This paper discusses the effect of the road user charging scheme at the Peak District National Park, UK. The analysis was carried out with stated preference survey techniques and using a multinomial mixed logit model as well as conventional statistic and regression models. The analysis focused on not only the congestion level and environmental impact, but also equity issues associated with the road user charging scheme. From the estimation results, the scheme has great potential to reduce congestion in this area of natural beauty. However, the potential monetary policy tool also presents an equity problem, because elderly visitors will be more willing to pay the toll and the fee to park at the Information Centre. In other words, elderly visitors are more disadvantaged than other visitors. This example shows how a monetary policy tool causes an uneven effect.

Key Words: road user charging, road pricing, mixed logit, stated preference, discrete choice

INTRODUCTION

Private car use is a key component in areas of outstanding natural beauty because these locations attract many visitors from local and urban areas who arrive by car. Traffic congestion and associated air pollution due to excessive private car use are considered the most significant threat to the UK tourism industry, and eventually leave a negative impression on visitors. In order to reduce traffic congestion and improve the value of the natural beauty by reducing visual intrusion and traffic noise, transport policies such as private car access regulation, road user charging, and road pricing schemes are usually considered by policy makers. According to underlying economic theory, Road Pricing or Road User Charging is a suitable tool to ensure that road users pay for the external costs generated by their travel (Hensher, et al., 2005; Higgins, 1979; Steiner and Bristow, 2000). Currently, one of the major objectives of road user charging is to reduce traffic congestion levels. The Upper Derwent Valley in the Peak District National Park is one of the proposed areas for implementation of this new policy tool. It is likely that a road user charging scheme around the Upper Derwent Valley will be considered a viable option for reducing traffic levels. At the same time, it is important to examine to the extent to which visitors feel uncomfortable about the scheme.

This paper analyses the scheme with econometric tools including a multinomial discrete choice model using the Upper Derwent Valley in the Peak District.
national Park (the Valley) as a case study. In this paper, the demand of the one-day visitor is focused on because it is the major component of traffic in the Valley. First, this paper analyzes visitor characteristics and the willingness of visitors to pay fees such as a road toll and an associated park and ride charge. Then, the proposed transport policies are analyzed by a multinomial mixed logit model with stated preference data. A special focus is given to the equity impact of the road user charging scheme, as this matter is an interesting research topic these days and highly relevant to the research area (Bureau and Glachant, 2008; Hensher and Puckett, 2005; Ison and Rye, 2005; Maruyama and Sumalee, 2007; Mitchell, 2005). The objectives of this paper are to analyze both the effects of the new schemes on congestion levels and an equity problem presented by the potential monetary policy tool.

The rest of this paper is organized as follows. Section one explains some key background information, namely a case study site description and discrete choice analysis. Section two outlines the data collection processes and the stated preference questionnaire design. Section three describes individual characteristics of visitors, the distribution of willingness to pay the road user fee, and individual differences in behavior in response to parking costs. Section four analyzes the relationship between parking location and willingness to pay the road user fee, and the potential effects of the road user fee and the park and ride scheme on the basis of the estimation results from a discrete choice model. Finally, section five discusses the important findings and highlights some policy implications.

BACKGROUND

Case Study Site Description

The Upper Derwent Valley is located between two large cities, Manchester and Sheffield, as shown in Figure 1. Access to the Valley by private car is easy, not only from local towns, but also from nearby cities via the A57. Entrance to the Valley by car is only from the A57 and only through Derwent Lane, which comes to a

Figure 1. Map of the Upper Derwent Valley