% of respondents from the NP zone indicated a WTP for reducing it. WTP in the other zones was lower 14.25% (CP) and 16.26% (SP).

The major on-site risk factors were, in turn, abnormal prices, untidiness and inconvenience with some necessary facilities such as toilets, shower facilities, and cooking facilities, and congestion in site. These factors could lead visitors to find substitutes elsewhere outside the province, which would come at a cost to local government, and the community and its people. Thirty percent of the respondents wanted to impose fees such as an entrance fee to the beaches (BEF) to solve those problems. 59.26% of respondents from the NP zone indicated a positive WTP of BEF while those in the other zones were lower, 10.34% (CP) and 11.82% (SP).

Table 2: Risk factors when planning to visit

risk factors	No. 1	No. 2	No. 3	total
traffic congestion	471	131	90	692
congestion at the site	69	169	158	396
abnormal prices	191	235	145	571
untidiness of and inconvenience with toilets, shower facilities, and cooking facilities	119	187	173	479
carparking	29	92	128	249
crime	8	14	34	56
water activity related safety	14	15	38	67
uncleanness of beach	16	47	86	149

source : Shin (2003)

3. Risk Averting WTP

Two non-market valuation methods, TCM and CVM, were mixed together in one questionnaire. Open-ended CVM questionnaire were used to elicit a WTP amount for reducing the disutility of the externalities. The WTP question dealt with two scenarios: a traffic congestion fee (the WTP for reducing traffic congestion from home to the site and back), and a site entrance fee to reduce unpleasant factors at the sites such as people congestion, waste and untidiness, abnormal price rise, etc.

Since 62.3% of total respondents gave a zero WTP[6], its statistical significance might be low. However, it could be explained by two factors. First, there is a gap between on-site user's initial budget (at home) and travel cost (on-site), which is NZ$5.9 for the positive WTP respondents and NZ$2.9 for the zero WTP. While the former's budget covers the average WTP of NZ$5.9 (to be explained below), the latter's budget can not cover it. This means, thus, that zero WTP respondents do not have the ability to pay for the average WTP in the *status quo*. Second, 53.53% of zero WTP respondents answered they would not change recreation site by going to another region even if risk averting fees were imposed. This implies that they will be able, and willing to pay, the risk averting fees on their next visits. Therefore, high zero WTP response rate will neither theoretically nor empirically affect our study results given the evidence presented above.

[6] The reasons for not willing to pay are: either provincial or local government should remove such risk factors for more visitors (54.01%); central government is in charge of them (25.94%); willing to pay, but not enough money (10.14); and satisfied with current status (9.91%).

TCF and BEF for NP zone are NZ$5.6 and NZ$4.7, and are higher than those of the other zones. Average TCF and BEF per visit were NZ$3.1 and NZ$2.4, respectively. Total individual average WTP per visit to avoid both risks turns out to be about NZ$5.9 (made up of NZ$3.1 for the average traffic congestion fee and NZ$2.4 for the average site entrance fee). Among three zones, WTP of NP was highest ranked.

Table 3: Average WTP for averting risk factors

(unit : NZ dollar)

NP			CP			SP			TOTAL		
TCF	BEF	ALL*	TCF	BEF	ALL	TCF	BEF	ALL	TCF	BEF	ALL
5.6	4.7	10.2	1.3	0.8	3.2	1.5	0.9	2.7	3.1	2.4	5.9

* ALL means average WTP of TCF and/or BEF.

Ⅳ. Economic Effects of Risk Averting Fees

1. Model and Analysis

A basic travel cost model was applied to this study. Included in the model were socio-economic variables and travel cost. Also, variables of satisfaction with Gangwon Nature and the interviewed sites were used as a proxy of service quality. The model used are equation (1).

(1) $Y = f(x_1, x_2, x_3, x_4, x_5)$

where Y : days of visits to the east coast beaches

x_1 : travel costs per day per person

x_2 : education

x_3 : income

x_4 : nature satisfaction

x_5 : on-site service satisfaction

SPSS 10.0 win was used for this analysis. Fundamental statistics are shown in the Table 4.

Table 4: Fundamental statistics of variables

model / variables	NP		CP		SP		ALL	
	mean	std. dev.	mean	std. dev.	mean	std. dev.	mean	std. dev.
days of visits	5.03	6.38	3.80	4.65	2.79	3.17	4.08	5.25
travel costs per day per person[1]	35,062	23299.66	38,404	29412.35	29,216	19053.67	35,072.74	25244.42
Education[2]	14.22	2.28	13.48	2.21	13.82	2.25	13.82	2.25
Income[3]	33,113.07	1441.98	19,750.34	16938.39	25,232.26	22850.72	25,232.26	22850.72
nature satisfaction[4]	4.54	0.65	4.11	0.87	4.23	0.87	4.31	0.81
on-site service satisfaction[4]	4.31	0.80	3.91	0.94	4.00	0.95	4.09	0.90

[1] Korean Won
[2] year
[3] Korean thousand Won
[4] 5 point scale

Assuming a one-to-one relationship, a nonlinear inverse function was found to be the best fitting equation using OLS. The nonlinear inverse demand function does not necessarily have an intercept because it does not have any cost on the vertical axis if travel does not occur. Thus, no intercept was included in the model.

Table 5 shows the results. With keeping the dependent variable constant at the current level according to the implicit function rule (Chiang, 1967), changes in travel costs per day per person (x_1) and on-site service satisfaction (x_5) have a positive relationship in all equations (4 equations, one for a each zone and aggregate equation). Then, it can be expected that increasing travel cost (due to the inclusion of a fee) will lead to an increase in service satisfaction (through the reduction in the level of external factors).

With the introduction of risk averting expenditure, travel cost would increase and visitors would expect the utility to increase. If they don't achieve this, their expenditure will decrease or they will stop coming to sites and go somewhere else. Thus, it can not be simply true that economic prosperity of the site-related communities could be expected as revenues increase.

Table 5: Estimated coefficients of models

variables \ model		estimated coefficients			
		ALL	NP	CP	SP
days of visits	Y	dependent variable			
travel costs per day per person	x_1	6574814 (1.505)	9085.157 (0.992)*	5482.935 (0.973)	5898.630 (0.965)
education	x_2	30.162 (1.154)	8.416 (0.454)	33.829 (3.498)	15.213 (1.451)
income	x_3	-360.424 (-3.185)	$-1.4*10^7$ (-2.963)	-1965080 (-1.600)	-846036 (-0.559)
nature satisfaction	x_4	3.195 (1.836)	14.679 (2.131)	-0.414 (-0.116)	4.404 (1.279)
on-site service satisfaction	x_5	3.415 (3.928)	5.274 (1.414)	4.307 (1.611)	0.924 (0.408)
adjusted R^2		0.36	0.37	0.38	0.41
F value		104.48	45.329	45.515	28.983
N		939	378	358	203

* Number in parenthesis are t values.

2. Economic Effects

To derive the economic effect to the east coast communities of Gangwon province, the total estimated equation (ALL) was used. Mathematical expression is equation (2):

(2) $$Y = 6574814\frac{1}{x_1} + 30.162\frac{1}{x_2} - 360.424\frac{1}{x_3} + 3.195\frac{1}{x_4} + 3.415\frac{1}{x_5}$$

Assuming others constant, the partial derivatives of dependent variable with respect to travel cost variable has the following relationship (equation (3)):

(3) $$\delta Y = 6574814\frac{1}{x_1}{}_2\,\delta x_1$$

Equation (4) shows the marginal travel cost function. This is obtained from inverting equation (3) and setting x_1 equal to the average travel cost.

(4) $$\delta x_1 = -1/6574814\ x_1^2\ \delta Y$$
$$\fallingdotseq -187.09\delta Y$$

Equation (4) is used to derive the on-site benefit by integration. The use value per person of recreation sites in east coast was calculated to be NZ$954.16 with individual travel cost per visit of NZ$170.10. Then, with the introduction of TCF and BEF, the increased benefits were calculated by the same way as above by putting average TCF, BEF, and ALL into x_1^2 because they are the difference between the current and the increased travel costs. The increased total benefits are NZ$4.76, NZ$2.83, and

NZ$42.42, respectively. By subtracting WTP per user (A) from them (B), the net benefits per user are NZ$1.66, NZ$0.44, and NZ$36.52, respectively.

The imposition of the two fees will give two economic effects: revenue increase and income creation. The former was calculated by simply multiplying each WTP by the number of visitors, here, 10 million visitors per year. The latter was done by an income creation index, i.e., the inverse of one minus marginal propensity of consumption, and using the same visitor number as the above. Then, the imposition of traffic congestion fees and site entrance fees will provide local residents and their communities with significantly positive economic effects of between NZ$1.08 billion and NZ$3.71 billion with marginal propensity to consume of 0.6.

Table 6: Economic effects of imposition of risk averting fees

(unit : NZ dollars)

			TCF	BEF	ALL
WTP per user (A)			3.10	2.39	5.90
Total benefit per user (B)			4.76	2.83	42.42
Net benefit per user (B-A)			1.66	0.44	36.52
Total benefits*			47.58 *mil.*	28.33 *mil.*	424.25 *mil.*
Effects to east cost communities*	revenue increase effect		30.96 *mil.*	23.89 *mil.*	1,059.05 *mil.*
	income creation effect	0.6**	77.40 *mil.*	59.72 *mil.*	2,647.62 *mil.*
		0.7	103.20 *mil.*	79.63 *mil.*	3530.16 *mil.*

* Calculation is based on 10 million visitors per year.

** The numbers are based on marginal propensity of consumption in east coast districts between 0.6 and 0.7 every year.

Ⅴ. Concluding Remarks

The increasing number of visitors coming to the east coast of Gangwon province is, however, not necessarily promising economic prosperity for east coast communities. While at the moment tourist revenues are increasing so are signs of external costs. For example, in the beach area of the east coast, there already exist traffic congestion, abnormal price, waste and untidiness, on-site congestion, safety, etc. during the peak season. These factors put continued economic prosperity from tourism at risk, and if not dealt with, tourists would go to substitute sites.

Risk averting fees such as a traffic congestion fee and/or an entrance fee could be introduced to remove or reduce risk factors. The results from the study show that there is a WTP for putting in place risk averting fees. Such fees would lead to a reduced number of visitors, a reduction in external costs and a revenue components to the communities. The implementation of such fees would increase on-site users' utility and contribute to sustainable tourism development in the east coast regions.

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