

On Dependency in Double-Hurdle Models

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In microeconometrics, consumption data is typically zero-inflated due to many individuals recording, for one reason or another, no consumption. A mixture model can be appropriate for statistical analysis of such data, with the Dependent Double-Hurdle model (DDH hereafter) one specification that is frequently adopted in econometric practice. Essentially, the DDH model is designed to explain individual demand through a sequential two-step process: a market participation decision (first hurdle), followed by a consumption level decision (second hurdle) - a non-zero correlation/covariance parameter allows for dependency between the hurdles. A significant feature of the majority of empirical DDH studies has been the lack of support for the existence of dependency. This empirical phenomenon is studied from a theoretical perspective using examples based on the bivariate normal, bivariate logistic, and bivariate Poisson distributions. The Fisher Information matrix for the parameters of the model is considered, especially the component corresponding to the dependency parameter. The main finding is that the DDH model contains too little statistical information to support estimation of dependency, even when dependency is truly present. Consequently, the paper calls for the elimination of attempts to estimate dependency using the DDH framework. The advantage of this strategy is that it permits flexible modelling, some possibilities are proposed.

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