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Analysis of optimal timing of tourism demand recovery policies from natural disaster using the contingent behavior method

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HIGHLIGHTS

- The contingent behavior method is useful for analyzing the tourism demand recovery.
- Announcing safety information would be most effective policy.
- Income effects would change from negative to positive during the recovery process.
- Optimal steps include safety, event, and visitor information, and price discounting.

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ABSTRACT

This paper examines the applicability of contingent behavior (hereafter, CB) method for analyzing dynamic processes and efficient policies in tourism demand recovery. The CB questionnaires used for this study used a hypothetical disaster situation of bird flu in Kyoto, Japan. Safety, event, visitor information, and price discounting policies were designed accordingly. Respondents were then asked about their willingness to travel time. The results showed the optimal timing for devising pertinent policies during the year. We found that the first step requires a safety information announcement, within one week, immediately after disaster site decontamination. The second step is the implementation of event information policy within 24th to 36th week after the disaster. The third step constitutes announcing visitor information within the 37th to 52nd week after the second step. The final step is the implementation of price discounting policy, until the 52nd week, immediately after the third step.

1. Introduction

Natural disasters have occasionally caused physical and economic damage to both tourist and non-tourist sites, leading to loss of tourism opportunities and the collapse of tourism industries (Murphy & Bayley, 1989; Ritchie, 2009). Given the possibility of long-term economic deterioration due to continuing reduction in tourism demand, opportunity losses are a major concern for policymakers and the industry itself (Chew & Jahari, 2014).

The bird flu outbreak in Japan's Miyazaki prefecture in 2010 forced public officers to prohibit visitor entry to disaster areas, followed by the culling of influenza-stricken birds, which caused losses of approximately ¥8.1 billion (Miyazaki Prefecture, 2011). The Great East Japan Earthquake, which occurred at a magnitude of 9.0, and the ensuing tsunami in Tohoku area (Eastside of Japan), in 2011, killed nearly 200,000 people. These disasters led to economic losses of ¥16.9 trillion, which included losses due to a decrement in the number of tourists—from 27.7 million in 2010 to 21.1 million in 2011 (Cabinet Office, Government of Japan, 2011; Kento, 2015). The Great Kumamoto Earthquake, which occurred in Kyushu area (Westside of Japan) in 2016, caused 67 deaths and economic damages worth ¥2.4 million to ¥4.6 trillion to the Kumamoto and Oita prefectures. It further resulted in a decrease of approximately 2.3 million tourists to the Kyushu area between April and June 2016, compared to the same period in 2015 (Cabinet Office, Government of Japan, 2016; Kyushu Economic Research Center, 2016).

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In previous literature, tourism management studies have analyzed frameworks and methods for tourism recovery at disaster sites (Durocher, 1994; Faulkner, 2001; Huanga & Min, 2002; Mazzocchia & Montini, 2001; Wang, 2009). For instance, Ritchie (2009, p. 262) noted that tourism crisis and disaster management models should be developed for decision-making. However, due to lack of tourism demand data with respect to disasters, few studies have examined the quantitative effects of recovery policies.

Owing to insufficient research on this topic, this study examines a valuation method, while simultaneously measuring the quantitative effects and the optimal timing (order) of tourism recovery policies applying the contingent behavior (hereafter CB) method. By showing the optimal policy timing (order), we expect to contribute toward 1) helping policymakers when they may not be able to undertake rescue operations and recover disaster losses due to financial and human resources shortages simultaneously and 2) development of advance planning (the stage 1 of Faulkner, 2001) before potential disasters.

The CB method design requires consideration of the realities and existence of disaster-related solutions. As it is difficulty to design and establish efficient solutions for earthquakes of large magnitudes, tsunamis, and typhoons—which typically cause considerable damage across a wide area—this study employs a bird flu scenario as a hypothetical natural disaster. The World Health Organization (2013) reported that, from 2003 to 2013, bird flu claimed 630 human lives globally. In Asia alone, 65% and 49.5% of all those infected by bird flu died in China and Vietnam, respectively. Brahmbhatt (2005) reported that bird flu decreased Vietnam's gross domestic product (GDP) by 0.4%. Moreover, the alarming possibility of a worldwide bird flu pandemic continues to exist. In such a scenario, approximately 5 million to 150 million people could die (Ministry of Foreign Affairs of Japan, 2007).

The remainder of this paper is structured as follows. Section 2 summarizes the main objectives of this study based on a review of previous studies. Section 3 describes the estimation models and survey questionnaires. Section 4 presents the estimation results. The discussion and conclusions appear in Sections 5 and 6, respectively.

2. Literature review

2.1. Tourism demand recovery management from disasters

Faulkner (2001) and Ritchie (2009) presented the frameworks of tourism demand recovery processes (strategies). Faulkner (2001)'s framework is divided into six stages: 1) the pre-event (pre-disaster) stage (stage 1) to mitigate the effects of disaster through advance planning, 2) the prodromal stage (stage 2), indicating the inevitability of a disaster, 3) the emergency stage (stage 3) to undertake rescue operations in the event of a disaster, 4) the intermediate stage (stage 4) that responds to the short-term needs (e.g., food, medicines) of people and companies in the disaster site, 5) the long-term recovery stage (stage 5), which includes reconstruction of infrastructure and victim counseling, and 6) the resolution stage (stage 6), which requires restoration of routine along with new and improved state establishments. The fifth and sixth stages are post-event stages, and the focus of this study. Thus, the policy effects from pre-event to the post-event stages and the feedback effects from the post-event to the pre-event stages described in Racherla and Hu (2009) are not our focus. Furthermore, the third and fourth stages would constitute the main parts of emergency policies.

As mentioned in Ritchie (2009), the quantitative valuation of recovery process is one of the most important tasks of tourism disaster management. Faulkner (2001), thus, presented various strategies, such as restoration of business and consumer confidence, and repair of damaged infrastructures. The Ministry of Land, Infrastructure, Transport and Tourism of Japan (MLITT, 2009) states that the recovery process has to include management policies for safety information, pricing, visit campaigns, among others. Moreover, Beirman (2009) suggested the importance of media, public relations, and regional cooperation in case studies. Regardless of these suggestions, policymakers might not know which policies are effective, when they should be implemented, and which policy ordering is desirable under the provision of few quantitative valuations.

The method used in this study could lead policymakers to make quick and appropriate decisions that may reduce or prevent damages related to a disaster.

2.2. Policy analyses by tourism demand functions

The Ministry of Land, Infrastructure, Transport and Tourism of Japan (2009) has published a manual (hereafter the MLITT manual) on the management of tourism demand recovery before and after the occurrence of infections, such as the bird flu. Fig. 1 shows the framework of the recovery process as per the MLITT manual in relation to the stages in Faulkner (2001). The vertical axis shows tourism demand (tourists' choice probability) levels. The horizontal axis shows time series, where t_0 refers to the emergence time of the bird flu, t_1 denotes the time when the affected areas/sites are decontaminated, and t_2 denotes the time that the tourism demand recovers to the standard (pre-stage) demand level. Thus, the *optimal* policy (or policies) in this study refers to a policy or a combination of policies that can recover a tourism demand level immediately after t_1 is closest to or over the standard demand level at t_0 (t_2). The tourism demand process was categorized into Periods 1 to 4. Period 1 almost corresponds to stages 1 and 2 of Faulkner (2001); Period 2, to stages 3 and 4; and Periods 3 and 4, to stages 5 and 6, respectively. One of the aims of this study is to examine the recovery process by estimating the demand function after t_1 in Period 3.

Theoretically, tourism demand is determined by travel prices to tourism sites, individual, or household income, and site attributes data, such as nature, safety levels, and leisure amenities (Dann, 1981; Dwyer, Forsyth, & Dwyer, 2010). Tourism policy evaluations, which are based on demand function approaches, measure policy effects from these factor (policy variable) changes (e.g., discounting the prices and improving attributes). While micro (consumer behavior) data are frequently used for the demand analyses (Fleming & Cook, 2008; Phaneuf, Kling, & Herriges, 2000), the difficulty of researching such data from the time series of

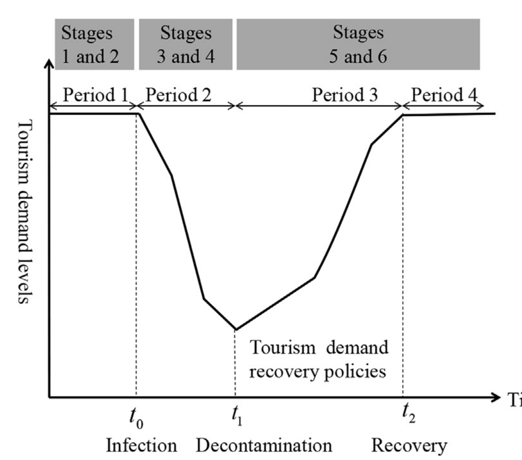

Fig. 1. Process of tourism demand recovery before and after the bird flu outbreak.