Transport Policy xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Transport Policy

journal homepage: www.elsevier.com/locate/tranpol

Preferences for alternative travel arrangements in case of major flight delays: Evidence from choice experiments with prospect theory

Chieh-Hua Wen*, Wei-Ning Wu, Chiang Fu

Department of Transportation Technology and Management, Feng Chia University, 100, Wenhwa Road, Seatwen, Taichung 40724, Taiwan, ROC

ARTICLE INFO

Keywords:
Airline
Flight delay
Discrete choice
Stated preference
Prospect theory

ABSTRACT

Flight delays have always been a source of dissatisfaction for passengers whose travel arrangements are interrupted. This study identifies passengers' preferences for arrangement mechanisms in flight delay situations. A choice experiment is designed considering a set of attributes, including the duration of the delay, monetary compensation, free snacks and beverages, cabin class upgrade, free airport lounge access, and free hotel accommodation. An integrated model is developed using the discrete choice model, combined with the cumulative prospect theory to identify significant attributes. Questionnaires were collected from Taiwanese air travelers flying full-service carriers at the Taiwan Taoyuan International Airport. The results show that, if a major flight delay occurs and the airline would like passengers to maintain the booked flight, it needs to maintain a good long-term relationship with them by offering exclusive arrangements, such as free meals and, more importantly, free lounge access and hotel accommodation for long-distance travel. If the booked flight cannot resume operation on time, the airline could assist high-priority passengers take the next flight offered by the same airline or transfer their flight to another airline. Offering price discounts to typical passengers who are willing to fly business class and a free upgrade to a higher class for frequent flyers are effective schemes as well.

1. Introduction

Daily airline operations often encounter flight delay concerns. According to statistical data acquired from the US Federal Aviation Administration, the average rate of on-time performance in 2014 was 76.34%, while the rate of cancelled flights was 2.25% (US Department of Transportation, Bureau of Transportation Statistics, 2014). Even the best airline can have difficulties avoiding delay problems (Wen and Chi, 2012). Depending on the extent of flight delays, the impact is difficult to estimate accurately, thus almost certainly causing inconvenience to air passengers and preventing them from completing their trips in a punctual manner. Airline delay issues are very common and potentially serious, which may result in extremely severe economic losses and passenger dissatisfaction (Ball et al., 2010). The length of time for coping with delay problems could affect the satisfaction of passengers towards airlines (Swanson and Kelley, 2001). As such, good processing and shorter waiting times for resolving flight delays can enhance the willingness of air passengers to travel with the respective airline again.

Regarding flight delays, there is a contractual obligation between airlines and consumers. Airlines have many different rules and regulations for compensation and passenger arrangements in the event of long delay of flights, and not every passenger's demand is the same. For passengers who experience flight delays, airlines should solve problems as soon as possible and make alternative travel arrangements for the impacted passengers in the affected airports. At the same time, airlines have to provide additional services to satisfy the needs of their passengers. According to the regulations of the Civil Aeronautics Administration in Taiwan, when an airline confirms a flight will be delayed by more than fifteen minutes on domestic routes or thirty minutes on international routes, or when the route is changed for landing or departure, it must promptly notify the cause of a delayed flight and handling process. Additionally, depending on the situation, the airline must appropriately provide: (1) necessary communication with passengers; (2) necessary meals or accommodation; (3) items to keep passengers warm or emergency medical supplies when necessary; (4) arrangements for transferring passengers with special needs to other airlines or other forms of transportation. The Civil Aviation Authority in Taiwan does not explicitly request airlines to provide flight delay compensation. Within the European Union, air passengers are protected by Regulation 261/2004 (Regulation (EC) No 261/2004), which establishes rules for all passengers who experience denied boarding, flight cancellations, or long delays for their flights. Under Regulation 261/2004, airlines should provide necessary assistance as well as compensation to passengers if their flight is severely delayed.

* Corresponding author.
E-mail address: chwen@fcu.edu.tw (C.-H. Wen).

http://dx.doi.org/10.1016/j.tranpol.2017.02.005
Received 28 June 2016; Received in revised form 10 December 2016; Accepted 14 February 2017

This study mainly focuses on the view of passengers, using the current solutions that airlines offer to analyze passengers' preferences for alternative travel arrangements. To examine passengers' preferences on different options when there are flight delays, this study uses the stated preference method to design a questionnaire that considers a set of attributes, including the duration of the delay, monetary compensation, free snacks and beverages, cabin class upgrade, free airport lounge access, and free hotel accommodation.

Depending on the causes of flight delays, their duration is often uncertain under some circumstances. Consequently, passengers could encounter travel decisions under risk and uncertainty. This study uses the cumulative prospect theory to capture the uncertainty of flight duration and the risk attitudes of passengers and estimates discrete choice models to identify significant attributes. Based on model estimates, suggestions are provided for airlines to develop proper travel arrangements and compensation when a flight delay occurs.

The remainder of this paper is structured as follows. Section 2 summarizes previous studies on airline delay and presents a methodological review of past literature. Section 3 provides the settings of the stated preference experiment and formulation of the multinomial logit and mixed logit models, combined with the cumulative prospect theory, to identify significant attributes. Section 4 describes the data collection and socioeconomic and trip profile of the respondents. Section 5 presents estimation results for the standard multinomial logit and mixed logit models accommodating cumulative prospect theory. Section 6 concludes with policy implications and directions for future research.

2. Literature review

2.1. Airline delay

Flight delays or cancellations directly affect the travel arrangements of passengers, preventing boarding the aircraft and also indirectly influence the transfer or connecting flights for these passengers (Jafari and Zegordi, 2011; Lan et al., 2006). Several factors can cause flight delays, either uncontrollable or controllable factors (Garrow et al., 2011). The uncontrollable factors consist of inclement weather or fog, air traffic congestion, airport closures, and fuel shortages (Gilbo, 1997; Tu et al., 2008). Controllable factors comprise flight mechanical problems, engineering failure, material fatigue, aircraft cabin transfer, and human errors. The airlines usually offer reasonable compensation to passengers if flight delays are caused by human errors.

A common issue related to aircraft damage is, for example, oil leakage. Primarily caused by the airlines' lack of mechanical checks, oil leakages may cause inconvenience to passengers (Tu et al., 2008). If it takes too long to repair the damaged aircraft, airlines will do their best to arrange another airplane or carrier. Another common cause of airline flight delays are weather conditions (Tu et al., 2008). These can have a direct impact on the physical space needed to accommodate the airplane while awaiting favorable weather for taking off, and thus airport hangar space may be required to house the aircraft meanwhile. The weather factor is an uncontrollable factor, and, consequently, it cannot be precisely foreseen or avoided. As such, this causes issues for airports, airlines, and passengers, and may lead to the loss of passengers' goodwill (Lan et al., 2006).

Many passengers regard airlines as the responsible party for delay problems and may feel dissatisfied with them, which usually results in the passengers asking the airlines for an apology and a refund (Kelley et al., 1993). The manner in which the airline executes its travel arrangements will affect the loyalty of passengers to airlines. If specific arrangements of airlines are accepted and satisfy the customers, they can decrease the loss feelings of customers and their satisfaction (Maxham and Netemeyer, 2002).

2.2. Airline attributes

The stated preference method has become an increasingly popular methodology for investigating travel behavior. Recently, it has been extensively applied in air travel research. Many studies applied discrete choice models to characterize air itinerary choice by using the stated preference method with a set of airline service attributes (Collins et al., 2012; Espino et al., 2008; Lijesen, 2006; Martin et al., 2008; Seelhorst and Liu, 2015; Wen and Lai, 2010; Wen et al., 2014).

There are a number of attributes that air passengers could be concerned about when a major delay occurs. For example, Anderson et al. (2009) used previous data concerning customer satisfaction from an independent market research company and employed the structural equation model to identify the main service elements influencing customer satisfaction for passenger air travel, including physical attributes of the service (e.g., food and personal space), employee-customer contacts (e.g., with flight attendants and gate agents), and operating performance (e.g., flight timeliness), with delays as moderating effects. While previous research has mostly focused on air passenger travel behavior, no exploration concerns passenger preferences for travel arrangements in case of flight delays or cancellations.

2.3. Decision under risk and uncertainty

Depending on the severity of incidents, the duration of flight delays may be unpredictable. When passengers encounter major flight delays, they could face travel situations with a high degree of uncertainty. When the airline performs its travel arrangements, air passengers must make travel decisions involving risk. The prospect theory, developed by Kahneman and Tversky (1979), explains how people make choices between probabilistic alternatives under risk. This theory denotes the expected utility of the outcomes, which comprises a value function and its corresponding probability. Depending on the reference point determined by the decision maker, the consequences of a decision can be losses and gains. The value function can conclude the risk attitudes of decision makers: risk-averse, risk neutrality, and risk-seeking. The original version of the prospect theory was extended to the cumulative prospect theory by incorporating a weighting with the cumulative probability distribution function (Tversky and Kahneman, 1992).

An alternative behavioral framework that investigates decision making under risk is the rank-dependent expected utility model (Quiggin, 1982). One of the major distinctions between the rank-dependent expected utility theory and the cumulative prospect theory is that the former does not specify a reference point; all outcomes may be viewed as losses only (Razo and Gao, 2013). This approach thus avoids the determination of a reference point, which poses a major challenge in implementing the cumulative prospect theory.

In recent decades, transportation scholars have studied how travelers reach a destination, considering the variability of travel time (Noland and Small, 1995). Hence, the prospect theory has been used in transportation research studies that have especially focused on route choices and departure times. For example, in order to measure the negative effects of travel time information and uncertainty, Ettema and Timmermans (2006) proposed a conceptual model of departure time choice under travel time uncertainty and information, which is based on the prospect theory. The items would influence the outcome, including the quality of travel time information, travelers' perception of travel time, and the variation of travel time. Schwanen and Ettema (2009) considered how people make choices with a priori unknown consequences by using the cumulative prospect theory. The study focused on uncertain peak-hour congestion and the effectiveness of relief measures on employed parents' trips to pick up their children from childcare at the end of a workday, rather than home-to-work trips in the morning. Gao et al. (2010) applied discrete choice modeling based on the cumulative prospect theory to examine route choice,