

VALUING BENEFITS OF CULTURAL HERITAGE SITE  
PRESERVATION IN URBAN ROAD PLANNING

Kumamoto University, Member, PARUMOG Michelle  
Kumamoto University, Member, MIZOKAMI Shoshi  
Kumamoto University, Member, KAKIMOTO Ryuji

1. Introduction

Damage to cultural heritage sites is among the numerous environmental impacts of road development. This study aims to estimate benefits due to preserving cultural heritage sites in road planning. To estimate components of the total economic value (TEV) of the cultural heritage site, two types of valuation methodology are used, travel cost (TC) and contingent valuation (CV) to estimate indirect use and non-use values, respectively.

2. Valuation of Cultural Heritage

Cultural heritage sites are considered generally as a public goods. Public goods, one of the most common market limitations, are goods or services which can be used by one person without affecting the amount available to others. In valuing cultural heritage sites, it is good to decompose value according to respective environmental impacts under the framework of the total economic value (TEV). The TEV components include use and non-use values (Dixon, 1998). Non-use values can be further decomposed into direct or extractive use, indirect or non-extractive use, and option value. On the other hand, non-use value can be further broken down into bequest and existence value.

Among the most useful methodologies in valuing non-marketed goods are the Travel Cost Method (TCM) and Contingent Valuation Method (CVM). TCM is useful for analyzing recreational goods which can be indirectly priced using time and money cost of travel. TCM assumes that changes in total travel costs are equivalent to changes in the number of visits. From this demand curve, the total benefit visitors obtained can be calculated in the form of consumer surplus.

In the TCM, the ordinary Marshallian demand model, which is the function of the price of the recreational good or generalized travel cost, was used as the travel demand function of individual *i*. Each cost include: (1) transportation cost; (2) opportunity (time) cost; and (3) access fees.

CVM, on the other hand, is a method used in valuing non-marketed environmental goods and amenities on the basis of the willingness to pay (WTP) for improved environment or the willingness to accept (WTA) compensation for damaged environment or to accept a condition of being deprived of the improved environment. Two type of elicitation method were used, open-ended for the pre-test survey and double-bounded discrete choice for the full-sample survey. The discrete choice method makes use of random utility maximization (RUM) specifications.

3. Case

The Cebu South Coastal Road (CSCR) project in Cebu City, Philippines aims to address the significant increase of traffic volume in Metro Cebu by providing an uninterrupted north-south traffic system and open the south reclamation area of the city. The Segment 3 under this project starts at the causeway section and ends at the McArthur Boulevard (S.Osmena Boulevard, Cebu City). Prior to the actual sub-

surface design, the sub-surface component has three (3) alternative alignments as shown below:

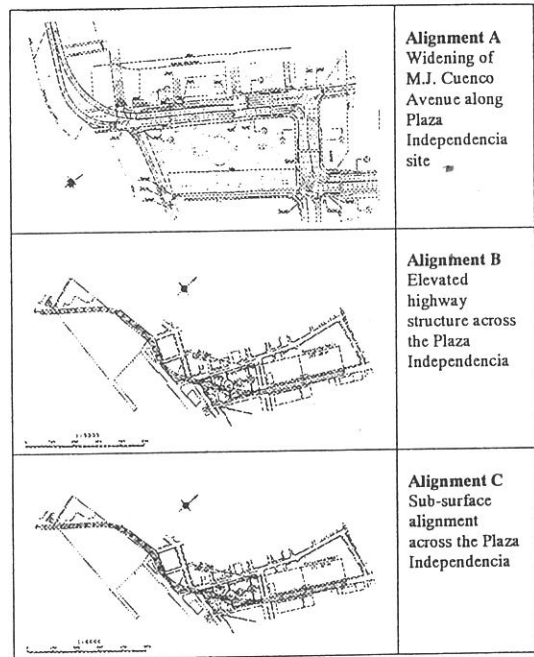


Figure 1. Alternative Alignments for Segment 3 of CSCR

The first alignment is estimated to cost about 464 million PhP. A large portion of this cost is due to land acquisition. The second alignment or the elevated alignment entails a cost 57 % higher than first alignment and require the acquisition of land and the dismantling of some of the landscaping structures within the Plaza Independencia-Fort San Pedro complex. The sub-surface alignment marked the highest cost which is 91% higher than the first alignment and 22% higher than the second alignment. In this alignment, part of the existing landscape in Plaza Independencia will be dismantled. In addition, trees and plants that will be affected will be transplanted within the park but will be re-transplanted during landscape restoration works.

Long-term traffic alleviation is only limited to the second and third alignments (i.e. elevated and sub-surface).

4. Results

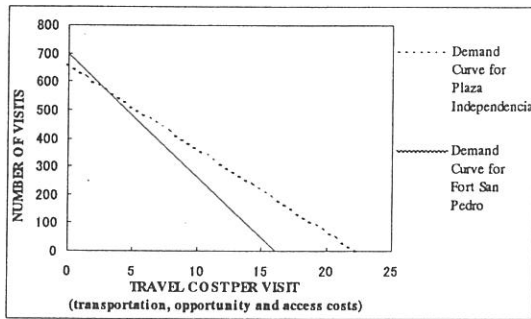
Based on the analysis of logit model discrete choice preference of cultural significance, factors that influence the level of perception are visual appeal, in the case of Plaza Independencia, and years in school and endowment to the next generation in the case of Fort San Pedro.

The following table and figure show the parameter estimates of the travel demand models and the travel demand curves of Plaza Independencia and Fort San Pedro, respectively. The expected relationship of declining number

of trips as the travel cost increases were depicted in the models. Based on the figure, one can gather that visiting Plaza Independencia has higher utility than visiting Fort San Pedro.

**Table 1. Parameter Estimates of TCM**

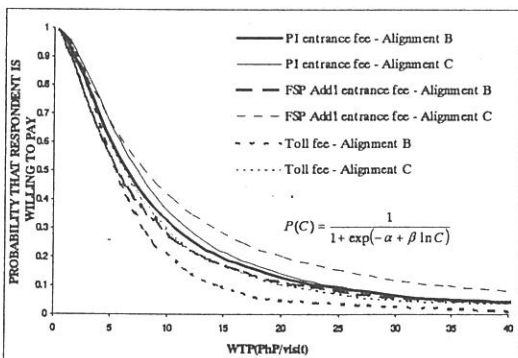
Variable	Plaza Independencia		Fort San Pedro	
	Est.	t-stat	Est.	t-stat
Constant	11.34 (0.69)		-7.95 (-0.65)	
Travel cost (i.e. transportation cost, time cost, access fee)	-0.03 (1.99)		-0.02 (-1.84)	
Is the site is visually appealing? 1 = yes, 0 = no	14.42 (2.71)		10.84 (2.63)	
Income	-3.80E-04(-1.07)		-1.59E-03 (-1.28)	
Age	1.06 (4.16)		0.82 (4.34)	
Number of years in school	-2.68 (-2.62)		-0.81 (-1.05)	
R <sup>2</sup>	0.1224		0.1007	



**Figure 2. Demand Curves of Plaza Independencia and Fort San Pedro**

Using TCM method, annual recreational benefits of Plaza Independencia and Fort San Pedro were computed as 77.2 million PhP and 26.4 million PhP, respectively.

In terms of willingness to pay, the following figure shows the probability distribution of WTP for different alignments and payment vehicles.



**Figure 3. Probability Distribution of WTP per Payment Vehicle and Alignment**

Among the payment vehicles used, toll for the use of road registered lower values than entrance fees. Moreover, sub-surface alignment draw out higher values than the elevated alignment. The difference is greater for the Fort San Pedro additional entrance fee. For Plaza Independencia entrance fee, only minimal difference was observed. Table

2 shows the parameter estimates and the median values ( $\bar{c}$ ) of the WTP per payment vehicle and alignment.

**Table 2. Parameter Estimates and Median of WTP**

Variable	Parameter $\alpha$		Parameter $\beta$		$\rho^2$	$\bar{c}$
	Est.	t-stat	Est.	t-stat		
Entrance fee to Plaza Independencia (Alignment B)	3.21	14.21	1.71	17.32	0.08	6.53
Entrance fee to Plaza Independencia (Alignment C)	3.65	15.20	1.83	15.27	0.11	7.39
Additional entrance fee to Fort San Pedro (Alignment B)	2.82	13.75	1.63	15.52	0.08	5.64
Additional entrance fee to Fort San Pedro (Alignment C)	3.19	15.87	1.52	16.33	0.11	8.09
Toll fee (Alignment B)	3.89	12.03	2.28	12.84	0.09	5.50
Toll fee (Alignment C)	3.35	11.35	1.83	11.99	0.10	6.23

The results of the valuation shows that the Present Value computed for 20 years at a discount rate of 15 percent was higher for sub-surface alignment than elevated alignment for only a marginal six percent (6%) or 5.7 million PhP. Though the difference in value may not be that significance as compared with the actual consequences of the different alternative alignments, the difference still showed that the experimental market marginally discriminate the goods in question.

Various biases were observed during the conduct of study. Among these biases are:

- Higher income groups do not always offer the highest WTP bids;
- Difference in the probability of WTP in the open-ended and discrete choice elicitation format; and
- Inconsistent estimate of use value from TCM and CVM.

The first two biases may be related to the free riding and the perception level of the hypothetical scenario. The third, on the other hand, maybe due to the limitations in defining travel demand curves in cases of cultural heritage sites of international interest.

## 5. Conclusions

The resulting benefit estimates made it clear that there are benefits to preserving cultural heritage sites. However, though this research has presented a framework of valuing cultural heritage sites, it is still best that the protection of these resources be mandatory as the extent of non-use value is deemed underestimated. The valuation framework may prove to be useful in cases of damage assessment and evaluation of alternative degree of cultural heritage preservation.

## References

1. Dixon, John. and Pagiola, Stefano (1998), 'Economic Analysis and Environmental Assessment', *Environmental Assessment Sourcebook Update No. 28*, The World Bank, Environment Department, Washington D.C.
2. Metro Cebu Development Project III (2000), *Environmental Impact Statement --Segment 3 Viaduct cum Subway Project, Cebu South Coastal Road Project*
3. Tabororoff, June (1994), 'Cultural Heritage in Environment Assessment'. *Environmental Assessment Sourcebook Update No. 8*. Washington DC. World Bank, Environment Department.