

The Taylor decomposition: a unified generalization of the Oaxaca method to nonlinear models

Stephen Bazen

Abstract

The widely used Oaxaca decomposition applies to linear models. Extending it to commonly used nonlinear models such as binary choice and duration models is not straightforward. This paper shows that the original decomposition using a linear model can be obtained as a first order Taylor expansion. This basis provides a means of obtaining a coherent and unified approach which applies to nonlinear models, which we refer to as a Taylor decomposition. Explicit formulae are provided for the Taylor decomposition for the main nonlinear models used in applied econometrics including the Probit binary choice and Weibull duration models. The detailed decomposition of the explained component is expressed in terms of what are usually referred to as marginal effects and a remainder. Given Jensen's inequality, the latter will always be present in nonlinear models unless an ad hoc or tautological basis for decomposition is used. (with X Joutard)