R&D, Inter-Industry and International Spillovers of Technology and the Total Factor Productivity Growth of Manufacturing Industries in Canada, 1974-1989

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October 1994

Abstract

The paper offers new econometrics evidence on the relationship between total factor productivity and the R&D expenditures of Canadian manufacturing industries in the presence of inter-industry and international spillovers of technology. The construction of spillover proxies is based on a matrix of Canadian patent counts. The normalized distributions of inventions patented in Canada by each country of the G-7 group are weighted by their respective R&D expenditures to generate estimates of R&D expenditures in other industries in Canada and abroad, creating spillovers that can be used by each Canadian industry.

The results confirm Griliches' (1994) finding that the TFP-R&D nexus is strongly influenced by the inclusion or exclusion of the computer industry, whose TFP has been adjusted for quality improvement. They also suggest that the process-related R&D activity appears to have a statistically more significant effect on TFP than the product-related R&D. Federal grants to R&D do not appear to enhance TFP. The estimated effect of spillovers from R&D in other industies in Canada varies over time and, in contrast to former studies, is smaller than the effect of the industry's own R&D. The estimated effect of international spillovers of R&D on TFP is mostly statistically significant. Its magnitude, however, varies over time and is smaller than the effect of industry's own R&D.

Keywords: Total factor productivity, R&D expenditures, spillovers, R&D grants.

Abstrakt

Tato studie přináší nové ekonometrické výsledky dokumentující vztah mezi multifaktoriální produktivitou (MFP) a výdaji na průmyslový výzkum a vývoj v kanadském

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zpracovatelském průmyslu, včetně meziodvětvových a mezinárodních technologických externalit. Podkladem pro konstrukci proměnné reprezentující technologické externality je matriace kanadských patentů. Souhrn technologických externalit, které jsou k dispozici kanadskému průmyslu odpovídá normalizovanému rozdělení vynálezů patentovaných v Kanadě každou ze zemi skupiny GT (USA, NSR, VB, Japonsko, Francie, Itálie a Kanada) váženému výdaji daného odvětví na průmyslový výzkum a vývoj v každé ze sedmi zemí.