Available online at www.sciencedirect.com
ScienceDirect
Journal of Econometrics 140 (2007) 333–374
JOURNAL OF Econometrics
www.elsevier.com/locate/jeconom

Identification and estimation of econometric models with group interactions, contextual factors and fixed effects

Lung-fei Lee*

Department of Economics, The Ohio State University, 410 Arps Hall, 1945 North High St., Columbus, OH 43210-1172, USA

Available online 22 August 2006

Abstract

This paper considers identification and estimation of structural interaction effects in a social interaction model. The model allows unobservables in the group structure, which may be correlated with included regressors. We show that both the endogenous and exogenous interaction effects can be identified if there are sufficient variations in group sizes. We consider the estimation of the model by the conditional maximum likelihood and instrumental variables methods. For the case with large group sizes, the possible identification can be weak in the sense that the estimates converge in distribution at low rates.
© 2006 Elsevier B.V. All rights reserved.

JEL classification: C13; C21; R15

Keywords: Social interactions; Group structure; Fixed effects; Spatial autoregression; Conditional maximum likelihood

1. Introduction

The social interaction model considered in this paper has an important link with spatial econometric models. A typical spatial autoregressive (SAR) model is specified as

$$Y_n = \lambda_0 \mathcal{W}_n Y_n + X_n \beta_0 + \mathcal{E}_n, \tag{1.1}$$

*Tel.: +1 614 292 5508; fax: +1 614 292 4192.
E-mail address: lflee@econ.ohio-state.edu.

0304-4076/$ - see front matter © 2006 Elsevier B.V. All rights reserved.
doi:10.1016/j.jeconom.2006.07.001

where $\mathscr{E}_n$ is a n-dimensional vector consisting of i.i.d. disturbances with zero mean and a variance σ_0^2. In this model, n is the total number of spatial units, X_n is an $n \times k$ matrix of regressors, and $\mathscr{W}_n$ is a specified constant spatial weights matrix with a zero diagonal (Cliff and Ord, 1973).

In urban and regional economic studies, a region, a district, or a county can be a spatial unit and its neighboring units in $\mathscr{W}_n$ are defined in terms of a certain physical or economic distance. The equation in (1.1) implies elements of Y_n shall be simultaneously determined given x's and the disturbances ε's as

$$Y_n = (I_n - \lambda_0 \mathscr{W}_n)^{-1} X_n \beta_0 + (I_n - \lambda_0 \mathscr{W}_n)^{-1} \mathscr{E}_n. \tag{1.2}$$

This model also has applications in labor economics and social studies—the so-called new social economics (Durlauf and Young, 2001). For those studies, a spatial unit can be an individual belonging to a social group. The individuals within a group may interact with each other but are usually not interrelated with members in other groups. Suppose there are R groups and there are m_r units in the rth group. A typical group interactions model has $\mathscr{W}_n$ being a block diagonal matrix, i.e.,

$$\mathscr{W}_n = \mathrm{Diag}(W_1, \ldots, W_R), \quad W_r = \frac{1}{m_r - 1}(l_{m_r} l'_{m_r} - I_{m_r}), \quad r = 1, \ldots, R, \tag{1.3}$$

where l_{m_r} is the m_r-dimensional column vector of ones, and I_{m_r} is the m_r-dimensional identity matrix. Empirical studies on group interactions are in Case (1991, 1992) in consumption pattern and technology adoption, Betrand et al. (2000) on welfare cultures, and Sacrerdote (2001) and Hanushek et al. (2003) on student achievement, among others.

The effect of social interactions in a SAR model is directly modeled in terms of observed outcome y's in a group. The parameter λ in (1.1) captures the contemporaneous and reciprocal effect of peer achievement. As a group effect model with interactions may have policy implications, researchers have pointed out various important specification issues of a group effect model beyond those in a typical spatial model. Manski (1993), Brock and Durlauf (2001) and Moffitt (2001) point out that empirical analyses of peer influences have been inhibited by both conceptual and data problems. Manski (1993) and Brock and Durlauf (2001) separate interaction effects into endogenous and exogenous (contextual) effects. The endogenous effect refers to the contemporaneous and reciprocal influences of peers. The contextual effect includes measures of peers unaffected by current behavior. Manski (1993) has considered a group effect model where social interaction is modeled with expected outcomes and the expected outcomes are solutions from social equilibrium. Manski has pointed out some difficult identification issues on his social effect model as the expected outcome from social equilibrium might be linearly depended on observed exogenous variables of a group in the model—the 'reflection' problem. The reflection problem refers to the difficulty to distinguish between behavioral and contextual factors. Another main concern is on possible unobservables in a group, as unobservables in a group may have direct effect on observed outcomes. The unobservables may also cause the total disturbances to be correlated across individuals in a group. Moffitt's criticism is, in particular, relevant as his discussions are presented for the SAR model in (1.1) with a group structure. Moffitt (2001) argues that the basic identification problem of group interaction effects is how to distinguish within group correlations of outcomes that arise

دریافت فوری ← متن کامل مقاله

ISIArticles
مرجع مقالات تخصصی ایران

✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
✓ امکان دانلود نسخه ترجمه شده مقالات
✓ پذیرش سفارش ترجمه تخصصی
✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
✓ دانلود فوری مقاله پس از پرداخت آنلاین
✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات