ESTIMATING THE PUBLIC GOOD VALUE OF PRESERVING A LOCAL HISTORIC LANDMARK:

THE ROLE OF NON-SUBSTITUTABILITY AND INFORMATION IN CONTINGENT VALUATION

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Abstract. This study applies the contingent valuation method to estimate the public good values of preservation and restoration of a local historic landmark in a medium-sized U.S. city. The survey device centers on a referendum-style dichotomous-choice question regarding city participation in a restoration partnership. Use of a double-split sample allows analysis of the effect on valuation of (1) heritage information and (2) willingness-to-pay versus willingness-to-accept constructs, where the latter is approached by the method of paired comparison, allowing a nonsubstitutability effect to be separated from any endowment effect. Econometric analysis using a standard binary logit model indicates the existence of a strong nonsubstitutability effect, and a significant information effect that further suggests the importance of nonsubstitutability in valuation.

Key words: Historic preservation, heritage conservation, contingent valuation, willingness-to-pay, paired comparison, information.

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Robert W. Kling, Charles F. Revier, and Karin Sable

1. Introduction

Tools developed by environmental economists to value public good aspects of the "natural" world increasingly are viewed as relevant to valuation of analogous aspects of the "cultural" environment. Among these tools, the contingent valuation method (CVM) has been virtually the only one applicable when non-use values are important to include.

CVM has mostly been applied to natural environmental goods because of the important presence of non-use values (option, bequest and existence values) as components of total value. Historic preservation is in most ways equivalent to environmental preservation; although the environment is cultural and man-made rather than natural, it typically involves both use and non-use values that are exactly analogous, and that make CVM an obvious tool for valuation (Frey, 1997; Throsby, 1997). Previous published applications of CVM to cultural heritage assets are few enough (for a very good summary see Santanaga and Signorello (2000)); even more limited are those studies focusing specifically on the physical preservation of the built environment itself. Among those published in the professional literature are the studies of Groschlaude and Soguel (1994), Willis (1994), Maggi (1994), Beltrán and Rojas (1996), and Chambers et al. (1998).

Not only might CVM be of practical use for heritage valuation, but certain theoretical issues arising in CVM are particularly germane to the historic built environment. First, built

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heritage assets frequently are unique and always irreplaceable in any meaningful sense; this raises the prospect that a "nonsubstitutability effect" may contribute importantly to a discrepancy in "value" when measured as willingness-to-accept (WTA) versus willingness-to-pay (WTP). Such discrepancies are normal and often considered problematic in CVM studies. Second, since CVM relies on the construction of a hypothetical market-like scenario to elicit valuation from respondents, practitioners recognize the need to adequately inform respondents of the key characteristics of the asset to be valued. In the case of cultural assets, this issue is especially interesting since site-specific education serves not just to inform a person of some set of objective, independent asset characteristics, but actually creates in part the understanding that is the core of cultural value. More to the point of this paper, information can affect respondents' assessments of the nonsubstitutability factor.

In this study we use the case of an historic hotel in a medium-sized U.S. city to examine how each of these issues enters into the valuation of built heritage via CVM. The survey device centers on a referendum-style dichotomous-choice question regarding city participation in a restoration partnership. Use of a double-split sample allows analysis of the effect on valuation of (1) heritage information and (2) WTA versus WTP valuation constructs. Actually, the study uses an altered WTA construct inspired by the paired comparison (PC) method, allowing isolation of the nonsubstitutability effect. Econometric analysis using a standard binary logit model indicates the existence of a strong nonsubstitutability effect, and a significant information effect that further suggests the importance of nonsubstitutability in valuation.

2. Background

2.1 Willingness-to-pay versus willingness-to-accept

Under standard assumptions, theory predicts that marginal WTP and marginal WTA should be about equal, and should reflect the "willing buyer, willing seller" price that would prevail if a true market for the good were feasible. However, the numerous studies showing that measured WTA significantly exceeds measured WTP have generated controversy over the reliability of CVM, and a bias toward use of the lower WTP measure despite valid explanations for the disparity and legal contexts in which WTA is the conceptually relevant approach. For cases when the WTA-WTP disparity persists even in the absence of income effects and risk effects and when every effort is made to minimize methodological biases, there are a number of possible explanations, as summarized by Brown and Gregory (1999). For the purposes of this paper, we briefly review the two leading explanations.

Hanemann (1991) has made clear that the greater the lack of substitutes for the good under evaluation, the greater the likely divergence between WTA and WTP. On the basis of this "nonsubstitutability effect," we would expect WTA-WTP disparities to prevail in the evaluation of generally unique aspects of the natural environment, where CVM is most commonly applied, and in many cases of cultural environment, particularly built heritage. Hanemann's theoretical proposition has been supported by experimental evidence offered by Shogren et al. (1994) and Boyce et al. (1992). The latter researchers broadened the nonsubstitutability factor to include other "intrinsic" factors such as irreversibility, sentimentality, and moral obligation; their experimental evidence indicated that such intrinsic elements exacerbate the WTA-WTP disparity.

The other main explanation involves the "endowment effect" posited by Kahneman and Tversky (1979) and Thaler (1980) as arising from a combination of a respondent's "reference

point" and preferences characterized by "loss aversion." A formal theoretical model of this phenomenon has been offered by Tversky and Kahneman (1991), and numerous empirical studies have attempted to assess its significance. See, for example, Kahneman et al. (1990) and Knetsch (1995). Frey and Pommerehne (1987) evidenced the phenomenon at the aggregate level for cultural treasures, which is relevant to the present study. But in general, studies indicate that the loss aversion phenomenon generates an endowment effect on WTA even for the most trivial of private goods, such as coffee mugs.

2.2 The paired comparison construct

The paired comparison (PC) approach can provide a hybridized measure of value that approaches WTA but that adjusts for reference point and eliminates the "endowment effect" that could be responsible for WTA-WTP disparities. Originating in marketing research, PC has been explored by environmental economists for its applicability to public good valuation. It has been applied by Loehman and Hu De (1982) to value air quality improvements, and by Magat et al. (1988) and Viscusi, Magat, and Huber (1991) to value risk choices. Peterson and Brown (1998) tested experimental PC results against standard preference axioms, and discussed the implications for real policy evaluation.

Kahneman et al. (1990) and Loomis et al. (1998) compared PC-type estimates with more traditional WTP and/or WTA estimates for private goods in experimental settings. In this connection, and at the risk of reviewing the obvious for the already initiated reader, let us summarize how WTP, WTA, and PC questions relate to choices such as are illustrated in Figure 1. Suppose point A is the respondent's current endowment of public good and private goods (income). When (with appropriate context) a researcher asks a respondent, "Would you be

willing to pay Y dollars to obtain an increase of X in the amount of public good?", the respondent is being asked to compare point A and point B, with point A as the reference point. If Y can be narrowed to the amount at which the consumer is indifferent to that exchange, then Y is the exact WTP for X, and the indifference curve runs through A and B as shown. On the other hand, when a respondent is asked, "Would you be *willing to accept* Y' dollars in exchange for forgoing the public good increment in amount X," he/she is being asked to compare points C and D, with point C as the reference point.

Next consider a *paired comparison* question in which the respondent is asked, "Would you rather receive increment X of the public good or increment Y of income?" In this case, he/she is being asked to compare points C and D as in the WTA question, but clearly with point A rather than point C as the reference point. Table 1 summarizes the key elements of each of the 3 approaches.

In the language of Kahneman et al. (1990), those asked each question are, respectively, "buyers", "sellers", and "choosers." The bulk of WTA-WTP studies have compared the outcomes of the first and second approaches. The Loomis et al. study compared the first and third approaches, with the advantage that respondents were making use of the same reference point, while still comparing trade-offs at the two different utility levels (C-D versus A-B) shown in Figure 1 and implicit in all other WTA-WTP studies. They found that a disparity persisted, though in much smaller measure than found in typical CVM studies. That finding is consistent with the results of Kahneman et al.

In this study we extend this line of research by comparing WTP and PC values for a real-world public good. We find that even when PC is used instead of WTA, there exists a large disparity relative to WTP. In contrast to the private good cases of Kahneman et al. (1990) and

Loomis et al. (1998), our public good case indicates that the nonsubstitutability effect plays a significant role.

2.3 The role of information

The type and amount of information to offer CVM respondents about the good to be valued is what Cummings, Brookshire and Schulze (1986) call the "framing" issue. As argued early by Randall, Ives and Eastman (1974), for the scenario presented to the respondent to effectively mimic a market or referendum in the desired way, the information must include, among other things, an adequate description of the good itself, so the respondent can reasonably weigh relevant quantity and quality factors against price. Bergstrom, Stoll and Randall (1990) give theoretical rationale and empirical evidence that enhanced commodity specification increases willingness to pay, and does so constructively. Boyle (1989) presents evidence that elaborated information can reduce the variance of value estimates, generating greater statistical confidence in those estimates. Blomquist and Whitehead (1998) find that detailed information helped respondents differentiate among resources of varying quality, thereby enhancing the validity of valuation.

On the other hand, some authors (e.g., Samples, Dixon and Gowen, 1986; Ajzen, Brown and Rosenthal, 1996; Tkac, 1998) raise the concern of "information bias" and the potential that a subjectively chosen information set could cause value to be distorted, and most likely overstated. That discussion adds information bias to the long list of other biases that can plague survey-based research.

In the present study we test the impact of enhanced information on valuation in the relatively novel context of historic preservation. In the valuation of natural environment, valuation is mostly individualistic, though some altruism can enter as a non-use value. By

contrast, the very essence of culture is shared understandings, and the value of the built heritage springs not only from individual aesthetic appreciation, but also very significantly from its role in providing distinctive social reference points based on shared understandings. In this context, description of the historic character of an asset is almost unavoidably preference-*forming* as well as preference-*in*forming. A sort of Heisenberg uncertainty principle applies: the very act of surveying serves to identify the asset as a heritage good in the sense discussed by Peacock (1994) when it might not have been so identified before. The survey itself can generate "attention" in the sense recently discussed by Mignosa (2000). We make no judgement about whether that effect represents an undesirable bias. Rather, for the case of a relatively unique and irreplaceable asset, we consider whether added information contributes to the nonsubstitutability factor in valuation.

3. The empirical study

3.1 The referendum context

We take advantage of a relatively recent form of referendum in Colorado, which also has been in use in other states. Under the 1992 "Taxpayers' Bill of Rights" amendment to the state constitution, localities whose tax revenues perchance exceed the constitutionally prescribed growth limits must either rebate the surplus to citizens, or seek their permission to keep it, via referendum. Typically, the referendum issue specifies the use to which the funds would be put, if citizens vote to forego a rebate. Thus, Colorado has come to see a special form of ballot issue in which voters are asked, essentially, if they would rather have Y (a lump-sum dollar amount to be added to their budgets) or X (a particular type and amount of public good). For example, in the medium-sized city in which our study was conducted, voters recently have been asked to choose between a city tax rebate and certain street improvements, and between a state tax rebate and

certain school, transportation, and university construction projects; they chose the public good in the former case and the rebate in the latter. This type of question corresponds to the typical paired comparison question used in survey research.

At the same time, local voters are familiar with the more traditional referendum question in which they are asked to approve a special tax in order to fund a particular public good. Since 1990, voters in our study locality considered and *rejected* local sales tax proposals for jails, low income health care access, a zoo, open space purchases, and a courthouse complex; considered and *approved* special sales taxes for natural areas, a revised open space purchase plan, revised courthouse and jail projects, and a county fairgrounds project; *rejected* property tax increases for instructional improvements in the schools and for weed control, then *approved* a revised school tax proposal; and *rejected* a tobacco tax to fund tobacco-related health and education needs, and a fuel and vehicle tax to fund transportation needs. The electorate appears not only inclined to choose among different types of public goods, but also willing and able to discriminate between similar but distinct proposals for a given type of public good.

Given this background, we were able to design a survey instrument that, using a split sample, asked local citizens to respond to hypothetical referenda of familiar types, one corresponding to a traditional WTP question, and one corresponding to a PC question.

3.2 The historic landmark

The actual heritage good in question was the salvation and restoration of the Northern Hotel, an important landmark in downtown Fort Collins that stood in serious risk of irreversible deterioration leading to total loss. The hotel had its origins in 1866 (before Colorado gained statehood), was built up to true hotel status in 1905, and reached its current size and its archi-

tectural prime in the 1920s and 1930s. It hosted numerous movie stars and President Franklin Roosevelt, before its decline in the 1950s. It remains the largest old building in the historic district, but decades of neglect, a major fire, and abusive commercial tenants have degraded its structural integrity and appearance, and it has been at risk of complete destruction. While not a monument of importance to a national population, this hotel is a unique, large, highly visible, broadly identifiable landmark representing the historic identity of a high-growth city struggling with massive homogenization of the built landscape.

3.3 The survey instrument

The survey instrument was designed according to standard CVM guidelines, and presented a referendum-style dichotomous choice question to the respondent. Respondents were provided: (1) an historic photograph of the hotel and historical background information; (2) questions assessing their attitudes toward historic preservation and awareness of this particular hotel; (3) a description of the anticipated impacts of the proposed restoration, including the appearance and use of the building, (4) a section giving the proposed funding mechanism, the referendum question itself, and a probe for possible protest votes, and (5) a request for standard demographic information.

Within this basic outline of the 8-page instrument, four treatments were applied to a double-split sample. One differentiation involved the amount of historical information provided: in the “high information” version, two full pages of historical information (including an extra photograph) were provided as background; in the “low information” version, the information section was cut by 75 percent, to a simple half-page paragraph.

The second split treatment related to the valuation question. In one version, respondents were asked whether they would vote YES or NO on a one-time property tax for the stated purpose, with bid amounts varying among respondents, at 16 levels ranging from $2 to $300. In the other version, respondents were asked if they would vote YES or NO on a proposal to use their share of a revenue surplus for the project as opposed to a tax rebate, with the same distribution of bid amounts. Thus, the tax version corresponds to a standard WTP question, while the rebate version corresponds to a PC question.

In all cases, the survey instrument made clear that if the tax or rebate reassignment were not approved by voters, "restoration would not occur, and the Northern Hotel would continue to deteriorate and might eventually require demolition."

3.4 The sample

Since the subject hotel is clearly a local public good, the appropriate survey region was the city of Fort Collins. Accordingly, the survey was sent by mail to a sample of 501 city households drawn at random from among city utility customers. The procedure included: (1) an announcement card sent 10 days prior to the main mailing, (2) the survey instrument itself with a cover letter explaining the purpose of the survey and encouraging participation, (3) a follow-up letter and survey to non-respondents approximately one month after the initial mailing, and (4) telephone follow-up with remaining non-respondents, offering a final opportunity to return the survey. The process, carried out during spring and summer of 1997, brought a final return rate of 50.5 percent, which is typical for a general population mail survey with no financial incentives enclosed (Loomis and Gonzales-Caban,1994).

Key statistics for the final "cleaned" sample used for estimation are summarized in Table 2, and compared to population statistics where possible. The statistics indicate that our sample was noticeably more affluent, older, and more educated than the general city population. Although comparative data are not available, it is our subjective judgement that the sample respondents probably also have longer than average tenure in the city, and higher than average frequency of visits to the historic city center. On the assumption that the original mail distribution was effectively random, the non-representative sample is likely due to respondent self-selection, and introduces the possibility of sample bias in the analysis. In the section on econometric results, we discuss the adjustments we make for this non-representativeness. Table 3 shows the unanalyzed YES/NO responses by bid amount, for the full sample and each subsample. These responses are what the econometric analysis seeks to explain.

4. Econometric Analysis

4.1 The general binary logit model

As usual with a dichotomous-choice or voter-referendum survey, the object of the econometric analysis is to estimate the relationship between the probability of a particular choice—say, a YES vote—and the explanatory factors that would have some impact on that probability. These explanatory factors would include the attitudes, preferences, knowledge, and socioeconomic characteristics of the individual, as well as the specific terms of the vote—the dollar amount of support the individual is asked to approve and the form in which that support would be given. We use the standard binary logit model. With the logit formulation, the probability that a particular individual will vote yes is assumed to be related to the explanatory variables as described by the following equation:

$$\text{Prob(yes)} = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \cdots + \beta_k X_k)}} \tag{1}$$

or,

$$\log \frac{\text{Prob(yes)}}{1 - \text{Prob(yes)}} = \beta_0 + \beta_1 X_1 + \cdots + \beta_k X_k \tag{2}$$

where $X_1, \ldots, X_k$ are the explanatory variables,

$\beta_0, \ldots, \beta_k$ are the parameters to be estimated,

e is the base of natural logarithms,

log is the natural logarithm.

Since this relationship is nonlinear in the parameters, a maximum-likelihood estimation procedure is used to estimate the parameters. In this case the probability of a YES vote for supporting preservation of the Northern Hotel was related to the following explanatory variables:[1]

BID = the particular amount of tax or revenue surplus proposed to each respondent;

AGE = the age of the respondent;

EDU = the number of years of formal schooling completed by the respondent;

INC = before-tax household annual income from all sources, in thousands of dollars.[2]

In addition, the following explanatory variables concern the rating which respondents gave, on a 5-point Likert scale (strongly disagree = 1, strongly agree = 5), to the statement that "historic

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[1]Other household data collected, but not included in the final analysis because they showed little independent explanatory power, included: respondent gender, residence tenure in the city, area of residence, frequency of visits to the city historic district and other historic sites, and affiliation with heritage organizations.

[2]On the survey, respondents placed their income in one of twelve ranges. The variable INC was created by using the midpoint as an estimate of income in each range, but with the value for the first category (less than $10,000) set at $8400, and the value for the top category (over $150,000) set at $180,000.

preservation efforts are important for building community, identity, and unity among Fort Collins residents."

SOCDUM12 = 1 if the response was a 1 or a 2 on the Likert scale, and 0 otherwise;

SOCDUM3 = 1 if the response was a 3, and 0 otherwise;

Preliminary analysis showed that there was no significant difference between those who responded with a 4 and those whose response was a 5. Likewise, there was no significant difference between ratings of 1 and 2. Therefore, respondents with a 4 or 5 were taken to be the base case, and the coefficients of the two dummy variables indicate the differential impact on probability of a "disagree" rating of 1 or 2, or a "neutral" rating of 3, from an "agree" rating of 4 or 5.

The responses to the various attitudinal questions on the survey were highly correlated. This particular question concerning social and community values seemed to be the best summary measure of attitudes regarding support of historic preservation.

4.2 Protest votes

Although 252 surveys were returned, 40 of these had no usable response for one or more of the variables included in the equation, leaving a sample of 212 usable observations. The sample also was screened for "protest votes" that signal objection to some aspect of the exercise rather than a pure WTP of zero. In the questionnaire, respondents who voted no to the amount of the BID written in on the survey were then asked what amount they would be willing to approve if there were some smaller amount they would find acceptable. If they expressed an unwillingness to approve *any* amount, they were then asked to select from a list of possible reasons, or to write in their own explanation. If respondents indicated a willingness to pay a smaller amount, or if they indicated that they did not believe the hotel was worth the amount they were asked to

approve, or if they indicated they could not afford to pay the amount, then these responses were interpreted as true no votes. However, if respondents felt a contribution from them to preserve the hotel was unfair, if they were opposed to government support for historic preservation, if they felt preservation was not important, if they felt the proposed restoration was too ambitious, or if they expressed similar misgivings, then their responses were interpreted as protest responses. These responses represented concerns over the scenario presented to them which they are expressing by voting no, when in fact they may very well view preservation of the hotel as providing positive benefits which they would value. Following usual CVM practice we omitted these protest votes from the sample. Of the 212 surveys providing all the information necessary to estimate the logit equation, there were 35 protest votes, leaving a sample of 177 observations excluding the protests.

4.3 Preliminary tests of the sample splits

We initially tested for differences in constants and coefficients between the subsample using the refund of a revenue surplus as the payment vehicle and the subsample using an added tax as the payment vehicle (corresponding to the PC and WTP constructs, respectively). A preliminary likelihood ratio test revealed that the null hypothesis that all coefficients were the same for the two subsamples was rejected at the 1% significance level, with a log likelihood ratio of 28.5. However, with a dummy variable TAX (with value 1 for the tax vehicle, 0 for the foregone rebate vehicle) included to allow for different constant terms, the null hypothesis that the slope coefficients of all explanatory variables were the same for both subsamples could *not* be rejected at the 10% significance level, with a log likelihood ratio of 4.51.

Similar likelihood ratio tests for differences between the subsample of surveys involving low information about the history of the hotel and the subsample involving high information revealed that even with a dummy variable, HIINFO, included to account for differences in the constant term, the null hypothesis that all the slope coefficients were the same was easily rejected at the 1% significance level. The value of the log likelihood ratio for this test was 24.2. Closer analysis revealed that the explanatory variables which had distinctly different effects in the low and high information subsamples were BID, EDU, and SOCDUM3. Allowing for different constant terms and different slope coefficients for BID, EDU, and SOCDUM3, the null hypothesis that the remaining slope coefficients were the same in both subsamples could not be rejected at the 10% significance level, with a log likelihood ratio of 3.52.

4.4 Final estimated equation

On the basis of the preliminary testing described above, an equation was estimated for the sample of 177 observations with protest votes excluded. The results were:

$$\begin{aligned}\log\frac{\text{Prob(yes)}}{1-\text{Prob(yes)}} = {} & \underset{(2.68)}{1.96} - \underset{(0.553)}{2.47}\ \text{TAX}^* + \underset{(3.74)}{7.26}\ \text{HIINFO} - \underset{(0.00542)}{0.0235}\ \text{BID}^* \\ & + \underset{(0.00617)}{0.0180}\ \text{HIINFO} \times \text{BID}^* - \underset{(0.0183)}{0.00806}\ \text{AGE} + \underset{(0.161)}{0.191}\ \text{EDU} \\ & - \underset{(0.219)}{0.572}\ \text{HIINFO} \times \text{EDU}^* + \underset{(0.00753)}{0.0199}\ \text{INC}^* \\ & - \underset{(1.63)}{5.75}\ \text{SOCDUM12}^* - \underset{(1.38)}{4.37}\ \text{SOCDUM3}^* \\ & + \underset{(1.54)}{3.30}\ \text{HIINFO} \times \text{SOCDUM3}^* \end{aligned} \tag{3}$$

$n = 177$ LR (12 df) = 85.0

% Yes votes in sample = 70.6 McFadden R - squared = 0.397

The LR statistic allows us to reject at the 1% significance level the null hypothesis that none of the explanatory variables is statistically significant. The numbers in parentheses are the asymp-

totic standard errors for the estimated coefficients, and the specific explanatory variables with significance at the 5 percent level are marked with asterisks. Though more detailed discussion of key variables will follow, the basic conclusions with respect to the coefficients include:

- The key explanatory variables that are statistically significant at the 5 percent level, with coefficients of the sign expected *a priori*, are the TAX dummy, the BID amount, the income level, and a "disagree" or "neutral" rating of the social importance of historic preservation.
- The three cross-effect variables, measuring the change in the BID coefficient for the high-information subsample, the change in the education coefficient for the high-information subsample, and the change in the coefficient of the dummy variable for those who were "neutral" about the social importance of historic preservation, also have statistical significance.
- Age, as well as education level for the low-information subsample, are statistically insignificant explanatory variables. HIINFO, the dummy variable for the high-information subsample was statistically significant at the 10 percent significance level, but not at the 5 percent level.
- Having a "negative" rating of the social importance of preservation has a larger downward impact on valuation than having a "neutral" rating, consistent with theoretical expectations.

Taken as a whole, the results indicate the study has construct validity. We now proceed to the model's implications regarding the value of this public good, and to elaborated discussion of what the TAX and HIINFO variables' impacts tell about the role of nonsubstitutability in households' valuation.

4.5 Value of the public good

As Hanemann (1989) demonstrates, the mean WTP may be determined from the formula

$$\text{Mean WTP} = \frac{1}{\beta} \ln(1 + e^{\alpha}) \tag{3}$$

where β is the absolute value of the coefficient of BID in the estimated logit equation, and α is the sum of all the other terms in the equation evaluated at the mean values of the explanatory variables. Since our sample seems not to be representative of the actual city population in terms of income, age, education, and possibly attitude, we calculated mean valuations using four models to adjust for the differences, as follows:

Model 1: Unadjusted; calculated using sample means for explanatory variables.

Model 2: Adjusted for known differences; calculated substituting city population means for income, education, and age; attitude variables left at sample means.

Model 3a: Adjusted for known differences in income, education, and age, and calculated as if all households held a "neutral" attitude about preservation.

Model 3b: Adjusted for known differences in income, education, and age, and calculated as if all households held a "negative" attitude about preservation.

The results, applying each of the four calculation models to each of the four sample splits, are shown in Table 4. The large differences in the values across each row indicate how sensitive the valuation estimates are to standard demographic attributes and, even more so, to assumptions about the population's general attitude toward preservation. The possibility of an attitude-biased sample suggests that realistic estimates be adjusted away from those of Models 1 and 2 and toward Model 3a or, to be extremely conservative, toward Model 3b.

Setting the attitude assumptions aside, however, the results in each column show important gaps between WTP and PC values, indicating an important "nonsubstitutability" effect. They also highlight the effect of information on valuation, including how high information affects persons with "neutral" attitude much more than those with "negative" attitude.

We derived representative "demand" functions for the various sample splits. Figures 2 and 3 compare the WTP and PC "demand" functions corresponding to Model 2, for the separate scenarios of low information and high information, respectively. In both cases the gap between the two valuations shows clearly. The estimated curves in the high-information case display highly inelastic demand, which is partly what lies behind the highest valuation estimates in Table 4.

4.6 Valuation construct, information, and the nonsubstitutability effect

The significant negative coefficient on TAX indicates that respondents' valuation is sensitive to the nature of the valuation construct, namely, to a WTP question versus a PC question. The impact is manifested in the mean valuation figures summarized above, and for the demand functions more generally, the effect is illustrated in Figures 2 and 3. Figure 2 compares the WTP and PC demand curves in the low information case, and Figure 3 does the same for the high information scenario, both using Model 2. In both cases we note that some factor causes PC valuation to be higher than WTP valuation.

Since income effects should be negligible for the bid values in question (see Randall and Stoll, 1980), and since use of the PC question instead of traditional WTA eliminates the potential for loss aversion or endowment effect to affect valuation, we are left with the conclusion that nonsubstitutability plays the critical role in this case, and that the impact is substantial.

This conclusion is further supported by the role that information, in the form of the HIINFO variable, plays in respondents' valuation in this study. As noted above, the provision of fuller information has a marked impact on households' valuation of the public good, increasing the mean value in Model 2, for example, from $95 to $353 under the tax scenario and from $196 to $779 in the forgone rebate scenario. The more general impact on the demand functions is shown in Figures 4 and 5, for the tax and rebate scenarios respectively. The visual impression from these figures is that, rather than unambiguously shifting demand outward, information provision mainly has the effect of making demand much less elastic.

The significantly positive coefficient of HIINFO x BID contributes to this steepening of the bid curves. Using a Wald test, the null hypothesis of a zero value for the BID coefficient for the long-description subsample (the sum of the coefficient of BID and the coefficient of HIINFO x BID) could not be rejected at the 10% significance level (using either the chi-squared test or the F-test). Thus, we can only weakly conclude that these bid curves are downward-sloping at all, when high information is provided.

Of the factors traditionally cited as lowering price elasticity — low budget share, degree of necessity, short time allowed for adjustment, and low availability of substitutes — the last clearly provides the best explanation for the elasticity effect in this case. We postulate that in this study, fuller provision of information served to distinguish the historic landmark in question from other parts of the local built heritage, and thereby to enhance the nonsubstitutability factor in respondents' assessments.

The positive and statistically significant coefficient on HIINFO x SOCDUM3 indicates that for those who were neutral with regard to the social value of historic preservation, the provision of more complete information significantly increased the likelihood of a YES vote at

any given BID amount. Those who were neutral toward preservation were still less likely to vote yes than those with a more favorable attitude, but the greater amount of information substantially reduced that difference. In fact, a Wald test shows that the coefficient of SOCDUM3 for the high-information subsample is not statistically significant at the 10% significance level, though it is statistically significant at the 5% level for the low-information subsample.

A final note concerns the interactive effect of information and education. The EDU variable has a negligible solo impact on household valuation. However, the interaction variable HIINFO x EDU has significant and negative impact, meaning that in this study either more education reduced the impact of information or, less plausibly, that more information causes EDU to have a negative effect on valuation. A Wald test shows the coefficient for EDU to be negative and statistically significant at the 5% level for the high-information subsample, but *not* statistically significant even at the 10% level for the low-information subsample.

5. Conclusions

In this study we used the contingent valuation method to explore demand for the public good aspects of preservation of a local historic landmark. A double-split sample allowed comparison of valuation under willingness-to-pay and paired-comparison question formats, as well as comparison of the impact of high versus low information.

Both aspects of the comparisons served to highlight the importance of nonsubstitutability in valuation of a unique, irreplaceable asset such as the one studied here. While a PC question resembles a WTA question in that it addresses the trade-off on a prospective higher indifference level than the WTP question, it differs in reference point and therefore eliminates the prospect of loss aversion affecting valuation. Therefore, when the usual WTA-WTP disparity manifests itself

anyway, it is most plausibly ascribed to a strong nonsubstitutability effect rather than an endowment effect.

In addition, the specific results of this analysis show that the provision of richer site-specific information to household respondents has the main result of making demand for preservation much more inelastic with respect to price. This result, too, signals that nonsubstitutability is a major factor behind how households value this type of heritage asset. The impact of site-specific information is especially strong on respondents who expressed a neutral attitude toward historic preservation in general.

As a final aside, let us note how the status of this preservation project has progressed since the time of our survey in 1997. The scenario presented in the survey instrument involved restoration of the building as a functioning hotel catering to the heritage tourist and business traveler market; at the time, this was the leading vision of the hotel's future. In the interim, the actual project has been revised in the interest of financial realities, and now involves the street level housing commercial tenants and the three upper floors being remodeled into 47 apartments for low-income senior citizens. The facade would be restored to its 1930s appearance, as proposed in our survey. The $10 million project is becoming a reality, under a partnership among private organizations and the City of Fort Collins, and the city's financial involvement will amount to some $670,000 or about $17 per household. By all but the most conservative benefit estimates given in Table 4, this level of public involvement in the project would appear to be economically rational.

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TABLE 1. Reference points for WTP, WTA, and PC, relative to Figure 1

	Asks for comparison of . . .	Using reference point . . .
WTP question	A and B	A
WTA question	C and D	C
PC question	C and D	A

TABLE 2. Sample and population means

		Full Sample (N = 177)	Tax, low info (N = 39)	Tax, high info (N = 43)	Rebate, low info (N = 47)	Rebate, high info (N = 48)
ANNUAL HOUSE-HOLD INCOME	Sample	$68,861	$77,692	$80,116	$56,702	$63,508
	Population	$56,904				
AGE OF ADULTS	Sample	47.3 years	48.2 yrs.	47.6 yrs.	46.2 yrs.	47.2 yrs.
	Population	38.8 years				
YEARS OF EDUCATION	Sample	16.6 years	16.6 yrs.	17.0 yrs.	16.4 yrs.	16.5 yrs.
	Population	14.0 years				
YEARS IN FORT COLLINS	Sample	18.2 years	21.7 yrs.	19.4 yrs.	16.6 yrs.	15.8 yrs.
MONTHLY VISITS TO HISTORIC CENTER	Sample	2.5	2.3	2.7	2.5	2.4
PERCENT VOTING YES		70.6%	51.3%	62.8%	78.7%	85.4%

TABLE 3. Responses by Subsample for Each Bid Amount

Bid	Full Sample (N = 177) Yes / No	Tax, low info (N = 39) Yes / No	Tax, high info (N = 43) Yes / No	Rebate, low info (N = 47) Yes / No	Rebate, high info (N = 48) Yes / No
$2	9 / 1	1 / 0	1 / 1	2 / 0	5 / 0
$10	8 / 1	2 / 0	0 / 1	1 / 0	5 / 0
$20	17 / 1	5 / 0	4 / 0	5 / 0	3 / 1
$40	10 / 1	1 / 0	3 / 1	4 / 0	2 / 0
$60	7 / 1	0 / 1	5 / 0	2 / 0	0 / 0
$80	10 / 5	1 / 2	3 / 1	2 / 1	4 / 1
$100	8 / 5	1 / 1	1 / 3	5 / 1	1 / 0
$120	9 / 2	1 / 1	3 / 1	1 / 0	4 / 0
$140	7 / 3	3 / 2	1 / 0	1 / 0	2 / 1
$160	6 / 1	2 / 0	1 / 0	3 / 0	0 / 1
$180	6 / 7	0 / 5	0 / 1	4 / 1	2 / 0
$200	6 / 8	2 / 4	1 / 3	1 / 1	2 / 0
$220	6 / 8	1 / 0	2 / 3	2 / 3	1 / 2
$250	8 / 5	0 / 2	0 / 1	3 / 2	5 / 0
$294	1 / 0	0 / 0	1 / 0	0 / 0	0 / 0
$300	7 / 3	0 / 1	1 / 0	1 / 1	5 / 1
Total	125 / 52	20 / 19	27 / 16	37 / 10	41 / 7

TABLE 4. Estimates of mean valuation per household

	Model 1 Unadjusted, all means set at sample means	*Model 2* Adjusted, using city population means, but with attitude set at sample means	*Model 3a* Adjusted, using city population means and with attitude set at "neutral"	*Model 3b* Adjusted, using city population means and with attitude set at "negative"
WTP with low information	$121	$95	$9	$3
PC value with low information	$224	$196	$58	$23
WTP with high information	$232	$353	$259	$5
PC value with high information	$630	$779	$662	$54

FIGURE 1.
Reference Points for Willingness-to-Pay, Willingness-to-Accept, and Paired Comparison

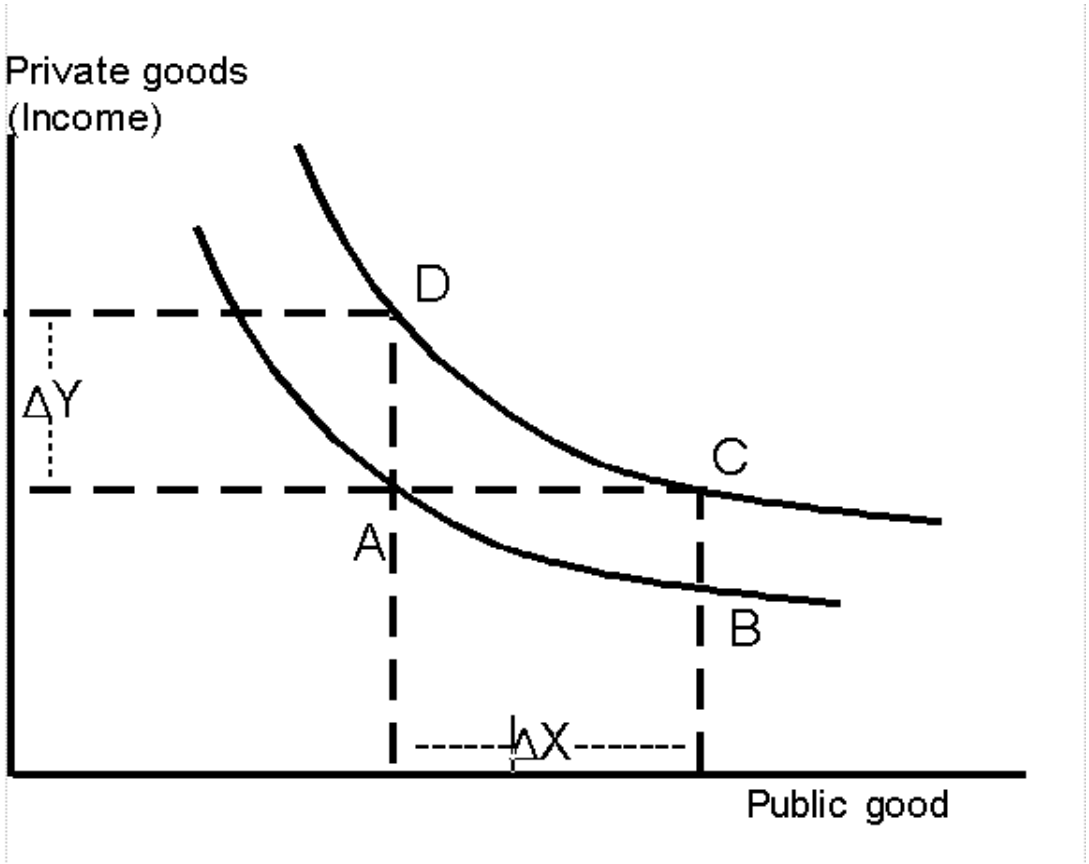

FIGURE 2.
Willingness-to-Pay and Paired-Comparison Demand Curves, with Low Information

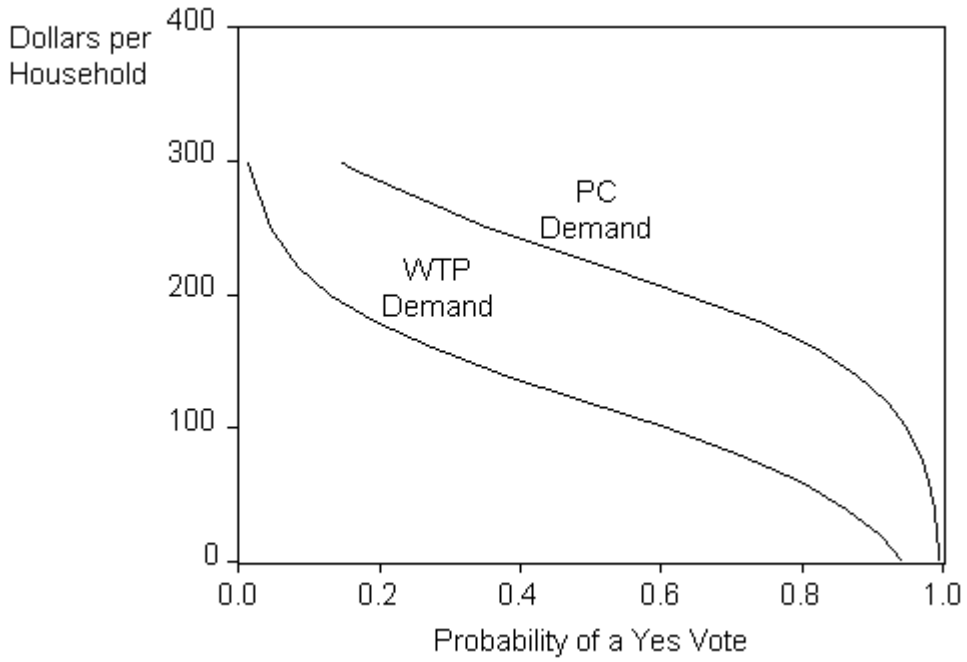

FIGURE 3.
Willingness-to-Pay and Paired-Comparison Demand Curves, with High Information

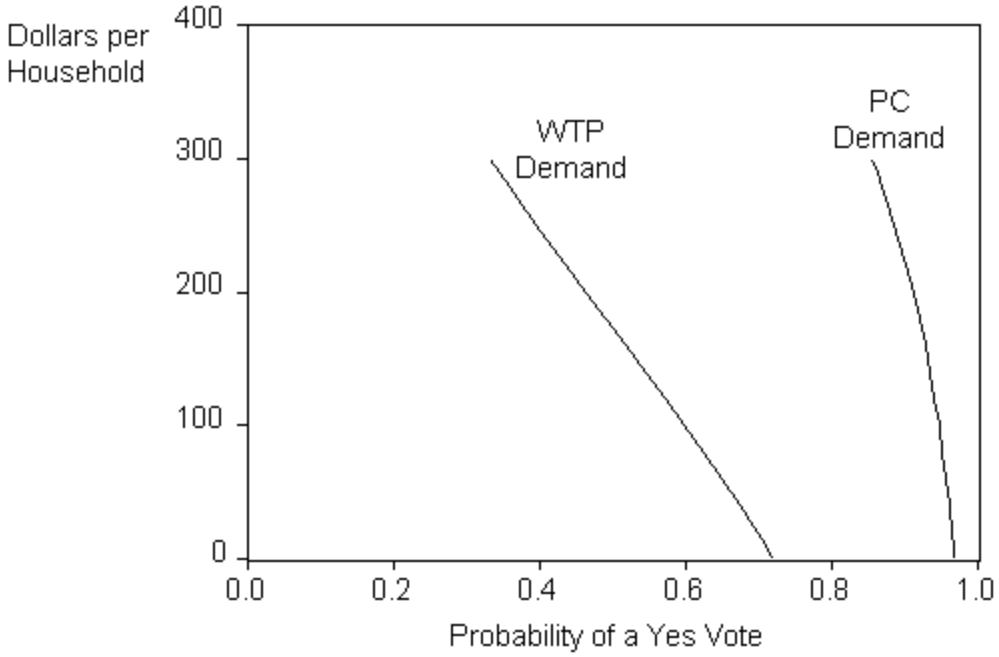

FIGURE 4.

Low- and High-Information Demand Curves, WTP Scenario

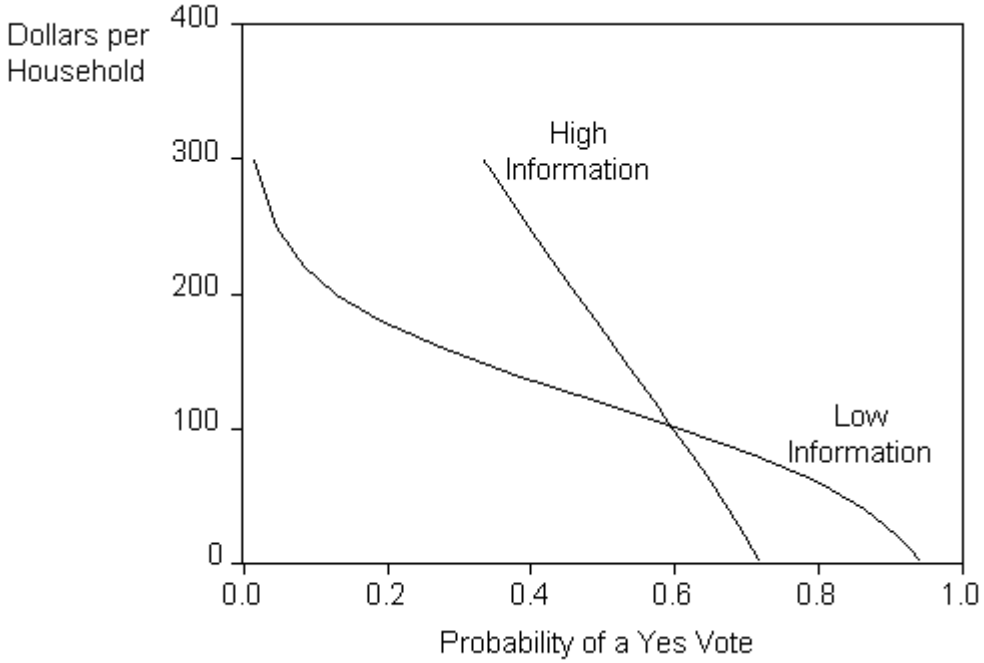

FIGURE 5.

Low- and High-Information Demand Curves, PC Scenario