Economic valuation of recreational resources in rural area

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Abstract: Quantitative studies on economic value of resources in rural area are carried out by determining the benefits gained by the tourists using the resources at the site. The value then can be used to imply the importance of conservation of resources to the communities. As many rural tourism destinations depend on the natural resources to be the main product of the tourism development, failure to take measures to conserve the natural resources in rural areas may cause overuse and sometime leading to irreversible damage. An alternative way to determine the value of resources is by using the travel cost method (TCM) which is an environmental valuation technique. TCM is site specific. Modification to the basic travel cost model (TCM) will account for other factors that may influence the demand for the rural tourism resources. The benefit from resources will be measured through the determination of a recreation demand curve for a particular site using the concept of consumer surplus. Hence, this paper intends to highlight the usefulness of economic valuation for a sustainable rural tourism setting and the biases of basic TCM which in turn induces the need for a modified TCM to obtain a perfect measure of the value of resources to tourist.
Keywords: benefit, damage, conservation, economic valuation, rural tourism, consumer surplus

ACKNOWLEDGEMENT

This work / research was partially funded by Ministry of Higher Education’s (Malaysia) Long Term Research Grant Scheme (LRGS) Programme [Reference No.: JPT.S (BPKI) 2000/09/01/015Jld.4 (67)].

INTRODUCTION

The importance of the sustainability of rural tourism in rural area

In a study on rural tourism in Kedah, Liu (2006) pointed out that rural area had limited choices for economic development due to remoteness and underdevelopment. Rural areas rely heavily on the traditional way of earning a livelihood on crops or stocks. Hence, he claimed that rural areas should find alternative sources of income; tourism will be an alternative to stimulate the rural economy. Similarly, Ahmad (1995) claimed that the adoption of tourism as an alternative sector will support in increasing the income of the residents of Ulu Tembeling in which is located in a rural setting.

According to Rural Tourism Master Plan, RTMP (2001) rural tourism is a pivotal source of income for the rural communities. Among the benefits of developing rural tourism includes the creation of new job in the tourism sector while at the same time maintaining the existing employment opportunities in services. Besides that, tourism acts as an alternative tool to diversify the local economy meanwhile, supporting the existing businesses and services. In addition, it encourages an entrance of new business to a particular area which in turn diversifies and strengthens the local economy.
The sustainability of rural tourism depends vastly on the availability of rural tourism products, which in many cases, is derived from the natural resources. It is therefore crucial that the natural resources can be conserved due to its function as a pivotal asset for tourism development in rural areas providing various benefits to the rural communities.

**USEFULNESS OF ECONOMIC VALUATION**

Shuib (2011) in his study on the value of outdoor recreation in Langkawi, pointed out on the various usefulness of economic valuation. That usefulness comprises as follows.

Since outdoor recreational facilities are public goods in nature therefore an appropriate charges for the usage of recreational facilities to the users are unknown. In this the economic valuation study would be a good medium to determine appropriate charges for the usage of recreational facilities by consumers or also known as entrance fee. Secondly, the determination of the value of resource would be beneficial for resource planning purposes by the state government.

Thirdly, the value derived from outdoor recreation could be used to impute a measure to see if investment in such a project would pay in terms of acceptable rates of return. In this it could be used to justify whether is it worthwhile to invest public money for rural tourism as there are also many other investment alternatives. For instance, Gurluk & Rehber (2008), in their study found that the recreational value of Kuscenneti National Park (KNP) was (US$ 103,320,074); it was higher than the annual operation expenditures and investments in KNP. Hence, there is a surplus in the value of natural resources. Therefore, government spending for Kuscenneti National Park (KNP) is worthwhile.
Fourthly, quantitative value obtained from economic valuation can be used to convey the role of recreations as the user of land and water resources. Finally, the quantitative estimates of outdoor recreation could be used to implement pricing schemes and management decision making which in turn could efficiently allocate the resources at a particular site.

Furthermore, the quantitative value of resources could be used to suggest maximum fee also known as conservation fee. With the willingness to pay for conservation, the resource would be used at a sustainable level. The failure to conserve the natural resources will lead to depletion. If, depletion of resource takes place, rural tourism may not be attractive to the visitors as the benefit gained will be reduced.

Besides that, Becker et al (2005) in a study on the estimation of economic value of viewing griffon vultures at Gamla Nature Reserve Israel argued that the value could be used to prompt the policy makers on the necessity for further investment to protect the Eurasian griffon vulture species. By protecting the carnivore it in turn can be viewed by future generations as well.

In addition, recently Chae et al (2012) stated that findings from the economic valuation study was useful to convey a strong economic justification for the designations of Marine Protected Areas (MPAs) for recreation as well as for the conservation of marine protected area in Lundy.

According to Becker et al (2005) the failure to determine the economic value of environmental resources would lead to poor decision making and thus contributing to negative consequences to the environment and society. Hence, it suggests a crucial need for an economic valuation study for the sustainability of environmental resources.
**Methods/approaches for economic valuation**

There are several methods developed to measure the economic value of non-marketed environmental goods for instance, recreation areas and parks. They comprise direct and indirect method. Indirect method is a tool to reveal the value that consumers assign to non-marketed goods through a revealed preference technique (Ortacesme et al., 2002). On the other hand, direct method is a tool to directly determine the value that consumers assign to non-marketed goods by asking the willingness to pay (WTP) through a survey (Smith et al., 1986 in Ortacesme et al., 2002).

Contingent Valuation Method (CVM) and the Travel Cost Method (TCM) are among the popular methods to determine the value of outdoor recreation to consumers. CVM is based on stated preference approach, whereas TCM is based on revealed preference approach. Both methods intend to extract the willingness to pay for outdoor recreation. For CVM, the consumers’ willingness to pay is known by directly asking them, whereas in TCM the willingness to pay is known indirectly by identifying the travel cost incurred by an individual for recreation to a specific site. Although, the approaches are different their purpose is still the same which is to derive the demand curve for outdoor recreational resources. In this, the consumer surplus gained by the consumers could be measured (Shuib, 2011).

**Travel Cost Method**

According to Chen et al (2004) TCM is used as an indirect or alternative method to estimate the benefits user gain through the visitation to recreational sites for instance,
heritage sites, parks, beach and major tourist attractions. TCM assumes that the total expenditures incurred by an individual to visit a recreational site reflect their willingness to pay for the site (Ortacesme et al., 2002) Therefore, the expenditure incurred to a particular site is used as a proxy for price. The expenditure comprises travel costs, entry fees, on site expenditures an outlay on capital equipment (Fleming & Cook, 2008). With the determination of price we can estimate the demand function and so forth the consumer surplus value of resources to tourists (Chen et al., 2004).

**Determination of value of resources**

The demand curve establishes a function between price and number of trips to a recreational site. The demand curve is downward sloping as at a higher price the number of visitation is low, while at lower price the number of is high. The area under the demand curve is the total benefit to users. In order to know the value of resources the concept of consumer surplus is adopted. The consumer surplus is the area under the demand curve but above the price (Lober & Menkhaus, 1996). The consumer surplus implies the value of resources to tourist.

**Travel cost models**

Individual Travel Cost Model (ITCM) and Zonal Travel Cost Model (ZTCM) are two types of travel cost models. For the ITCM the dependent variable is the number of trips per season or per year made by an individual to a particular recreation site. On the other hand, for ZTCM the dependent variable is the number of trips to a particular site by the population of a particular zone or region.
Assumption of basic travel cost model

Douglas & Taylor (1999) indicated that the basic travel cost model assumed that opportunity cost of visiting a particular site is an increasing function of the travel distance. This indicates that consumer needs to forgo more money to travel far. Next, the utilities generated by the visits to the site were a function of an array of discretionary expenditures. This indicates that the satisfaction they gain through the recreation is reflected by their expenditure to the particular site.

Basic Travel Cost Model

Basic Zonal Travel Cost Method Adapted from (Herman, 2010)

The basic Clawson model is established from the function below

\[ \text{VisCap}_{ij} = \beta_0 + \beta_j \text{RITC}_{ij} + \epsilon \]

Where:

\( \text{VisCap}_{ij} \) = the visit rate per capita from each zone of origin

\( \text{RITC}_{ij} \) = the total round trip travel cost of individual \( i \) to site \( j \)

\( \epsilon \) = random error

The recreation demand model shows the visitation rate per capita (quantity) as the dependent variable and total round trip travel cost (price) as the independent variable. Hence, a demand curve for recreation to a specific site could be derived.
Herman (2010) in his study on valuing recreational user benefit of Perlis State Park tested the basic zonal travel cost model developed by Clawson. Ordinary Least Square Regression (OLS) was used in the study to look at the relationship between the trip travel cost and visitation rate for the basic Zonal TCM. The results were as per below.

**Table 1: Parameter estimates of the basic Zonal TCM**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>S.E.</th>
<th>t-Value</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>12.694</td>
<td>2.226</td>
<td>5.703</td>
<td></td>
</tr>
<tr>
<td>RITC</td>
<td>-0.0188</td>
<td>0.0078</td>
<td>-2.405</td>
<td>0.00</td>
</tr>
<tr>
<td>R²</td>
<td>Adjusted R²</td>
<td>Std. Err</td>
<td>F- Value</td>
<td></td>
</tr>
<tr>
<td>0.009</td>
<td>0.007</td>
<td>44.5734</td>
<td>5.709</td>
<td></td>
</tr>
</tbody>
</table>

The result shows that the coefficient of multiple determinations ($R^2$) which is the measure of the fitness of a model is only 0.9%. This implies that only 0.9% of the variation in the visits per capita was explained by the independent variable which is the travel cost ($RITC$). This indicates that $R^2$ is extremely low. Ahmad (1994) claim that a higher $R^2$ indicates that calculated dependent variable equation line fits closer to the data points. Hence, a larger $R^2$ would suggest a better model fit. The model is not fit probably due to the failure to incorporate or include other variables which might significantly influence the visitation rate.

Although the model does not fit well, however, the independent variable (RITC) is important to explain the dependent variable since the t-computed value ($-2.405$) is greater than the t-tabulated value of 1.96 at 0.95 confidence level. In a condition whereby
the t-computed value is greater than the t- tabulated value, the particular variable is pivotal in determining the dependent variable.

Coefficient ($\beta_1$) is negative 0.0188 and is significant at 0.05 levels. This confirms an inverse relationship between the visits per capita and the travel cost. This is aligning to the theory of demand (Herman, 2010). In addition, the negative coefficient implies that 1 percent increase in the travel cost leads to a drop in visitation rate of 0.0188 percent to Perlis State Park by tourist.

The demand function is as follows

$$V = 12.694 - 0.0188(RITC)$$

**Discussions on biases of basic travel cost model by Clawson**

In the basic TCM, only the travel cost incurred to a specific site is considered as the determinant for visitation rate to a specific site. This in turn, led too many issues or biases in the model. The following argument on the relevancy of the basic TCM will be based on past studies.

Clawson & Knetsch (1966) claim that the basic TCM are subjected to potential bias due to the failure to incorporate the taste and preferences of recreationalist, access to substitute sites, income level, and the value of time elements.

**BIASES OF BASIC TRAVEL COST MODEL**

Multiple destination trips
Visitors to a recreational site can be either a single or multiple site visitors. The basic TCM did not take into account the variation of visitors that may influence the findings on consumer surplus. According to Clough & Meister (1989) the multiple site visitors are sentenced to joint-consumption benefits. In this the visitors benefit gained from recreation may not be the one derived from the study site alone, instead it may be just a portion of the benefit gained from their visit. Therefore, they claim that the failure to take into account the exact benefit gained by the visitors to the study site may in turn lead to the overestimation of the consumer surplus value for the particular site being explored.

In addition, Ervit (1983) highlighted on the Clawson studies which classified users in origin zones by their home addresses due to its assumption that the trip made by the recreationists is intended to visit the study site alone. This in turn, has lead to an overestimation of benefits. This implies that the basic TCM model did not incorporate the multiple destination trip made by the tourist in order to get to a site. Similarly, Mendelhson et al (1992) pointed on the weakness of basic TCM model which in turn may lead to bias of the model. They claim that traditional travel cost analysis basic TCM has either ignored multiple destination trips or arbitrarily allocated trip costs across visited sites.

**Substitute sites**

Caulkin (1985) in his paper highlighted that based on past literature a single independent recreation sites are hardly found. He claimed that the failure to include price of
alternative sites in the demand equations would lead to bias in the estimation of the value of resources in a specific site.

Besides that, the importance of incorporating the substitute sites were pointed out by Burt & Brewer (1971) which suggested that one would expect that bias to be great when closely substitutable sources of recreation are near to the specific recreation sites being examined. They claim that it may in turn result in an estimated recreational value which is biased upwards. Hence, the failure to incorporate the price of substitute’s site in basic TCM will lead to bias.

In addition, Shuib (1993) in a study on the factor of competitor in the estimation of demand for outdoor recreation mentioned that the availability of alternative recreation sites particularly for the tourist who stays far away from a particular recreation site might influence the number of visits taken to the site. Hence, he claimed that the exclusion of alternative site would lead to a bias in the estimation of demand for outdoor recreation. In his study he found that the value of consumer surplus per visit through the inclusion of the substitute site variable by an amount of RM425.53 is greater than the value of consumer surplus per visit gained upon the exclusion of the variable by an amount of RM361.01. This proves the bias that exists upon excluding the substitute site variable in the outdoor recreation demand function.

Recently, Herman (2010) included alternative site variable in measuring the demand Perlis State Park in order to avoid bias in the demand function. He suggested that there are two type of relationship between the investigated site and alternative sites. It comprises substitute and complement relationship. A substitute relationship suggests that
the visitors make their own choice to site which has almost similar characteristics. Whereas, for complement it suggests that the visitors keen to visit both the investigated site and the alternative site.

**Time**

Next, bias of basic TCM rises due to the failure to incorporate the time element in the model. Following is the discussion on the importance of inputting the time variable in a TCM model to avoid bias in the estimation of consumer surplus. According to Cesario (1976) the services provided by the typical public recreation site are not marketed, but are instead offered at a free of charge or at a negligible price it is important to impute a demand curve. A favored method for imputing recreation site is so called Hotelling-Clawson-Knetch (HCK) approach. The root problem of the method is to capture the value placed on travel time by consumers of recreation services. The failure to incorporate this aspect of recreation site usage, results in the imputation of demand curve which is biased downwards from its through position.

Similarly, Shuib (1991) in his study on the cost of a visit to an outdoor recreational centre in Langkawi indicated that the opportunity cost of travelling for the visitors to Langkawi is equivalent to 92.2% of their hourly wage rate. Therefore, he highlighted that the exclusion of the value of time in the recreation demand function would in turn result in a biased benefits of outdoor recreation estimates. This is proven by the researcher by comparing the quantitative monetary value of the benefits of outdoor recreation by including or excluding the value of time. The study found that the value upon the
inclusion of the time variable in the recreation demand function showed a greater benefit of outdoor recreation by an amount of RM425.41 per visit as compared to the benefits of outdoor recreation upon the exclusion of the time variable by an amount of RM351.57 per visit.

**On site time**

According to Acharya et al (2003) in the study on the role of on-site time in recreational demand for wilderness, the exclusion of onsite time from demand function contributes to biased parameter estimates. In this, the action of a researcher to omit the onsite time variable would result in a biased estimation.

**Conclusion**

Economic valuation studies are useful to enhance the sustainability of rural tourism. Among the tool to gauge the value of resources is Travel Cost Method. Basic TCM were used by Clawson to gauge the value of resources. However, many past studies have pinned out the weakness or the biases in the basic TCM. The exclusion of variables which might influence the visitation rate might overestimate the consumer surplus value of resources. Hence, a modification of basic TCM is highly recommended. A modified model may incorporate the onsite time, onsite cost, travel time, alternative sites, multiple destinations and socio demographics as additional to the travel cost variable.
References


