The current issue and full text archive of this journal is available on Emerald Insight at:
https://www.emerald.com/insight/2397-3757.htm

Exploring potential cruisers behavior based on a preference model: the Japanese cruise market

Tomoya Kawasaki
Department of Systems Innovation, The University of Tokyo, Tokyo, Japan, and
Yui-yip Lau
Division of Business and Hospitality Management, College of Professional and Continuing Education, The Hong Kong Polytechnic University, Hung Hom, Hong Kong

Received 5 March 2020
Revised 29 May 2020
30 May 2020
18 July 2020
Accepted 20 July 2020

Abstract

Purpose – The purpose of this study is to analyze the preferences of potential Japanese cruise ship tourists and identify the factors influencing their participation in cruise ship tourism. In the analysis, preference for cruise ports in East Asia is also examined.

Design/methodology/approach – The behavioral model of potential cruiser is developed through a mixed ordered logit approach. The data are collected by means of the stated preference method with the application of a Web-based questionnaire. Multiple answers are collected from each respondent. Hence, panel effects between answers are considered so as to obtain a robust model.

Findings – The results show that Nagasaki and Hong Kong ports are preferred, and other domestic ports, namely, Kobe, Kagoshima, and Naha are also relatively popular places to visit. However, potential Japanese cruisers are reluctant to visit two South Korean destinations which are frequently selected as cruise lines by avoiding Cabotage rule. Besides, shorter cruise duration and lower prices increase the possibility of participation in cruise tourism, particularly for working people. Retirees tend to have less interest in cruise tourism. However, Japanese-related services will increase retirees' intentions to participate in cruise tourism.

Research limitations/implications – This study attempts to analyze potential cruisers' behavior toward cruise ship tourism in Japan and discusses how to increase the number of cruisers participating in cruise ship tourism. In this vein, repeat behavior should also be analyzed. Repeat behavior contributes to the maintenance and increase in cruisers in Japan.

Originality/value – There is no study on potential cruiser's behavior analysis in Japan which is the emerging country as cruise market. Thus, the number of potential cruisers is expected to be high. This study reveals that potential cruisers' preferences on cruise ship services (e.g. duration, price, on board services, etc.), which are separately analysed for working ages and retirees. Besides, preferences on port of calls in East Asian context are revealed. These results are useful for cruise ship industries, especially for cruise lines.

Keywords Cruise tourism, Japanese market, Mixed ordered logit model, Passenger preferences, Potential demand

Paper type Research paper

© Pacific Star Group Education Foundation. Licensed re-use rights only.

Maritime Business Review
Vol. 5 No. 4, 2020
pp. 391-407
Emerald Publishing Limited
2397-3757
DOI 10.1108/MABR-03-2020-0011

1. Introduction

A cruise has been identified as the "transportation of pleasure-seeking travel" on ocean voyages offering one or more glamorous ports of calls (Kendall, 1986, pp.360). In general, a cruise ship gives a service to work for the cruiser who seeks for interest, pleasure, and relaxation (Lau and Sun, 2019). In terms of Asian cruise market, Japan is one of the representative countries in Asia Pacific region (Lau and Yip, 2020). In recent years, the Japanese cruise market has expanded dramatically because of traditional culture, gourmet restaurants, and various top attractions (Nagasaki, Niseko, Mt Fuji) (Lau and Yip, 2020). Cruise ships called at Japanese cruise ports 2,928 times in 2018, whereas this figure was recorded as 929 in 2010 (Japan Tourism Agency, 2019a). This boost is mainly because of an increase in foreign cruise ships, which generally call at the southern parts of Japan (i.e. Kyusyu and Okinawa regions). Foreign cruise ships operate quite actively in the East China Sea, the vicinity of Kyusyu and Okinawa. The number of inbound tourists to Japan via cruise ships reached approximately 1.12 million in 2015. This was beyond the expectations of the Japanese Government, which in 2012 launched an "Action Program for Tourism Nation" that aimed to increase the number of tourists arriving via cruise ships to 1 million by 2020. The government's target was thus achieved five years earlier than planned. For this reason, the government revised its objective and now aims to increase the number of inbound passengers to 5 million by 2020.

In this situation, Japanese cruisers are also continuously increasing in number. In 2018, the number of Japanese cruisers was recorded as 321,000, which was the highest to date (Japan Tourism Agency, 2019a). However, the ratio of cruisers (i.e. cruisers/population) in Japan is still far lower than in countries with mature cruise industries. According to the database of Cruise Line International Association (CILA), the cruisers ratios in the USA, Australia, the UK and Canada were 4.3%, 4.3%, 2.8%, and 2.0%, respectively, whereas Japan's ratio in 2014 was only 0.2%. A characteristic of cruisers is that they are generally wealthy older people (Shibasaki *et al.*, 2011). As Japan has a large population that satisfies this demographic, there are further potential passengers in Japan (Kawasaki *et al.*, 2017). Therefore, it is important to analyze the preferences of potential cruisers toward cruise tourism.

Several behavioral analyses of attitudes toward cruise tourism have been undertaken. For example, Petrick *et al.* (2007) analyze the decision-making processes of cruisers. Duman and Mattila (2005) examined several affective factors associated with the perceived value of cruise tourism to passengers in the USA. In Asia, in particular in the Japanese context, however, few studies have been conducted. For instance, Shibasaki *et al.* (2011) attempt to evaluate the attractiveness of Japanese ports as cruise destinations. Kawasaki *et al.* (2017) analyze the attitude modification of potential cruisers in Japan and reveal that imparting cruise-related information to potential cruisers alleviates negative images such as long tour durations, high prices and elite customers. However, there are no studies that analyze potential cruisers' preferences toward cruise tourism in Japan. Hence, the objectives of this study are set as follows: to analyze the preferences of potential Japanese cruisers; and to identify the factors influencing their participation in cruise tourism. Specifically, a behavioral model of potential cruiser is developed through using a mixed ordered logit approach. In the model, preference for cruise ports in East Asia is also examined. The data are collected by means of the stated preference (SP) method with the application of a web-based questionnaire. Multiple answers are collected from each respondent. Hence, panel effects between answers are considered so as to obtain a robust model.

2. Literature review

In this section, a number of research papers related to the cruise industry are reviewed to locate this study within the literatures. In studies of cruise tourism, ones of the main targets are economic evaluations of the effect on local economies (Dwyer and Forsyth, 1998; Henthorne, 2000) and behavioral analyses of cruisers (Petrick *et al.*, 2007). The labor issues of cruise seafarers (Terry, 2009), environmental impacts (Butt, 2007), safety management (Lois *et al.*, 2004), cruise ship operational efficiency and cruising regulations (Sun *et al.*, 2019b) have also been subjects of cruise research. Since this study focuses on a factorial analysis of potential cruisers, it can be classified as a behavioral analysis of cruise tourism. To this end, we mainly review research studies related to behavioral factors. However, as mentioned in Hung and Petrick (2011), little effort has been made to study cruise tourism even if the vast amount of attention that has been paid to studying travel motivation in general.

Several studies have undertaken behavioral analyses of cruise tourism and concluded that offering shorter cruise duration with lower prices is an effective way in encouraging cruisers' participation (Kawasaki *et al.*, 2017). Meanwhile, several factors other than price and tour duration are also shown to be important in affecting the decision-making process of cruisers. Petrick *et al.* (2007) identified loyalty, familiarity and the social influences of cruise tourism as significant elements. Social influence is described as influences from family and friends who have experience in taking cruise tours. Other studies focus on the behavior of repeat cruisers. High-income cruisers tended to be repeat customers and they spread their experiences of taking cruise ship tours by word of mouth (Petrick, 2004a). In many cases, these anecdotes are spread as positive experiences. Therefore, the participation of high-income cruisers posed impacts not only on their own repeat behavior, but also on encouraging their families and friends to involve in a cruise tour. Loyalty is also recognized as an important function in increasing cruisers' satisfaction levels (Li and Petrick, 2008). Other factors that determine cruise tourism satisfaction are service quality (Petrick, 2004b), price sensitivity (Petrick, 2005), novelty and hedonic value (Duman and Mattila, 2005) and perceived impression (Park, 2006) on cruise experiences. Petrick (2004a, 2004b) compared between the first-timers and repeaters. Surprisingly, the first-timers are less price sensitive than repeaters. In Japan context, Shirai (2010) and Narumi (2015) conducted a statistical analysis and found that tour duration and prices are critical factors affecting cruisers' satisfaction levels. Kawasaki *et al.* (2019) conducted an analysis from the perspective of shipping lines. It is revealed that monetary subsidies for operators have little impact on changing their selection for ports of calls.

As seen above, several studies relevant with the behavioral analysis of cruisers have been undertaken. However, most of these studies have concentrated on experienced cruisers. So, the behavior of potential cruisers seriously overlooked. To this end, the contribution of this study is to explore and clarify potential cruisers' behavior. Specifically, studies in the context of the Japanese cruise market are relatively rare in the academic world. In addition, this investigation analyzes the preferences for visiting ports in East Asia. These findings provide valuable insights to cruise lines for encouraging potential cruisers to participate in cruise tourism.

3. Questionnaire survey

3.1 Research design

To understand potential cruisers' attitudes toward cruise tours, a questionnaire survey was carried out with potential cruisers. It defines the people who are willing to but have never participated in a cruise tour. SP questionnaire form is developed with the support from

cruise lines so that realistic questions are prepared. After that, we conduct a Web-based questionnaire survey.

In this study, it is set as the people who never participate in a cruise tour and living place is accessible location to Yokohama port. Thus, respondents were extracted from people living in places accessible to Yokohama port, such as Tokyo, Kanagawa, Chiba and Saitama prefectures. All these places are relatively easy access to Yokohama port because of its proximity and the availability of public transport (e.g. bus and train). Note that in cases where cruise tours incorporate air transport, the port of embarkation is Tokyo International Airport where it is also easily accessible from these prefectures. An overview of the questionnaire survey is shown in Table 1.

The questionnaire survey was conducted with monitors employed by a survey company. Prior to conducting the survey, screening surveys were done with monitors between 12 and 17 December 2015. Respondents evenly distributed in terms of generation, gender and annual income which might be influential attributes of preferences for cruise tourism. As for generations, 100 samples were collected for each adult decade (i.e. 20*s*, 30*s*, 40*s*, 50*s* and 60*s*). The samples are all selected from the working population. The proportion by gender was collected evenly. According to survey interviews conducted with the cruise lines, the proportion of female users of cruise tourism was slightly higher than that of male users. However, samples for male and female were collected equally for a comparison purpose.

Apart from people of working age, 254 and 246 samples were collected from retiree and housewife, respectively. The retiree sample was also considered because a number of cruisers involved in cruise tour were retirees (Kawasaki *et al.*, 2018). As for the age share of the retirees, those in their 50*s* and 60*s* represent 14.6% and 85.4%, respectively. Concerning about the proportions by gender of retirees, male and female comprised 94.5% and 5.5% of the sample, respectively. Income level was likely to be an influential attribute on preferences to participate in cruise tours. In general, cruise tours were more popular among the wealthy because of the higher number of older cruisers compared with younger generations (Kawasaki *et al.*, 2017). Hence, samples were equally collected in terms of income level for comparison purpose. In this study, sample sizes of above and below average income (MHLW, 2017) for each generation were equally collected. As for retirees, financial assets data were used instead of annual income. The composition by occupation including 31.5% were company employees, 7.2% were self-employed businesses, 24.6% were housewives,

Table 1.
Overview of questionnaire survey

Items	Contents
Survey period	• Screening survey: 15–17 December 2015 • Questionnaire survey: 22–24 December, 2015
Target of respondents (Screening survey)	• People who are willing but have never participated in a cruise tour • Potential passengers of cruise tourism living in Tokyo, Kanagawa, Chiba and Saitama – 1,000 monitors of survey company (i.e. excluding students) – Gender, age (20s–60s) are evenly collected
Method	• Distributed to 1,000 monitors on the website • Answered on the website
Survey contents (Main survey)	• Attitudes toward cruise tours (preferred ports, region, option services, maximum willingness to pay for cruise tour, etc.) • Reason(s) not to participate in cruise tours • Preferences to participate in a hypothetical cruise tour (SP questionnaire)
Valid answers	•1,000 samples (100%)

8.9% were part time jobs and 2.4% were others. Students were excluded from the samples because of low possibilities of joining cruise tours according to interview with cruise lines. There were no noteworthy differences among generations. Eventually, 1,000 valid samples were gathered.

3.2 Descriptive analysis

We conduct a descriptive analysis to understand potential cruisers' preferences toward cruise tours as shown in Figures 1, 2 and 3, respectively. Figure 1 highlights the reasons for not to participate in cruise tours for each segment such as working people and retirees. As expected, "high price" receives a relatively high share (i.e. approximately 50%) for both segments. As for "no time," a large gap between working people and retirees is observed. Working people receive 28.2 points higher than retirees. This result indicates that those of working age are in a more severe situation in terms of time availability. However, working people shows relatively less consideration for a long cruising duration. As shown in Figure 1, "long tour duration" is selected by retirees rather than by those of working age. These results imply that working people consider that cruising duration is not very long. Nonetheless, they do not have enough time to spend cruising activities because of their limited time availability. An item in the questionnaire survey asks the maximum possible days available to spend on a cruise tour. Working people and retirees are able to spend an average of 5.43 and 7.76 days on cruise ship tours, respectively. For retirees, the answer rate of "no time" is relatively low (i.e. 18.9%) while they tend to feel that the duration of cruise tours is too long to participate. Considering all the above results, the inference can be made that retirees show a low motivation to join cruise tours because of long tour durations, although their time is relatively available.

Preferred region(s) to visit by cruise ship for working age people and retirees are given in Figure 2. In Figure 2, the regions between Kyushu and Hokkaido correspond to domestic regions, while others are foreign regions. In overall trends, we can observe that the preferred regions among Japanese cruise ports are Kyushu, Okinawa and Hokkaido. These regions are all famous destinations for cruise tours. Kyushu and Okinawa region ranked at 1st–3rd positions among Japanese cruise ports in 2016 in terms of the number of cruise ship calls (Japan Tourism Agency, 2019b). Nagasaki is located in Kyushu region where it is famous as a "port town" and Naha is located in Okinawa region where it is widely known as a popular tourist destination. As for foreign regions, the Mediterranean and Caribbean seas received

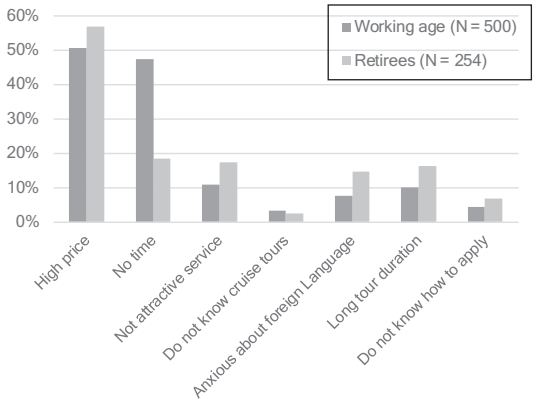


Figure 1.
Reasons not to participate in cruise tours

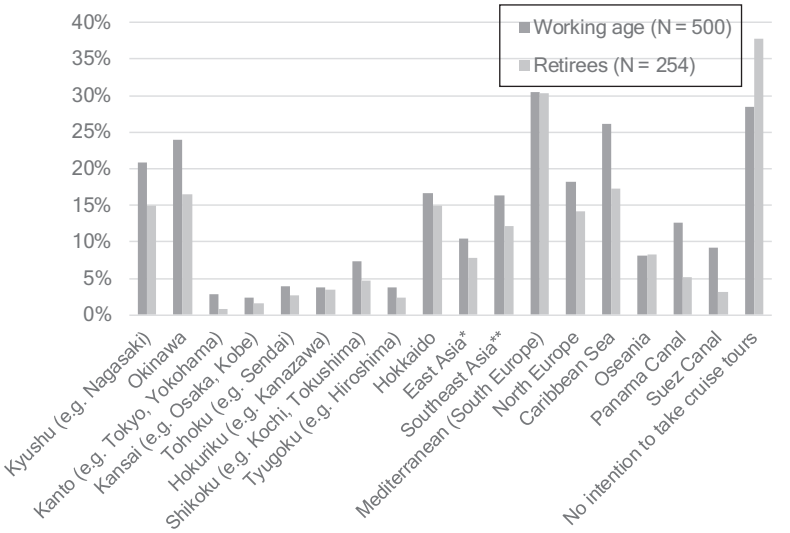


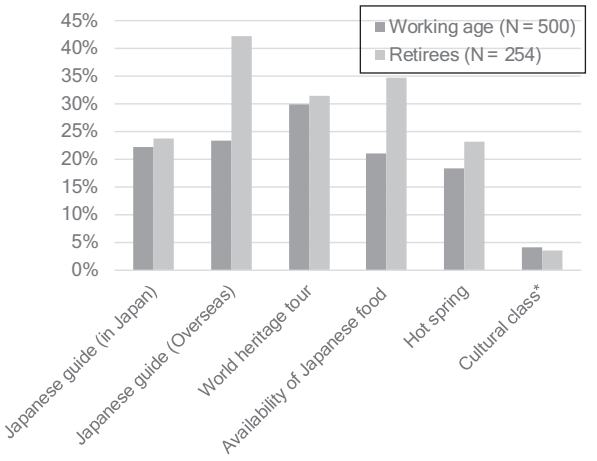
Figure 2.
Preferred region(s) for cruise tours

Notes: *East Asia: China, South Korea, Taiwan, Hong Kong; **Southeast Asia: Thailand, Vietnam, Singapore

comparatively high scores. These regions are well known as traditional and popular destinations for world cruise tours. Considering all the above results, we can postulate that potential cruisers intend to visit famous places on cruise tours. Hence, it seems important to provide cruise services that include popular tourist attractions as cruise destinations. As for the comparison between working age people and retirees in terms of overall trends, working age receives higher points than retirees in all regions. On the other hand, retirees received 9.4 points higher than working age regarding "no intention to take cruise tours." This means that retirees have more negative intentions toward cruise tours. This result is consistent with the discussion above regarding Figure 1.

In cruise tours, several service options are offered for both onboard and associated land tours. The results of preferred service options for working age and retirees are addressed in Figure 3. As seen in Figure 3, answer rates for retirees are higher than for working age people for all items except "cultural classes." In particular, "Japanese guide (overseas)," "availability of Japanese food" and "hot spring" are overwhelmingly preferred by retirees. This implies that providing Japanese-related service options is an effective approach to encourage potential cruisers among retirees to participate in cruise tours.

On the other hand, cultural classes, which include Hula dance, piano and Japanese tea ceremony, received only 4.1% (working age) and 3.9% (retirees). From this result, cultural classes are not regarded as critical service options for potential cruisers. However, according to the survey interviews with cruise lines, cultural classes are relatively popular and obtain high satisfaction levels from onboard cruisers. In this study, none of the respondents has experienced in cruise tours. We can consider that such non-experienced cruisers cannot realize the attractiveness of these cultural classes. Unless such classes are actively promoted, they cannot realize a key service option to increase the desire of potential cruisers to involve in cruise tours, while it might be an effective option to attract repeaters.



Note: *Hula dance, Piano, Tea ceremony

Figure 3.
Preferred service options

Considering the above descriptive analysis, retirees and older people are more likely to be reluctant to participate in cruise tourism compared with working ages. Shares of *captives* for people in their 50*s*, 60*s* and retirees are 56.0%, 54.0% and 56.3%, respectively, whereas the total share of captives is 50.4%. The definition of captives indicates those people who have absolutely no intention to join a cruise tour. Note that captive samples are identified in the question of "maximum possible days and prices to participate in cruise tours." In this question, the answer of "I do not participate in cruise tours" is included. In cases where respondents choose this answer, corresponding samples are defined as captives. Otherwise, samples are defined as *choices*. The definition of choices is that they express intentions to join cruise tours. Therefore, it implies that older generations have a comparatively negative attitude toward participation in cruise tours.

3.3 Design of stated preference surveys

Preferences toward cruise tours are investigated by SP survey. This survey is conducted for the purpose of collecting input data for model development. The conditions of nine hypothetical cruise tours, designating Yokohama as the turnaround cruise port, are shown in Table 2. To make each cruise tour as realistic as possible, we conducted survey interviews with three cruise lines and specified unit prices per day for each tour class by referring to existing cruise tours. We incorporate air transportation for half of journey for cruise tours B, E and I so as to shorten the total tour duration. Note that the departure airport is set as Tokyo International Airport (i.e. Haneda Airport) instead of Yokohama port. As for service options, each cruise tour contains one out of three options such as "live music by famous artist," "Japanese tour guide in foreign country," and "cuisine by famous restaurant (chef)." Using these variables, nine combinations of variables are established. The design of experiment aims to satisfy orthogonality between the alternatives. As an example, one question is shown in Figure 4. Respondent's preferences toward cruise tours are evaluated on a four-point scale, such as "I would take this tour (Category 4)," "I might take this tour (Category 3)," "I might not take this tour (Category 2)," and "I would not take this tour (Category 1)." Respondents choose one of four categories.

Tour	Tour Duration	Tour price	Ports (Foreign ports are underlined)	Class	Option (Inclusive in tour price)
Tour A	11 days 10 nights	¥120,000	YOK, PUS, NGS, TPE, OKA, YOK	Casual/standard	Live music by famous artist
Tour B	9 days 8 nights	¥300,000	HND, HKG, TPE, OKA, UKB, YOK *HND→HKG(Air)	Luxury	Live music by famous artist
Tour C	5 days 4 nights	¥95,000	YOK, CJU, YOK	Premium	Land tour
Tour D	14 days 13 nights	¥600,000	YOK, OKA, HKG, CJU, UKB, YOK	Luxury	Land tour
Tour E	7 days 6 nights	¥150,000	HND, TPE, NGS, UKB, YOK *HND→TPE(Air)	Premium	Land tour
Tour F	7 days 6 nights	¥220,000	YOK, KOJ, PUS, YOK	Luxury	Dinner by famous restaurant (chef)
Tour G	6 days 5 nights	¥65,000	YOK, CJU, KOJ, YOK	Casual/standard	Land tour
Tour H	13 days 12 nights	¥270,000	YOK, OKA, TPE, HKG, KOJ, YOK	Premium	Live music by famous artist
Tour I	4 days 3 nights	¥45,000	HND, PUS, UKB, YOK *HND→PUS(Air)	Casual/standard	Dinner by famous restaurant (chef)

Table 2.
The conditions of each tour

Notes: YOK (Yokohama), UKB (Kobe), NGS (Nagasaki), KOJ (Kagoshima), OKA (Naha), HND (Tokyo International Airport); PUS (Pusan), CJU (Jeju Island), TPE (Taipei), HKG (Hong Kong)

4. Modeling the behavior of potential cruisers

4.1 Utility function

As for preferences toward cruise tours, there might be a degree of intention to join. For example, when respondents feel a positive impression, they are likely to consider "I would participate" or "I might participate" toward hypothetical tours. Hence, an ordered logit model is used to consider potential psychological differences in terms of utilities (Train, 2003). The probability of choosing the mth (m = 1–4) category P_m and the respondent's utility V can be shown as equations (1) and (2), respectively:

$$P_m = \frac{1}{1+\exp(V-\theta_{m-1})} - \frac{1}{1+\exp(V-\theta_m)} \tag{1}$$

$$\begin{aligned} V &= V(\text{Day, Price, Port, Fly, Class, Option}) \\ &= \beta_1 \text{Day} + \beta_2 \text{Price} + \sum_{i=1}^{7} \beta_{3i} \text{Port}_i + \beta_4 \text{Fly} \\ &+ \sum_{j=1}^{2} \beta_{5j} \text{Class}_j + \sum_{k=1}^{2} \beta_{6k} \text{Option}_k + \sum_{l=1} \beta_{7l} \text{Dummy}_l \end{aligned} \tag{2}$$

θ_m denotes the mth threshold while the β_i represents unknown parameters for explanatory variables to explain utility V. Other than total tour duration and price, variables are

Tour Duration	11 days,10 nights
Tour Price	120 thousand yen/passenger
Ports	Yokohama, Pusan, Nagasaki, Taipei, Naha, Yokohama
Class	Casual/Standard
Option	Live music by famous artist

Notes: *6-7 hours stay for each port; *conducted in Japanese, modified to English

Figure 4.
Example of SP survey

identified as eight ports, three classes, three service options and dummy variables for air transportation ["Fly" in equation (2)] and individual attributes (e.g. age, income, etc.). Since this survey collects nine preferences from one respondent, model robustness will be increased by considering panel effects (Hsiao, 2002). A mixed logit style model is able to consider panel effects and is thus developed. In cases where a random error term over individuals ξ is considered, the probability to choose the mth category $L_m(\xi)$ can be described as shown in Equation (3):

$$L_m(\xi) = \frac{1}{1+\exp(V-\theta_{m-1}+\sigma\xi_i)} - \frac{1}{1+\exp(V-\theta_m+\sigma\xi_i)} \tag{3}$$

ξ_i is a random error term over the individuals that is defined to follow the standardized normal distribution, $\xi_i \sim N(0,1)$ ($f(\xi_i)$) and σ denotes its unknown parameter. Owing to the absence of strong evidence for the distribution shape of $f(\xi_i)$, several studies (Yannis and Antoniou, 2007) also use the standardized normal distribution, as assumed in this paper. Considering the distribution of ξ, the probability of choosing the mth category P_m of the mixed logit model can be expressed as the product of probability ($L(\xi)$) and the probabilistic density function ($f(\xi_i)$) as shown in Equation (4):

$$P_m = \int_{\xi_i} L_m(\xi) f(\xi_i) d\xi \tag{4}$$

As equation (4) is composed of standardized normal random parameters and hence is not a closed form. Parameter estimation for the mixed logit model needs simulation. In this paper, simulation for parameter estimation is based on the Halton sequence which is used instead of pseudo-random numbers, as employed in several studies (Train, 2003; Sandor and Train, 2004).

4.2 Explanatory variables

4.2.1 Total tour duration (days). Total tour duration (days) indicates total days have been taken between origin port embarked and final port called. Tour duration comprises navigation and calling time at the ports. Navigation times between ports are calculated by using SeaRates.com. The procedures of immigration are assumed to take for 1.5 h. The duration of land tours is set as 6–7 h for all ports called. After developing nine hypothetical cruise tours, the questionnaire form was checked by three cruise lines to verify its reality.

4.2.2 Tour price (Yen). In this study, tour price is defined as the total price of cruise tours. It excludes additional fees for service options. Typical examples of extra service options are alcoholic drinks and meals in addition to breakfast, lunch and dinner. Total price is calculated on the basis of actual services provided by cruise lines. In addition, cruise class is considered to determine tour prices.

4.2.3 Ports of call (dummy variable). Ports seem to be important factors that affect cruiser's motivation. In this study, the domestic ports selected are Kobe (UKB), Nagasaki (NGS), Kagoshima (KOJ) and Naha (OKA) because of their high number of calls by cruise ships (Japan Tourism Agency, 2019b). As for foreign ports, Pusan (PUS), Jeju Island (CJU), Taipei (TPE) and Hong Kong (HKG) are selected. All these selected cruise ports are located in East Asia and can be accessed from Yokohama port within two weeks. These cruise ports are expressed as a dummy variable that takes 1 in case the cruise port is included in a cruise tour, otherwise, 0.

4.2.4 Air transportation dummy. In some of the tours, air transportation is introduced in the half of cruise journey. Air transport can shorten the total tour duration. Taking Tour B in Table 2 as an example, the port of embarkation is set as Tokyo International Airport (Haneda) flying to Hong Kong, the first destination of the tour. From Hong Kong, cruisers embark on the cruise ship bound for the next destinations until reaching Yokohama port. By using air transport between Tokyo and Hong Kong, total tour duration can be significantly reduced. In this study, air transport is introduced between Haneda and Hong Kong (Tour B), Haneda and Taipei (Tour E) and Haneda and Pusan (Tour I), which reduce tours by 5 days, 3 days and 2 days, respectively, compared with pure cruise ship tours. In cases where air transportation is not incorporated, this dummy variable is 1, otherwise, 0.

4.2.5 Service class dummy. Service classes of cruise ship are divided into three categories, namely, casual/standard, premium and luxury. High-class ships provide comparatively luxurious environments and services. In addition, cruisers need to dress up as necessary onboard. On the basis of actual services provided by cruise lines, contents and characteristics of each class are explained in the questionnaire form in order to let respondents understand the differences between these classes. This dummy variable receives 1 in cases where the corresponding class is operated, otherwise, 0.

4.2.6 Service options dummy. Several service options are given in cruise tourism to make cruise tours more attractive. Among several option services, "land tour," "cuisine by famous restaurant" and "live music by famous musician" are adopted because of their popularity based on the survey interviews. If cruise tours provide the corresponding service option, this dummy is set as 1, otherwise, 0.

4.3 Specification of utility function

Using the variables above, the models for preferences toward cruise tours are created. Results of parameter estimation are shown in Table 3. The variables in the model are selected when the highest likelihood ratio is attained. In all models, total tour duration and price are included as they are vital decision variables. The adjusted likelihood ratio exceeds more than 0.4 in all models except Model 1, which does not incorporate panel effects. Regarding the thresholds θ, most of the parameters indicate statistical significance at levels greater than 10%. From this result, an application of the ordered logit model is regarded as appropriate. Models 2–7 incorporate panel effects, forming mixed ordered logit models. The parameter of panel effects σ satisfies the 1% significance level in all models. Also, the t-values of each parameter is dramatically increased by introducing panel effects. Besides, the adjusted likelihood ratio increases to more than 0.4, which is high enough to discuss the results using these models. Therefore, the data collected by SP survey contain clear panel effects and we can conclude that the application of the mixed ordered logit model is appropriate. Regarding service options, incorporating these variables in the model makes the adjusted likelihood ratio dramatically lower and the parameters of other explanatory variables turn to insignificance. Thus, service options are not included in the model.

4.4 Findings and discussion

4.4.1 Tour duration and price. The parameters of "tour duration" and "tour price" were obtained as negative values with statistical significance in all models, except tour duration for Model 7 (captives). We find that potential cruisers tend to prefer shorter cruise period and lower prices. Regarding air transportation variable (Fly dummy) itself, significant results cannot be obtained. However, the interaction in terms of Fly dummy and tour duration in Models 2, 4, 5 and 6 are demonstrated as significant results with negative signs. From this result, there is a synergy effect between inclusion of air transportation and tour duration in the models of "all sample," "working age," and "choices." Since coefficients of this interaction term are obtained as a negative value, the reduction in tour duration attracts these potential cruisers.

Although the literature has clarified that tour durations should be shorter, cruise tours from/to Japan tend to be longer. According to the Japan Tourism Agency (2019a), cruises of 3–4 nights occupy more than half the total share in terms of cruiser numbers before 2009. However, after the year 2010, cruise tours gradually start getting longer. Finally, cruises of 5–7 nights and 8–13 nights together occupy approximately 70% in 2014. According to survey interviews with cruise lines, this trend can be explained by the strategy of cruise lines. Since cruisers in Japan are mainly repeat customers (Shibasaki *et al.*, 2011), whose somewhat prefer longer cruise ship tours. To this end, cruise lines set tour durations lightly longer to attract such repeat customers. This is an understandable strategy because of repeat cruisers are more beneficial for cruise lines. Thus, in order to acquire new users, providing short cruise trip period is also an important strategy for cruise lines in the forthcoming years.

4.4.2 Ports of call. The parameters of ports of call are discussed in this section. For all models, Nagasaki and Hong Kong are preferred with high t-values. According to the survey interviews, Nagasaki and Hong Kong are famous as "port towns." This impression is possibly important for potential cruisers. From this result, inclusion of conventional ports such as Nagasaki and Hong Kong port encourage potential cruisers to participate cruise tourism. Figure 5 generates the evaluation results for preferable cruise ports to visit for vacations. From Figure 5, it clears that Nagasaki and Hong Kong are the most popular

Table 3.
Results of parameter estimation

Explanatory variable	Model 1: All sample (OL)	Model 2: All sample (MXOL)	Model 3: All Sample (MXOL)	Model 4: Working age (MXOL)	Model 5: Retirees (MXOL)	Model 6 Choices (MXOL)	Model 7 Captives (MXOL)
Tour duration (D)	−0.13 (−3.04***)	−0.15 (−3.14***)	−0.13 (−1.83*)	−0.27 (−2.87***)	−0.02 (−1.97**)	−0.16 (−2.22**)	−0.01 (−1.14)
Tour price (P)	−0.03 (−4.80***)	−0.08 (−4.83***)	−0.04 (−3.29***)	−0.03 (−3.94***)	−0.02 (−2.55***)	−0.07 (−2.60***)	−0.28 (−3.99***)
Ports ($Port_i$)							
Kobe	0.11 (1.98**)	0.12 (1.98**)		0.02 (2.17**)	0.23 (2.03**)	0.15 (2.35**)	0.45 (2.52**)
Kagoshima	0.26 (2.08**)	0.24 (2.09**)		0.08 (0.31)	0.31 (2.55***)	0.37 (2.99***)	0.24 (1.96*)
Nagasaki	1.67 (4.38***)	1.69 (4.42***)		1.46 (3.75***)	1.94 (3.21***)	1.85 (3.99**)	1.05 (2.73***)
Naha	0.33 (1.56)	0.13 (3.56***)		0.21 (1.88*)	0.36 (2.75***)	0.48 (2.71***)	0.14 (2.33**)
Pusan	0.03 (0.40)	−1.57 (−2.38**)		−0.11 (−0.07)	−1.02 (−3.14***)	−0.05 (−0.25)	−1.36 (−2.52***)
Jeju Island	0.01 (0.31)	−0.24 (−1.74*)		−0.01 (−0.22)	−0.62 (−2.47***)	−0.24 (−0.91)	−1.07 (−2.22**)
Taipei	−0.28 (−2.23**)	0.13 (0.58)		0.56 (0.78)	0.11 (1.19)	−0.31 (−0.17)	−0.69 (−1.34)
Hong Kong	1.70 (3.99***)	1.04 (4.40***)		1.99 (3.41***)	1.08 (1.99**)	1.35 (2.21**)	0.95 (1.73*)
Fly Dummy (yes = 0, no = 1)		−0.38 (−1.42)		−0.47 (−1.42)	−0.03 (−0.18)	−0.11 (−0.32)	−0.03 (−0.61)
Fly Dummy× D (Interaction term)		−1.23 (−3.20***)		−1.74 (−4.97***)	−0.99 (−1.45)	−1.23 (−3.26***)	−0.52 (−1.24)
Class							
Luxury			−0.03 (−0.21)				
Premium			−0.04 (−0.67)				
Casual			0.25 (0.41)				
Luxury × P (Interaction term)			−1.98 (−3.21***)				
Premium × P (Interaction term)			−0.31 (−2.34***)				
Casual × P (Interaction term)			0.47 (0.70)				
Age Dummy							
20s–40s		0.59 (2.43**)		0.20 (2.15**)		0.13 (2.30**)	0.01 (1.71*)
50s–60 s (base)		–		–		–	–
Annual Income (1,000 *USD)*							

(*continued*)

Explanatory variable	Model 1: All sample (OL)	Model 2: All sample (MXOL)	Model 3: All Sample (MXOL)	Model 4: Working age (MXOL)	Model 5: Retirees (MXOL)	Model 6 Choices (MXOL)	Model 7 Captives (MXOL)
Less than 60 (base)		–					
60–100			0.75 (0.63)				
More than 100			0.79 (2.71***)				
Threshold θ							
Category 1 to 2	−0.19 (−1.05)	0.01 (1.67*)	0.02 (1.67*)	−0.70 (−2.76***)	0.52 (1.37)	0.36 (1.89*)	0.27 (2.31**)
Category 2 to 3	1.48 (8.00***)	1.33 (4.83***)	1.31 (4.69***)	1.06 (4.15***)	2.36 (6.08***)	2.24 (2.60***)	1.94 (6.35***)
Category 3 to 4	3.27 (16.52***)	2.74 (16.52***)	2.73 (6.41***)	2.85 (10.46***)	4.35 (10.11***)	3.36 (7.24***)	4.41 (9.46***)
Panel effect σ		12.39 (6.70***)	6.26 (4.49***)	9.14 (6.98***)	11.43 (6.46***)	5.79 (5.01***)	11.18 (6.09***)
Sample size	9,000 (=1,000*9)	9,000 (=1,000*9)	9,000 (=1,000*9)	4,500 (=500*9)	2,286 (=254*9)	4,671 (=519*9)	4,329 (=481*9)
Adjusted McFadden's R^2	0.31	0.42	0.42	0.43	0.43	0.44	0.40

Notes: ***1%Significance level; **5% significance level; *10% significance level

Table 3.

domestic and foreign tourism destinations among the places studied. Other domestic ports, namely Kobe, Kagoshima and Naha are also relatively popular places to visit.

Taipei was judged as statistically insignificant in all models except Model 1, although Taipei itself registers relatively good impressions among foreign places, as shown in Figure 5. This might be because of the fact that Taipei is not known as "port town." In visiting Taipei by cruise ship, one needs to call at Keelung port where it is located 30 km away from Taipei. To large extent, the location of the cruise terminal is inconvenience and far away from the city center. Poor connectivity is a main reason for Taipei fails to become as "port town" (Sun *et al.*, 2019b). Regarding Pusan and Jeju Island, the parameters for models, except Model 4 for working age and Model 6 for choices were obtained as negative signs with statistical significance at more than 10% levels. These results are also consistent with Figure 5, which shows that potential Japanese cruisers are reluctant to visit these two South Korean destinations.

4.4.3 Class of cruise ships. In Model 3, the class dummy is included as an explanatory variable whereas ports of call are not incorporated in order to maintain model robustness. In cases where ports are included in the model with class dummies, the adjusted likelihood ratio and parameters of other variables lost their significance. The main effect of the class dummy itself is insignificant, even at the 10% level. Since the class of cruise ship is highly bound up with tour price, interaction terms between class dummy and tour price are considered. These interaction terms for luxury and premium classes received negative values with 1% significance levels. From these results, class itself is not an influential factor on potential cruisers' behavior. However, the class of cruise ship has a synergistic effect with tour prices. As cruise ship tours become high class, prices also get higher. Thus, cruisers tend to avoid high-class and high-price tourism. Sun *et al.* (2019a) further explained that price would become a determinant motivation factor for cruisers to travel. Consequently, it can be suggested to cruise lines to assign standard/casual class cruise ships for encouraging beginners to participate in cruise tourism.

4.4.4 Annual income. In Model 3, the annual income dummy is considered. It is stratified into three main groups, these being less than US$60,000 per year (low class), US$60,000–100,000 per year (middle class) and more than US$100,000 per year (high class). Retirees are grouped on the basis of financial assets data for each class. The result shows that high-class people have more possibilities of joining cruise tours. This is expected and consistent with existing works (Kawasaki *et al.*, 2018; Sun *et al.*, 2019a). To some extent, the cruise lines design and implement VIP scheme to provide tailor-made service package for such high-class people. The high-class people is classified as the protect segment which are the most profitable in the cruise line business (Coyle *et al.*, 2013).

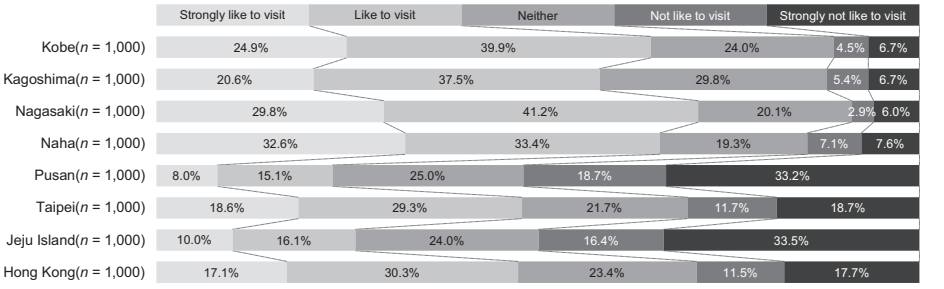


Figure 5.
Preferred port(s) to visit for vacation

4.4.5 Working age and retirees. Models for working age and retirees are separately developed as shown in Models 4 and 5. The models of both groups show similar results in terms of significant parameters and their signs although exact comparison is impossible. The variables in both models are different. The results of the parameters of the interaction term of Fly dummy and tour duration imply that working age is more sensitive to tour duration. In the model for retirees, this interaction term was insignificant, while that of working age is a significant value. This can be interpreted as implying that shortening total tour duration by introducing air transportation for some parts of total journey is ineffective in increasing retirees' willingness to join cruise tours.

In the model for working age, dummy variables for age are incorporated and yield statistically significant results with positive values for the 20 *s*–40 *s* generations. As implied in the descriptive analysis in section 3, there are more positive intentions to participate in cruise tourism among younger generations compared with older generations. However, since senior people have more time and money compared with younger generations, the actual number of older cruisers is higher than that of younger generations. Many of the younger generation have intentions to join cruise tours and once their time constraints have disappeared, the number of new cruisers will increase significantly. For example, according to the survey interviews with three cruise lines, many actual cruisers made the decision to take cruise tours because of retirement from their job. In the future, we suggest that cruise lines can conduct extensive marketing research to explore the younger generations whose are self-employed, part-time and flexible working hours.

4.4.6 Choice and captives. Finally, the models for choices and captives are analyzed. As for the model for captives, any combination of the variables decreases the model reliability in terms of adjusted likelihood ratio. Tour duration of the captive model is not obtained as a significant variable. Since tour duration is a core decision variable in this study, we explore the combinations satisfying statistically significant results for tour duration. However, no combination could reach a significant result on tour duration. Although there is a concern with model reliability, we might consider that captives do not put importance on tour duration. On the other hand, the parameter of tour price obtained a large value compared with working age. From these results, time related factors do not affect captives' attitudes toward participation in cruise tours. However, captives are more sensitive to tour prices.

5. Conclusion

This study developed a preference models for potential cruisers on cruise ship tours from/to Yokohama port. Using a developed model and statistical results of a questionnaire survey, factors and cruise ports influencing willingness to participate cruise tourism comprehensively analyzed. The results show that shorter cruise trip duration and lower prices increase the cruisers possibility of participation in cruise tourism. This trend can especially be seen for beginners, who are the target of this study. In addition, inclusion of Nagasaki and Hong Kong as destinations is effective. As for those of working age, their main reason not to participate in cruise tourism is time unavailability. For this segment, inclusion of air transportation is effective, since it can dramatically reduce total tour duration.

As for segmentation by working age and retirees, there are more positive intentions to participate in cruise tourism among younger generations compared with older generations. However, the elderly (i.e. retirees) have more time and money compared with younger generations, the actual number of elderly cruisers are higher than that of younger generations. Many of the younger generations have intentions to join cruise tours. Once their time constraints are removed, the number of new cruisers will increase significantly. There

are captives, who totally have no intention to participate in cruise tourism, among older people rather than younger generations. Thus, the reliability of the model for retiree generations is rather low and factors to increase the possibilities to participate in cruise tourism cannot be identified. However, descriptive analysis reveals that Japanese-related services such as hot springs, Japanese food and Japanese tour guides would increase retirees' intention to participate in cruise tourism.

This study attempts to analyze potential cruisers' behavior toward cruise tourism in Japan and discusses how to increase the number of cruisers participating in cruise tourism. In this vein, repeat behavior should also be analyzed. Repeat behavior contributes to the maintenance and increase in cruisers in Japan. Investigating this is the future work of this study. Sample selection also remains further research. The role of family characteristics is one of the important attributes for cruise ship preferences. However, we could not identify such characteristics in this study. In addition, 94.5% of retirees' samples are mainly stemming from male respondents. This influences the results for retirees' model since several behavioral differences are observed between male and female. Further balanced data collection in terms of gender is one of the important future works.

References

Butt, N. (2007), "The impact of cruise ship generated waste on home ports and ports of call: a study of Southampton", *Marine Policy*, Vol. 31 No. 5, pp. 591-598.

Coyle, J.J., Jr Langley, C.J., Novack, R.A. and Gibson, B.J. (2013), *Managing Supply Chains: A Logistics Approach*, South-Western Cengage Learning, Mason, OH.

Duman, T. and Mattila, A.S. (2005), "The role of affective factors on perceived cruise vacation value", *Tourism Management*, Vol. 26 No. 3, pp. 311-323.

Dwyer, L. and Forsyth, P. (1998), "Economic significance of cruise tourism", *Annals of Tourism Research*, Vol. 25 No. 2, pp. 393-415.

Henthorne, T.L. (2000), "An analysis of expenditures by cruise ship passengers in Jamaica", *Journal of Travel Research*, Vol. 38 No. 3, pp. 246-250.

Hsiao, C. (2002), *Analysis of Panel Data*, Cambridge University Press, Cambridge.

Hung, K. and Petrick, J.F. (2011), "Why do you cruise? Exploring the motivations for taking cruise holidays, and the construction of a cruising motivation scale", *Tourism Management*, Vol. 32 No. 2, pp. 386-393.

Japan Tourism Agency (2019a), *White Paper on Tourism in Japan: The Tourism Situation in FY2015*, Ministry of Land, Infrastructure and Tourism (MLIT), Japan.

Japan Tourism Agency (2019b), *Number of Inbound and Outbound Travelers*, Ministry of Land, Infrastructure and Tourism (MLIT), Japan.

Kawasaki, T., Inokuchi, K., Hyodo, S. and Todoroki, T. (2018), "Attitude modification of attention, consideration, and action for initial use of cruise ship tourism", *Journal of Japan Society of Civil Engineers, Ser. D3 (Infrastructure Planning and Management)*, Vol. 74 No. 5, pp. I_799-I_807, in Japanese.

Kawasaki, T., Todoroki, T., Kobuke, R. and Inokuchi, K. (2017), "Analysis of the potential user's behavior of cruise ship tourism from/to Japan", *Journal of Japan Society of Civil Engineers, Ser. D3 (Infrastructure Planning and Management)*, Vol. 73 No. 5, pp. I_799-I_808, in Japanese.

Kawasaki, T., Tagawa, H., Tamane, T., Hanaoka, S. and Watanabe, T. (2019), "Effects of incentive policy on maritime stakeholders in Japanese local ports", *Journal of Eastern Asia Society for Transportation Studies*, Vol. 13, pp. 2260-2277.

Kendall, L.C. (1986), *The Business of Shipping*, Cornell Maritime Press, Centreville, MD.

Lau, Y.Y. and Sun, X. (2019), "An investigation into the responsibility of cruise tourism in China", in Ng, A.K.Y., Monios, J. and Jiang, C. (Eds), *Maritime Transportation and Regional Sustainability*, Elsevier, Cambridge, MA, pp. 239-249.

Lau, Y.Y. and Yip, T.L. (2020), "The Asia cruise tourism industry: current trend and future outlook", *The Asian Journal of Shipping and Logistics*, in press, doi: 10.1016/j.ajsl.2020.03.003.

Li, X. and Petrick, J.F. (2008), "Examining the antecedents of brand loyalty from an investment model perspective", *Journal of Travel Research*, Vol. 47 No. 1, pp. 25-34.

Lois, P., Wang, J., Wall, A. and Ruxton, T. (2004), "Formal safety assessment of cruise ships", *Tourism Management*, Vol. 25 No. 1, pp. 93-109.

MHLW (2017), "Statistics Report", Ministry of Health, Labour and Welfare, Japan.

Narumi, S. (2015), "Classification of research papers of cruise industry in Japan and United States", *Journal of Japan Foundation for International Tourism*, Vol. 22, pp. 195-200, in Japanese.

Park, S.Y. (2006), "Tapping the invisible cruise market: the case of the cruise industry", Doctoral dissertation, Texas A&M University, August.

Petrick, J.F. (2004a), "Are loyal visitors desired visitors?", *Tourism Management*, Vol. 25 No. 4, pp. 463-470.

Petrick, J.F. (2004b), "The role of quality, value, and satisfaction in predicting cruise passengers' behavioral intentions", *Journal of Travel Research*, Vol. 42 No. 4, pp. 397-407.

Petrick, J.F. (2005), "Segmenting cruise passengers with price sensitivity", *Tourism Management*, Vol. 26 No. 5, pp. 753-762.

Petrick, J.F., Li, X. and Park, S.Y. (2007), "Cruise passengers' decision-making processes", *Journal of Travel and Tourism Marketing*, Vol. 23 No. 1, pp. 1-14.

Sandor, Z. and Train, K. (2004), "Quasi-random simulation of discrete choice models", *Transportation Research Part B: Methodological*, Vol. 38 No. 4, pp. 313-327.

Shibasaki, R., Aramaki, K., Kato, S. and Yonemoto, K. (2011), "Characteristics of cruise ship tourism and evaluation of port attractiveness", *Journal of Transport Policy Studies*, Vol. 14 No. 2, pp. 2-13, in Japanese.

Shirai, Y. (2010), "Cruise ship tourism", *Annual Report of Regional Policies*, Vol. 12 No. 4, pp. 59-75, in Japanese.

Sun, X., Xu, M., Lau, Y.Y. and Gauri, D.K. (2019a), "Cruisers' satisfaction with shore experience: an empirical study on a China-Japan itinerary", *Ocean and Coastal Management*, Vol. 181, p. 104867.

Sun, X., Yip, T.L. and Lau, Y.Y. (2019b), "Location characteristics of cruise terminals in China: a lesson from Hong Kong and Shanghai", *Sustainability*, Vol. 11 No. 18, pp. 5056-5070.

Terry, W.C. (2009), "Working on the water: on legal space and seafarer protection in the cruise industry", *Economic Geography*, Vol. 85 No. 4, pp. 463-482.

Train, K. (2003), *Discrete Choice Methods with Simulation*, Cambridge University Press, Cambridge.

Yannis, G. and Antoniou, C. (2007), "A mixed logit model for the sensitivity analysis of Greek drivers' behavior towards enforcement for road safety", *European Transport*, Vol. 37, pp. 62-77.

Corresponding author
Tomoya Kawasaki can be contacted at: kawasaki@sys.t.u-tokyo.ac.jp

For instructions on how to order reprints of this article, please visit our website:
www.emeraldgrouppublishing.com/licensing/reprints.htm
Or contact us for further details: **permissions@emeraldinsight.com**