Visitors' Willingness to Pay for Park Fees: A Case Study of Penang Botanic Gardens

Sher Akbar & Ahmad Puad Mat Som
School of Housing, Building and Planning, Universiti Sains Malaysia

Khurram Ghani
Graduate School of Business, Universiti Sains Malaysia

ABSTRACT
This study was undertaken to determine some characteristics of visitors' willingness to pay (WTP) for park fees. The objective was to derive quantitative data on their willingness to pay for park entry and willingness to support for nature conservation. The study is based on a questionnaire survey carried out among 110 respondents at Penang Botanic Gardens in mid-2009. A series of multivariate analyses was used to determine the respondents' WTP, and the study showed that factors like income, age of respondents, education and quality of recreational services of the garden were significant determinants of WTP. The demand visitation of the garden was significantly income elastic, negative elastic of demand with its own price. This estimate provides an important indication to the conservation value of recreational services at the chosen site.

Keywords: economic valuation, willingness to pay, botanic gardens, visitors.

INTRODUCTION

The economics of renewable resources and ecological systems has gained greater attention in recent years. Valuation of the services of global ecosystems has expanded social perceptions of nature, and how the production capacity of ecosystems far exceeds the traditional market commodities that may be associated with them (Dailey, 1997). The rationale for providing public parks and outdoor recreation areas is that participation in these recreation activities contributes to people's mental and physical well-being. Equally important are the mental and emotional benefits of outdoor recreation (Loomis, 1989). These benefits are perceived by both users and society, and visitors to public parks and outdoor recreation areas see the benefits as real. They repeatedly commit both money and time to participate in outdoor recreation activities. Nevertheless, Driver and Brown (1986) and West (1986) argued that few long-term scientific studies have been conducted in recreation.

One well-established measure of users' perceived benefits from outdoor recreation is their 'willingness to pay' for continued participation (Loomis, 1989). The willingness to pay includes both the amount they actually spend to visit a recreation area and the personal gain (often called consumer surplus) that they realize over and above their actual

expenditures to participate. A reasonable and affordable pricing policy for public parks and outdoor recreation areas can be used as a tool not only to achieve successful and sustainable management, but also to provide quality products and services to visitors. There are many questions arise as how to establish an appropriate pricing policy for the recreational areas and how to preserve the nature beauty, when they are not traded in the market.

This study was undertaken to determine some characteristics of visitors' willingness to pay (WTP) for entry fees at Penang Botanic Gardens in Malaysia. The objective was to derive quantitative data on their willingness to pay for park entry and willingness to support for nature conservation. The Gardens, like other environmental resources, benefit society in many ways. Besides recreational function, the Gardens also perform horticultural, educational and tourism functions. The Gardens has always been regarded as one of Penang's most beautiful natural assets and a popular tourist destination.

LITERATURE REVIEW

The economic approach in valuing environmental changes is based on people's preferences for changes in the state of their environment. The term value in economics has a precise definition; it is the price individuals are willing to pay in order to obtain a product or service (Nuva *et al*., 2009). According to Lipton *et al.* (1995), the economic value is a measure of what the maximum amount an individual is willing to forego in other goods and services in order to obtain some good, service or state of the world. This measure is typically used for non-market goods.

It must be noted in this paper that the economic value is the willingness to pay for use and non-use of the resource, exclusive of all economic costs or leakages. The WTP is a measure of the direct economic use of nature, as defined in the broader context of total economic vale by Pearce and Turner (1990). Direct use values are manifested in income earned through direct use of the resource or environment asset in question. A visitor's or tourist's willingness to pay can be part of his or her direct use value but can also reflect non-use values. Non-use value occurs when someone perceives value in the existence of an asset, even though they might not be making any use of it (Barnes *et al*., 1997).

Method such as WTP is often used to assess visitors' views and opinions towards potentially paying more in order to sustain an organization's role in nature management and conservation. This is important as revenue funds from visitors' fees can greatly improve management efficiency and conservation effectiveness (Spergel and Moye, 2004). In many destinations in developing countries, the organizations often charge far less than what tourists are willing to offer.

The most common type of income generating is entry fee, which has been known to generate revenue to cover operating costs (Spergel and Moye, 2004). Previous WTP studies on protected areas indicated that tourists were willing to pay the proposed rate, and in other cases, they were willing to pay far more than the established rate (Riley *et*

al., 2006). However, establishing the 'right' fee or price is not that easy, and the amount is often kept low to ensure wide acceptance. Depondt and Flumerfelt (2006) argued:

> *'If the fee is too high, visitors may be reluctant to visit the protected areas, and decide to visit other areas with a lower or no fee. If the fee is too low, cost of collecting and monitoring the fee may end up being higher than the revenue generated by the fee'.*

Past researches on environmental valuation studies have used economic approach to assess WTP such as by Grandstaff and Dixon (1986) on Lumpinee Park and by Kaosa-are *et al.* (1995) on Khao Yai National Park in Thailand. Both studies have utilized the combination of travel cost method (TCM) with the open-ended contingent valuation method (CVM) to determine WTP. Similarly, Loewen and Kulshreshta (1995) have used TCM and CVM to estimate the economic value of the recreational experience at Prince Albert National Park of Saskatchewan, Canada. The main purposes of their study were to approximate the economic benefit to society from recreation and to analyze park user patterns and characteristics. In a related development, Khan (2001) used multivariate analyses to investigate empirically the WTP of the consumers for recreational services in two selected parks in Northwest Frontier Province (NWFP), Pakistan. The multivariate analyses were performed to explore the variations in different measures of visitors' WTP for improved recreational services of the two parks.

As mentioned above, the CVM tool has been the subject of methodological research and applied in estimating both use values and non-use values of environmental goods (Cummings et al., 1986; Mitchell and Carson, 1989). It is called 'contingent' because respondents are asked how they would act if they were placed in certain situations (Mathews *et al*., 2001). As WTP is one of the most important concepts in CVM (Samdin, 2008), it can be argued that the economic valuation is an attempt to assign quantitative values to the goods and services provided by environment resources, whether or not market prices are available (Barbier *et al*., 1997). The environment resources are always faced with the problem of limited information about the price, costs, and quantity consumed. Therefore the benefits and costs of these resources are difficult to determine. Using the economic valuation process in finding WTP value could solve some of the problems, as discussed earlier.

The above studies were based on multi-park systems and undertaken in different countries. Despite richness of knowledge, some studies suffered from methodological limitations of one type or another. In fact, fewer comprehensive studies have been done regarding the public goods of urban resource system, which includes Botanical Gardens (Wolf, 2004). While theory and valuation approaches may be similar, urban settings can be more complex landscapes, making it more difficult to isolate the specific economic contributions of nature. This study attempts to measure visitors' WTP for entry into Penang Botanic Gardens in Malaysia, and to determine their perceptions based on multi statistical models.

RESEARCH METHODOLOGY

An effort was given to understand the determinants of visitor's WTP responses and to see whether these determinants are consistent with economic demand theory. A series of statistical analyses were performed with data obtained from the questionnaires. Various independent variables were used to explain the variation in a different measure of visitor's WTP for improving recreational services of the garden. Each visitor and tourist who entered the garden was chosen as respondents, based on a convenient sampling. A total of 110 respondents were surveyed in mid-2009, and they broadly defined theirs preference and WTP into the garden.

The survey was alienated into two sections. First part represented the socio-demographic characteristics of visitors. The second part was designed to identify the characteristics of paying and mean value of WTP for entrance fees into the site. Multiple estimated statistical analyses were taken in consideration, and a multivariate analysis was applied. The details are discussed as follows:

3.1 Ordinary Least Squares (OLS) Models

The estimated OLS method model

$$Yi = \beta o + \beta 1TC + \beta 2\ INC + \beta 3\ ED + \beta 4\ AGE + \beta 5\ DIS + \beta\ 6D1 + \beta 7\ D2 + ei \quad (eq.\ 1)$$

Where *Yi* = Final bid for WTP amounts, TC = Total travel cost (RM.), INC = Household's income (RM. /Month), ED = Respondent's educational level (years completed), AGE = Respondent's age (years), DIS = Distance (km), D1 = 1 if respondent is male and 0 otherwise, and D2 = 1 if respondent's perception about garden's recreational facilities is good and 0 if bad.

To obtain estimated benefit, a specification of the functional form is essential. In practice, choosing the functional form requires empirical evidences. There is a consensus that a semi-log gives the best results, regressing the logarithm of visitation rates against travel cost, etc. (Bann, 1998). Log functional form has been used in the above model to estimate price and income elasticity of demand for visitation at the garden.

3.2 Logit Model

This model is used to examine whether a visitor is willing to pay for visitation at the garden by using Logit models. This model was chosen because of its ability to deal with a dichotomous dependent variable and a well-established theoretical background. The model is specified as follows:

$$Pi = E(Y = 1 | Xi) = [\ 1/\{1 + e^{-(\beta 0 + \beta i \Sigma\ Xi)}\}] \quad (eq.2)$$

Where Pi = is the probability that Y =1, Xi is a set of independent variables explained above and βi s are coefficients to be estimated corresponding to logistic distribution.

Taking a natural logarithm of eq. (2) we obtain

$$Li = ln\{Pi/(1-Pi)\} = \beta 0 + \beta i \Sigma\ X\ i + ei \quad (eq.3)$$

Where *Li* , which is called logit, is the log of the odd ratios and is linear in both independent variables and parameters. The estimation method to be used will be maximum likelihood estimator (MLE), Alberini et al. (1997); Alberini (1995); and Kannien (1995).

3.3 Tobit Model

According to Tobin (1958), Tobit models were used to show the variation in the respondents' answer to the last question of the bidding game, but in this case, the dependent variable was restricted to nonnegative values. The general formulation is given in terms of an index function as below:

$Y^*i=\beta 0+\beta i\Sigma Xi + ei$ *(eq. 4)*

Where Var[ei] = exp. γ z

i and Zi represent the variables identified to be heteroscedastic (Greene, 1990). We define a new random variable, Y, which is transformed from the original one,

Y*, by Y = 0 if Y* ≤0 and Y = Y* if Y* > 0 (Greene, 1990).

In both Logit and Tobit models, same explanatory variables were used as outlined in OLS model above.

RESEARCH FINDINGS

This section will contain the summary statistics of the respondent's socio-economic characteristics and also respondent's responses regarding their perceptions and attitudes towards WTP.

4.1 Socioeconomic characteristics

As mentioned earlier, the survey was conducted in mid-2009; a sample of 110 visitors was selected for data collection. The following tables show the empirical results of respondents surveyed.

Table 1: Statistical Description of Respondents

Variables	Mean	Std.Dev.	Min.	Max
No. of visits to Botanic Gardens	2.25	2.51	0.00	15.00
No. of recreational trips in a year	14.40	15.30	1.00	20.00
Distance (Km) to Botanic Gardens	25.10	14.58	1.20	90.35
Age of respondents	36.80	11.20	16.00	65.40
Household size of respondents	7.20	13.10	4.60	12.25

Monthly income (RM)	1200.90	650.65	500.00	7000.00

Table 2: Demographic Profile of Respondents

Variables	Percentage
Sex:	
Male	38%
Female	62%
Marital status:	
Single	25%
Married	75%
Education:	
None	10%
Primary	15%
Secondary	35%
Technical Diploma	25%
Bachelor's Degree and above	15%
Residence:	
Penang	65%
Other areas	35%

Table 1 and 2 shows the statistical description and demographic profile of respondents. The findings indicated that females over-represented males in the survey, and three-quarters of them were married and had at least secondary education. 60 per cent of respondents patronized the parks regularly while 20 per cent of them visited once in a year. Due to high number of visitations by locals, the sample mean of 14.4 was supposed to be an overestimate. 60 per cent of visitors showed satisfaction to the quality of the garden, while the remaining rated it badly or did not indicate any preference. On their WTP, 45 per cent of respondents agreed to allocate the fund for preservation of the garden, while 20 per cent donated voluntarily and 35 per cent insisted on government allocation.

4.2 Willingness to pay analysis

In this section, the respondents' WTP is examined.

Table 3 Determinants of Visitors' WTP and Their Statistical Results

Variables	OLS	Tobit	Logit
Total travel cost	-0.094(-3.45) ***	-0.090 (-2.77) ***	-0.057 (-0.02) ***
Visitors income	2.400 (-3.391) ***	2,517 (5.20) ***	0.072 (5.72) ***
Age	0.09 (1, 91)*	2.34 (0.96)	0.75 (1. 33)
Education	2.34 (3.34) **	2.45 (3.47) **	0.031 (2.67) **
Distance	- 11.20 (-3.02) ***	-11. 23 (-2.88) ***	-0.13 (2.67) ***
Quality of recreational Service	3.40 (6.36) ***	2.34 (5.67) ***	0.55(4.46) ***
Sex	0.45 (1.55)	0.36(1.38)	0.55(0.054)
Log (L)	-	232.34	451.13
R-squared	57.78	-	-
F-Value	9.45	-	-
Sample size	110	110	110

Note: The coefficient ratio of the estimated asymptotic standard errors. Like *, ** and *** representing the value of significance level of 10, 5, and 1 percent, correspondingly.

A series of multivariate analyses were performed with the survey data to understand the determinants of the respondent's willingness to pay the recreation and other services of the garden. Five independent variables are statistically significant determinants of visitors' WTP into the garden. Income of respondent is statistically significant which indicates a positive correlation with visitors' WTP for the recreational service improvement of the garden. Age and education level of the respondents also showed positive result but with little impact on WTP. Quality of the recreational service also led to a higher demand of WTP at the garden. Travel cost was also significant but had a negative effect coefficient. Hence, a higher travel cost reduces visitors' and tourists' WTP. Using multivariate analysis, the results showed the economic theory and premier expectations, with respect to estimation technique and model specification. The overall result of the model is satisfactory, for example the R-squared value for the OLS is 57.78 percent. Similarly, the robustness of the results is statistically significant.

Table 4: Estimated Elasticity of the Garden Visitation's Demand

Variable	Penang Botanic Gardens
Price	0.29*** (0.094)
Income	0.087**(0.05)

*** Significant at 1% level
** Significant at 5% level

Demand elasticity of the visitors can be calculated from marginal effects associated with the estimated demand coefficients. So, the estimated elasticity associated with their own price, cross price and income variable are significant determinants of visitors' WTP to the garden, and are negative due to the inverse relationship between entry fee and visitors' demand. Cross price elasticity is positive and significant indicator for better quality recreation services.

CONCLUSION AND IMPLICATIONS

An individual willingness to pay for a good or service is a reflection of preferences and demographic characteristics such as income, age, gender, education, and others. Usually, the income level of respondents is an important factor that will affect their WTP for entry fee. More income indicates that they would be willing to pay more, as stated in the literature discussion. Studies by Hanim (1999), Zhongmin *et al* (2002) and Syakya (2004) have also identified similar results.

In this study, the WTP was analyzed by using the OLS, Tobit and Logit. The Logit regression analyzed the probability of visitors' WTP for the entrance fee, and the analysis was also used to test the significance difference in the variables of the socioeconomic factors. The estimated mean and standard deviation of WTP derived from logistic and linear regression analysis, and the estimates obtained from positive WTP responses.

This study has evaluated the role of economic analysis for visitors' WTP. The demand elasticity of visits to the garden demonstrated homogeneity characteristics of visitors' behavior and garden attractions and facilities. Income, age of respondents, education and quality of recreational services of the garden were positively related to visitors' WTP. The findings showed that most of respondents were willing to pay entrance fees, and the WTP reflected their satisfaction with their visits to the garden. However, most respondents were willing to pay only if the money collected was to be used to improve the management of the garden.

As the study shows that visitors are willing to pay more for entry, it is suggested that the pricing strategy be revised either to increase charges for both local and foreign visitors or to apply price discrimination between the two groups. Clearly, both options will bring revenue maximization and establish a more efficient pricing system. By quantifying the economic value of the park resources, the study demonstrates the potential to charge new prices for the use of park resources and to capture natural resource benefits as cash values. Other than generating revenues, price and market measures can provide means for regulating the demand for resources and providing incentives for sustainable park management. Hence, quantification of the economic return will allow recreation to compete more effectively with other programs for increasingly scarce funds and resources. Existing knowledge and emergent science can enable park management to justify ongoing strategic investment in nature and green space.

It is also important, regardless of how the fee is collected, that visitors are provided with sufficient information about the fee, such that they can feel informed both about the nature of the park fee and about its purpose. The park management can also utilize the fee collection as an instrument to monitor visitors, such as recording certain details. This information can be used to track trends which may provide management with information which may be useful for planning considerations. Furthermore, economic data becomes an asset, useful for creating and defining public value.

In conclusion, this paper contributes to the understanding of the potential role of economic analysis in park resources, and it can be argued that such economic valuation contributes towards informed decision-making by reflecting the true value of the park

resources while raising awareness of the importance of the resources. Further understanding of the economic benefits of these areas requires different methodological approaches and consistently collected data and analysis.

REFERENCES

Alberini, A. (1995). Efficiency vs. Bias of Willingness-to-estimate Bivariate and Internal Data Models. *Journal of Environmental Economics and Management* 29: pp 169-80.

Alberini, A., Kanninen, B., and Carson, R. T., (1997). Modelling Responisve Incentive effects in Dichotomous Choice Contingent Valuation Data. Land Economics 73: pp 309-24.

Bann, C. (1998). The Economic Valuation of Tropical Forest Land Use Option. A Manual for Researchers. *Economy and Environment Program for Southeast Asia*, Singapore.

Barbier, E.B., Acreman. M. and Knowler, D. (1997). Economic valuation of wetland: *A guide for policy makers and planners*. Switzerland: Ramsar Convention Bureau.

Barnes, J.I., Schier, C., Rooy, G. Van. (1997). Tourists' willingness to pay for wildlife viewing and wildlife conservation in Namibia, *Research Discussion Paper* No. 15, Directorate of Environmental Affairs, Ministry of Environment and Tourism, Windhoek, Namibia 22pp.

Cummings, R.R., Brookshire, D.S., and Schulze, W.D. (1986). *Valuing environmental goods: An assessment of the "Contingent Valuation Method"* Totowa, NJ: Rowan Allanheld.

Dailey, G. C. (1997). *Nature's Services: Societal Dependence on Natural Ecosystems. Washington D. C*: Island Press.

Depondt. F, and Flumerfelt, S. (2006). *Tourism Fees in Marine Protected Areas: A Practical Guide for Practioners*. The Coral Reef Alliance (CORAL): Unpublished

Driver, B.L. and P. Brown. (1986). Probable Personal Benefits of Outdoor Recreation. *A Literature Review: President's Commission on Americans Outdoors*. Washington, DC: U.S. Government Printing Office.

Greene, W. H. (1990). *Econometric Analysis*. New York: Macmillan Publishing Company and London: Collier Macmillan Publishers.

Grandstaff, S. and J.A. Dixon (1986). Evaluation of Lumpinee Park in Bangkok, Thailand. In J.A. Dixon and M.M. Hufschmidt (eds) *Economic Valuation*

Techniques for the Environment: A Case Study Workbook. Baltimore: John Hopkins University Press.

Hanim, N. (1999). Valuing outdoor recreational resources: A case study at Taman Negara, Pahang Darul Makur. *Unpubished Master of Science Thesis*, University Putra Malaysia.

Khan, H. (2001). The willingness to pay for recreational services: An empirical investigation with the application of multivariate analyses of two public parks in Northern Pakistan. [Online] Available: http:// www.ravi.lums.edu.pk/aesm/papers.

Kaosa-ard, M., D. Patmasiriwat, T. Panayotou, and J.R. Deshazo (1995). *Green Financing: Valuation and Financing of Khao Yai National Park in Thailand.* Thailand Development Research Institute, Bangkok.

Kannien, B.J. (1995). Bias in Discrete Response Contingent Valuation. Journal of Environmental Economics and Management 22, pp. 57-70.

Lipton, D.W., Wellman, K., Sheifer, I.C. and Weiher, R.F. (1995). *Economic Valuation of Natural Resources.* NOAA Costal Ocean Program Decision Analysis Series No. 5. [Online] http:// www.csc.noaa.gov/coastal/economics/irreversibility.htm.

Loewen, K. G. and Kulshreshta, S. N. (1991). *Economic value of recreation experience at the Prince Albert National Park of Saskatchewan*. Canada: Prince Albert Model forest Association Inc.

Loomis, J. B. (1989). Estimating the economic activity and value from public parks and outdoor recreation areas in California. *Journal of Park and Recreation Administration,* 7(2), 56-65.

Mathews, L.G., Kask, S., Rotegard, L. and Stewart, S. (2001). Using economics to inform national park management decisions: *A case study on the Blue Ridge Parkway.* Source http://www.georgewright.org

Mitchell, R.C. and Caron, R.T. (1989). *Using Surveys to Value Public Goods: the Contingent Valuation Method,* Washington, D.C.

Nuva, R., Shamsudin, M. N., Radam, A., Shuib, A. (2009). Willingness to Pay towards the Conservation of Ecotourism Resources at Gede Pangrango National Park, West Java, Indonesia. *Journal of Sustainable Development*. Vol.2, No.2 pp 173-186.

Pearce, D. W. and Turner, R. K. (1990). *Economics of Natural Resources and the Environment.* Harvester Wheatsleaf, Landon, UK. 378pp.

Samdin, Z. (2008). Willingness to pay in Taman Negara: A Contingent Valuation Method, *Int. Journal of Economics and Management* 2(1):81-94.

Spergel, B. and Moye, M. (2004). *Financing Marine Conservation: A menu of options*. Washington D.C: WWF Center for Conservation Finance.

Syakya. (2004). Strategi Pengembangan Pariwisata dan par Partisipasi Masyarakat Pengunjung objek wisata pantai (studi kasus pada Pantai Lampuuk, Propinsi Nanggroe Aceh Darussalam). *Thesis. Sekolah Pascasarjana. Institut Pertanian Bogor*.

Tobin, J. (1958). Estimation of Relationships for Limited Dependent Variables, *Econometrica* 26; pp 24-36.

West, P. 1986. Social Benefits of Outdoor Recreation. *A Literature Review: President's Commission on Americans Outdoors*. Washington, DC: U.S. Government Printing Office.

Wolf, K.L. (2004). Public Value of Nature: Economics of Urban Trees and Open Space, in: Miller, D. and J.A. Wise(eds). *Procceding of the 35th Annual Conference of the Environmental Design Research Association*, Edmond, 88-92.

Zhongmin, X, Guodong, C., Zhiyong, S., and Loomis, J. (2004). Applying contingent valuation in china to measure the total economic value of restoring ecosystem services in Ejina region. *Ecological Economic Journal*, Vol. 44, pp.345-358.