Effects of Socioeconomic Factors on Tourist Demand and Consumer Surplus

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Abstract
This study constructed tourism demand model considering socioeconomic characteristics and quantitatively analyzed consumer surplus (economic value) according to tourist characteristics. Poisson regression model is commonly used when the count variable such as the number of sightseeing is a dependent variable. Because the target of the analysis is tourists, the truncated Poisson regression model was used in view of the fact that the number of sightseeing is greater than zero. The analysis shows that the truncated Poisson model has more predictive power than the Poisson model. Socioeconomic characteristics (income level, tourism cost, age difference, family members, marital status, gender difference, etc.) had a significant impact on tourism demand. The consumer surplus that tourists get from one trip is around 609,756 won. Estimating the tourism demand of the Korean people considering the socioeconomic characteristics and analyzing the difference of the benefits according to the difference of the socioeconomic characteristics will provide useful information for forecasting the tourism demand, planning the tourism development plan and making the decision.

Keywords: socioeconomic characteristics, tourism demand, economic value, truncated poisson

Introduction

Interest in quality of life is increasing due to the increase in income level. With the introduction of the five-day workweek in July 2004 and the five-day workweek class in March 2012, the nation's tourism demand for tourism has surged. In the case of the Korean tourism market, the percentage of Koreans spending on domestic tourism is considerably low and the reliance on foreign tourists, especially Chinese tourists, is quite. Recently, it was confirmed that China's restrictions on tourism in Korea related to the Saad placement problem could significantly affected domestic tourism industry. Considering the stagnation of the number of foreign tourists and spending, it is urgent to expand the safety net of the domestic tourism industry. In this situation, it is timely to analyze the factors affecting the national tourist demand in Korea and to prepare countermeasures against them.

Tourism demand is influenced by socio-economic factors. In particular, tourism costs and income are important economic variables in analyzing tourism demand (Becker, 1965). Eugenio-Martin & Campos-Soria, 2011; Shin, Young-Cheol, 2012; Eom Young-suk, 2008). In particular, travel costs can be seen as an important variable in quantitatively analyzing the difference in consumer surplus. Individual characteristics (gender difference, age, education levels etc.) also affect tourist demand and benefit (Lehto, Jang, Achana, & O'Leary, 2008; Berni & Cracolici, 2015; Li, 1985; Ye, & Law, 2013).

The first objective of this study is to develop a national tourist demand model considering the socio - economic characteristics including income level, tourism cost, age difference, household members, marital status, and gender difference. The second objective is to quantitatively analyze benefits from one trip and differences in benefits depending on socioeconomic characteristics. The third purpose of this study is to provide implications based on the results of empirical analysis.

In this study, a truncated Poisson model was used. In general, the Poisson model is commonly employed when the dependent variable is an additive variable such as the number of sightseeing. However, the data used in this study is a questionnaire surveyed by the Korea Institute of Cultural Tourism in 2015. Since non-tourists were not included in the analysis, the number of sightseeing is greater than zero. Therefore, the Poisson model, which is truncated at 0, is appropriate, because of reflecting the characteristics of these data.

This study estimates the tourism demand of Korean people considering the socio - economic characteristics and analyzes the difference of benefits according to the difference of socio - economic characteristics. When analyzing demand for individual entities on a microeconomic basis, prices and income should be included in the analysis of national tourist demand as a key variable. Economic variables are important, but if they are omitted from the model, there is a bias or inconsistency in the estimation coefficients. Therefore, a model with economic variables will have more rigorous results than those without. The second feature is the analysis of the difference of benefits from tourism according to the difference of socioeconomic characteristics. Unlike most studies analyzing the relationship between individual characteristics and tourism demand, the difference in benefits according to individual characteristics was estimated quantitatively. At this time, the price variable (travel

cost) included in the model can be used to estimate the benefit difference of individual characteristics.

Section II discusses the theoretical background of the tourism demand model. Section III provides the truncated Poisson model used in the analysis and the estimation of the benefits of individual characteristics. In Section IV, the data and analysis results are presented. In Section V, the research results are summarized, implications are discussed.

Literature Review

Tourism is generally classified into international tourism and domestic tourism, which is defined as national tourism including overseas tourism of Koreans and domestic tourism of Koreans (Lee, 2004). To estimate the demand for national tourism, economical major economic variables are income and price. First, it is necessary to understand income effects and substitution effects to see how income changes affect tourism demand. Income effects indicate that the higher the income, the greater the demand for tourism. However, as wage increases, incomes increase, but the relative value of leisure increases, so tourism demand decreases i.e., substitute effects (Becker, 1965). Therefore, the effect of income on tourism demand is determined by the relative size of income effect (+) and substitution effect (-). Generally, income effects are known to be larger than alternative effects.

Van Soest & Kooreman (1987), Eugenio-Martin & Campos-Soria (2011), and others have analyzed the impact of income levels on tourism demand. Van Soest & Kooreman (1987) analyzed the impact of income on tourism demand in 1981 in Dutch consumption expenditure data. The impact of income on tourism demand was positive, but the effect of domestic tourism demand on international tourism demand was different. Income has a negative effect on domestic tourism demand, but it has a considerable positive effect on international tourism. Eugenio-Martin & Campos-Soria (2011) analyzed the relationship between income and tourism demand in 1977, using household data from 15 European countries. As a result, it was found that the higher the income, the higher the demand for tourism.

The other major economic variable is tourism costs (prices). Tourism costs include hotel charges, transportation costs, and opportunity costs for time. The higher the price, the less demand for tourism. Price variables are used to estimate the difference of consumer surplus according to the difference of individual characteristics. Tourism costs are considered to have the characteristics of the visiting area and the value of the natural environment.

Lehto, Jang, Achana, & O'Leary(2008), Berni & Cracolici(2015), Szromek, Januszewska, & Romaniuk(2012), Li, Ye, & Law(2013) analyzed the difference in preference of tourism demand according to the generation difference for the US domestic tourists. These studies found that elderly households prefer to travel on casinos, gambling, and wellness, but found that the baby boomers prefer to increase their intimacy through family trips. Berni & Cracolici (2015) analyzed the tourism behavior of Italian furniture from 1997 to 2007. As age increases, tourism demand decreases, but tourism expenditure increases. The income elasticity of tourism for each household is different.

The method of estimating tourism demand and its benefits is based on the travel cost method (TCM). The travel cost method includes economic variables (income and price) in the tourism demand model for evaluating the value of tourism demand and tourism resources. In particular, travel costs are used as surrogate variables of tourism service prices to estimate the difference in benefits resulting from differences in individual characteristics. The benefit of individual characteristics can be estimated by dividing the estimated coefficients of individual characteristics by the estimated coefficients of prices.

Most of the domestic researches applying the travel cost method evaluated the value of tourism demand or resource in a specific area by analyzing the tourists visiting specific areas. There is no research that analyzes the difference in benefits from tourism due to differences in the benefits according to the socioeconomic characteristics.

The literature provides several findings. First, the effect of income on tourism demand is positive (+) and tourism is normal good. Second, the effect of price on tourism demand is negative. Third, the economic variables (income and tourism cost) are important variables for estimating tourism demand. Based on these findings, this study estimates the tourism demand model considering socioeconomic variables and estimates the difference of tourism benefit according to individual characteristics. A survey used in this study was conducted for non – tourists. Therefore, the truncated Poisson model was used to reflect the characteristics of the data, and a robust standard error method was used in consideration of the possibility of dispersion.

Methods

The number of a tour is determined by maximizing utility with a limited budget. At this time, tourism demand can be expressed as a function of socio-economic characteristics (income, tourism price, sex, education level, age, etc.).

Before estimating the difference in benefits according to socioeconomic characteristics, tourism demand function should be estimated. In this study, we use the truncated Poisson model to reflect the characteristics of the data. The Poisson model is generally used because the dependent variable is an integer as the number of tour services. However, in the case of surveys targeting tourists, the demand for tourism ranges from 1, which is greater than zero. Most studies analyzed tourist demand except for the responses of 0 when information on the responses of those who did not participate in the tourism activities were not available (Bockstael, Strand & MacConnell, 1990). The results of the conventional regression or Poisson model that do not adequately reflect the response of 0 are likely to be undesirable. Therefore, considering truncation of observations may provide reliable results (Grogger & Carson, 1991; Cameron & Trivedi, 2005, 2009).

Poisson model is widely used for explaining the probability of occurrence of certain incidents (frequency of violent crime, number of hospital visits, number of visits, etc.) in a certain period (Cameron & Trivedi, 2005, 2009). The probability density function of the univariate Poisson distribution with respect to the number of trips (y) in the tourism sector during one year can be expressed as follows (Cameron & Trivedi, 2005, 2009; Habb & McConnell, 2002).

$$\Pr(y|\mu) = \frac{\exp(-\mu)\mu^{y}}{y!}, \qquad y = 0,1,2\ldots, \tag{1}$$

where y is the number of trips occurring in a year, and y is the parameter to be estimated. The Poisson distribution is characterized by the fact that the average and variance of the number of travels occurring in a specific period are the same. As a survey of people who have actual tourism experiences, the number of tourism, which is a dependent variable, has a positive value. In order to reflect the characteristics of these data, a truncated Poisson model with a dependent variable of 0 is more suitable than the Poisson model. The probability density function that reflects the characteristics of the cut data is shown in Equation (2).

$$f(y|\theta, y > 0) = \frac{f(y|\theta)}{1 - F(0|\theta)} \tag{2}$$

where $f(y|\theta)$ is a probability density function, $F(y|\theta)$ is a cumulative distribution function, θ is parameters estimated. $F(0) = \Pr[y \le 0] = \Pr[y = 0] = e^{-\mu}$.

In the tourism demand model, the dependent variable is the number of tourism and the socio-economic characteristic variable is the explanatory variable (3). The regression model of the exponential form guarantees $\mu_i > 0$ (Agresti, 1996).

$$\mu_i = E(y_i|x_i) = \exp(x_i\beta) \tag{3}$$

where i is the number of visits by respondents, and μ_i is the average and variance of the number of visits by i respondents. And x_i is a vector representing the socioeconomic characteristics (price, income, sex, education level, etc.) of the respondent and is an unknown parameter to be estimated. The estimation method is the maximum likelihood estimation (MLE), and the parameter is the solution obtained from the first-order condition of the nonlinear equation (4).

$$\sum_{i=1}^{N}\{y_i - \exp(x_i'\beta)\}x_i = 0 \tag{4}$$

From the estimated tourism demand model, it is possible to calculate the differences in economic value according to the social characteristics. At this time, the welfare analysis on tourists can be implemented using the approximate compensation change and the consumer surplus. By integrating the lower part of the estimated demand curve, consumer surplus is calculated. The change in the expected number of trips due to changes in prices represents expected consumer surplus and can be obtained from Eq. (5) (Hellerstein & Mendelsohn, 1993).

$$E(CS) = \frac{E(y|X)}{(y-1)!} = -\frac{\mu}{\beta_p} \tag{5}$$

Here, the average number of trips is the estimated coefficient of prices. Therefore, consumer surplus per trip is the reciprocal of price estimation coefficient. The

difference in consumer surplus due to socioeconomic factors can be estimated using equation (6).

$$E(\triangle CS) = -\frac{\delta E(y_i)/\delta x_i}{\beta_p} = -\frac{\beta_i}{\beta_p}\mu \qquad (6)$$

Here, μ is the average of the number of trips, β_0 is the estimation factor of tourism price, and β_i is the estimation parameters of ith explanatory variable. Therefore, the change or difference in consumer surplus per tour according to the different characteristics can be obtained by dividing the estimated coefficient by the estimated coefficient of price.

Empirical Results

In order to analyze the relationships between socioeconomic characteristics and tourism demand, this research employs the National Tourism Research Institute 's 2015 National Travel Survey. This data provides sufficient observations and information necessary for analysis. The survey was conducted between January 1 and December 31, 2015. Out of the sample of 6534 households with 2492 households over 15 years of age living in South Korea, 5736 samples were finally used except for no answer or outliers.

Table 2 presents definitions and basic statistics for the variables used in this study. Dependent variable is addition data as annual number of trips. It is confirmed that it is larger than 0 because it is a survey data for tourists. Therefore, the truncated Poisson model may represent this feature. The explanatory variables influencing the number of tourism are socioeconomic characteristics (tourism price, income, individual gender, age, education level, household size, etc.), tourism price and income are selected based on economic theory, the literature, and data availability. Among the explanatory variables, gender, marital status, and tourism type are the dummy variable, and the difference of the reference variable can be analyzed. The tourism type were included because domestic tourism and international tourism may have different effects on tourism demand and convenience. The sample average of the average number of sightseeing trips per person over the past year is 8.83, and the sample variance is 360.24, so there is scattering. Therefore, more rigorous model setting is necessary through the test of the model.

<Table 1> Summary statistics in variables

variable	explanation	mean	std. err	min	max
trip	number of tourism per year	8.83	18.98	1	305
price	tour price(cost of a tour: 10000won)	28.56	78.97	0	2000
y	average monthly income(10000won)	366.34	254.74	3	1250
sex	sex(female=1; male=0)	0.59	0.49	0	1
age	age	52.17	18.93	15	97
school	year of education	4.25	1.56	1	8
fsize	size of households	3.10	1.41	1	9
marry	marriage(married=1; unmarried=0)	0.57	0.49	0	1
type	tour type (domestic=1; international=0)	0.92	0.27	0	1

Table 2 shows the estimated results of the Poisson regression model (model 1) and the truncated Poisson regression model (models 2 to 4). As we have seen in the data analysis, there was a possibility of over-dispersion where the variance of the number of trips (360.24) was larger than the average (8.83). To test this, the test method proposed by Cameron & Trivedi (2005, 2009) was used. If the predicted value of the model is $\widehat{trip}$, $\widehat{trip}$ is regressed on $[(trip-\widehat{trip})^2-trip]/\widehat{trip}$. The t-test is performed to determine whether the coefficient of $\widehat{trip}$ is 0 or not. If the estimation coefficient is significant, there is an over-dispersion, and if not, it can be judged that there is no over-dispersion. The results show that all models have over-t dispersion, so a robust standard error method was used.

Akaike Information Criteria (AIC) information criterion and Bayes Information Criteria (BIC) information criterion indicate that the lower the value, the higher the fit of the model. Since model 4 have the lower AIC (88180.99), BIC (88234.23) than the other models. Model 4 holds the highest fitness. In the case of Model 4, all estimated coefficients have statistically significant effects on tourism demand. Estimation coefficients of trip costs are statistically significant negative and consistent with economic theory. In other words, the higher the travel cost, the smaller the number of trips. The coefficient of estimation of income is significant (+), which means that the higher the income, the greater the number of trips. Estimates of age are positive signs, indicating that the larger the age, the greater the number of visits. Although older respondents have some limitations on their ability to operate, they can be seen to have relatively high tourism demand based on high economic power. In Korea, men are more likely to be employed and economically than women. The estimation coefficient of gender (female = 1) is a negative sign, meaning that the number of trips is smaller for women than for men.

Estimation coefficients of marital status (married = 1) were positive, which means that more members of the family have more trips than married single (unmarried, divorced, bereaved). The coefficient of the tourism type (domestic tourism = 1) is negative (-), indicating that international tourism has higher demand than domestic

tourism. Although it is not included in model 4, the coefficient of estimation of school is positive (+), and the higher the education level, the higher the demand for trips.

<Table 2> The result of estimated tour demand models

	Poisson	Truncated Poisson		
	model 1	model 2	model 3	model 4
price	-0.0124***	-0.0166***	-0.0161***	-0.0164***
	(0.0002)	(0.0025)	(0.0025)	(0.0025)
y	0.0013***	0.0013***	0.0011***	0.0014***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
sex	-0.4082***		-0.4096***	-0.4661***
	(0.0547)		(0.0552)	(0.0511)
age	0.0129***	0.0142***	0.0169***	0.0100***
	(0.0025)	(0.0025)	(0.0026)	(0.0024)
school	0.0686***	0.1177***	0.0680***	
	(0.0185)	(0.0171)	(0.0189)	
fsize	-0.1257***	-0.1288***		-0.1300***
	(0.0315)	(0.0318)		(0.0156)
marry	0.1393*	0.1728*	0.0327	0.1765***
	(0.0116)	(0.0117)	(0.0484)	(0.0841)
type	-0.3831	-0.4878*	-0.4776*	-0.503**
	(0.2478)	(0.2632)	(0.2624)	(0.2637)
constant	1.7710***	1.3993***	1.4366***	2.3438***
	(0.3620)	(0.3480)	(0.385)	(0.3624)
Heteroskedasticity test	-2.60***	-2.49**	-2.41**	-2.37**
AIC	88885.87	89680.05	88752.15	88180.99
BIC	88945.76	89733.28	88805.39	88234.23

Since the Poisson model is a nonlinear model, it is difficult to interpret the estimated coefficients. Therefore, the estimation coefficient of the nonlinear model can be interpreted as a general linear model by converting it to the mean marginal effect. <Table 4> shows the results of the average marginal effect. In the case of model 4, the marginal effect of price is -0.1435, and if the cost of tourism is 10,000 won lower, the number of trips is 0.14. The marginal effect of income is 0.0124, and if the income is 10,000 won higher, the number of trips is 0.012 more. The marginal effect of age is 0.088, which is as many as 0.088 times the age of one year old. The marginal effect of the number of family members is -1.1405. In case of married status, the number of the trips is 1.52 times more than that of non - domestic travel, and domestic travel is 4.41 times smaller than international travel.

<Table 3> Marginal average effects

	Poisson	Truncated Poisson		
	model 1	model 2	model 3	model 4
price	-0.1098***	-0.1457***	-0.1414***	-0.1435***
	(0.0190)	(0.0245)	(0.0246)	(0.0011)
y	0.0113***	0.0114***	0.0098***	0.0124***
	(0.0012)	(0.0012)	(0.0010)	(0.0011)
sex	-3.603***		-3.5931	
	(0.516)		(0.5173)	
age	0.01141***	0.1248***	0.1479***	0.0880***
	(0.0222)	(0.0221)	(0.0218)	(0.0213)
school	0.6053***	1.0323***	0.5967***	
	(0.1649)	(0.1569)	(0.1684)	
fsize	-1.1100***	-1.1303***		-1.1405***
	(0.2687)	(0.2691)		(0.2758)
marry	1.2295*	1.5158*	0.2870**	1.5482*
	(0.6664)	(0.6764)	(0.5385)	(0.6587)
type	-3.3828	-4.4279*	-4.1901*	-4.4114*
	(0.2478)	(2.3549)	(2.3469)	(2.3603)

Consumer surplus per trip using Equation (7) is calculated, and the results are shown in Table 5. In case of Model 4, the consumer surplus of respondents from one trip is about 609,756 Korean won (about $550). In the case of the Poisson model (model 1), the consumer surplus for one trip was 806,451 Korean won(about $750), which overestimated the consumer surplus over the cut Poisson model, while the cut Poisson model (model 2, model 3, model 4)

<Table 4> The economic value of a trip

	model 1	model 2	model 3	model 4
economic value	806,451	602,409	621,118	609,756

<Table 5> shows the consumer surplus difference of one trip according to the different individual characteristics. The Poisson model (Model 1) is presented for comparison with the optimal model, Model 4 (the truncated Poisson model). As in Table 4, the Poisson model overestimates the difference in consumer surplus by characteristics over the truncated Poisson model. In the case of model 4, the higher the income is 10,000 Korean won (about $90), the higher the consumer surplus from one trip is 865 won ($7.8). When the age is 1 year old, the value of the one-time canal is 6129 Korean won ($5.6) higher, and the value of one time tour is lower than male by 284,837 won. Respondents with family members rated the value of one trip higher than that of the other one by 107,837 won, and the respondents gave a high value of 307,264 Korean won($280) to international tourism than domestic tourism.

<Table 5> The economic value of tourism by socioeconomic characteristics

	model 1	model 4
y	1029	865
sex	-328104	-284724
age	10390	6129
school	55109	N/A
fsize	-101065	-79437
marry	111945	107837.1
type	-307990	-307264

Conclusions

In this study, we estimated the tourism demand function considering the socio - economic characteristics and measured the difference of benefits according to the differences in socio - economic characteristic. Considering data characteristics the truncated Poisson model was used and a robust standard error adjusted for the over-dispersion was employed. Consumer surplus per trip and the difference of consumer surplus according to the difference of individual characteristics were calculated based on the tourism demand model with high fitness (model 4).

In Korea, it is necessary to appropriately estimate and analyze national tourism demand and benefits for tourism policy to promote domestic tourism. In this study, the socioeconomic characteristics that were overlooked in the previous studies and the difference of the benefits according to the differences in socio-economic characteristics. From the analysis results, the following suggestions can be obtained. First, the greater the age, the higher the benefits for tourism, which may be an important policy consideration at this time of rapid aging. In the aging society, it is necessary to plan for the increase of tourism demand and benefit of aged population.

Second, the benefits of international tourism are much higher than those of domestic tourism. It is necessary to promote tourism benefits through the development of domestic tourist facilities and tourist sites. In Korea, there is a high level of dissatisfaction with domestic tourists due to the lack of sightseeing spots, tourist infrastructure, and relatively high tourist expenses. Taking this into consideration, it is expected that the expansion of tourism infrastructure and the reduction of tourism cost will contribute to revitalizing domestic tourism by increasing the level of welfare through the recreation and emotional content of tourists. This will increase the level of welfare through tourist recreation and emotional content. This information can be used in promotional and marketing strategies and tourism policy decisions.

Third, in order to improve the accuracy and predictability of analysis, it is important to select models that reflect the characteristics of theory and data. According to demand theory, economic variables (price, income) are the main variables to be included in the tourism demand model. In particular, price variables are important for measuring benefits and differences in benefits according to the different socio-economic characteristics. If the key economic variables are included in the model, the

accuracy of the estimates will be increased. It is necessary to select a model that reflects the characteristics of the data, such as the response processing and over-dispersion. The results of this study show that the truncated Poisson model and robust standard error method can deal with this problem adequately. This will provide useful information for tourism demand analysis, planning for the development of tourism industry, and decision - making.

Unlike most studies evaluating the tourism demand or the value of resources in the specific area, this study analyzed general tourist demand and benefits per trip. The difference in benefits according to the different characteristics was estimated. The methodology was chosen to reflect the features of the data, and in order to enhance the robustness of the estimation results, rigorous diagnostic tests and various models were compared.

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