

# Semiparametric Estimation of Multinomial Choice Models with Rank-Order Property\*

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Job Market Paper

October 14, 2016

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## Abstract

In this paper, I propose a new semiparametric identification and estimation approach to multinomial choice models using cross-section data. The approach relies on the rank-order property employed in Fox (2007) and Yan (2013), which is a distribution-free restriction on the random utility framework underlying multinomial choice models. From the rank-order property, a reparameterization provides a multivariate nonlinear least squares (population) criterion identifying the structural parameters under standard regularity conditions on observed covariates. This identification result then motivates a sieve-based estimation procedure, which is the first in the semiparametric literature to allow joint estimation of regression coefficients and other reduced-form parameters such as choice probabilities and marginal effects. Asymptotic properties of the proposed estimator are developed and a Monte Carlo study indicates that it performs well in finite samples. I illustrate the implementation of the estimation procedure via estimating a model of college major choice using UCOP data of 1998-2003.

*JEL classification Codes:* C13, C14, C35.

*Keywords:* multinomial choice model, rank-order property, sieve estimation, multivariate NLS, regular and irregular functionals.

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\*I would like to thank Shakeeb Khan, Matthew A. Masten, V. Joseph Hotz, and Arnaud Maurel for their guidance and encouragement. I acknowledge useful comments from Federico A. Bugni, Luis E. Candelaria, Jia Li, Adam M. Rosen, Christopher Timmins, Takuya Ura, Yichong Zhang, and seminar participants at Duke Microeconometrics Lunch Group and the Triangle Econometrics Conference. All errors are my responsibility. This work is supported by Duke Summer Research Fellowship.

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