

**Organizational Strategies, Firms'
Performance and Spatial Spillovers. The
Canadian Case in Research and Development.**

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Abstract

This thesis consists of four essays that use micro-datasets from Statistics Canada's surveys on research and development (R&D) and innovation mainly to investigate the relations between firms' strategies in R&D. In the first essay we shed some light on how firms make decisions on how to acquire the technology measured by the research and development activities. More specifically, we propose to expand the conceptual "Make and Buy" framework for the choice of modes of participation in R&D partnership. We consider that the R&D performer can do R&D for its own purposes, have it done by other organizations, or do it for other organizations, be it external partners or subsidiaries. The intensity of the relationship is quantified in monetary terms (R&D expenditures) and not by a mere count of the firms involved, as is more generally done in the empirical literature. The descriptive portrait shows that during the period 1997 to 2002 the majority of R&D spending, around 62%, was of internal origin and conducted by the performer. The remaining portion (38%) included two groups: one group (24%) performed R&D on behalf of another organizations that is, they contracted in. The remaining 14% had the R&D conducted by another performer, that is, they contracted out. An estimated 13% of research and development was conducted with no external partnerships.

In the second essay we consider the same idea but in a context where the decisions on technological choices are not independent of each other. Furthermore, we show how transitions in the way of acquiring R&D over time can affect the firm's labour productivity. The panel dimension of the data allows controlling for individual unobserved heterogeneity to analyse the transitions of the decisions regarding the location of funding (execution) of R&D generated by a first-order Markov process. By applying a maximum simulated likelihood estimator we show that there is strong true state dependence in all states of R&D (the manner of acquiring the R&D). Also, we see that not only the way of organizing the R&D matters, but also that the firm's growth in labour productivity depends on the nature of the R&D and on its persistence. These factors can easily increase the returns to R&D for all performers in Canada. Our findings on the importance of R&D performed internally appears to contrast, to some extent, with the results of other stud-

ies looking at similar issues, in which the R&D performed extramurally has a higher impacts on the firm's productivity.

The third essay deals with the effects of the geographic distance that separates R&D performers from universities on the extent of knowledge spillovers. It is found that a 10% increase in distance decreases the proportion of total R&D paid to universities by 1.4% for firms that do not report any codified knowledge flow, and by 0.7% for firms that report codified knowledge flows.

Finally, given the growing importance of the role played by governments in the stimulation of innovation, the last essay is dedicated to the evaluation of the impacts of R&D tax credits on a series of innovation indicators. Using a non-parametric matching approach, we find that compared to a hypothetical situation of no R&D tax credits, recipients of R&D tax credits show significantly higher proportions of world-first and Canadian-first new products, numbers of new products and shares of sales due to new products. However, these firms do not perform better in terms of profitability, domestic market share, international sales or ability to keep up with competitors. We therefore conclude that tax credits lead to additional innovation output, but not necessarily better firm outcomes.