

# Discrete Choice Labor Supply: Conditional Logit vs. Random Coefficient Models

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## Abstract:

Estimating labor supply functions using a discrete rather than a continuous specification has become increasingly popular in recent years. The main advantage of the discrete choice approach compared to continuous specifications derives from the possibility to model nonlinearities in budget functions. However, the standard discrete choice approach, the conditional logit model, is based on the restrictive assumption of homogenous error variances. This leads amongst others to the unattractive independence of irrelevant alternatives (McFadden 1973). Econometric literature has suggested more general discrete choice models that relax the iid assumption and that allow for effect heterogeneity, for example the random coefficient model (Revelt and Train 1996). However, these less restrictive specifications have shown to incur very high computational cost, which might obstruct the estimation of confidence intervals of marginal effects or elasticities. It is therefore of particular interest for applied research which approach is more adequate when analyzing discrete choice models: the standard conditional logit model or more general random effect models. To the extent that effect heterogeneity is present in empirical models of labor supply functions, the application of a random effect model is necessary to avoid biased estimates. However, if such heterogeneity is nonexistent or the bias is insignificant standard discrete choice models provide the more favorable choice.

Studies estimating labor supply in the Netherlands (van Soest 1995) and in the UK (Duncan and MacCrae 1999) with several discrete choice models, have found no significant differences between the results of fixed or random specifications. So far, an empirical analysis of different discrete choice labor supply models for German data has not been carried out. There exists a large literature on labor supply in Germany using the micro data on the German

Socio Economic Panel (GSOEP). Considering the importance of this data set for national and international research on labor supply employing discrete choice (e.g. Beblo et al. 2003, Bonin et al. 2003, Buslei and Steiner 1999, Gustavson 1991), an analysis of the appropriate specification of the discrete choice model on basis of the GSOEP is of particular interest.

The purpose of my paper is twofold. First, I discuss the differences between the standard conditional logit model and random effects discrete choice models. Thereafter, I estimate different model specifications with or without random effect parameters of a household utility function drawing on micro data of the GSOEP. The idea is to test whether the results derived from the above-defined specifications differ significantly. Considering the Akaike Criterion and (co)variance parameters of random effects, my findings suggest that there exists some evidence for effect heterogeneity in labor supply functions. However, although heterogeneity is present the implications of the standard discrete choice model and the random coefficient model are the same. Tests based on bootstrapped confidence intervals reject the hypothesis that labor supply elasticities derived from both specifications differ significantly. Therefore, for computational reasons, standard discrete choice models that are more restrictive in their assumptions regarding error variances, seem to represent the adequate model choice for the analysis of labor supply functions on basis of the GSOEP.

**Keywords:** labor supply, discrete choice models, specification test

**JEL Classification:** C25, C52, J22

## Literature:

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