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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One of the challenge developing sustainable urban environment and transport policies is deriving measurable estimates of social costs as a consequence of sprawl. One of the environmental impacts of road development is damage to cultural heritage resources in which protection are embodied in both local and international policies. The 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 scenario describing degree of cultural heritage preservation. Two types of interview survey were conducted to derive stated preference data: the pre-test survey using open-ended (OE) format; and the full-sample survey using double-bounded discrete choice (DC). The results of the survey showed the WTP values show variance in terms of: scenario specifications, valuation methodology, income, and elicitation method. Among the main reasons of these biases are the free riding and 'yes'-saying tendency of respondents in the WTP results and some limitations of the TC methodology. The derived estimates of aggregated benefits shows significant values as compared with the measurable costs of alternative scenarios. However, a more reliable estimate can be achieved if the associated biases are properly addressed.

1.0 INTRODUCTION

Adequate roads ensure mobility of goods and people. This equates to the increase in the demand for roads as more complex urban functions develop. Road development has been constantly associated with economic growth. In view of this, economic programmes of developing countries like the Philippines have seen motivations in road infrastructure investments. However, among the consequences of this development direction is the increasing impacts on natural and social environments. In some cases, these impacts go beyond the benefits due to the infrastructure.

One of the irreversible impacts of road development is damage to cultural heritage sites. These impacts are likely to be experienced in urban cores where most historic sites are located. In the historic city of Manila, demand for transportation facilities has caused destruction of a number of sites considered culturally significant[1]. The failure to assess the

[1] An example of this is the construction of the Park and Ride building on Mehan Gardens in the City of Manila. The project proceeded in spite of the protest movements of conservationists and environmentalists.

values of these cultural heritage sites is one of the reasons why appropriate evaluation cannot be done. The evident impacts of roads development on cultural heritage indicate the need to value the economic benefits of cultural heritage preservation. Roads, after all, are built to enhance the general quality of life.

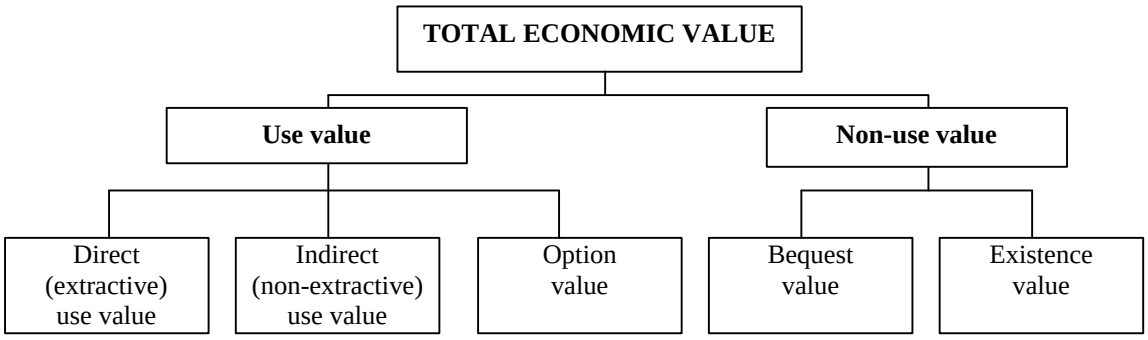
In the area of urban planning, the term 'sustainable' is fast becoming a cliché. It is used extensively in the universal statements of development vision and goals. Nevertheless, the question on how to develop sustainably is still an area open for more deliberation. The World Commission on Environment Development (WECD) defines sustainable development as 'development that meets the needs of the present generation without compromising the ability of the future generations to meet their own needs' (WECD,1987). Various interpretations of this definition have been given. One interpretation states that it is living on the interest of the irreplaceable resource capital by which loss is irreversible. Thus, if the goal of sustainability is to be achieved, the society must develop economically and socially in a manner that minimizes the effect of development activities, the cost of which are carried by the poorest members of the present and future generations (Turner, 1999). The core of sustainable development is anchored on increasing the people's standard of living, in particular, the least advantaged people in society, and avoiding uncompensated future cost (Turner, 1993). These future costs can be counteracted by considering benefits of maintaining the resource capital in the present to avoid resorting to damaging development alternatives.

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 which are of outstanding universal value from the point of view of history, art or science. Cultural heritage monuments may be architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features. On the other hand, groups of separate or connected buildings which hold historic, artistic, and scientific value because of their architecture, their homogeneity or their place in the landscape are considered part of cultural heritage. Cultural heritage sites are works of man or the combined works of nature and man, and areas including archaeological sites.Cultural heritage, being a socio-economic environment attribute is considered generally as a public good. In this regard, the valuation of heritage must capture use and non-use value.

Public goods are one of the two most common market limitations. The other limitation is incidence of externalities. Externalities occur when market transaction affects third parties who are not involved in the exchange and in return causes effects which are not accounted for in the exchange (NCSE, 2000). Since cultural heritage goods are not traded in the actual market, externalities may arise as people who see the goods as culturally significant and holds value for the goods, may not actually be accounted for in the exchange. Conversely, 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. Public goods are deemed to cause externalities. These goods inherently hold non-use values (Krutilla, 1967; NCSE,2000). These values can be indicated by people's willingness to contribute time or money for things they consider as having social values.

In case of unreliability of markets such as in the case of externalities and public goods, it is advantageous to decompose value according to respective environmental impacts. An approach is through the framework of total economic value (TEV) where values are decomposed to different categories of value (Dixon, 1999). In this framework, some of the value categories can be easily measured while others are quite difficult to quantify.

Figure 1
Total Economic Value



As shown in Figure 1, the total economic value of a 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 actualized using existing markets. On the other hand, indirect use value (i.e. value of recreation) are often derived using surrogate markets which are often valued using travel cost methodology. 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.

1.1 Statement of the Problem

Road projects impose social costs. However, since these cost are usually unaccounted for, decisions are likely to be socially sub-optimal, or worse, may result in social costs exceeding social benefits. When costs exceed benefits, the social balance is undesirable and the development is ultimately unsustainable.

The roads must function not only as utility or distribution network but also as a 'life-giver'. To achieve this end, the environmental impacts of roads should be appropriately scoped in the cost-benefit analysis of road projects. Impacts on cultural heritage is one of the critical social costs that should be appropriately valued. This study specifically aims to answer the following questions:

1.2 Objectives

The objectives of the study are the following:

- To suggest an estimation framework of the total economic value (TEV) of cultural heritage preservation as road cost externalities using combined stated preference (SP) and revealed preference (RP) data;

- To identify some methodological issues in the use of travel cost method (TCM) and contingent valuation Method (CVM) in the valuation of road cost externalities as applied on the local context; and

- To suggest planning policies in the context of the valuation framework and derived cultural heritage perceptions.

1.3 Significance of the Study

Since the environment sector is important in national and local development strategies, framing it along with economic and other sectors is critical in making the development process more dynamic or participatory. In a country with depleting resources, prioritisation is critical to development programming. Giving importance to environmental goods like cultural heritage through damage of benefit assessment means involving the environment sector in the complex decision-making process.

Another key significance of valuing cultural heritage damages or benefits is its relevance to project appraisal. Since CBA is the most reliable assessment technique, being able to internalise the benefits or damage cost of a cultural heritage site is critical to sustainable decision- or policy-making.

1.4 Scope and Limitations

The valuation of the cultural heritage preservation as externalities will be done on the basis of both surrogate and experimental market. Surrogate markets techniques entail looking for private markets to value the goods in concern. For instance, 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 a market with undefined characteristics where the presupposed or hypothetical scenario are posed induce its preferences. Travel Cost and Contingent Valuation methods are used for the purpose of the study. At the end of the study, it is deemed that indicative component values related to cultural heritage benefits will be derived.

Due to the limited number of samples gathered, there are a number of factors that the study will not be able to cover. One of these is the ability of the data to interpret the impacts of

tourist, both local and international. The number of tourist sampled is not adequate to draw statistically valid conclusions. Moreover, the extreme values of income observed particularly from international tourists significantly change behavior of the WTP data. Limitations of the travel cost methodology to include recreational demand of international tourist due to the multi-purpose nature of their trips are also considered. For this reason, international tourist cases were eliminated from the data base. Another limitation of the study is the employed convenience sampling methodology. Since the study did not use stratified random sampling because of time and budget constraints, some sampling bias is expected.

The value of cultural heritage and the applicable valuation method based on the literature reviewed are summarised in Table 1. This categoriztion of value served as basis in the formulation of the conceptual framework of the study.

Table 1
Value of Cultural Heritage and Applicable Valuation Method

Categories of Value*		Components of Value**	Indicators	Applicable Pricing Methodology	Advantage of Methodology
Use	extractive, consumptive	scientific or research, historic	archeological treasures, historical exhibits, structures (tangible resources)	Market pricing methods	use market price
	recreational	social, economic, aesthetic	transportation cost, opportunity cost, access fee	Travel Cost	based on generalized travel cost to destination
	aesthetic value	aesthetic	transportation cost, opportunity cost, access fee	Travel Cost, Hedonic Pricing, Contingent Valuation	market price of rent and wage, and generalized travel cost to destination
non-use	existence, option and bequest	aesthetic, historic, scientific or research, social or economic	willingness to pay avoid damages to cultural resources	Contingent valuation	able to capture the non-marketed attributes of the goods

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

Based on the literature review, no local study has been conducted to value cultural heritage sites as a road project externality. Moreover, studies on the valuation of cultural heritage mainly dealt with estimation of value component of TEV. The study takes on pioneering steps in valuing cultural heritage as a public good using combined travel cost and contingent valuation method in the local context.

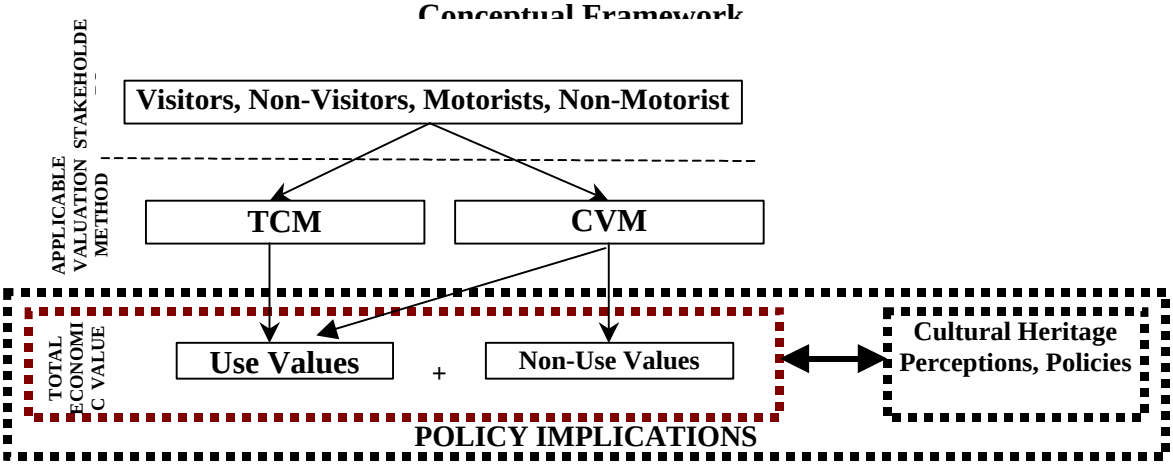
2.0 THEORETICAL FRAMEWORK

2.1 Conceptual Framework

The main idea of the study is determining the total economic value of cultural heritage sites so that it could be inputted as benefit indicator in the environmental impact assessment of road projects. The conceptual framework to do so is illustrated in Figure 2. The framework shows how the total economic value (TEV) of the cultural heritage will be valued using appropriate valuation method from the stakeholders from whom values will be elicited. The stakeholders are the people to which the benefits of preserving the cultural heritage sites are due. These are deemed to be the visitors and non-visitors; and the road-users and the non-road users. The stakeholders are limited by what can immediately be elicited. In general situation, the market of cultural heritage site is not only limited to the locality but on a larger scale, the country or even the world. Moreover, the TEV will be measured against the

existing policies and cultural heritage perceptions of the stakeholders. The relationship of these factors shall be the context of the policy recommendations of the study.

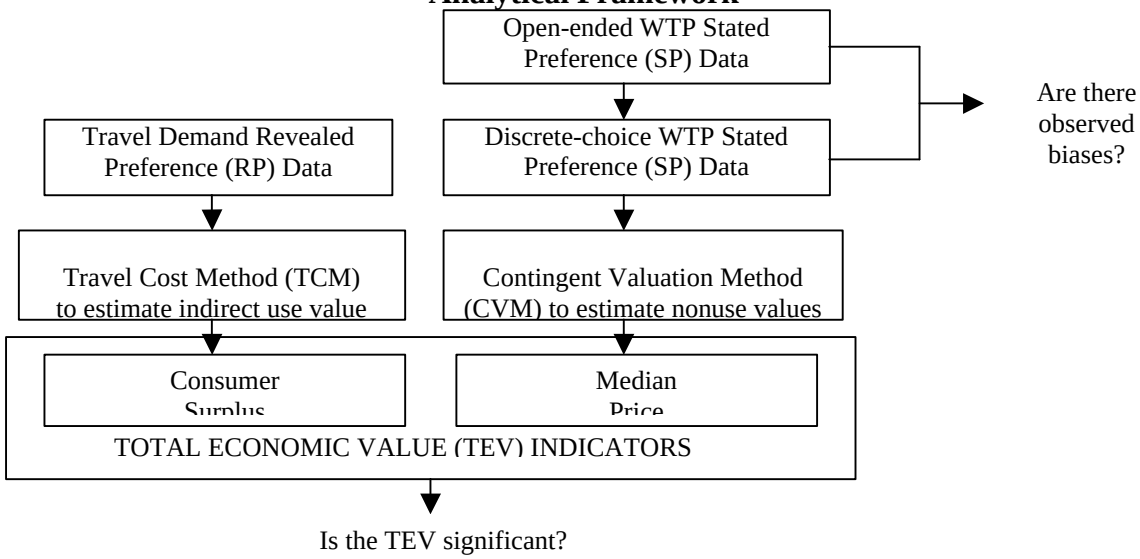
Figure 2
Conceptual Framework



2.2 Analytical Framework

The analytical framework of the study is geared towards increasing the validity of the WTP estimates, rationalizing associated bias in the use of CV, and establishing significance of preserving cultural heritage sites through indicative values. The objective of the analysis is to model the revealed and stated preference data that will lead to the estimation of monetary values associated with the indirect use and non-use values, rspectively. The revealed preference data are generally the tavel charcteristics data while the stated preperence data are the willingness to pay for preserving cultural heritage sites. For the stated preference data, open-ended and discrete choice data will obatained in two separate surveys. The data sets from the two survey will be compared to determine if there are any biases with regards to the use of different elicitation methods. On the other hand, the estimated aggregated value of the cultural heritage sites will be further evaluated to establish if it is significant.

Figure 3
Analytical Framework



2.3 The Empirical Models

The analyses of revealed and stated preference data are done using travel cost method (TCM) and contingent valuation method (CVM). Since revealed preference data are actual 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.

Travel Cost

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

$$q_i = f(p_i, y_i, x_i; b) + e_i \quad (1)$$

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 b 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:

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

In principle, a regression of the recreational demand against the decomposed travel cost will yield parameters b_t, b_o, and b_a associated with transport, time and access costs, respectively (Earnhart, 1999). If transport and time cost are appropriately valued, the relationship $b_t = b_o = b_a$ should follow which also mean that the ratios between the parameters are equal to one.

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. Nobel price winner James Heckman in 1976 offered the two-stage method, also known as the Heckman correction, in handling selection bias. The famous Heckman's lambda has been constantly used in the different applied microeconomic studies.

Contingent Valuation

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:

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

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:

$$U(d,Y) = V(d,Y) + e \quad (4)$$

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 probalility that the respondent will answer yes in a DC WTP question is given by:

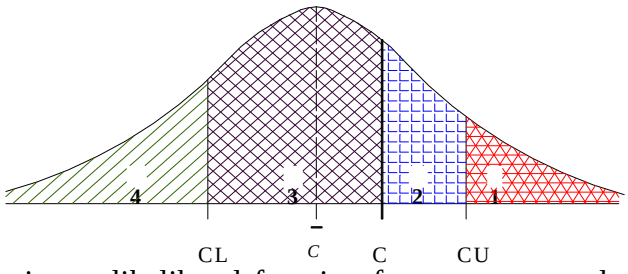
$$Pr(Yes) = Pr\left(V(1,Y-C) + e_1 > V(0,Y) + e_0\right) \quad (5)$$

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:

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

Moreover, the probabilities of the different answer combinations can be approximately illustrated by the following normal distribution graph.

Figure 4
Probabilities of YY, YN, NY and NN responses



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

$$\ln L^{SP} = \sum_i \left(d^i_{yy} \ln P^i_{yy} + d^i_{yn} \ln P^i_{yn} + d^i_{ny} \ln P^i_{ny} + d^i_{nn} \ln P^i_{nn}\right) \quad (7)$$

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

$$\Delta V(C) = a - b \ln C \quad (8)$$

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 equation below shows the functional derivation of the median.

$$0.5 = \frac{1}{1 + \exp\left(-a + b \ln C\right)}$$

$$\overline{C} = \exp(\hat{a} / \hat{b}) \qquad (9)$$

3.0 METHODOLOGY

3.1 Study Area

The study area is the segment 3 of the South Cebu Coastal Road Project located in Cebu City. The Cebu South Coastal Road is a loaned project by the Philippines Government to 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.

Figure 5
Location of Plaza Independencia and Fort San Pedro

The Segment 3 under this project, starts at the Segment 2 - Causeway section and ends at the McArthur Boulevard (S. Osmena Boulevard, Cebu City). Prior to the actual subway design, the subway component has three (3) alternatives namely: (1)widening of M.J. Cuenco Avenue along Plaza Independencia site; (2) elevated highway structure across the Plaza Independencia; and (3) subway/ sub-surface alignment across the Plaza Independencia. Long-term traffic alleviation is only limited to second and third alternative (elevated and sub-surface alignment, respectively). The decision-makers have 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. In spite 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. However, 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.

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.

Figure 6
Plaza Independencia (left) and Fort San Pedro (right)

3.2 Survey Design

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 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 was performed (Section 5.4 refers). Adjustment was made to minimize the sampling error of the full-sample.

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.

Hypothetical Scenario

Since CVM is very much dependent on the respondents' understanding the good in question, the hypothetical scenario 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 degree of preservation will be presented in the alternative scenario, indication of the actual market price of each infrastructure must be

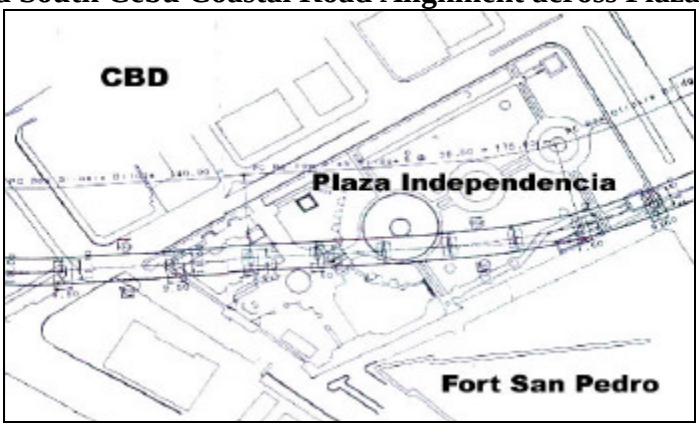
presented as context. The hypothetical scenario for the willingness-to pay question was presented as follows:

> 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 alternative options on how to go about the project. The following table describes the alternative and its consequences.

ALTERNATIVES	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 alternative **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 alternative **A**;18% higher than cost of alternative **B**

The preferred alternative was not elicited. The respondents were asked how much they were willing to pay the following for both alternative A and B 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. The figure below is presented to the respondents to orient them with the scenario described.

Figure 7
The Presented South Cebu Coastal Road Alignment across Plaza Independencia



Measures to Reduce Bias

Different measures were done in the survey to minimize bias mostly related to the conduct of CV studies. The following table presents the summary of these measures.

Table 2
Measures to Reduce Bias

Bias	Measures
Strategic Bias	• use of discrete-choice WTP elicitation format
Starting Point bias	• random card drawing of the initial and follow-up bids
Hypothetical Bias	• use of WTP rather than WTA format
Interviewer and Respondent bias	• orientation of the interviewers on the extent of the study, its objectives and the hypothetical scenario • conduct of pre-testing to familiarize interviewers to the questionnaire • conduct of pre-survey demonstration for each of the interviewer to screen points where questionnaire could be misinterpreted.

4.0 DATA COLLECTION AND ANALYSES

The pre-test survey was conducted from June 25 to 26, 2001 yielded 116 samples while the full sample survey was conducted from June 28 to July 1, 2001. To capture a sample that is representative of the income distribution of the study area, surveyors were assigned in public places where a more random mix of income level could be derived. These sites are: Sto. Nino Church; Plaza Independencia-Fort San Pedro Complex; SM and Ayala shopping malls; CBD; and public and private hospitals. There are 199 (57.18%) male and 149 (42.82%) female respondents. 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.

Based on the general observation of the characteristics of the samples from the pre-test and full-sample surveys, some differences were noted. These minor differences were observed in terms of education level and income. As opposed to the pre-test survey, the full sample survey was able to capture some respondents from a relatively higher education and income level. This difference may be attributed to the areas where the surveys were conducted. It was observed that a more random mix of income could be drawn from areas like the shopping malls than public areas like Plaza Independencia.

4.1 Indirect Use Value Derivation

Travel cost analysis is among the most used methods in estimating indirect use value like the recreational benefits of a site. The method simply entails, first, estimation of the recreational travel demand curve and, second, computation of the consumer surplus which approximates the benefits due to the sites. Bias associated with sample selection in the derivation of wage rate equation was addressed by the Heckman correction method. As derived from the 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.

After the appropriate travel cost components were derived, an aggregated travel cost demand curve based on Marshallian demand function (Equation 1) can be 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 are given by:

q_{PI}	= 11.3407	- 0.029826 TC_PI	+ 14.4207 VISAP	- 0.00038 INCOME	+ 1.05641 AGE	- 2.68294 EDUC, and
	(0.693753)	(-1.99483)	(2.71129)	(-1.07396)	(4.15544)	(-2.62012)
q_{FSP}	- 7.95305	- 0.020509 TC_FSP	+ 10.8355 VISAP	- 0.0003.4 1NCOME	+ 0.824544 AGE	- 0.81088 EDUC
	(-0.65234)	(-1.83574)	(2.62522)	(-1.28491)	(4.3371)	(-1.05435)

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 the following table.

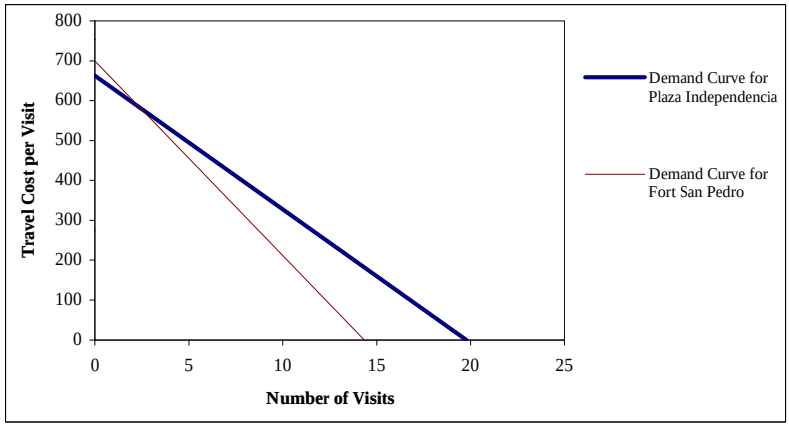
Table 3
Demand Elasticities

	Formula	Plaza Independencia	Fort San Pedro
Price	$h = \frac{(\Delta TC_i / TC)}{(\Delta q_i / q)}$	-7.428	-6.36404
Income	$h = \frac{(\Delta y_i / y)}{(\Delta q_i / q)}$	-7.055	-5.73208

The negative price elasticities of PI and FSP demand curves indicate that the demands for these site are elastic meaning a drop in travel cost increases the frequency of visits, and a rise in travel cost increases it. 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 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 8
Travel Cost Demand Curves of Plaza Independencia and Fort San Pedro



The following table 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.

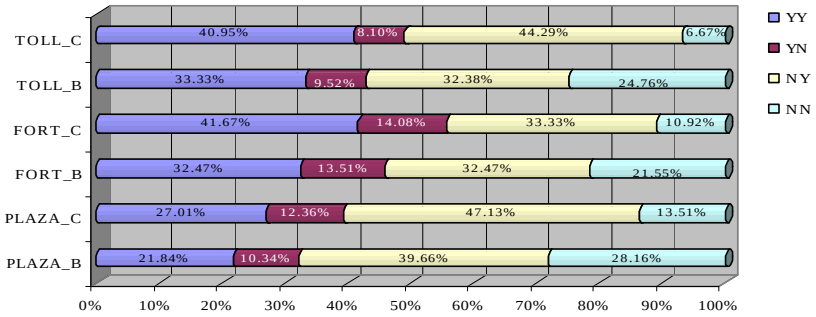
Table 4
Demand Curves Intercept and Consumer Surplus

Destination	Intercept	Consumer Surplus (CS)	Average Benefit per Visit
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**

4.2 Willingness-to-pay for Non-Marketed Goods

To be able to subject the WTP data from the pre-test survey and the full-sample survey into a comparative analysis it must first be established that: (1) WTP data follows a normal distribution, and (2) there is equality between the two populations. The distributions of the double-bounded DC data are shown in the following figure. The figure shows the preponderance of the YY and the NY answer combination.

Figure 9
Distribution of Answer Combination per Payment Vehicle



For the double-bounded DC WTP from the full-sample survey, TSP® software package was used to derive the parameter estimates of the different payment vehicle. The estimated parameters based on the aggregated full sample were used to compute the median WTP.

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

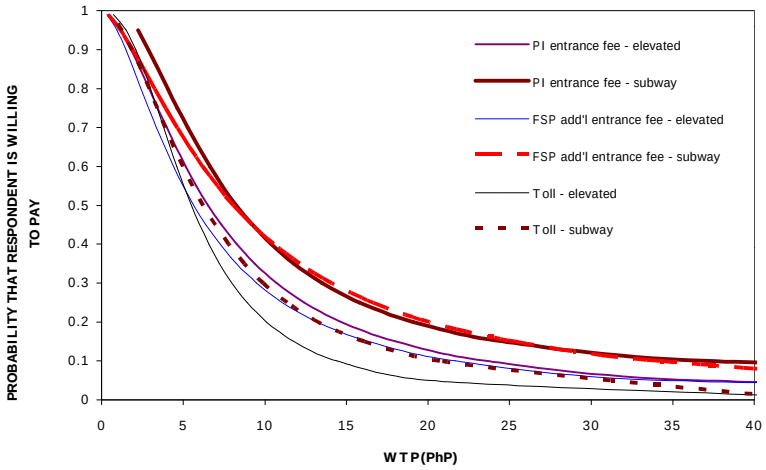
Variable	Parameter	Estimate	Asymptotic Standard Error	t-statistic	$L(0)$	$L(b)$	r^2	Median $(\overline{C})$
PLAZA_B[1]	a	3.20616	.225618	14.2106	-2474.1	-2271.52	0.0819	6.53
	b	1.70929	.098669	17.3234				
PLAZA_C[2]	a	3.65335	.240314	15.2024	-2582.8	-2311.32	0.1051	7.39
	b	1.82610	.119585	15.2703				
FORT_B[3]	a	2.82413	.205325	13.7544	-2479.5	-2289.34	0.0767	5.64
	b	1.63188	.105183	15.5147				
FORT_C[4]	a	3.18562	.200710	15.8718	-2601.7	-2323.26	0.1070	8.09
	b	1.52353	.093303	16.3289				
TOLL_B[5]	a	3.88604	0.322914	12.0343	-1481.5	-1353.83	0.0862	5.50
	b	2.27937	0.177537	12.8388				
TOLL_C[6]	a	3.34565	0.294728	11.3517	-1550.1	-1393.55	0.1010	6.23
	b	1.82835	0.152447	11.9934				

[1]*Entrance fee to Plaza Independencia for Alternative B*
[2]*Entrance fee to Plaza Independencia for Alternative C*
[3]*Additional entrance fee to Fort San Pedro for Alternative B*
[4]*Additional entrance fee to Fort San Pedro for Alternative C*
[5]*Toll fee for Alternative B*
[6]*Toll fee for Alternative C*

5.0 FINDINGS

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 the following figure.

Figure 10
Cumulative Probability of DC WTP by Alternatives 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 alternatives 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. 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.

Biases are differences between actual behavior and theoretical behavior. As discussed previously, among the biases observed in the analysis of WTP data are:

- 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; and

- 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.

5.1 Value of the Cultural Heritage Site

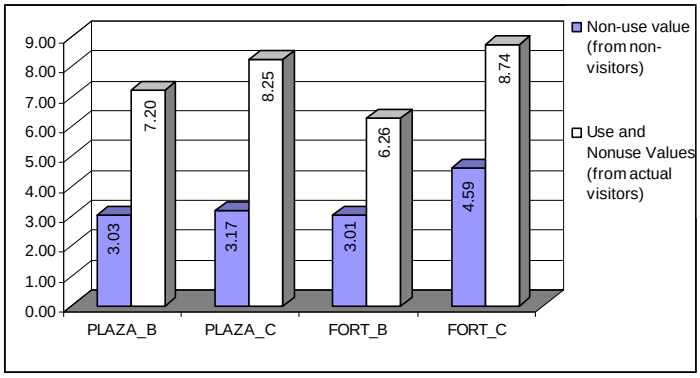
Indirect Use Value

The recreational values of Plaza Independencia and Fort San Pedro were estimated by means of computing consumer surplus from the 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.

Willingness-to-pay

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 graphs show that the site has inherent values that is recognized by non-users. The following figure shows the comparison of values elicited from the non-user and user of the site. 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 values indicated by for Fort San Pedro Fee is about fifty (50%) of the combined use and non use values.

Figure 10
Comparison of Stated-Preference WTP from User and Non-User of the Site



In terms of use values, it is clear that the benefit estimates of use value using TCM is significantly higher than that which could be deduced from the CV survey. The merit of the results of CV survey is mainly in being able to capture non-use values.

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 alternative 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 alternative B and C respectively; and (3) a toll fee of 5.50 and 6.23 pesos for alternative B and C respectively.

The results of the valuation shows that the Present Value computed for 20 years at a discount rate of 15 percent[2] was higher for subway alignment than elevated alignment for only a marginal six percent (6%). Though the difference in value may not be that significance as compared with the actual consequences of the different alternatives, the difference still showed that the experimental market marginally discriminate the goods in question. This value distinction was also used to adjust the indirect use value.

6.0 CONCLUSION AND RECOMMENDATIONS

The study was able to estimate the economic value cultural heritage using the Travel Cost and Contingent Valuation methods. A more comprehensive value of the cultural heritage site was achieved by combining revealed and stated preference data in the valuation of its disaggregated value. The study proves that Travel Cost and Contingent Valuation surveys can be conducted easily in the local context. Moreover, 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 benefit estimates make it clear that there are benefits to preserving cultural heritage sites. The use of discrete-choice method of eliciting WTP proved to reduce the incidence of free-riders. The incidence of free-riders can likewise be illustrated by 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. Since the cultural heritage value can be more understood by a person who reached higher level of education and persons in low-income groups reached only lower level of education as compared with high-income groups. One factor that can explain the bias is the weakness of the hypothetical scenario 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, on the other hand, is the ability to be able to conduct high quality CV studies because of higher literacy rate, thus more qualified surveyors, and lower fees for surveyors, therefore ability to have larger sample.

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. 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. The study may prove to be useful in cases of damage assessment and evaluation of alternative degree of cultural heritage preservation**.**

Recommendations

The valuation of cultural heritage sites preservation must be adopted as one of the general strategies for roads and other infrastructure developments. Bilateral talks between public works offices and National Museum must be done to lay down policies that will prevent damages to cultural heritage resources and prevent delays for much needed road projects. In

[2] Discount rate and project life is adopted from the Feasibility Study of the project.

this line, both the National Museum and DPWH must be able to strengthen its capacity in terms of environmental economics to properly address social and environmental impacts.

Since 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.

Since damages to cultural heritage is an irreversible environmental impact, its the appropriate protection of such cultural heritage must be supported by various related policies on cultural heritage protection specifically recommending tools for valuing cultural heritage resources.

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