USING TRAVEL COST AND CONTINGENT VALUATION METHODOLOGIES IN VALUING EXTERNALITIES OF URBAN ROAD DEVELOPMENT: AN APPLICATION IN VALUING DAMAGES TO CULTURAL HERITAGE

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Abstract: One of the challenges of developing sustainable urban environment and transport policies is estimating the social costs of transport infrastructure projects. Damage to cultural heritage resources is one of the irreversible environmental impacts of road development. This paper aims to determine indication of total economic value (TEV) of cultural heritage preservation as road cost externalities using Travel Cost (TC) and Contingent Valuation (CV) methodologies. The TC methodology used revealed preference (RP) data while the CV methodology used stated-preference (SP) data which is the willingness-to-pay (WTP) for the posed hypothetical scenarios describing degree of cultural heritage preservation. The results of the survey showed that WTP values vary in terms of: scenario specifications, valuation methodology, income, and elicitation method. The derived estimates of aggregated benefits show significant values as compared with the measurable implementation costs of alternative scenarios.

Key words: TCM, CVM, environmental amenity valuation, cultural heritage preservation

1. INTRODUCTION

Road development is commonly associated with economic growth. In this light, economic programmes of developing countries like the Philippines have seen motivations in road infrastructure investments. However, among the consequences of this development direction are increasing impacts on natural and social environments. In some cases, these impacts go beyond the benefits due to the infrastructure. The failure to internalise intangible externalities in cost-benefit analysis of road projects commonly resulted in unsustainable development.

Among the irreversible impacts of road development is damage to cultural heritage sites. This impact is likely to be experienced in urban cores where most historic sites are located. The United Nations Educational, Scientific and Cultural Organization (UNESCO) is responsible for the international legal protection of cultural heritage. In 1972, UNESCO sponsored the Convention Concerning the Protection of the World Cultural and Natural Heritage. The convention defines 'cultural heritage' as monuments, group of buildings or sites that are of outstanding universal value from the point of view of history, art or science. Cultural heritage is further defined as works of man or the combined works of nature and man, and areas including archaeological sites. Cultural heritage sites can be generally considered as public

good. Public goods can be regarded as a special case of externality. Externality occurs when market transaction affects third parties who are not involved in the goods exchange. Public goods are goods or services which can be used by one person without affecting the amount available to others. Since public goods are available to all, individuals cannot be excluded from their benefits. These goods inherently hold non-use values (Krutilla, 1967; NCSE, 2000).

Cost benefits analysis (CBA) is one of the most important tools of informed decision-making. This method is very useful in environmental assessment where costs and benefits due to a development are accounted for to determine feasibility of the project. In terms of road infrastructure development, conventional analysis mainly focuses on measurable items associated with existing technical and transport economic costs and benefits. Other benefits such as natural and social environmental amenities are commonly disregarded or treated qualitatively not because of non-recognition but due to lack of appropriate valuation tool. Benefits assessment, which is an intrinsic component of CBA method, has produced emerging interest in ways of valuing preferences for public goods.

This paper aims to present a framework for estimating the total economic value (TEV) of cultural heritage preservation as road cost externalities using travel cost method (TCM) and contingent valuation method (CVM). Methodological issues shall be identified, and planning policies on the context of the valuation framework, derived cultural heritage perceptions and estimation results shall be presented.

2. VALUE OF CULTURAL HERITAGE SITE

Different categorization of the value of cultural heritage can be found in different literature. One definition entails disaggregation of the value of cultural heritage according to TEV components as shown in Table 1. On the other hand, Tabororoff offered the concept of cultural significance in the estimation of the value of a site.

Table 1. Value of Cultural Heritage Site

Categories of Value*		Components of Value**	Indicators	Valuation Methodology
Use	extractive, consumptive	Aesthetic, historic, scientific or research, social or economic	Archeological treasures, historical exhibits, structures (tangible resources)	market pricing methods
	recreational		Transportation cost, opportunity cost, access fee	TCM, Hedonic Pricing, CVM
	aesthetic value		Transportation cost, opportunity cost, access fee	
Non-use	existence, option and bequest		Willingness-to-pay avoid damages to cultural resources	CVM

**Based on Pagiola's definition (1996)*
***Based on Tabororoff's definition (1994)*

The TEV of a public good is comprised of use and non-use values (Dixon, 1999). Direct- and indirect-use values are subsumed into use value. Direct use value, also called extractive, consumptive, or structural use value, are derived from goods which can be extracted, consumed, or directly enjoyed. On the other hand, indirect use value, also known as non-extractive use value or functional value, can be obtained from the services the good provides. To illustrate these values on the context of cultural heritage sites, direct use value for cultural heritage goods are the existing monuments, exhibits, landscape, structures etc. within the site, while the indirect use are the recreational services that can be derived from the site. Direct use value is actualised using existing markets. On the other hand, indirect use value (i.e. value of recreation) is often derived using surrogate markets that are often valued using TEV. The value related to keeping an option to use a certain good at a later date is called option value (Dixon, 2000; Morey, 2000). This value is comparable to an insurance

premium to ensure the supply of something of which availability is uncertain in the future (Pearce, 1990).

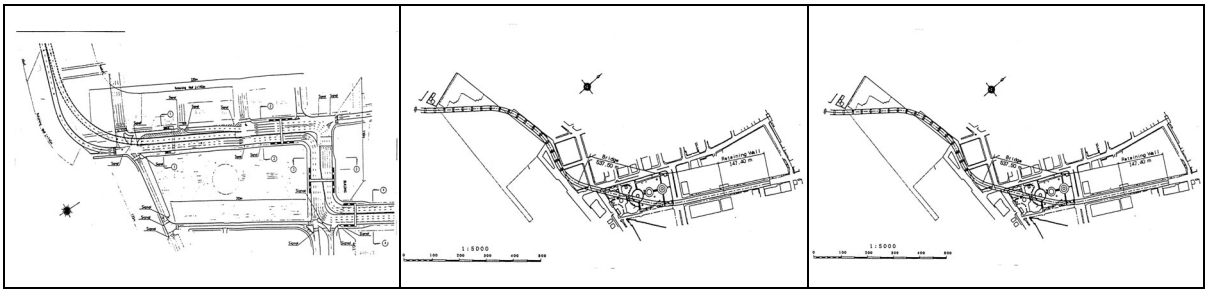
Non-use value, in contrast with use-value, is value associated with the benefits the environment provides without having to use it directly or indirectly. It can be further broken down into existence and bequest values. Existence values refer to the values an individual attaches to a good just knowing that it exists with or without the intention of using it. This value can be seen in the sentiments of people to preserve cultural heritage sites even though they still have not actually been in sites. On the contrary, bequest value is related to maintaining a certain good for the next generation. Since non-use values are linked to individuals' behaviour and are not observable, these value categories are very hard to capture (Dixon, 2000; Morey, 2000). In some cases, the term passive use value is used to approximate the aggregation of option, existence and bequest values.

In terms of concept of cultural significance, value can be assessed in terms of aesthetic, historic, scientific or research, and social value. Though the recognition of these value is often subjective, in general, evaluation of cultural significance simply implies that sites that are likely to be more significant are those that help our understanding of the past, or enrich the present, and that will be of value to future generation.

The valuation framework of the cultural heritage preservation as externalities used in this study is done on the basis of both surrogate and experimental market. Surrogate markets techniques entail looking for private markets to value the goods in concern. In this case, recreational benefits can be estimated by looking at the actual travel choices by the visitors to a certain recreational site. Experimental market, on the other hand, is markets with undefined characteristics where the presupposed or hypothetical scenario is posed induce its preferences. Resulting monetary estimates of TCM and CVM are used for the purpose of the study.

3. STUDY DESIGN

The study area is the segment 3 of the South Cebu Coastal Road Project located in Cebu City. The Cebu South Coastal Road (CSCR) Project is a loaned project of the Philippines Government from the Overseas Economic Cooperation Fund (OEDF) of Japan through the Metro Cebu Development Project III (MCDP III) Project Coordination and Monitoring Office (PCMO). The project aims to address the significant increase of traffic volume in Metro Cebu by providing an uninterrupted north-south traffic system. The Segment 3 under this project, starts at the Segment 2 - Causeway section and ends at the McArthur Boulevard (S. Osmena Boulevard, Cebu City). Three (3) alternative alignments, as shown in Figure 1, were considered for the segment alignment and C was chosen.



Alignment A	**Alignment B**	**Alignment C**
Widening of M.J. Cuenco Avenue along Plaza Independencia site	Elevated highway structure across the Plaza Independencia	Sub-surface alignment across the Plaza Independencia

Figure 1. Alternative Alignments for Segment 3 of CSCR

Plaza Independencia nd Fort San Pedro (Figure 2) would be affected by the project. Fort San Pedro is one of the oldest fortresses in the Philippines while the Plaza Independencia has

been the center of social and cultural activities of the region. A review of the previous rescue archeology revealed the historic and cultural significance of the port area, now known as the downtown Cebu, where Plaza Independencia and Fort San Pedro are located.

Figure 2. Plaza Independencia (left) and Fort San Pedro (right)

As decision-makers decided in favor of sub-surface alignment, it is clear that visual amenity and cultural heritage preservation were given great weight in the project evaluation. However, in spite of the preferred alignment, the study will refer back to the alternatives to determine what premium should be associated in the preservation of the cultural heritage site. On the other hand, rather than adopting the on-grade alignment, which entails widening of M.J. Cuenco along Plaza Independencia Site, the alignment posed in the hypothetical scenario is the on-grade alignment that would cut across Plaza Independencia.

3.1 Questionnaire Design

The questionnaire is divided into four sections namely, socio-economic characteristics, travel characteristics, cultural heritage perception and the willingness-to-pay. The cultural perception section of the questionnaire validated the components of the cultural heritage value as identified by literature review. A pre-test of questionnaire was employed prior to the full-sample survey. The pre-test aims to assess the clarity of the questionnaire, and possible interviewer effects. Since the pre-test survey employed open-ended (OE) elicitation format, an indication of the distribution of the WTP was also derived. In the full-sample survey, double-bounded discrete choice (DC) format using the bid range derived from the OE WTP distributions was used. Random card drawing was used to elicit the DC responses. In this method, bid amounts within the bid range are assigned to draw cards and are offered to the respondents. The initial card drawn by the respondent will be the initial bid. If the respondents answered ‘yes’ or is willing to pay the amount, he will be asked again to draw from the cards containing value higher than the initial bids. Conversely, if the respondents answered ‘no’, he will be offered cards with lower values.

Face-to-face interviews were conducted to facilitate the questionnaires, as there is a need to explain clearly the required background information and the hypothetical scenario for valuation. For this purpose, maps are presented to help respondents identify the goods being valued.

As CVM is very much dependent on the respondents’ understanding the good in question, the hypothetical scenarios must be clearly presented. Questions on cultural heritage perception were given before the WTP bidding to condition the respondents of the good to be valued. It is critical that the respondents reveal their preferences in the experimental market just as they would in a real market. Given that alternative degrees of preservation will be presented in the alternative scenarios, indication of the actual market price of each infrastructure must be presented as context. The hypothetical scenarios for the willingness-to pay question was

presented as follows:

> The Cebu South Coastal road is a proposed major road connecting Talisay and Cebu City. The most feasible alignment of the northernmost portion of the road, however, would directly pass through Plaza Independencia. There are three alignment options on how to go about the project. The following table describes the alignment and its consequences.

ALIGNMENTS	CONSEQUENCE/S
(A) putting the road on-grade claiming a portion of the Plaza Independencia	splitting of Plaza Independencia
(B) putting up an elevated road which will run over Plaza Independencia and block the view of Fort Santiago from the plaza	physical obstruction in Plaza Independencia; visual obstruction of Fort San Pedro; 36% higher than cost of alignment A
(C) putting up the road on a subway and not changing the existing condition after the project is done.	high construction and maintenance cost; 49% higher than cost of alignment A;18% higher than cost of alignment B

The preferred alignment was not elicited. The respondents were asked how much they were willing to pay the following for both alignment B and C to maintain and preserve cultural heritage. The payment vehicles used were: (1) entrance fee to Plaza Independencia, (2) additional entrance fee to Fort san Pedro, and (3) toll fee.

3.2 Data Sampling

The two main requisites for a good sample design are its efficiency and absence of bias. In practical terms however, cost-effectiveness is commonly considered. The efficiency of a sample depends on its randomness in such a way that the behavior of the sample depicts that of the whole population. It is common to look at the variability of the sample to design measure to reduce bias. However, in this study, there is no indication of the variability of the experimental market to be able to design an unbiased sample. In this case, a pragmatic sampling approach is done where the aim is to obtain the largest sample within existing time and budget frame.

To gather as many respondents as possible, the survey employed convenience sampling. Surveys were held where respondents with mixed income level could be derived. These public places include Plaza Independencia–Fort San Pedro Complex, Post Office, CBD, churches, City Hall, shopping centers, hospitals and schools. In the pre-test survey, a more random sample was obtained because the survey was mainly conducted within the study area and its vicinity. To ensure that the full-sample follows the degree of randomness of the pre-test sample, a test on the equality of populations in terms of income was performed. Adjustment was made to minimize the sampling error of the full-sample.

4. EMPIRICAL MODELS

The analyses of data are done using travel cost method (TCM) and contingent valuation method (CVM). Using respondents' socioeconomic characteristics and visitation rates, TCM was used to derive the recreation demand curve of the site and its benefit indicator which is the consumer surplus. Willingness-to-pay based on the posed hypothetical scenario, on the other hand, served as the stated preference data which was used to estimate the contingent value of preserving the cultural heritage amenity of the site.

4.1 Travel Cost Methodology

The travel demand model used the ordinary Marshallian demand function associated with the recreation good which is:

$$q_i = f(p_i, y_i, x_i; \beta) + \varepsilon_i \quad (1)$$

where an individual i allocates its income y_i for a recreation good q_i with price denoted as p_i, and x_i as other factors. The element β is the vector of unknown parameters and ε_i is the additive stochastic term which is assumed to follow a normal distribution. The price of the recreational good or the generalized travel cost, q_i, includes: (1) transportation cost, t_i; (2) opportunity (time) cost, o_i; and (3) access fees a_i, such that:

$$p_i = t_i + o_i + a_i \quad (2)$$

Wage rate is commonly used to estimate time cost. However, one of the factors that should be considered in using wage rate as value indicator is the selection bias. Selection bias can be viewed as problem of missing observation. This simply denotes that wage and hours cannot be observed from non-working individuals who, had they chosen to work, have some unobservable wage potential. Two-stage Heckman correction in handling selection bias was employed for this purpose.

Moreover, the adjustment factor for the wage rate was computed by regression of the recreational demand against the decomposed travel cost (i.e. transportation, opportunity and access costs) which yield parameters β_t, β_o, and β_a associated with transport, time and access costs, respectively (Earnhart, 1999). If transport and time cost are appropriately valued, the relationship $\beta_t = \beta_o = \beta_a$ should follow which also mean that the ratios between the parameters are equal to one. The ratio of the parameters is used to adjust the wage rate to be used.

4.2 Contingent Valuation Methodology

The interpretation of the WTP gathered in the full-sample survey employ double-bounded discrete choice analysis. This method proposed by Hanneman (1985) and Carson (1985) involves an initial 'yes'-'no' specific peso random bid C question followed-up by a 'yes'-'no' question. In the second question, if the respondent answered 'yes' she will be given random bid CL where C>CL while if she answered 'no' she will be given random bid CU where C<CU.

In theory, an individual's WTP is bounded by her income y. Thus, an individual's willingness to pay C for a public good q with quality changing from q^0 to q^1 an is given by:

$$C = f(q^0, q^1, y, \varepsilon) \le y \quad (3)$$

In terms of random utility maximization (RUM) specifications direct utility U(·) is equal to indirect utility V(·) plus some stochastic components representing the concept of preference that is random. In discrete conditions, this could be explained by the following equation:

$$U(\delta, Y) = V(\delta, Y) + \varepsilon \quad (4)$$

whereby, δ if respondent agrees with payment C for environment preservation measure, 1 otherwise 0, and Y which is the income level. In this case, the probability that the respondent will answer yes in a DC WTP question is given by:

$$Pr(Yes) = Pr\left(V(1, Y - C) + \varepsilon_1 > V(0, Y) + \varepsilon_0\right) \quad (5)$$

In case of the double bounded discrete response CV with WTP distribution $G_C(\bullet)$, the probabilities of the different response combinations are given by the following equations:

$$
\begin{aligned}
&(1) P_{yy} = \Pr(\textit{Yes for } C, \textit{Yes for } CU) = 1 - G_C(CU) \\
&(2) P_{yn} = \Pr(\textit{Yes for } C, \textit{No for } CU) = G_C(CU) - G_C(C) \\
&(3) P_{ny} = \Pr(\textit{No for } C, \textit{Yes for } CL) = G_C(C) - G_C(CL) \\
&(4) P_{nn} = \Pr(\textit{No for } C, \textit{No for } CL) = G_C(CL)
\end{aligned} \tag{6}
$$

Assuming that the this distribution follows a standard logistic cummulative density function (cdf), Equation 8 could be further interpreted as follows (Bishop and Heberlein,1979):

$$
\begin{aligned}
Pr(\ Yes\ ) &= \frac{exp\ [V(1, Y - C)]}{exp\ [V(1, Y - C)] + exp\ [V(0, Y)]} \\
&= \frac{1}{1 + exp\ \{-[V(1, Y - C) - V(0, Y)]\}}
\end{aligned} \tag{7}
$$

In the same manner, the probabilities of the different answer combinations in a double bounded CV are derived as follows:

$$
\begin{aligned}
P_{yy} &= Pr(\textit{Yes for } C, \textit{Yes for } CU) = \frac{1}{1 + exp\{-[V(1, Y - CU) - V(0, Y)]\}} \\
P_{yn} &= Pr(\textit{Yes for } C, \textit{No for } CU) = \frac{1}{1 + exp\{-[V(1, Y - C) - V(0, Y)]\}} - \frac{1}{1 + exp\{-[V(1, Y - CU) - V(0, Y)]\}} \\
P_{ny} &= Pr(\textit{No for } C, \textit{Yes for } CL) = \frac{1}{1 + exp\{-[V(1, Y - C) - V(0, Y)]\}} - \frac{1}{1 + exp\{-[V(1, Y - CU) - V(0, Y)]\}} \\
P_{nn} &= Pr(\textit{No for } C, \textit{No for } CL) = 1 - \frac{1}{1 + exp\{-[V(1, Y - CL) - V(0, Y)]\}}
\end{aligned} \tag{8}
$$

The corresponding maximum likelihood function for every respondent is illustrated by the following equation:

$$
\ln L^{SP} = \sum_i \left(\delta^i_{yy} \ln P^i_{yy} + \delta^i_{yn} \ln P^i_{yn} + \delta^i_{ny} \ln P^i_{ny} + \delta^i_{nn} \ln P^i_{nn} \right) \tag{9}
$$

To derive monetary values from the double –bounded dc data, identity (7) was used whereby the entity V(1,Y-C)-V(0,Y) shall be replaced with ΔV(C) yielding a new equation:

$$
\Delta V(C) = \alpha - \beta \ln C \tag{10}
$$

An indicative measure of monetary values could be facilitated by the central tendency measure of the normal probability distribution derived from the statistical model. The mean and the median of the estimated WTP distribution can be used for the purpose. However, Stavig and Gibbons (1997) claim that the mean is more sensitive to skewness or kurtosis than median in terms of WTP distribution. In case of the WTP distribution with no negative responses, a positively skewed distribution is implied (Haneman et al, 1999). In view of this, the median WTP shall be used as the measure of central tendency of the DC formatted WTP responses. The median (C) can be computed directly from the empirical response probability function (Equation 4) corresponding to 50% response probability of saying 'yes'. The following equation shows the functional derivation of the median.

$$
\begin{aligned}
0.5 &= \frac{1}{1 + \exp\ (-\alpha + \beta \ln C)} \\
\overline{C} &= \exp(\ \hat{a} / \hat{\beta}\ )
\end{aligned} \tag{11}
$$

5. RESULTS

The pre-test and full-sample survey yielded 116 and 348 samples, respectively. In the full sample survey, majority of the respondents belongs to the age group 20-29 (42.81%), and are married (54.89%). About 143 (41%) of the respondents have bachelor's degree while 68 (19.54%) took vocational or technical courses. Most of the respondents are private employees (36.21%). Ninety-two percent (92%) of the respondents belong to income bracket 10,000-14,999 and below. Some 199 respondents (57.18%) do not own a car. Most of the respondents are non-tourists (96.26%). Only a total of 13 respondents are tourists, two of which are foreigners.

5.1 Recreational Benefits

As derived from the disaggregated wage rate equation, the adjustment factors of 0.36 for the employed and 0.20 for the unemployed were used to derive opportunity cost from wage rate. An aggregated travel cost demand curve based on Marshallian demand function (Equation 1) is estimated. Two models for each site using Ordinary Least Square (OLS) and Tobit Models were estimated. Though tobit models show a better fit than the OLS models, the OLS parameter estimates are used for the computation on the consumer surplus because of the lower significance of the travel cost variables in the tobit models. The demand models for Plaza Independencia and Fort San Pedro shown and illustrated in Table 2.

Table 2. Travel Demand Models for Plaza Independenca and Fort San Pedro

Variable	Description of Variables	Plaza Independencia	Fort San Pedro
B_0	*Constant*	11.34 (0.69)	-7.95 (-0.65)
TC	*Travel cost (i.e. transportation cost, time cost, access fee)*	-0.03 (1.99)	-0.02 (-1.84)
VISAP	*If Plaza Independencia – Fort San Pedro complex is visually appealing: 1= yes, 0= no*	14.42 (2.71)	10.84 (2.63)
INCOME	*Income: continuous variable*	-3.80E-04 (-1.07)	-1.59E-03 (-1.28)
AGE	*Age: continuous variable*	1.06 (4.16)	0.82 (4.34)
EDUC	*Years in school: continuous variable*	-2.68 (-2.62)	-0.81 (-1.05)
R^2		0.1224	0.1007

For both the demand models of Plaza Independencia and Fort San Pedro, among the significant variables influencing the demand are how the respondent perceived the visual appeal of the site and the age of the respondent. However, the negative sign of the variable EDUC and INCOME for all models indicating the tendency of the respondents with lower income and education level to visit the site more is a notable behavior. The negative sign of the variables travel cost (i.e. TC_PI, TC_FSP) indicate the negative slope of the demand curve. The relative price and income elasticities of the demand curves are shown in Table 3.

Table 3. Demand Elasticities

	Formula	Plaza Independencia	Fort San Pedro
Price	$\eta = \frac{(\Delta q_i / q)}{(\Delta TC_i / TC)}$	-0.00187	-0.01046
Income	$\eta = \frac{(\Delta q_i / q)}{(\Delta y_i / y)}$	-0.00002	-0.00083

The negative price elasticities of PI and FSP demand curves indicate that the demands for these site are inelastic meaning change in travel cost only marginally change the frequency of visits. On the other hand, the negative income elasticities of PI and FS demand curves show that these public good are inferior goods meaning consumption of these goods decreases as income increases. The following Figure 3 shows the travel cost demand curve of Plaza Independencia and Fort San Pedro. The expected relationship of the declining number of trips

as the travel cost increases were depicted by the demand curves. Based on the figure, one can gather that visiting Plaza Independencia has higher utility than visiting Fort San Pedro.

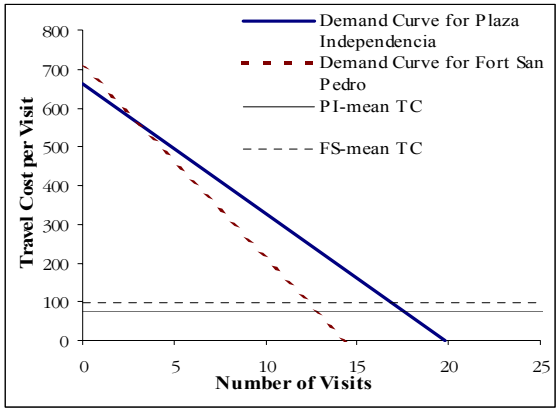


Figure 3. Travel Demand Curves for Plaza Independenca and Fort San Pedro

Table 4 shows the intercept, the consumer surplus and the average benefit per visit. Since the number of visits is obtained when the travel cost is zero then the maximum number of visits is the intercept, then the average benefit per visit is the consumer surplus divided by the intercept.

Table 4. Demand Curves Intercept and Consumer Surplus

Destination	Intercept	Consumer Surplus (CS)	Average Benefit per Visit (PhP)
Plaza Independencia	19.78	5,093.39	257.54
Fort San Pedro	14.35	3,785.55	263.85
TOTAL	34.12	8,878.94	260.19

5.2 Willingness-to-pay

The estimated parameters based on the aggregated full sample were used to compute the median WTP. Table 5 shows the parameters and median estimates by payment vehicle and scenario.

Table 5. Parameter Estimates and Median of the Double Bounded DC WTP Bids

Payment Vehicle	Alignment	Parameter	Estimate	Asymptotic Standard Error	t-stat	$L(0)$	$L(\beta)$	ρ^2	Median ($\bar{C}$ in PhP)
Entrance fee to Plaza Independencia	B	α	3.21	0.23	14.21	-2474.1	-2271.52	0.08	6.53
		β	1.71	0.10	17.32				
	C	α	3.65	0.24	15.20	-2582.8	-2311.32	0.11	7.39
		β	1.83	0.12	15.27				
Additional entrance fee to Fort San Pedro	B	α	2.82	0.21	13.75	-2479.5	-2289.34	0.08	5.64
		β	1.63	0.11	15.51				
	C	α	3.19	0.20	15.87	-2601.7	-2323.26	0.11	8.09
		β	1.52	0.09	16.33				
Toll fee	B	α	3.89	0.32	12.03	-1481.5	-1353.83	0.09	5.50
		β	2.28	0.18	12.84				
	C	α	3.35	0.29	11.35	-1550.1	-1393.55	0.10	6.23
		β	1.83	0.15	11.99				

Based on the results of the analyses of DC WTP, the study shows than an average person is willing to pay the following: (1) entrance fee to the Plaza Independencia amounting to 6.51 and 7.39 pesos for alignment B (elevated alignment) and C (sub-surface alignment) respectively; (2) additional entrance fee to Fort San Pedro amounting to 5.66 and 8.11 pesos

for alignment B and C respectively; and (3) a toll fee of 5.50 and 6.23 pesos for alignment B and C respectively. Moreover, Figure 4 shows the derived median prices for the users and non-users of the site.

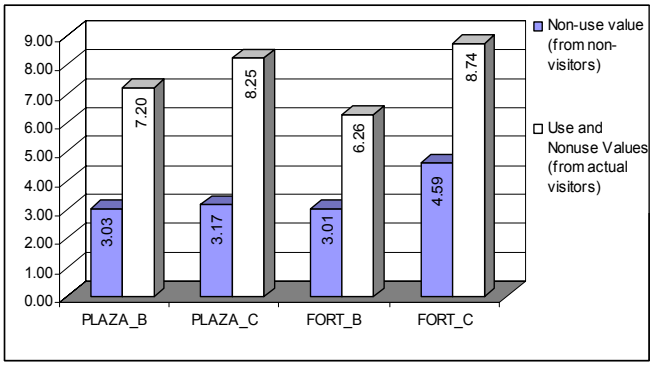


Figure 4. WTP from User and Non-User of the Site

The distributions of the double-bounded DC data are shown in Figure 5. The preponderance of the YY and the NY answer combination is evident.

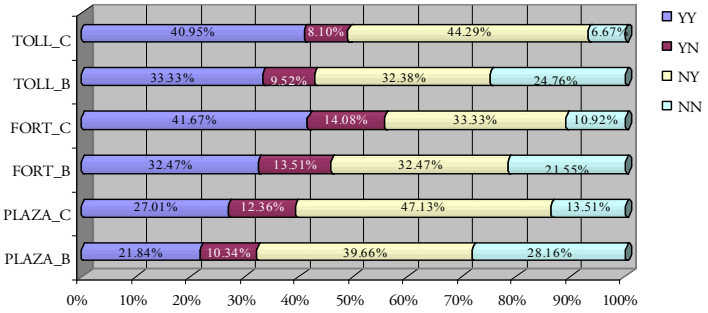


Figure 5. Distribution of Answer Combination per Payment Vehicle

Based on the parameter estimates derived from the logit analysis of WTP data, the probability density curves of the different payment vehicles per scenario were estimated. These are shown in Figure 6.

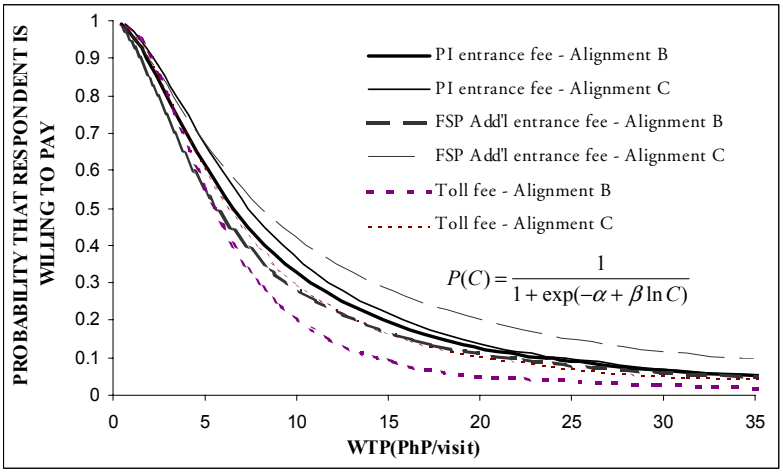


Figure 6. Cumulative Probability of DC WTP by Alignments and Payment Vehicle

The graph shows that among the payment vehicles used, toll for the use of road registered lower values than entrance fee. 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. In regards to Fort San Pedro additional entrance and toll fee, the difference is quite notable. The unexpected small difference in WTP observed from the two alignments considering the degree of difference can possibly be explained by the failure of the respondents to perceive the hypothetical scenario accurately.

Observing the probability density curve of OE and DC responses with the probability of respondent paying the fee/additional fee on the y-axis and the visitor fee per visit on the x-axis, the double bounded DC format generates a probability distribution that is shifted significantly above the probability distribution of the WTP using OE bids (See Figure 7).

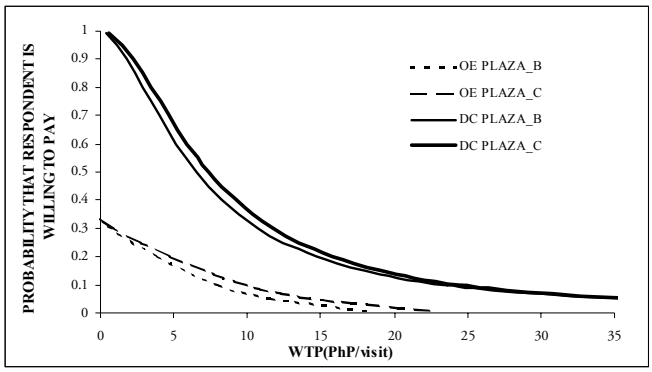


Figure 7. Comparison between OE and DC WTP
(Plaza Independencia Entrance Fee)

It can also be observed that the higher income groups do not always offer the highest WTP bids. In some instances like the entrance fee to Plaza Independencia, lower income groups offer higher values (See Figure 8).

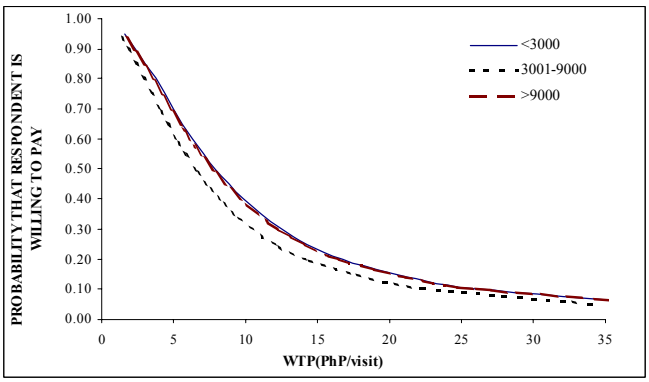


Figure 8. Comparison of DC WTP by Income Level
(Plaza Independencia Entrance Fee –Alignment C)

Different biases can be deduced from the listed findings. Among the notable biases observed in the analysis is the difference in the probability of the acceptance of WTP values in the open-ended and discrete choice elicitation format which is deemed to be a combined effect of the free-riding tendency in the open-ended elicitation and the tendency of respondents to say yes in DC format if posed a question they do not understand thoroughly. Moreover, the observed relationship between income and WTP in DC elicitation format is the probability that lower income groups agree to higher offered values than the higher income groups.

5.3 Value of the Cultural Heritage Site

The recreational values of Plaza Independencia and Fort San Pedro were estimated through the consumer surplus approach using recreational demand curves. Based on the visitor count conducted from November 18 to 24, about 265,460 and 88,296 visit Plaza Independencia and Fort San Pedro. To account for the increase in visitors of the site during the annual Sandugo festival and during peak tourists season, the number of visitors of Plaza Independencia and Fort San Pedro were estimated as 300,000 and 100,000 visitors, respectively.

Evidence of non-use values could be seen by examining the stated preference WTP of the respondents who have not been in the site. The resulting values show that the site has inherent values that are recognized by non-users. Non-use values derived from the nonuser are lower compared to the WTP of respondents who have actually been in the site. Derived non-use values for the Plaza Independencia is about forty percent (40%) of the combined use and non use values while the non-use value for Fort San Pedro Fee is about fifty (50%) of the combined use and non use values.

Recreational values were estimated from consumer surplus estimates from TCM while non-use values were extracted from the WTP of those who have not been in the site. The results of the valuation shows that the Present Value computed for 20 years at a discount rate of 15 percent was higher for subway alignment than elevated alignment for only a marginal four percent (78.1 million PhP vs. 74.6 million PhP). The result show that the values of preserving cultural heritage for the actual site users are about 74 and 78 percent of the respective construction cost of the elevated and subsurface alignments. Though the difference in value may not be that significant as compared with the actual consequences of the different alignments, the difference still showed that the experimental market marginally discriminates the goods in question. Estimates can be improved by extending computation to the actual stakeholders of the site. The bounding population, or the extent of stakeholders, on the other hand, is very hard to define. Further study should be done in the definition of the population in order to derive an expansion factor for the Total Economic Value.

6. CONCLUSION AND RECOMMENDATIONS

The study was able to estimate the economic value of a cultural heritage using the TCM and CVM. The study proves that TCM and CVM surveys can be easily implemented on the local context. Proper consideration, on the other hand, should be done to address associated biases that arise from the use of the methods. The ability of the methods to give monetary measures of use and non-use values as well as its ability to distinguish value of alternative scenarios make it very useful in project assessment and evaluation.

The resulting estimated benefits estimates make it clear that there are benefits to preserving cultural heritage sites. The incidence of free riders can likewise be illustrated by a majority of the respondents who are not willing to pay in the OE WTP reasoning out that the government should pay. However, there are still some biases observed in the results, one of these is its bias in terms of predicting values over low-income groups. Several reasons can explain this observation. Cultural heritage values can be more understood by a high-income person who has reached higher level of education than a person in the low-income groups who have reached only lower level of education. Another possible factor that can explain the bias is the weakness of the hypothetical scenarios to be clearly understood by the lower-income population. This limitation may be common to other developing countries.

The advantage of CV studies in developing countries, particularly the Philippines, is the ability to be able to conduct high quality CV studies because of high literacy rate, thus more qualified surveyors could be employed.

In terms of policy, the Philippines has laid down the basic framework that will ensure the preservation of cultural heritage resources. To further strengthen it, the institutional arms assigned to the protect it, must be equipped with appropriate tools for an informed decision-making. This research has presented a framework of valuing cultural heritage sites, but it is still best that the protection of these resources be mandatory as the extent of non-use value of these resources are vast and deemed underestimated. The study may prove to be useful in cases of damage assessment and evaluation of alternative degree of cultural heritage preservation.

As the identification of the cultural heritage sites at the local level is an essential task before the benefits or disbenefits of a site can be listed, it is imperative that sites be identified and protected through local ordinances such as zoning.

In view of the fact that damages to cultural heritage constitute as an irreversible environmental impact, the protection of such cultural heritage must be supported by appropriate policies on cultural heritage protection specifically recommending tools for valuing cultural heritage resources.

In terms of methodology, the merits and limitations of the process done in this research could further be explored. Clearly, questionnaire development is among the critical improvement need both for the TCM and the CVM. The limitations of the CVM due to its associated biases particularly in posing hypothetical questions to low income groups, can be reduced by developing better ways of posing presupposed situation and developing a more reliable payment vehicle. Moreover, studies that will investigate the difference between estimates by different methodologies should also be pursued.

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