

# **Analysing Women's Employment Transitions using a Dynamic Multinomial Logit Random Effects Model**

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Many processes of interest in social science research are recorded as nominal variables with two or more categories such as employment status, occupation, political preference and self-reported health status. With panel data it is possible to analyse the transitions of individuals between different states of the outcome variable. The generalized linear mixed model (GLMM) often used to analyse nominal variables with repeated observations is the dynamic multinomial logit random effects model. For this model, the marginal distribution of the response does not have a closed form solution and hence numerical integration must be used to obtain maximum likelihood estimates for the model parameters. Techniques for implementing the numerical integration are computationally intensive requiring a large amount of computer processing time that increases with the number of clusters (or individuals) in the data. In this paper we utilise and compare a classical and Bayesian approach to estimate the GLMM, with specific application to analysing employment transitions of women over four waves of the Australian panel survey known as HILDA. We find that Markov chain Monte Carlo simulation allows more flexible model estimation and is less computationally intensive than the classical approach using adaptive Gaussian quadrature.

Furthermore, we investigate the possible reciprocal causal relationships among employment transitions and self-reported health status using a simultaneous multiprocess model where the random effects of two dynamic multinomial logit models are allowed to covary. Preliminary results will be discussed.

This is joint research with Professor Mark Western, Director, ISSR.