The distribution of willingness to pay for travel information

Dereje F. Abegaz

deab@transport.dtu.dk

Department of Transport

Technical University of Denmark

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1 Abstract

Unpredictable traffic incidents such as accidents, adverse weather, fluctuation in demand, and an unannounced roadworks cause travel delays by obstructing the normal flow of traffic. Travel delays inflict substantial economic cost on travellers in terms of lost productivity and vehicle operating expenses (fuel and wear). Moreover, traffic incidents complicate the trip planning and worsen driving experiences. Uncertainty in travel conditions is an attribute of information, addressing it being the defining feature of trip planning. An important input in trip planning is information on travel conditions. The provision of dynamic travel information could improve travellers' trip quality and driving experiences besides reducing trip cost and unreliability. Exacerbating traffic conditions and advances in hand-held and in-vehicle information transmission devices has enhanced the demand for a reliable travel information.

The need for travel information is linked to the expected benefit it offers in improving driving experiences through reducing the effect of unpredictable traffic incidents (Small & Verhoef, 2007). Its demand is enhanced by advances in in-vehicle and hand-held information devices. Information has economic value because it contributes positively to expected trip outcomes. Establishing and operating traveller information systems as well as developing optimal pricing strategy for its services require knowledge of individuals' willingness to pay for travel information. Despite previous research on the subject (e.g. Chorus *et al.* (2006, 2010)), further investigation is essential where more customised and more desirable and valuable service improvements are considered (Khattak *et al.*, 2003).

Since the importance of information is not known ex ante, its valuation represents the perceived benefit from its use in adjusting travel choices as well as from the reduced uncertainty *per se*. Its perceived benefits induce individuals to pay for travel information (Khattak *et al.*, 2003). The purpose of this paper is to investigate the distribution of willingness to pay for customised facets of travel information. Concern was on systems of travel information which provide real- time information about traffic incidents to drivers on their trip from their origin to desired destination. The value of different facets of travel information is elicited from a choice experiment when sample respondents trade travel information and money. By uncovering this value, willingness to pay is measured as the change in outcome arising from the provision of a particular feature of travel information to travellers.

The distribution of willingness to pay is examined by allowing the preference for travel information vary within the population of individuals. When preferences are allowed to be random, there is no closed-form solution for choice probabilities in a discrete choice model. A common procedure in estimating such models involves specifying a particular distribution for the random coefficient and estimating the model by simulation performed based on draws from this distribution. To make draws, prior

knowledge of the distribution is required. This has led to important consequences. Inappropriate choice of distribution lead to bias which is of a prime concern given the purpose of the paper. We employed a technique of estimating random coefficients that overcome this caveat. Requires no prior knowledge of the distribution of random coefficients, this technique proposed by Fosgerau & Mabit (2013) involves a flexible method of approximating the distribution through a power series. Moreover, since an appropriate choice of distribution to each coefficient does not ensure appropriate distribution of WTP (Fosgerau & Bierlaire, 2007; Fosgerau & Mabit, 2013), and to ensure finite moment conditions for the distribution of willingness to pay (Daly *et al.*, 2011), the model is estimated in willingness to pay space as opposed to preference space. To allow for the possibility of a zero willingness to pay, the sample is viewed as representing two group of individuals: one that values the provision of travel information and hence has a positive willingness to pay for it; a second group that attach no importance to travel information and hence has a zero willingness to pay.

Analysis is performed using data collected through the use of internet survey administered to a sample of 2000 car owners in Denmark. A number of results emerged. A significant share of sample respondents are found to have a zero value of willingness to pay for travel information. On average, those who attached higher importance to travel information have lower marginal utility of income. This could indicate the existence of systematic bidders along side with free riders. Estimates also indicate that the willingness to pay is higher for information about traffic accidents and congestion than to roadworks. The implication of estimates is also discussed.

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