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The Effect of Status Quo (SQ) Interpretation on Welfare Estimates: An Application of White Water Rafting (WWR)

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ABSTRACT

Choice Experiment (CE) technique requires respondents to choose the most preferred alternative from a series of alternatives presented to them. One of these alternatives is Status Quo (SQ) option which resembles the current scenario. However, respondents' interpretation of SQ may differ. This is inevitable for environmental goods. Using the case study of white water rafting (WWR) activity, this article investigates the effects of respondents' willingness to pay (WTP) when they are allowed to define their own SQ. Three types of SQ are being investigated: a) individual interpretation; b) group interpretation; and c) authors' interpretation. The results show that the personal and group interpretations of SQ produce better results compared to the authors' interpretation at least in significance of attributes. This indicates that in complex choice experiment exercises, the determination of the SQ should be decided by the respondents rather than by the researcher.

Key words: choice experiment (CE), status quo (SQ), willingness to pay (WTP), white water rafting (WWR)

INTRODUCTION

Status Quo (SQ) is an alternative resembles to the current scenario. In Choice Experiment (CE) technique, the SQ will be paired with hypothetical scenario alternatives to form a choice card. In this choice card, respondents are required to choose the most preferred alternative from series of alternatives presented to them. The inclusion of SQ alternative is not only to mimic the real market transaction (Carson et al., 1994), but the SQ is also need to be included to follow the Hicksian welfare measurement argument(Hanley, Mourato, & Wright, 2001).

An issue of SQ received much attention in the literature of environmental valuation technique recently, particularly in the CE technique. Introduced to the literature by Samuelson & Zeckhauser (1988), the investigation on SQ has been done my many analysts since then(i.e. Boxall, Adamowicz, & Moon, 2009; Kahneman, Knetsch, & Thaler, 1991; Marsh, Mkwara, & Scarpa, 2011).

However, not much attention wasgiven to investigate the issue of SQ in terms of its interpretation. To the best of our knowledge, only Marsh et al. (2011) did a study on the SQ interpretation. In their study on water quality management, the analysts allowed respondents to interpret the SQ according to theirown perception. In addition, respondentswerealso presented with the SQ interpreted by the analysts. In comparing these two approaches of

SQ interpretation, the analysts found that the respondents who wereable to interpret the SQ were willing to pay more for water quality proposed programmecompared to the results of the SQ interpreted by the analysts.

The study fromMarsh et al.(2011)has motivated us to explore further the effect of SQ interpretation in valuing environmental goods. Instead of relying on the individual SQ, this paper extends the interpretation of SQ where another type of SQ is included which is the SQ determined by group discussion. The inclusion of the group SQ is because we believe for some complex environmental goods such as the white water rafting (WWR)activity,the interpretation of the SQ provided by the analyst might not be in parallel with the respondents' understanding.

The objective of this paper is to investigate the application of CE to(1) rank the attributes provided at WWRrecreational sites; (2) measure the changes in welfare when improvement in attributes are proposed; (3) calculate the willingness to pay for the proposed improvement in attributes; and (4) investigate the effect of SQ interpretation on estimates.

The remainder of the paper is organized as follows. Section 2 provides a brief overview about the SQ issue in CE technique and the WWR site. The section explains on what circumstances the white water rafting can be considered as complex environmental goods. Section 3 discusses the study design and model specification. Section 4 presents and discusses the empirical results. Finally, concluding section is presented in Section 5.

LITERATURE REVIEW

CE is one of the environmental valuation techniques available in Choice Modelling (CM) approach. Considered as one of the methods inthe stated preference approach, the CE technique requires respondents to choose one most preferred alternative from series of alternatives presented to them. Usually, these alternatives are presented in a choice card format which consists of SQ alternative and hypothetical alternatives.

The application of CE techniqueto value environmental goods is not consider new and has been done by many analysts. Since it was introduced to the literature by Louviere & Woodworth (1983), the technique has been applied to value economic benefits of, *inter alia*, recreational parks(Hasan-Basri, Yahya, & Musa, 2013); river quality (Hanley, Wright, & Alvarez-Farizo, 2006); transport services (Hensher, 2006); transferability and heritage sites (Willis, 2009).The technique also has been employed to investigate transferability in economic benefits study (Hasan-Basri& Abdul-Karim, 2013).

Apart from that, studies to investigate issues in CE have also been conducted. Issues such as selecting attributes and their levels have been investigated by Blamey, Bennett, Louviere, Morrison, & Rolfe (2002) and pairing the alternatives (Bliemer & Rose, 2006). In addition, issue relates to designing the questionnaire such as to use label or no-label alternatives, number of attributes to be included in choice alternatives and the number of alternatives in each choice card have been investigated by Blamey, Bennett, Louviere, Morrison, & Rolfe (2000); Caussade, Ortuzar, Rizzi, & Hensher(2005); and Bergmann, Colombo, & Hanley (2008).

However, one of the issues that receive much attention in CE technique recently is SQ option. The SQ alternative has to be included in the choice card for several reasons, including mimicking real market transaction where the customer has an option not to buy a product and most importantly, to enable interpretation of the results in Hicksian welfare measurement (Hanley et al., 2001).

The issue of SQ effect was introduced to the literature by Samuelson & Zeckhauser (1988). Since then analysts such as Kahneman et al. (1991) and Boxall et al. (2009) followed their footsteps to investigate the effect of SQ. Recently, Hasan-Basri et al. (2013) have employed the Heterocedastic Extreme Value (HEV) model to investigate the affect of SQ effect on preferences uncertainty. In their study on economic benefits of recreational parks, the analysts found respondents wereuncertain with the SQ alternative. On the other hand, the respondents were more certain with the hypothetical alternatives.

Marsh et al.(2011), however, have focused on the SQ interpretation. Though it is common for the SQ alternativeto be interpreted by analysts (i.e. Blamey et al., 2000; Hasan-Basri & Abdul-Karim, 2013), the approach, however, could lead to bias results if applied to the complex environmental goods. Therefore, when valuing the water quality proposed programme,Marsh et al. (2011) allowed the respondents to interpret the SQ alternative by themselves.

Astudy on complex environmental goods is not easy to conduct. This is due to the fact that respondents arenot familiar with the goods and/or they only have little information about the goods. The response to the complex environmental valuation usually influenced by the respondents' experience. Therefore, the individualinterpretation SQ may differ from the SQ interpreted by the analysts. The respondents might choose the SQ not because they preferred the SQ alternatives but for some other reasons. For further details about the discussion in the SQ effect issue refer to Hasan-Basri, Yahya, & Musa (2013).

White water rafting is one of the examples for complex environmental goods. Participants in WWR will usually encounter extraordinary experience. However the satisfaction of this extraordinary experience is not

easily defined. This is because satisfaction with WWR is a hedonic but complex encounter between rafters, nature and activity. Such satisfaction could be embodied in attributes such as challenge, safety, amenities and facilities. Challenge could be derived, for instance, from the experience of surviving the rough rapids, and the amount of time freezing in wet clothes. Safety concerns with reliable rafting equipment, competent and knowledgeable guide, and assurance of minimal physical injury. On the other hand, amenities and facilities relate to acceptable level of lodging, food, and toilet facilities.

Since extraordinary experience emerges from, among others, the dynamic interaction of participants, it is difficult to predict their behavior. Thus, the emotional content of these interactions may be described as phenomenal since the WWR experience is spontaneous and unrehearsed, and that the emotion itself is subjective as it fluctuates across individuals and social situations. Theelements of experience and satisfaction discussed above make WWR a complex and challenging activity for researchers to predict. In light of this, the study employs the SQ definition by the participants (as an individual and as a group) since different participants with different expectation and experience may produce different definitions of WWR SQ.

RESEARCH METHODOLOGY

The final attributes in the study were determined through focus group meetings. The attributes are challenge, safety aspect, amenities and facilities provided at site area and the price. All attributes are divided into three levels which include basic, intermediate and advance. While the level for price attribute is RM100, RM150 and RM200. Details of the attribute are shown in Figure 1.

The next stagein CE technique after attributes' identification is experimental design. This stage is required to ensure estimates are not confounded with other attributes. If using the full factorial design, the four attributes with three levels of each will produce 81 combinations. Though the premise to apply the full factorial design is forthe completeness argument, it comes with a price. The full factorial design always associates with high cognitive burden and eventually yield less reliable information(Hensher, 2006). Therefore in the study the fractional factorial design with main effect of each attribute is employed. The design has the orthogonality property which means no confounding effects on the generated alternatives. The factorial design produced 18 combinations. To produce the choice card, the 18 combinations were paired randomly with replacement.

The respondents in the study were students of Universiti Utara Malaysia. These students were approached after they have participated in the WWR activities in Gopeng, Perak. In three different meetings, these students were asked to answer all the 18 choice cards where in each meeting they wereprovidedwith different interpretation of SQ. With higher academic qualification and controlled discussion setting, our observations reveal that the students manage to answers all the 18 choice cards though the number is considered large in CE exercise.

The study employed the Heterocedastic Extreme Value (HEV) model. The model is expressed as:

$$P_i(j) = exp(\mu_j \mathbb{x}'_{ij}\beta) / \sum_k \epsilon_{Ci} \exp\left((\mu_j \mathbb{x}'_{ij}\beta\right)$$

where$\mu_j$refers to different scale parameters across alternatives, $\mathbb{x}'_{ij}$ refers to attribute and β is for estimates. The HEV has several advantages compare to the Conditional Logit (CL) model. One of them is the HEV does not assume the equal variance for each alternative. That means the assumption of identical and independent distribution (iid) condition cannot be imposed on the HEV model.

RESULTS AND INTERPRETATION

The linearadditive utility function in the study is shown as:

$$\mathrm{V} = \mathrm{ASC} + \beta_1.\mathrm{Chal1} + \beta_2.\,\mathrm{Chal2} + \beta_3.\,\mathrm{Saf1} + \beta_4.\,\mathrm{Saf2} + \beta_5.\,\mathrm{ANF1} + \beta_6.\,\mathrm{ANF2} + \beta_7.\,\mathrm{Pri}$$

whereASC refers to Alternative Specific Constant. All the variables are explained in Table 1. The results are presented in terms of SQ interpretation: individual SQ, group SQ and authors SQ.

Comparing estimates from different interpretation of SQ

Based on the calculated McFadden pseudo r-squared, all estimated models are considered good in terms of model fitness. The pseudo r-squared for individual SQ, group SQ and authors SQ are 24%, 36% and 21%, respectively. The results of chi-squared value in all models are exceeded the critical chi-squared value indicate all models are significant at the 1% level. That means the coefficients are not jointly equal to zero. On the effect

of current scenario situation compare to hypothetical proposed situation, the ASC coefficient in all models is not significant means that there is no effect of current scenario situation compared to the hypothetical proposed situation.Details about the results are explained in the following section.

SQ Interpreted By The Individual

The results for this type of SQ show that all the parameters attribute are significant at least at or above the 95% significance level. In terms of attributes'preferences order, the respondents had highest preference for safety at advance level, followed by challenge at advance and basic level, safety at intermediate level, and lastly amenities and facilities provided at rafting site. Itisworth to note here the preference for facilities and amenities is nine-fold less than tothe preference for safety at higher level. This indicates that the respondents place more attention on the safety attribute when they were allowed to interpret the SQ. All attributes have the expected sign.

SQ Interpreted By The Group Discussion.

The results of the group SQ are similar toindividual SQ except for the attribute amenities and facilities. The results show in Table 2 is a bit surprising. The attribute of amenities and facilities provided at medium level produce higher utility compared to their counterpart at the higher level. It indicates the respondents preferred to have an average amount of amenities and facilities to be provided at rafting sites. This ismost likely because of they prefer to have the natural setting of rafting site. In terms of marginal utility calculation, the improvement in attribute provision from intermediate level to advance level are larger compared to the marginal utility obtained from individual SQ. For example, the marginal utility for challenge improvementfrom basic level to intermediate level is estimatedtobe 2.63 in the group SQ. However, the marginal utility for similar improvement in the individual SQ is only 1.54. All the estimatesare significant at least at the 95% and have *a priori* sign.

SQInterpreted By Authors

In this model, all estimates are significant at least at or above the 95% significance level except the amenities and facilities at both levels. This results show that the most preferred attribute is safety at higher level, followed with the attribute safety at medium level, attribute challenge at higher level, and lastly the attribute challenge at medium level. All these estimated parameters have the positive *priori* signs. Theseareexpected and followed the utility function assumption, *non-satiation*, which means many is always better than less. The parameter for attribute price isalso significant and has negative sign.

Comparing Willingness to Pay (WTP) from different interpretation of SQ

The calculation of WTP can be carried out by the ratio of estimates for the attribute (or level) with the price parameter. The WTP measures the consumer willingness to pay if an attribute is increased from one level to the next level. For instance, the WTP for attribute challenge at advance level for individual SQ means that the respondents are willing to pay up to RM135.55if the challenge element at rafting site is increased from the basic level to the advance level. However, the respondents are willing to pay an additional of RM4.63 for increment in challenge from intermediate to advance level. It is worth to note here that the calculation of WTP requires both estimates in the ratio are significant. Otherwise, the calculated WTP is meaningless.

In general, the WTP values for individual SQ are higher compared to the group SQ and authors SQ. In addition, the respondents give high priority on safety when involve with white water activities. This is not surprising because engaging inaccident-prone recreation such as white water rafting has encouraged respondents to willingtopay higher to have sufficient safe. Apart from that, the respondents in the study arealso considered new to this activity; therefore the safety element isessential.

The difference in WTP in terms of percentageis also shown in Table 3. The difference was calculated based on the formula given below:

$$\frac{WTP_{Isq\ or\ Gsq} - WTP_{Asq}}{WTP_{Asq}} X100\%$$

where the subscripts of *Isq, Gsq* and *Asq* refer to individual SQ, group SQ and authors SQ respectively. Overall, the difference of WTP in the study range from 32% to 233%. The attribute of challenge for individual SQ recorded the highest percentage with the valueofmore than 200%. While the minimum percentage is safety attribute at intermediate level for group SQ. The computation for facilities at both levels is not permissiblebecause the attributeintheauthors SQ is not significant.

CONCLUSION AND FUTURE RESEARCH

This paper has investigated the effect of SQ interpretation on WTP estimates. Two proposed SQ interpretation which arethe individual interpretation and thegroup interpretation arecompared to the conventional SQ, theauthors' interpretation. Applying the linear additive utility function format, the results of HEV model show that models when SQ refers to individual interpretation and group interpretation performed better than the authors, SQ at least in statistical basis. The value of McFadden *pseudo r-squared*forindividuallyinterpretedSQ and groupeddefinedSQarehigher than thoseinterpreted by authors. In addition, allestimates from individual and authors models are also statistically significant.

In terms of WTP values, the results in the study discover that the respondents are willing to pay higher in cases where they defined their own SQ ascompared to the WTP value determined by authors SQ. This indicates that the respondents have strong preferences on attributes improvement in WWR recreational site when they are allow to determine their own SQ either by individual or bygroup.

Though the findings in the study favour to the alternative ways to interpret the SQ, the results should be cautiously interpreted. This is due to some limitations in the study. First, the study employsthe main effect experimental design which leads to the linear additive utility function. It is suggested thatfor future study to explore theinteraction effects so that the multiplicative utility function can be employed. Secondly, there is a homogenous issue. Respondents in the study arestudents studying at the higher learning institution and have less experience on WWR activity. Therefore, to draw such conclusion from the findings is a bit premature because the findings are obtained from asmall group of people in the society. Nevertheless, the findings in the study indicate there is room for improvement in conducting the CE technique especially on methodological issue such as interpreting the SQ alternative.

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ATTRIBUTE	LEVEL	DESCRIPTION
CHALLENGE	BASIC	RAPID GRADE: 1-2; WATER LEVEL: LOW; WATER FLOW: SLOW; DISTANCE BETWEEN RAPIDS: FAR APART; DEGREE OF STRAINER: LOW
	INTERMEDIATE	RAPID GRADE: 3-4; WATER LEVEL: MEDIUM; WATER FLOW: MEDIUM; DISTANCE BETWEEN RAPIDS: MEDIUM DISTANCE; DEGREE OF STRAINER: MODERATE
	ADVANCE	RAPID GRADE: 5-6; WATER LEVEL: HIGH; WATER FLOW: FAST; DISTANCE BETWEEN RAPIDS: CLOSE TOGETHER; DEGREE OF STRAINER: HIGH
SAFETY AND RISK MANAGEMENT	BASIC	EXPERIENCED GUIDE; BASIC SAFETY BRIEFING SESSION; PERSONAL FLOATING DEVICE AND WHITEWATER HELMET; BASIC RISK ASSESMENT BY GUIDE; SAFETY EQUIPMENT (THROW BAG/LINE AND FIRST AID); INDEMNITY AGREEMENT
	INTERMEDIATE	VERY EXPERIENCED AND QUALIFIED GUIDE; INTERMEDIATE SAFETY BRIEFING SESSION; PERSONAL FLOATING DEVICE AND WHITEWATER HELMET; INTERMEDIATE RISK ASSESMENT BY GUIDE; SAFETY EQUIPMENT (THROW BAG/LINE AND FIRST AID); INDEMNITY AGREEMENT; WATER CONFIDENT SESSION; CLEAR COMMAND AND INSTRUCTIONS
	ADVANCE	HIGHLY EXPERIENCED AND QUALIFIED GUIDE; IN-DEPTH BRIEFING AND DE-BRIEFING SESSIONS; PERSONAL FLOATING DEVICE AND WHITEWATER HELMET; IN-DEPTH RISK ASSESMENT BY GUIDE; SAFETY EQUIPMENT (THROW BAG/LINE AND FIRST AID); INDEMNITY AGREEMENT WATER CONFIDENT SESSION; CLEAR COMMAND AND INSTRUCTIONS AND TWO WAYS COMMUNICATIONS
AMMENITIES AND FACILITIES	BASIC	CAMPSITES; TOILET AND SHOWER ROOMS; MULTIPURPOSE HALL; STORAGE FACILITY; COOKING FACILITY; FIRST AID FACILITY
	INTERMEDIATE	CAMPSITES AND CHALET; TOILET AND SHOWER ROOMS; MULTIPURPOSE HALL AND SURAU; STORAGE, LOCKER AND SAFETY BOX; COOKING FACILITY AND DINING AREA; TREATED WATER SOURCE; FIRST AID FACILITY AND TRAINNED PERSONNEL
	ADVANCE	GUARDED CAMPSITES AND CHALET; TOILET AND SHOWER ROOMS; MULTIPURPOSE HALL AND SURAU; STORAGE, LOCKER AND SAFETY BOX; COOKING FACILITY AND DINING AREA; CAFÉ; TREATED WATER SOURCE; SOURVENIR AND CONVINIENT STORE; TELECOMMUNICATION/PHONE LINE; CLINIC AND MEDICAL ASSISTANT

FIGURE 1: The Attribute Card

TABLE 1: Variables of Utility Function

Variable	Description
Chal	Challenge. It has three levels- advance (Chal1); intermediate (Chal2); and basic (base level)
Safety	Safety. It has three levels- advance (Saf1); intermediate (Saf2); and basic (base level)
ANF	Amenities and Facilities- It has three levels- advance (ANF1); intermediate (INF2); and basic (base level)
Price	Price for the activities. The levels for price were RM150, RM200 and RM250.

TABLE 2: Coefficients of HeterocedasticExterme Value (HEV) Model

Variable	Individual SQ	Group SQ	Authors SQ
ASC	0.0278 (0.1440)	-0.2054 (0.3562)	0.1262 (0.1223)
Chal1	1.6010*** (0.2613)	2.7069*** (0.8282)	1.0790*** (0.1595)
Chal2	1.5464*** (0.2563)	2.6399*** (0.8405)	0.9962*** (0.1606)
Saf1	1.8346*** (0.2817)	4.3563*** (1.3003)	1.8939*** (0.2077)
Saf2	1.1652*** (0.2113)	1.7170*** (0.5504)	1.1143*** (0.1598)
ANF1	0.2096** (0.1150)	0.5958** (0.2708)	0.0866 (0.1253)
ANF2	0.1797* (0.1065)	0.8320*** (0.3192)	-0.0638 (0.1239)
Price	-0.0118*** (0.0017)	-0.0294*** (0.0072)	-0.0254*** (0.0028)
Log likelihood Function	-916.5095	-768.8507	-951.7291
McFadden R^2	0.24	0.36	0.21
Chi squared value	579.5336	874.85	509.0943
***, ** and * denote significance at the 1%, 5% and 10% levels, respectively;std errors are in brackets.			

TABLE 3: WTP of Attribute in Ringgit Malaysia (RM)

Attribute	Individual SQ	Group SQ	Authors SQ
Challenge- advance	135.55 (218%)	91.94 (116%)	42.51
Challenge- intermediate	130.92 (233%)	89.66 (128%)	39.25
Safety- advance	155.32 (108%)	147.96 (98%)	74.61
Safety- intermediate	98.64 (125%)	58.32 (32.85%)	43.90
Facilities- advance	17.75 (n.a)	20.36 (n.a)	n.s
Facilities- intermediate	15.21 (n.a)	28.26 (n.a)	n.s

The percentage in brackets refer to the difference between the WTP value of respective columns with the WTP value in authors SQ column.

n.s.-the estimates are not significant, thus the WTP value is meaningless