

Some new estimates of returns to scale for EU regional manufacturing, 1986-2002

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Presentation prepared for Cambridge-MIT Institute
Workshop on Regional Innovation
Cambridge, Friday 9th June, 2006



Introduction

- Understanding of whether or not localised increasing returns exist in EU crucial:
 - Impact of integration upon the EU's economic geography
 - Important from a theoretical perspective
- Theoretical importance:
 - Traditional models based upon CRS \Rightarrow convergence of g , Y & regional production structures
 - Modern developments (“new economics” and NEG) \Rightarrow potentially intensified forces for divergence

Introduction

- Aim of presentation:
 - Present new estimates of returns to scale for EU regional manufacturing for the NUTS1 regions
 - Sample-period: 1986-2002
 - “Verdoorn law” framework \Rightarrow realisation of localised increasing returns partly conditional upon local demand growth
 - Spatial econometric estimation (“spatial hybrid” model)

Reduced form equation

$$tfp_j = \frac{\beta\lambda'}{\nu} + \left(\frac{\nu-1}{\nu}\right)q_j + \zeta_1 \ln D_j + \theta_1 \ln TFP_0$$

Verdoorn
effect



Agglomeration economies
from density



tech. diffusion



ν = composite measure of returns to scale (includes localised knowledge spillovers from, e.g., LBD processes)

Spatial econometric framework


- Motivated by desire to move away from standard “testing-up” approach: OLS → SAR specification *or* SEM specification
- Try to separate out 2 different types of spatial autocorrelation:
 - “nuisance”: ε_i correlated with ε_j because of, e.g., non-functional definitions of regional boundaries
 - “substantive”: due to genuine economic interactions between regions (e.g. cross-regional knowledge spillovers)

Spatial econometric framework

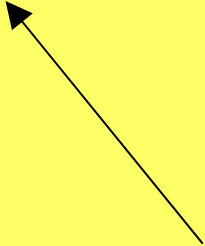
- General form of the “spatial hybrid” model:

$$y = X\delta + WX\rho + \varepsilon$$

Matrix of
independent
variables




“Spatial lags” of
independent
variables



$$\text{where } \varepsilon = \xi W\varepsilon + \mu$$

Error term with SAR
structure



W = weights matrix defining regions that are in the “neighbourhood” of region j

$\Rightarrow WX$ = weighted average of independent variables for “neighbourhood” set

Baseline results

ML estimation for single cross-section, 1986-2002 (59 regions):

$$\begin{aligned} tfp_j &= \mathbf{-0.003} & + \mathbf{0.673}q_j & + \mathbf{0.006}ln(D_j) & - \mathbf{0.026}ln(TFP_{0,j}) \\ &(-0.73) & (8.73) & (5.60) & (-4.55) \\ & + \mathbf{0.297}Wq_j & + \mathbf{0.006}Wln(D_j) & + \mathbf{0.011}Wln(TFP_{0,j}) & + \varepsilon_j \\ & (3.40) & (3.95) & (1.11) & \end{aligned}$$

$$\xi = 0.499 (4.63), \nu = 3.060, \phi = 2.17 \% \text{ p.a.}, \text{pseudo-R}^2 = 0.666$$

Two econometric problems

- Problem #1: omitted heterogeneity
 - E.g. absence of human capital
 - Expect to be positively correlated with both tfp_j and q_j (likewise for spatial lags) \Rightarrow potential upwards bias
 - Tackle using panel data techniques- 2-way FE estimation
 - $\Rightarrow v = 1.968$, co-efficient on $Wq_j = 0.007$ (t = 1.00)
- Problem #2: simultaneity bias
 - Real possibility of simultaneous reverse causation $tfp_j \rightarrow q_j$
 - Tackle using IV techniques
 - $\Rightarrow v = 1.713$, co-efficient on $Wq_j = 0.008$ (t = 0.40)

Conclusion

- Strong and robust evidence of localised increasing returns consistent with “new economics” and NEG
- However, contingency upon local demand growth poses a challenge
- Less robust evidence for cross-regional spillovers