

A Specification Test for Multinomial Choice Models

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Abstract

This paper proposes a consistent specification test for a multinomial choice model, namely, the test for the functional forms and the cdf of error terms in latent variable models. Multinomial choice models are applied in various fields, since data used in empirical works often contain discrete variables. While the specification of the latent variable models must be one of the essential issues for employing multinomial choice models, no specification tests have been developed so far. We thus construct a test that rejects null hypothesis, if at least one of our specifications on latent variable models are not correct. Our test is based on the distances between parametric and nonparametric inferences of regression functions which are the probabilities for choosing the alternative under the null hypothesis. We show that our test statistic converges weakly to chi-squared distribution with $J - 1$ degrees of freedom under some assumptions. Note that the computation of variance-covariance matrix which is necessary for constructing the quadratic form is exceedingly simple owing to the binary dependent variables. We also discuss the performance of our specification test in terms of the size and the power by conducting Monte Carlo experiments. The typical departures from the null are non-linearity and misspecification of the cdf of error terms. We take them into account in designing our experiments.

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