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An analysis on travel party composition and expenditure: a discrete-continuous model

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ABSTRACT

While the interrelated nature of tourism decisions is well recognised, there is a significant gap between conceptual understanding and modelling practice. Empirically, the interrelations between tourism decisions are often not tested and quantified because the research technique does not embody the capacity to test for the correlations between these decisions. This research aims to empirically investigate these interrelationships by using a multinomial discrete-continuous model estimated with trip expenditure hazard-based function. In the context of domestic tourism in Australia, this study adds to the emerging body of research by finding quantifiable evidence that travel party choices, travel mode choices, and expenditure decisions are interrelated, contributing towards developing a more nuanced understanding of these decisions.

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Introduction

Travel choice behaviour for leisure and tourism is multifaceted (e.g., Dellaert, Ettema, & Lindh, 1998; Woodside & Dubelaar, 2002). For a given trip, tourists have to make a range of interrelated decisions on destination, travel party, trip duration, transport mode, activity participation, and expenditure (e.g., Jeng & Fesenmaier, 2002). Eugenio-Martin (2003) considered five sequential stages: decisions to participate in tourism; budget; frequency of trip as well as the length of stay; the type of

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destination; and the actual destination and the travel mode used to reach that destination. The sequential decisions may be characterised by feedback loops, complicating the matter even further. Moreover, tourism decisions may also be related to other discretionary decisions, such as home renovation or purchase of home entertainment items (Crouch et al., 2007).

Although the interrelated nature of tourism decisions is well-known, such an integrated view of tourist behaviour has been mainly examined conceptually and qualitatively (Zhang, Zhang, & Kuwano, 2012). Understanding these interrelations (and the causal factors underpinning these decisions) is a data-intensive exercise. Consequently, from an empirical point of view, it is necessary to develop and appropriately apply a mathematically coherent model to the interrelated decisions. As a result of the interrelations, from a model estimation and data analysis perspective, considering one decision in isolation may introduce bias—the size of which is often unknown to the analyst. The bias may result in high occurrences of finding statistically significant results due to underestimated standard errors. Furthermore, in a single choice model, we preclude the possibility of empirically verifying (or refuting) such interrelations because the analysis already assumes the independence of each decision. The issues described above can be considered to be a problem of endogeneity, which is a significant problem in econometrics (e.g., Louviere et al., 2005). This is akin to a model misspecification problem, which results in biased estimates causing poor and misleading assessment of policy (Wu, Zhang, & Fujiwara, 2013). Wrong assumptions about the sequence of tourism decisions can also lead to endogeneity bias (Grigolon, Kemperman, & Timmermans, 2012). Generally, such problems will place serious doubts over the estimates' generalisability to the wider population.

A natural way to address the issue is by embodying the capacity to estimate correlations between decisions in the research design. One common approach is a two-stage estimation method with Heckman correction. For instance, Nicolau and Mas (2005) modelled the decision to take a holiday and how much to spend using this method, while Koo, Wu, and Dwyer (2012) applied Heckman correction to understand the interrelated nature of length of stay and visitor's decision to geographically disperse. Although a very important method in the arsenal of tools used for quantitative analyses, the technique is subject to some limitations (see Johnston & DiNardo, 1997, for a review). For example, the two-step estimation technique is inefficient compared to the maximum likelihood method, which estimates the two equations simultaneously (Johnston & DiNardo, 1997). Furthermore, many tourism decisions are not only multivariate (several dependent variables), but the dependent variables are also polychotomous (several mutually exclusive alternatives). In such situations, a more general approach is required.

Recently, multivariate models have been applied to tourism choices, allowing for the joint modelling of multiple decisions. For instance, Masiero and Zoltan (2013) used a bivariate probit model to find evidence of a link between multi-destination visits and transport mode choices. In that study, both decisions were considered to be discrete (binary) outcome variables. Wu et al. (2013) jointly modelled tourism participation and levels of trip expenditure using a Scobit-based discrete-continuous model. The model relaxed the implicit assumption that, in logit models, the marginal effect is the greatest around the midpoint of the logistic curve. For tourism decisions, Zhang et al. (2012) were one of the first to have modelled three discrete-continuous decisions jointly. The decisions included in the analysis were tourism participation, time allocated to a destination, and the level of spend at the destination. Generally, discrete-continuous modelling of multiple decisions is a difficult research challenge. Because of this, the application of discrete-continuous models in tourism research is very rare (Zhang et al., 2012). However, in reality tourist decisions are highly discretionary and multifaceted. Therefore, it is necessary to continue to reflect such innate characteristics in the quantitative analysis of tourism choices.

Against this background, our general aim is to enhance our understanding of tourist behaviour by applying a discrete-continuous model. We apply the model to develop a joint understanding of travel party choice and expenditure levels in the context of overnight domestic trips in Australia. Adopting the United Nations World Tourism Organisation (UNWTO, 2008) definition, travel party choice is defined as visitors travelling together on a trip and whose expenditures are pooled. While it seems intuitive that the two decisions are interrelated, this relationship has not been a subject of rigorous empirical investigation in the past. For instance, previous empirical studies show significant relations

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