DISAGGREGATING DENSITY: A KNOWLEDGE SPILLOVER ANALYSIS USING GEO-CODED DATA

JOHAN P. LARSSON, JÖNKÖPING INTERNATIONAL BUSINESS SCHOOL, SWEDEN

Discussant: Kimiko UNO, Tokyo University of Foreign Studies, Japan
Estimate ln (wage) with geo-coded square data and individual attributes.

“Densities” depend on spatial scales: Compare parameters across various size of “squares”.

The difference in parameters is interpreted as “spillover” effects.
DISCUSSION

◆ Geo-coded data:
  ● In Japan, so-called “third-level mesh” is defined as a rectangular area 45” wide and 30” height.
  ● In Tokyo (35° 40’N), its size is 1130.9m × 924.2m.
  ● In high-latitude region, like Stockholm (59° 20’N), width may be much shorter, and the size difference may not be ignored.

◆ Male shares:
  ● Unchanged with the size of squares; why?
DISCUSSION

Basic formula: micro panel

\[ \ln w_{it} = \alpha + \ln X_{jt}^{'} \beta + Z_{it}^{'} \gamma + \lambda_{it} + \epsilon_{t} \]

- I: number of individuals, J: number of squares.
- K, L: numbers of explanatory variables re. (i, j)

- For fixed t, \( LHS = I \times 1 \), \( X(J \times L) \), \( Z(I \times K) \):
  - Some \( I \times J \) conversion matrix is necessary.

- Does unique j (possibly the place of residence) correspond to each person?

- Fixed effects:
  \[ u_{it} = \lambda_{i} + \mu_{t} + \epsilon_{it} \]
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Spill-over is considered in terms of size of squares.

Spill-over effect exists if parameter is smaller for larger squares?

Spill-over may better be considered using spatial contiguity $\omega$.

$$\ln w_{it} = \alpha + \omega_{ij} \ln X_{jt} \beta + Z_{it} \gamma + u_{it}$$