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Status Quo Effect and Preferences Uncertainty: A Heteroscedastic Extreme Value (HEV) Model

(Kesan Status Quo dan Ketidakpastian Pilihan: Satu Model Nilai Melampau Heterogedastik (HEV))

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ABSTRACT

Analysts must include the status quo (SQ) option as one of the alternatives in the Choice Experiments (CE) technique to ensure the technique is consistent with the Hicksian welfare analysis. However, it comes at a price. Usually, respondents choose the option not because it provides the highest utility but to avoid making difficult decisions or to protest the attributes trade-off. One solution for investigating the effect of the SQ option is through the inclusion of the alternative specific constant (ASC) in an estimation model. However, the solution is not applicable for an estimation model that has no ASC. In the present study, the heteroscedastic extreme value (HEV) model is applied to investigate the affect of the SQ effect on preference uncertainty. By analysing respondents' preferences relating to attributes at recreational parks, the results suggest that more uncertainty exists in the SQ option, while less uncertainty exists in the hypothetical alternatives.

Keywords: Choice Experiment (CE), status quo, preferences, Heteroscedastic Extreme Value (HEV)

ABSTRAK

Penganalisis harus memasukkan pilihan status quo (SQ) sebagai salah satu alternatif dalam teknik Eksperimen Pilihan (CE) bagi memastikan teknik yang digunakan adalah konsisten dengan analisis kebajikan Hicksian. Biasanya, responden memilih SQ tidak kerana ia menyediakan utiliti tertinggi tetapi untuk mengelakkan daripada membuat keputusan yang sukar atau membantah tukar ganti atribut. Satu penyelesaian untuk menyiasat kesan SQ adalah dengan memasukkan alternatif tertentu berterusan (ASC) dalam satu model anggaran. Walau bagaimanapun, penyelesaian ini tidak terpakai bagi model anggaran yang tidak mempunyai ASC. Dalam kajian ini, model nilai heterosedastik melampau (HEV) digunakan untuk menyelidik kesan SQ terhadap ketidakpastian keutamaan. Dengan menganalisis keutamaan responden berkaitan dengan atribut di taman rekreasi, hasil kajian mencadangkan bahawa ketidaktentuan kerap wujud dalam SQ, manakala ketidaktentuan kurang wujud dalam hipotesis alternatif.

Kata kunci: Eksperimen Pilihan (CE); status quo; pilihan; Nilai Melampau Heterosedastik (HEV)

INTRODUCTION

Recently, the application of the choice modelling (CM) technique in valuing environmental goods has become popular. The popularity of the technique is due to its advantages over other preferences methods, such as the contingent valuation method (CVM). One advantage of the CM technique is that the technique is more informative than the CVM because respondents have a chance to state their preferences from a number of alternatives presented to them (for further details of the advantages, see Adamowicz et al.1998; Rolfe et al. 2002; and Bateman et al. 2002). CM analyses can be undertaken using four approaches: choice experiments (CE); contingent ranking; contingent rating; and pair-wise. However, only the CE is said to be relevant to the Hicksian welfare measurement because the approach includes the status-quo (SQ) option in its list of alternatives (Hanley et al. 2001). Additionally, the SQ option must be included to mimic a real market transaction where the customer cannot be forced to buy a product (Carson et al. 1994).

However, the inclusion of SQ comes at a price. Extant literature argues that respondents opt for SQ not because it provides highest utility among alternatives (Banzhaf et al. 2001), but to avoid making difficult decisions (Carson et al. 1994) or to protest about the attributes trade-off (Von Haefen et al. 2005). As a result, SQ effects are investigated by many analysts (Boxall et al. 2009; Marsh et al. 2011; Scarpa et al. 2007).

SQ effects can be investigated in many ways. One method of investigation involves the use of the alternative specific constant (ASC). The ASC is similar to the constant term in the regression model and captures the average effect on utility of all factors not included in the model (Train 2003). If the ASC is significant, the conclusion can be made that a SQ effect has occurred (Adamowicz et al. 1998; Scarpa et al. 2005). However, the question that arises is how to estimate a model that has no ASC. For instance, a study that applies generic alternatives (e.g. Alternative A, Alternative B) is suggested not to include the ASC because the value is meaningless in terms of its interpretation (Hensher et al. 2005). Hence, the motivation of the present study is to explore the effect of the SQ option on an estimation model that has no intercept. For this purpose, a heteroscedastic extreme value (HEV) model is applied.

The objective of this paper is to investigate how the CE can be applied to (1) determine attributes that members of the public prefer when visiting recreational parks; (2) estimate the monetary value of these attributes and the attributes' interaction effect; and (3) explore the affect of the status quo effect on preference uncertainty using the HEV model.

The rest of the paper is organized as follows. Section 2 describes the CE approach and the SQ effect. Section 3 discusses the methodology in regards to the experimental design and the field work survey. Section 4 presents and discusses the empirical results. A comparison of the two estimation models is included, one without the SQ effect and the other with the SQ effect. Finally, Section 5 concludes the present study.

CHOICE EXPERIMENT (CE) AND STATUS QUO (SQ) EFFECT

The CE is one of the techniques used in the stated preferences method. The CE requires respondents to choose the most preferable alternative from a series of alternatives presented to them. To be consistent with the Hicksian welfare measurement theory, one of the alternatives must be in the form of a SQ or current scenario. In many cases, respondents choose SQ to avoid making difficult decisions and to protest about the attributes trade-off. In CE literature, this phenomenon is known as the SQ effect (Samuelson & Zeckhauser 1988) or endowment bias (Kahneman et al. 1991).

The term 'status quo effect' was coined in the literature by Samuelson & Zeckhauser (1988). Other analysts have similarly followed suit, including Kahneman et al. (1991); Boxall et al. (2009); and, most recently, Marsh et al. (2011). Each study demonstrates different goals. For instance, Kahneman et al. (1991) demonstrate that respondents are most likely to opt for SQ if they want to avoid anticipated losses from the decision that they will make. Meanwhile, Boxall et al. (2009) hypothesizes that the propensity for respondents to choose SQ is because of a complexity factor (e.g. cognitive burden) when answering CE questions. This hypothesis is believed to come from a study by Beshears et al. (2008), who find that complexity often lead to a delay of choice. Iyengar and Kamenica (2007) also support the hypothesis, finding that respondents tended to opt for the simple option when presented with both complex and simple options. Blamey et al. (2000) explain that the complexity in the CE approach could arise from several sources, including the number of choice cards for respondents to answer; the number of alternatives on each choice card; and whether or not the alternatives on each card is labelled.

Recently, Marsh et al. (2011) compare the answers of respondents where descriptions of SQ are provided to those who have their own descriptions of SQ. In their study on freshwater streams valuation, the results indicate that respondents who can provide details on their perception of SQ display stronger preferences regarding water quality improvements. The results also show that such respondents are inclined to make their decisions in regards to the SQ option when compared against their counterparts. The analysts argue that this occurs because of the relationship between the amount of knowledge that respondents have concerning SQ and the tendency for selecting the SQ.

However, some analysts (i.e. Scarpa et al. 2005; Willis 2009)demonstrate the SQ effect on various econometric approaches. To investigate the effect, Scarpa et al. (2005) applies error component models, while Willis (2009) employs the heteroscedastic extreme value (HEV) model. Both studies utilize ASC in the models. The relationship between ASC and SQ effects were discovered by Adamowicz et al. (1998). In the study of Caribou habitats, the significant negative coefficient of ASC is found to indicate that the anticipated utility when moving away from the current scenario is negative, which is considered to be a form of the SQ effect.

Hensher et al. (2005) argue for the inclusion of an ASC in estimation models in CE analyses utilize generic alternatives. This is because the value corresponding to the intercept of the generic alternatives is meaningless in terms of its interpretation. Nothing significant can be explained based upon the coefficients of the ASC because the trade-offs in choice sets is between attribute levels that have no association with a particular label. Therefore, a conditional logit (CL) model that has no ASC is not suitable to be applied when investigating the SQ effect. Alternatively, analysts can apply the HEV model. Based on the random utility model (RUM), the HEV model deviates from the CL model in the sense that the latter assumes the scale factor value to be. In other words, the CL function assumes equal variances for each alternative in each choice set. The HEV relaxes the assumption. Details about the model are explained further in the model specification section.

ATTRIBUTES OF RECREATIONAL PARKS IN MALAYSIA

Recreational parks have been set-up for many purposes. According to Abu Bakar (2002), the purposes include relaxation (i.e. viewing scenery, picnicking, bird watching, taking pictures, reading, listening to music); educational and learning (i.e. watching cultural shows, creative acts, or painting demonstrations); and recreation (i.e. playing on swings and slides, jogging, boating, exercising, and fishing). Apart from that, parks have also been established to improve the environment through their roles in the provision of fresh air; and climate and land erosion control.

Parks can be defined as an enclosed piece of ground, within or near a city or town, that are ornamentally laid out and devoted to public recreation (Gibberd 1982). Meanwhile, Elliot (1988) describes parks as lands intended and appropriated for people's recreation by means of their rural, sylvan, and natural scenery; and character. In Malaysia, parks refer to areas of open space where recreational activities are held (Town and Country Planning Department Peninsular Malaysia 2002).

The history of recreational parks in Malaysia can be divided into three phases. The first phase, which occurred before the 15th century, refers to the pre-colonial period. The second phase refers to the colonial period. The third phase refers to the period following Malaysian independence until the present day. Each phase focused on different concepts of parks. For instance, during the pre-colonial period, elements of garden parks, such as tropical landscape plantations, were planted in the compounds of royal palaces. However, during the colonial period, parks were built for the recreational activities of British officers and their families. Two public parks that were built by the British and continue to exist today are the Lake Garden in Kuala Lumpur, which was built in the 1890s; and the Lake Garden in Taiping, which was built in 1910.

Nowadays, various amenities and facilities are provided in parks to attract people to visit the parks. Usually, the provision of amenities and facilities is subject to the design concept of the respective park, which includes park's potential visitors and the location of the park. For instance, parks that are targeted to attract teenagers would concentrate on facilities and amenities that suit the age of the target group, such as a special courtyard for physical activities (i.e. cycling and hiking).

One of the issues in managing parks in Malaysia relates to funding. The funds utilized to manage parks come from the federal government, which are usually insufficient to cover the park's operation costs (Ishahak, 1983). Consequently, the amenities and facilities provided at parks are not well maintained and, eventually, affect the total number of visitors to visit parks. Apart from that, the low maintenance of the amenities and facilities are likely to have an adverse impact on visitors' safety, especially in regards to children. Since the attributes of parks encompass many things, a study needed to be undertaken to determine types of attributes that visitors prefer to use or engage when visiting recreational parks. Information on visitors' preferences would be useful for park's management for future planning and design purposes.

The present study identifies four attributes to measure visitors' utility when they visiting a park: park amenities; recreational facilities; information; and natural attractions. At the same time, the price variable is also included to estimate visitors' willingness to pay for the attributes. The selected attributes are chosen based upon an extensive review of extant economic studies concerning outdoor recreation parks. The final list of attributes is determined after conducting three focus group meetings and stakeholder interviews. The details of these attributes and their levels are shown in Figure 1.

EXPERIMENTAL DESIGN AND RESEARCH METHODOLOGY

Each choice card consists of the SQ alternative and two hypothetical alternatives. The study employs the generic format where the alternatives are presented in the form of Park A, Park B and Park C. Park C (the SQ alternative) resembles the parks in Malaysia at the present time. The experimental design in the study is undertaken in three steps. First, the number of choice tasks (or runs) is determined to ensure the generated design is perfect balance and orthogonal. Second, an Orthogonal Main Effect Plan (OMEP) is created. Finally, the generated alternatives are paired.

The first step, which is performed using the Statistical Analysis Software (SAS), produces eighteen runs. The second steps utilize the software developed by Nguyen (accessible at http://designcomputing.net/gendex/noa/) to generate the OMEP. For pairing purposes, the present study employs the "cyclical or fold over" approach where the construction of a second alternative is based on the level of the first alternative (Louviere et al. 2008).The pairing alternatives are investigated with the software developed by Burgess(2007).The results of the investigation show that the design is 100% efficient and the main effects are uncorrelated. The design generated by the software was *D-efficient*, with the *D-error* sufficiently

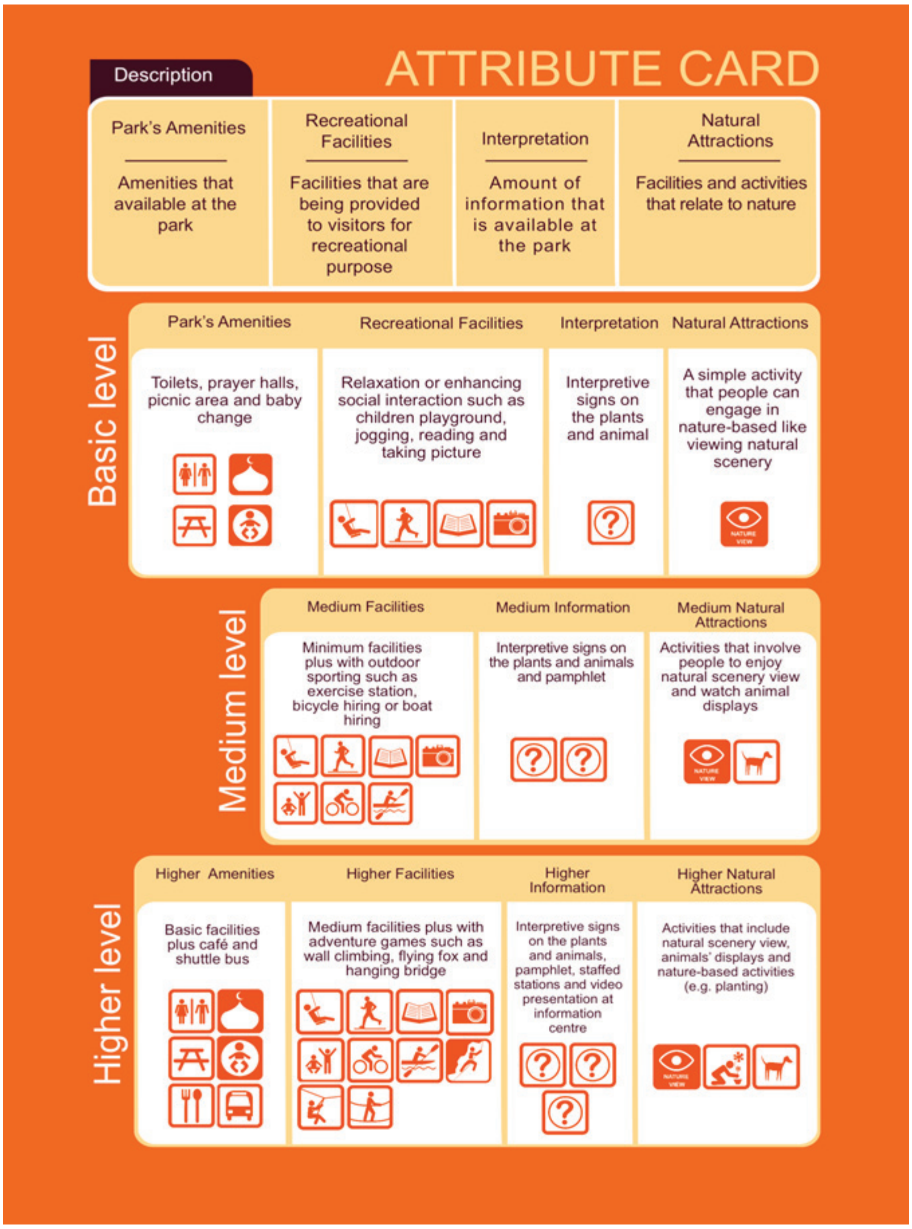

FIGURE 1. Attribute Card

low (Rose & Bliemer 2006). Each respondent is asked to answer six choice cards.

In the first week of September 2009, a series of face to face interviews were conducted to gather responses to the CE questions. In order to identify usable respondents, some follow up questions were posed. The follow up questions asked respondents to state the frequency of use of the attributes examined in the study while they were answering the CE questions. The frequency was measured as: always; seldom; and never. The respondents who stated "never" to all of these attributes were removed from the analysis, as their answers to the CE questions might be ill-informed. After analysing the follow up questions, the total number of usable respondents is 188. These 188 respondents provide 1128 choice responses. An example of the choice card is shown in Figure 2.

MODEL SPECIFICATIONS

The present section explains the specification of estimation models that take into account the SQ effect. The section begins with an explanation of the CL model, which is followed by an explanation of the HEV model.

Suppose a visitor faces a choice among J alternatives of parks in a choice set. The utility that visitor n derives from choosing a park can be expressed as $U_n = V_n + e_n$. Based upon the RUM framework, the indirect utility function of U_n can be decomposed into two components: V_n,which is the part that is a function of factors observed by the analysts and also referred to as the systematic component or deterministic element (Hanley et al. 2001); and e_n, the part that is unknown by the analysts and is

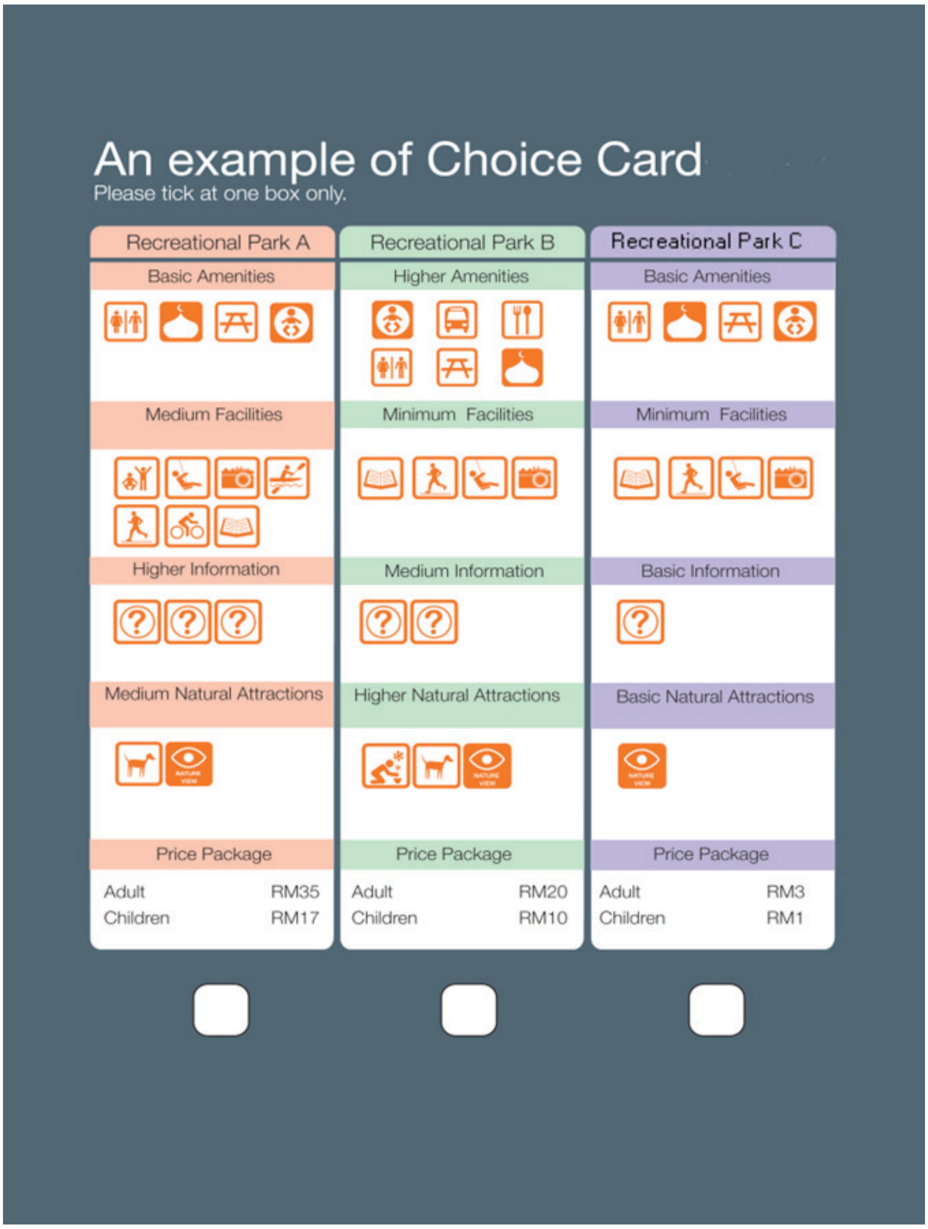

FIGURE 2. An Example of Choice Card

assumed to be a random with density $f(e)$. The latter part is known as the stochastic component (Hanley et al. 2001; Swait 2007).

In a simple scenario that only consists of two parks in a choice set, i or j, the behavioural model is, therefore, choose park i if and only if $U_{in} > U_{jn}$. In random utility terms, the probability that visitor n chooses park i (P_{in}) is shown in 1:

$$\begin{aligned} P_{in} &= P_r(U_{in} > U_{jn}) \\ &= P_r(v_{in} + e_{in} > V_{jn} + e_{jn}) \\ &= Pr(e_{jn} - e_{in} < V_{in} - V_{jn}) \qquad (1) \end{aligned}$$

The equation (1) explains that the probability to choose park i from the entire possible outcome (in this context, park i and j) is equal to the probability of stochastic component when the outcome of park i is chosen. To simplify this, an indicator function $I[U(V_n, e_n) = U_{in}]$ can be used to explain how equation (1) operates.

The indicator function takes value 1 if the statement in bracket is true (when is U_{in} chosen) and 0 if otherwise. The probability of visitor n choosing park i is equal to the expected value of the indicator function, which represents all possible values of the stochastic component when park i is chosen.

$$\begin{aligned} P(U_{in}|V_n) &= \text{Prob } I[U(V_n, e_n) = U_{in}] = 1 \\ &= \int I[U(V_n, e_n) = U_{in}]\, f(e_n)de_n \\ &= \int I(e_{jn} - e_{in} < V_{in} - V_{jn})\forall j \neq i)\, f(e_n)de_n \qquad (2) \end{aligned}$$

The probability of choosing park i can be calculated by specifying the distribution of the error terms, e_n. Basically, the error terms are assumed to be distributed independently and identically (iid) with a Gumbell (or Type 1 extreme-value) distribution (Swait, 2007) as stated in (3).

$$f(e) = \exp(-\exp(-\mu e)) \quad (3)$$

Following (3), McFadden (1973) shows that the selection of park i can be expressed in terms of a logistic function where the error terms are assumed to be distributed within a Gumbell distribution with a scale factor μ as shown in (4). In addition, McFadden (1973) generalises the logistic distribution to the case of three and more parks. The function is known as the CL function.

$$P(V_{in} > V_{jn}, \forall i \neq j) = \frac{\exp(\mu V_{in})}{\Sigma_{j \in J_n} \exp(\mu V_{jn})} \quad (4)$$

The presence of the scale factor, μ, plays an important role in determining choice probabilities. For instance, when μ approaches 0, equation (4) indicates all choice probabilities will approach equal probabilities for all alternatives, $(1/J_n)$. Whilst, when μ approaches ∞, equation (4) indicates that all choice probabilities become completely deterministic (Ben-Akiva & Lerman 1985; Swait 2007). In the Gumbell distribution, μ_n is used to capture the degree of spread (variance) of error terms for visitor n. This is shown in equation (5), where μ_n is inversely related to var (e_n). The larger the scale parameter, the smaller the variance.

$$Var(e_n) = \sigma^2 = \pi^2/\mu_n^2 \quad (5)$$

The scale factor, however, cannot be identified in the CL function (Hanley et al. 2001; Swait & Louviere 1993) because the value is confounded with the vector of utility parameters (Swait & Louviere 1993). Because of this, the scale factor value is always assumed to be $\mu = 1$ (Hanley et al. 2001; Swait 2007). In other words, the CL function assumes equal variances for each alternative in each choice set. The function that relaxes the assumption is the HEV. The scale parameter for each alternative can be estimated. However, for identification purposes, one of the scale parameters is set to one. If the value of variance for each alternative is related to uncertainty, the higher variance (or low scale factor) for an alternative means that there are more uncertain individuals in relation to the expected utility of that alternative. The explanation suggests that the HEV is suitable to be employed to investigate whether respondents are certain with utility from the SQ alternatives.

RESULTS AND DISCUSSION

The variables used in the random utility models are presented in Table 1. The number of categorical variables that can be entered into the estimation model is equal to J-1 where J is the total number of categories. Since the respondents' characteristics cannot be inserted directly into the model, they were interacted with the variable price. All qualitative variables are coded with dummy coding.

The estimated coefficients and implicit prices for basic CL and the CL with interactions models are presented in Table 2. The explanatory power for both models is considered good with their adjusted psuedo-$R^2$of 21% and 29%, respectively. The estimated results show that all attributes indicate significance at least at 10% in both models and have the *a priori* expected signs. The results also conform to the axioms of choice: *non-satiation* when the coefficient values for the attribute at a higher level are greater than the coefficient values for the attribute at a lower level. The attribute of natural attractions (NAtt) is significant (at the 1% level) in the basic and interactions models. This indicates that respondents in the city centre appreciate natural attractions.The finding is expected

TABLE 1. Variables for Random Utility Models

Variable	Type	Definitions
Amen	Qualitative	Amenities and services available at parks. It has two levels- basic and higher levels.
Fac	Qualitative	Facilities available at parks. It has three levels- basic, medium and higher levels.
Info	Qualitative	Information available at parks. It has three levels- basic, medium and higher levels.
NAtt	Qualitative	Natural attractions available at parks. It has three levels- basic, medium and higher levels.
Pri	Quantitative	Park entrance fee. The levels for package price were RM0, RM5.00, RM20.00 and RM35.00.
AgePri	Qualitative	The interaction between age of respondent and package price. It has three levels- 18 to 24 yrs old, 25 to 34 yrs old and 35 yrs old and above.
EduPri	Qualitative	The interaction between education level attained by respondent and package price. It has two levels- Non-university degree and university degree
EthPri	Qualitative	The interaction between ethnic group of respondent and package price. It consists of three groups- Malays, Chinese, and Indians and others.

*The bold denotes base level.

because opportunities to participate in outdoor activities, such as "hands-on training on planting", are limited for people living in urban areas.

All the estimated interactions variables indicate significance at the 5% level or higher, except for AgePri2. The results for interactions with the prices attribute also show that the estimated coefficient for respondents who have a university degree is greater than the estimated coefficient for those who do not. This suggests that a respondent who has attained higher education is willing to pay more when compared to a respondent with a lower level of education. In terms of interaction with ethnic groups and price, the results for ethnic Chinese, ethnic Indians and others show a negative sign. This indicates that these ethnic groups were not willing to pay as much as the base ethnic group:the ethnic Malays.

The implicit price for each attribute is calculated as the ratio of coefficients for the attribute (or level) with the cost parameter using the Wald procedure (Delta method) in Limdep 8.0. The implicit price measures the respondents' willingness to pay. For instance, the implicit price for attribute Fac2 in basic CL model means that respondents are willing to pay an extra of RM19.41 to obtain an improvement to the attribute from the basic to higher level.

As shown in Table 2, the implicit prices of attributes Amen, Fac1, Fac2, and NAtt1are higher in the basic CL compared to the extended CL. In terms of implicit price order of attributes, both models show similar results with facility at higher and lower level, amenities, natural attribute at higher and lower level and, lastly, information at higher and lower level.

TABLE 2. Results of Basic and Extended CL Models

Variable	Basic CL		Extended CL	
	Coeff.	Implicit Price	Coeff.	Implicit Price
Amen	0.5179*** (0.0868)	6.20	0.5712*** (0.0893)	5.54
Fac1- Medium	1.0505*** (0.1155)	12.58	1.1542*** (0.1175)	11.19
Fac2- Higher	1.6203*** (0.1221)	19.41	1.7387*** (0.1258)	16.86
Info1-Medium	0.2022** (0.1024)	2.42	0.3029*** (0.1076)	2.94
Info2- Higher	0.2347* (0.1391)	2.81	0.3389** (0.1489)	3.29
NAtt1- Medium	0.3357*** (0.1109)	4.02	0.3980*** (0.1153)	3.86
NAtt2- Higher	0.3516*** (0.1157)	4.21	0.4347*** (0.1208)	4.22
Price	-0.0835*** (0.0050)	-	-0.0628*** (0.0080)	-
AgePri1: 25 to 34 yrs old (Age1 x Price)	-	-	-0.0193** (0.0081)	-
AgePri2: 35 yrs old and above (Age2 x Price)	-	-	0.0063 (0.0087)	-
EduPri: University Degree (Edu x Price)	-	-	0.0216*** (0.0068)	-
EthPri1: Chinese (Ethnic1 x Price)	-	-	-0.0990*** (0.0091)	-
EthPri2: Indian and others (Ethnic2 x Price)	-	-	-0.0628*** (0.0115)	-
Summary Statistics				
Log-likelihood function:	-970.5034		-873.5593	
Log-likelihood: $L(0)$	-1239.2347		-1239.2347	
Psuedo-R^2	0.21518		0.29358	
Adjusted Psuedo-R^2	0.21204		0.28917	
Number of observations	1128		1128	

***, ** and * denote significance at the 1%, 5% and 10% levels, respectively;std errors are in brackets.

STATUS QUO (SQ) EFFECT AND PREFERENCES UNCERTAINTY

The results for the basic and extended HEV models are presented in Table 3. The goodness of fit for both models is slightly higher than the calculated adjusted pseudo-R^2 in the basic and extended CL. All attributes in the HEV model have the same sign as in CL model. The order of preferences for attributes in the HEV model is also similar to the CL model. However, there are changes in the significance of attributes. Attributes of information, which are statistically significant for both levels in CL, are no longer significant in the HEV model. In terms of implicit price, the calculated amount of money that respondents are willing to pay for improvement in attributes in the HEV model are lower compared to the CL model. The results indicate the influence of uncertainty towards the preferences of attributes and implicit prices.

The preference uncertainty in the HEV model is analysed through the scale parameter coefficient. Since the estimated scale parameter coefficient of SQ for the basic and extended HEV models are significant, it suggests that the respondents are uncertain with their expected utility from the SQ option. The magnitude of uncertainty is measured through the value of scale parameter as shown in equation 5. The higher the scale value, the lower the variance (i.e. means that lower uncertainty).

TABLE 3. Results of Basic and Extended HEV Models

Variable	Basic HEV		Extended HEV	
	Basic HEV	Implicit Price	Extended HEV	Implicit Price
Amen	0.3797*** (0.0865)	4.93	0.4559*** (0.0900)	5.14
Fac1- Medium	0.9058*** (0.1167)	11.76	0.9360*** (0.1114)	10.55
Fac2- Higher	1.3308*** (0.1353)	17.28	1.3891*** (0.1318)	15.66
Info1-Medium	0.0355 (0.1007)	0.46	0.1645 (0.1102)	1.85
Info2- Higher	0.0818 (0.1329)	1.06	0.1508 (0.1392)	1.70
NAtt1- Medium	0.1928* (0.1060)	2.50	0.2711** (0.1095)	3.06
NAtt2- Higher	0.2359** (0.1098)	3.06	0.2825** (0.1125)	3.18
Price	-0.0770*** (0.0049)	-	-0.0569*** (0.0071)	-
Scale Parameter	0.8443* (0.4473)	-	0.6242** (0.3125)	-
AgePri1: 25 to 34 yrs old (Age1 x Price)	-	-	-0.0166** (0.0067)	-
AgePri2: 35 yrs old and above (Age2 x Price)	-	-	0.0072 (0.0071)	-
EduPri: University Degree (Edu x Price)	-	-	0.0180*** (0.0056)	-
EthPri1: Chinese (Ethnic1 x Price)	-	-	-0.0795*** (0.0076)	-
EthPri2: Indian and others (Ethnic2 x Price)	-	-	-0.0506*** (0.0090)	-
Summary Statistics				
Log-likelihood function:	-966.8098		-872.2526	
Log-likelihood: $L(0)$	-1239.2347		-1239.2347	
Psuedo-R^2	0.21983		0.29614	
Adjusted Psuedo-R^2	0.21671		0.29174	
Number of observations	1128		1128	

***, ** and * denote significance at the 1%, 5% and 10% levels, respectively;std errors are in brackets.

In the present study, the scale parameter coefficient is considered low, with 0.8443 and 0.6242 for basic and extended HEV models, respectively. Therefore, the finding would suggest that the respondents are uncertain with the utility generated from the SQ option. On the other hand, the results indicate that respondents are more certain with alternative options.

CONCLUSION

The present study focuses on the investigation of preferences uncertainty on attributes available at parks. Because of the limitations in CL models, where the assumption is made that the scale parameter needs to be constant at 1, the model is not suitable to investigate preferences uncertainty where the variances are constant for all alternatives. Alternatively, the present study applies a model that relaxes the assumption, namely the HEV model.

The present study investigates the uncertainty effect of the SQ option through the scale parameter value. The results show that the scale parameter for both models, basic and extended HEV, is significant at the 10% level. Since the scale value is considered low, the expected utility from SQ is expected to be uncertain.This indicates that members of the public are uncertain with utility anticipated from SQ compared to other alternatives. Apart from that, the implicit prices calculated in the HEV models are lower than their counterparts calculated in the CL model. The finding suggests that estimates using different estimation models should be cautiously interpreted as such findings will have significant impacts on policy recommendations.

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