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PII: S0304-4076(13)00203-0
DOI: http://dx.doi.org/10.1016/j.jeconom.2012.08.022
Reference: ECONOM 3832

To appear in: *Journal of Econometrics*

Received date: 15 May 2009
Revised date: 23 August 2012
Accepted date: 27 August 2012

Please cite this article as: Bester, C.A., Hansen, C.B., Grouped effects estimators in fixed effects models. *Journal of Econometrics* (2013), http://dx.doi.org/10.1016/j.jeconom.2012.08.022

Grouped Effects Estimators in Fixed Effects Models

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First Draft: February 2009 This Draft: October 2011

Abstract.

We consider estimation of nonlinear panel data models with common and individual specific parameters. Fixed effects estimators are known to suffer from the incidental parameters problem, which can lead to large biases in estimates of common parameters. Pooled estimators, which ignore heterogeneity across individuals, are also generally inconsistent. We assume that individuals in the data are grouped on multiple levels where groups are defined by some observable external classification. We consider "group effects" estimators, where individual specific parameters are assumed common across groups at some level. We provide conditions under which group effects estimates of common parameters are asymptotically unbiased and normal. The conditions suggest a tradeoff between two sources of bias, one due to incidental parameters and the other due to misspecification of unobserved heterogeneity.

Keywords: Fixed Effects, Panel Data, Hierarchical Models

JEL Codes: C10, C13, C23

1. Introduction

Panel data is widely used in empirical economics. Such data allows researchers to control for unobservable, time invariant individual-level heterogeneity that, according to economic theory, may be related to covariates of interest. Examples include unobserved, household-specific willingness to pay for a product, which may be correlated with income, and unobserved firm-specific policies that may be related to capital structure.

This paper considers settings where individuals may be grouped at different levels. For example, students may be grouped into classes, grades, schools, and districts; or firms may be grouped according to 1-digit, 2-digit, 3-digit, and 4-digit SIC codes and further broken into sub-groups within 4-digit SIC based on quintiles of their size and market-to-book ratios. We consider "grouped effects" estimators, which estimate model parameters treating individual specific effects as if they are constant within groups at a particular level. Our grouped effects estimators require assumptions about the distribution of unobserved heterogeneity and thus should broadly be classified as random

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