

October 2009

**Technological Externalities and Economic Distance:
A case of the Japanese automobile suppliers**

Yosuke TAKEDA and Ichihiro UCHIDA

Faculty of Economics, Sophia University and Faculty of Economics, Aichi University

Abstract

This paper is in the spirit of Marshall (1920), who raised the question of how economic distance affects a firm's productivity, focusing upon the role of idea sharing in relation to technological knowledge or information between firms. In order to quantify the degree of knowledge spillover or information sharing, we take the production function approach. Assuming core-periphery structure around automobile assemblies surrounded with auto-parts suppliers, we estimate plant-level production functions of the Japanese auto-parts suppliers, where productivity function depends upon the degree of information sharing measured by both geographic plant location and membership of technological cooperation associations. We take econometric issues of cross-sectional dependence of productivity and a simultaneity problem between inputs, applying methods to the standard OLS and GMM estimators. Positive technological externalities are seen in general and for independent plants, the fact which is robust to specifications of the production functions. Agglomeration effects are however rarely observed for relation-specific or cooperative plants. Some of them cost substantial negative externalities. Once a simultaneity problem is econometrically considered, instead of increasing returns, decreasing returns to scale emerge in cases of total materials. Agglomeration, if any, could be brought about not by increasing returns to scale, but by productivity spillover among suppliers proximate to automobile assemblies.

Key words: Information sharing; Agglomeration; Technological externality; Productivity; Cross-sectional dependence; Simultaneity; Automobile supplier

JEL classification: R30, R12, L23, L22, L62