Measuring efficiency of regional knowledge spillover using DEA: An application to EU regions

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Abstract

Aim of this paper is to investigate the impact of various variables like patent applications, development level, employment level and degree of technological diversity on innovative efficiency. Innovative efficiency has been estimated by relating innovative inputs and innovative outputs. Expenditures in Research and Development and Human Capital stand for innovative inputs. Technological knowledge diffusion that comes from spatial and technological neighborhood stands for innovative output. We have estimated innovative efficiency following Data Envelopment Analysis (DEA) for 192 European regions for a 12 years period (1995–2006). We have also estimated how the various predictor variables interact with innovative efficiency and with one another by following Structural equation models (SEM) analysis.

Our results indicate that regions which present high innovative activity through patents production they also present high innovative efficiency. Furthermore, our findings show that regions characterized by high levels of employment achieve to manage efficiently their innovative sources. Additionally, we find that the level of regional development has both a direct and indirect effect on innovative efficiency. More accurately, transition and less developed regions in terms of per capita GDP present high levels of efficiency if they innovate in specific and limited technological fields. On the other hand, the more developed regions can achieve high innovative efficiency if they follow a more decentralized innovative policy.

keywords:	Technological diversity, R&D, Patents Data Envelopment Analysis, Structural Equation Modeling