

The projection approach for multi-way error components model with unbalanced panel data

Abstract

This paper presents a new framework for unbalanced data models with multiple error components, which cause endogeneity problem in both linear and Poisson models. Due to the high dimension of multiple error components, computational difficulty arises in using unbalanced data. For linear models, we show that the conventional projection method (Frisch and Waugh (1933) and Lovell (1963)) applied to unbalanced data can only remove one error component without causing bias, but for partially balanced data (i.e. balanced in subdimensions), our proposed projection approach can control as many error components as the number of balanced dimensions plus one. For the Poisson model, we propose an estimator based on the multiple control functions (MCF) obtained from multiple subdimensional projections and achieve the same results as in the linear model case. We examine the finite sample properties of the proposed estimators using Monte Carlo simulation. The proposed estimators are consistent and provide a correct inference with substantial power and no size bias.

The use of the proposed estimators is illustrated with the estimation of trade cost elasticity using four-dimension trade data, of which the proportion of missing data is about 80% and proper controlling multiple unobserved factors is crucial. We show that improper treatments of zero observations and unobserved factors (i.e. cases for most of empirical studies in empirical trade literature) severely underestimate the trade cost elasticity in both linear and Poisson models.

JEL Code: C23, F14

Keywords: Unbalanced panel data; Error components model; Within Estimator; Pseudo Poisson ML; Trade Cost Elasticity.

References

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