NON-MARKET VALUATION OF RURAL TOURISM IN YOGYAKARTA, INDONESIA

Endah Saptutyningsih, Nugroho Joko Prasetyo, Esty Setyaningrum
Faculty of Economics Universitas Muhammadiyah Yogyakarta
Jalan Lingkar Selatan, Tamantirto, Kasihan, Bantul, Yogyakarta 55183, Indonesia
Corresponding Email: endahsaptuty@gmail.com

Abstract

Rural tourism proposes a way of earning additional income from a traditional livelihood. Rural tourism encourages rural economics and provides benefits to income and employment generation. It is considered as an alternative for enhancing rural lifestyle and for leading positive changes in the distribution of income. Tourism at a rural area supports to stimulate the rural economy and plays an important role in producing a value-added for local products. Many of the rural tourism activities are nature-based tourism or ecotourism. Rural tourism can be classified as possessing public goods-type characteristics, and as such, welfare benefit estimates must utilize non-market valuation techniques. This study employ the travel cost method and contingent valuation method. Travel cost and contingent valuation methods are applied to the problem of estimating the potential consumer surplus available to tourists from rural tourism in Yogyakarta. Data are derived from surveys of tourists in Yogyakarta. The results are compared with contingent valuation analysis of willingness-to-pay of tourists in their current visit to rural tourism sites of Yogyakarta. The result of travel cost method indicates that tourists' average travel cost is estimated at IDR 122,050. The contingent valuation method concludes that the tourists' average willingness to pay in their visit to rural tourism sites of Yogyakarta is estimated at a reasonable amount of IDR 6,750.
Keywords: travel cost analysis; contingent valuation; non-market valuation; rural tourism; willingness-to-pay.
JEL: L83

Introduction

Economists are commonly use non-market valuation techniques for assessing environmental goods and other goods that have characteristics of public goods. Public goods are implied as goods that are non-excludable and non-rival in consumption (Ward and Beal, 2000, p. 50), take place in many segments of community. Generally, there are two categories of non-market valuation methodology that are used by environmental economists, the stated preference and revealed preference. Stated preference methods assess the value that individuals put on non-market goods through direct elicitation queries. The most predominant valuation method is known as contingent valuation method (CVM) (Ready and Navrud, 2002). On the other hand, Travel Cost Method (TCM) involves a revealed preference method, which infer value from individual travel expenditures to access and utilize the public good.

This study estimates the value of tourism at the rural tourism sites in Yogyakarta. These sites are the most visited rural tourism in Yogyakarta. These sites presents a natural scenery which is very beautiful to be enjoyed so that it can provide freshness and peace of heart, natural panorama of paddies and shady trees, and the clarity of the water, as well as custom homes known as joglo, a pyramid shape of roof with a large yard. The rural tourism sites in this study namely, Kelor and Pentingsari. The first method implemented to estimate the use-value is the Travel Cost Method (TCM). By applying TCM, we get the information on the willingness to pay of visitor and the price elasticity of demand estimates. The estimated price and income elasticity coefficients for the rural tourism sites can provide important information to site administrators. The second method utilized in this study is Contingent Valuation Method (CVM), aims to estimate tourists' willingness to pay to rural tourism sites in Yogyakarta.

Methods

Travel Cost Method (TCM)

A wide variety of empirical models have been formulated to estimate willingness to pay based on travel cost models (Smith and Kaoru, 1990). We use a variety of different travel cost models. Our study requires an assumption of tourists in viewing rural tourism travel as a commodity, who visits to different destinations such as Kelor and Pentingsari sites differing only in quality and price. We specify the total number of visits to rural tourism sites by each individual as: $X_i = \alpha_0 + \alpha_1 TC + \alpha_2 sosec_i + \alpha_3 quality_i + e_i$

X_i is the number of visits individual *i* takes to the rural tourism sites in last one year; TC is travel cost for visits to the rural tourism sites visited by *i*; *sosec* is vector of socio-economic characteristics; *quality* is subjective perception on quality of rural tourism sites in general.

Contingent Valuation Method (CVM)

The empirical CVM model is based on Hanemann's (1984) approach to estimate the mean willingness to pay from answers to the referendum style of contingent valuation questions used in the present survey. In this study, respondents were firstly being asked for a willingness to pay for their experiences to rural tourism sites, such as Kelor and Pentingsari sites. Respondents were asked to provide the amount money they would willing to pay as a fee per visit if they had to pay for enjoying the rural tourism sites.

The non-negative nature and the frequently skewed distribution of valuations have led researchers to assume a lognormal conditional distribution for valuations (Cameron and Huppert, 1989; Legget et al., 2003). The lognormal WTP function for the ith respondent can be written as

$$\log(WTP_i) = Y_i'\beta + Z_i + \varepsilon_i,$$

Yi is a vector of social demography characteristics; Z is perception of sites quality in general; and $\varepsilon \sim N(0,\sigma^2)$.

Data and Econometric Model

We employed 150 observations in the rural tourism. Three functional forms were used to estimate the econometric model of the rural tourism visitor demand as follows:

Linear Model 　　　 : $\text{visit}_i = \beta_0 + \beta_1 \text{cost}_i + \beta_2 \text{income}_i + \beta_3 \text{age}_i + \beta_4 \text{gender} + \beta_5 \text{child}_i + \beta_6 \text{educ}_i + \beta_7 \text{quality} + \varepsilon_i$

Semi − Log Model 　 : $\text{lvisit}_i = \beta_0 + \beta_1 \text{cost}_i + \beta_2 \text{income}_i + \beta_3 \text{age}_i + \beta_4 \text{gender} + \beta_5 \text{child}_i + \beta_6 \text{educ}_i + \beta_7 \text{quality} + \varepsilon_i$

Log − Log Model 　　: $\text{lvisit}_i = \beta_0 + \beta_1 \text{lcost}_i + \beta_2 \text{lincome}_i + \beta_3 \text{lage}_i + \beta_4 \text{gender} + \beta_5 \text{lchild}_i + \beta_6 \text{leduc}_i + \beta_7 \text{quality} + \varepsilon_i$

visit_i equals the number of visits of individual i; cost is the travel cost; income is income of individual per month; age is age of individual; gender is dummy variable (1=male;0=female); educ is year of schooling; quality is the subjective perception on site's quality; ε_i is the normally distributed, random-error component with a mean of zero and a variance of Φ^2.

A Box-Cox test used to test the hypothesis of linear versus semi-log functional forms (Ziemer et al., 1980). The test statistic LAMBDA was equal to 0.00, indicating that the semi-log functional form (using the natural logarithm of the dependent variable) was a better fit for our data than the linear form. The semi-log functional form is consistent with the Box-Cox test. It has been used with other TCM studies (Willis and Garrod, 1991; Hanley, 1989). In this study, willingness to pay (WTP) for rural tourism sites was modeled as a function of demographic characteristics, perceptions of tourism attribute importance and performance, and destination loyalty of the respondents. The WTP model as follow:

$$\log(WTP_i) = f\,(Age_i,\ Gender_i,\ Education_i,\ Income_i,\ Child_i,\ Quality_i)$$

Age, gender, education and income of tourists were included in the model to control for demographic variables that may influence WTP.

Estimation Results

The data used in our analysis are derived from a survey of tourists in the rural tourism sites. The on-site survey questionnaire included a series of question on: the costs of the visit; willingness to pay for visiting the rural tourism sites; and socio-demographic background.

Table 1. Variable summary statistics

Variable		The rural tourism sites	
		Mean	Standard deviation
Number of visit	(VISIT)	2.4600	0.8484
Willingness to pay	(WTP)	6,740.00	2,411.326
Travel cost	(COST)	122,033.3	122,104.17
Income per month	(INCOME)	1,660,000	684,708.33
Age	(AGE)	32.926	6.3172
Gender	(GENDER)	0.560	0.498
Number of children	(CHILD)	2.746	1.106
Years of Schooling	(EDUC)	13.000	2.593
Quality	(QUALITY)	0.613	0.488

Table 1 shows that the average number of visits to rural tourism sites is about three times. The average willingness to pay for visiting there is about IDR 6,750. Visiting rural tourism sites would need travel cost about IDR 122,050.

Travel Cost Method

With respect to the coefficient estimates of the rural tourism travel cost model, the price or travel cost coefficient estimate for each of the three model specifications, was consistent with demand theory which was inversely related to price or travel cost. The coefficient estimate associated with the travel cost variable was significantly different from zero at a 1% level for the linear, semi-log and log-log model. The coefficient of income variable was also significantly different from zero at the 1% level, for the linear, semi-log and log-log model specifications. The gender coefficient estimates were not significantly different from zero at the 5% level for all models. The sign on the gender coefficient estimate was positive in all three model specifications, indicating more visitor of the rural tourism were male.

Table 2. Regression result for alternative functional forms[a]

Variable	The rural tourism sites		
	Linear	Semi-Log	Log-Log

constant	2.497	0.380	0.446
cost	-2.13E-006***	-4.7E-007***	-0.267***
income	3.25E-007***	6.44E-008***	0.177***
age	0.021**	0.004*	0.261*
gender	0.007	0.004	0.002
educ	-0.042*	-0.009*	-0.176
child	-0.224***	-0.040***	-0.196***
quality	0.240*	0.048*	0.042*
Adj.R^2	0.287	0.273	0.308
F-stat	9.557***	9.009***	10.464***

[a]Dependent variable, the number of visits, is the natural logarithm of for the semi-log and log-log models.
***, **,* indicate coefficients are significantly different from zero at 1%,5%, and 10% levels, respectively.

The age coefficients estimation were positive for all three models, but significantly different from zero at the 5% level for the linear model and at 10% for semi-log and log-log models, indicating a positive relationship between age and the number of visits. The years of schooling and the subjective quality perception were significantly different from zero at 10% level in the linear and semi-log model.

For the linear and semi-log of the regression models, the elasticity coefficients are evaluated at the variable means. The price elasticity coefficients of the rural tourism regression model for the linear and semi-log models are−0.142 and −0.256, respectively, indicating an inelastic demand, such as a one percent increase in travel costs results in a corresponding less than one percent decline in the number of visits to the rural tourism for all three model specifications[1]. However, both price and income elasticity coefficients for all rural tourism regression model specification slightly less inelastic. As such, administrators at the rural tourism should recognize that the price elasticity of demand for the site may be slightly inelastic, in that the number of visits is somewhat not responsive to a change in price. For each models, the income elasticity was positive, which would categorize the site in economic terminology as a normal good. As the visitor incomes increase, visitors are more likely to prefer spending money on rural tourism sites.

Contingent Valuation Method (CVM)

In the CVM section of the tourist survey, visitors were provided with background information about the rural tourism such as the history, tradition, purpose of the sites,

---

[1]For the linear functional form the elasticity coefficients are estimated as βi (*X/Y*), and thus vary depending on the values of *X* and *Y*. Typically the elasticity coefficients are evaluated at the mean values of *X* and *Y*. Given the semi-log functional form, elasticity coefficients are estimated as the product βi *X*, where *X* is a vector of explanatory variables which are again typically evaluated at the variable mean values. Thus, for the semi-log model the price and income elasticity coefficients are calculated as $\beta_1 TC,$ and β_2 INCOME, where '*TC*' and 'INCOME' are mean data values (Gujarati, 1995, p. 178). For the log-log model the coefficient estimates themselves are equivalent to the elasticity measures.

educational facilities, etc. They were then asked if they would be willing to pay more for their current visit to the sites to include a visit to their itinerary. The linear specification that provides the best fit with the data, is presented in Table 3.

Table 3. Regression result for alternative functional forms[a]

Variable	Rural tourism sites		
	Linear	Semi-Log	Log-Log
Constant	5771.095	3.750	2.142
age	98.011***	0.006***	0.454***
gender	-229.924	-0.010	-0.015
educ	165.805***	0.011**	0.293**
income	0.001***	6.97E-008***	0.225***
child	-879.581***	-0.058***	-0.327***
quality	940.991***	0.066***	0.070***
Adj.R^2	0.378	0.347	0.308
F-stat	16.100***	14.182***	12.064***

[a]Dependent variable, willingness to pay for rural tourism site, is the natural logarithm of for the semi-log and log-log models.***, **,* indicate coefficients are significantly different from zero at 1%,5%, and 10% levels, respectively.

Willingness to pay of visitors in the rural tourism was approximately IDR 6,750 in average (see Table 1). Coefficients of age and gender of tourists were not significant (see Table 3). Coefficient of years of schooling was significant with positive sign for log-log, linear and semi-log model of rural tourism. This indicates that the higher the education, the more the visit to rural sites. Income of visitor had a small but positive and significant influence on WTP.

Conclusion

Our results show that by applying travel cost method, we found that based on the demand elasticity estimation value, visitors of rural tourism were slightly not responsive to price changes. Thus, we recommend for the site's administrator to use an alternative way to attract visitors. We also found a positive income elasticity that suggests a recommendation for marketing efforts toward potential higher income visitors. The high-income visitors are more likely to visit the rural tourism.

This study was also use contingent valuation method to estimate the willingness to pay (WTP) of visitors of the rural tourism. The function of visitors' demographic characteristics, and perceptions of the rural tourism sites' quality were examined. Willingness to pay of visitors in the rural tourism is about IDR 6,750 in average. The large divergence in results between the two methods suggests that only using one or both are inadequate for this type of estimation. The TCM is based on the real expenses and actual figures. The CVM may be not come up with a

reliable result in this analysis due to an open-ended question that leads to large variability in responses that were not constrained by range of option. The problem with using open-ended questions is that people will have a tendency to choose the first number that comes to mind. When people were inquired how much they would willing to pay, they didn't refer to their personal valuation of sites access but to what fee they might have paid in the past or in general for access to these sites. Unfortunately, due to the way the question was asked it is impossible to distinguish between the respondents who gave a true estimation of their WTP and those who did not really consider the question, and gave the most common figure they could think of or an estimation of their spare cash. Either way it seems that the WTP technique can be employed when it is reliable and lead to unbiased results. This technique would not be recommended for policy formulations based on the results of a CVM. The results of the travel cost method are also based on a number of assumptions. However, they come from a result of the revealed choices of visitors. This technique would be more meaningful.

References

Cameron, T.A., Huppert, D.D. 1989. 'OLS versus ML Estimation of Non-Market Resource Values with Payment Card Interval Data.' *Journal of Environmental Economics and Management* 17 (3): 230–246.

Damodar, N. Gujarati. 1995. *Basic Econometrics*. Third Edition. McGraw Hill New York.

Hanemann, M. W. 1984. 'Welfare Evaluations In Contingent Valuation Experiments with Discrete Responses.' *American Journal of Agricultural Economics*, 66: 332−341.

Hanley, N.D. 1989.'Valuing Rural Recreation Benefits: An Empirical Comparison of Two Approaches'. *Journal of Agricultural Economics* 40(3): 361–374.

Ready, Richard C. and Navrud, St˙ale .2002. "'Methods for Valuing Cultural Heritage' in St˙ale Navrud and Richard C. Ready (eds.). *Valuing Cultural Heritage: Applying Environmental Valuation Techniques to Historic Buildings, Monuments and Artifacts*. Edward Elgar, Cheltenham.

Smith, V. K. and Kaoru, Y., 1990. 'What have we learned since Hotelling's Letter? A Meta Analysis'. *Economics Letters*, 32: 267-272.

Ward, Frank A. and Beal, Diana. 2000. *Valuing Nature with Travel Cost Models: A Manual*. Edward Elgar, Northampton, MA.

Willis, K.G. and Garrod, G.D. 1991. "'An Individual Travel-Cost Method of Evaluating Forest Recreation'. *Journal of Agricultural Economics* 42(1): 33–42.

Ziemer, Rod F., Musser, Wesley N., and Hill, R. Carter. 1980. 'Recreation Demand Equations: Functional Form and Consumer Surplus'. *American Journal of Agricultural Economics* 62: 136–141.