Beyond Borders: Internationalisation of R&D and Policy Implications for Small Open Economies


This book uses a variety of data sets and methods to examine the issues mentioned in its title, often using the Belgian economy as an example. They seem to have acquired special urgency since the European Union (EU) set itself the goals at its 2000 Lisbon and 2002 Barcelona summits to increase the R&D/GDP spending ratio to 3% by 2010 and to become the world’s most competitive and dynamic knowledge-based economy. Moreover, successive EU expansions have raised fears in ‘old Europe’ about loss of competitiveness in attracting foreign direct investment. This background firmly focuses the book’s contributions on analyses of specific aspects of the National Innovation System (NIS) in the narrow sense, i.e. the Science and Technology (S&T) or R&D system.

The editors, who are both members of the Belgian Federal Science Policy Office, intend the book to be “a policy report that contributes to the understanding of the highly difficult transition of scientific research results into social accepted policy measures” (p. 2). They therefore asked contributors to conclude chapters with policy recommendations which, as it turns out, produced responses of very mixed quality. This is a lengthy book. In order to highlight the diversity of contributions and reasons for my unease about many of them I hope the reader will excuse my approach of briefly commenting on each chapter.

The first chapter, written by the editors, introduces the major themes of the chapters and describes some of the main characteristics of the Belgian NIS. The discussion of R&D spillovers highlights a ‘nationalistic’ perspective that also seems to pervade some of the other contributions. International spillovers from domestic R&D projects are described as ‘negative spillovers’. This is not how most economists would define the term. It is well known that knowledge spillovers cannot be confined within national borders, and this is usually seen as beneficial!

Chapter 2 investigates the impacts of foreign subsidiaries of multinational enterprises (MNEs) on the structure and dynamics of the Belgian manufacturing sector. They are found to have contributed greatly to overall productivity growth, and to have drastically changed the export specialisation of the country. The data suggest that Belgium is more affected by foreign firm’s activities than any other EU member state, raising a major issue about the book, i.e. how representative the Belgian experience really is for other countries. A second major issue concerns the timeliness of some of
the analysis. The productivity and trade data analysed are for 1960-90 and 1990-95, respectively.

Instead of grouping related topics together in major sections of the book, they jump back and forth in no particular order. Chapter 3 reports results from a project launched as part of the Technology Association for Technology Implementation in Europe (TAFTIE) network that tries to assess how national and regional EU R&D support agencies should assess R&D projects where benefits occur partly or largely outside the funding country. The political realities of the EU suggest that currently the best way forward in assessing such projects is to have more informal interactions between national R&D support agencies, instead of a formal shared funding system. The chapter highlights conflicts between national and regional interests versus EU-wide benefits arising from knowledge spillovers. It seems the EU still has a long way to go to come to terms with basic features of a knowledge-based economy.

The next chapter focuses on another regulatory issue, i.e. ownership of inventions conceived at universities. It presents a useful, if somewhat tedious, general survey of the diverse regulatory responses of EU governments, the US and Japan. In the majority of cases there has been a shift from an ‘academic-oriented’ approach supporting ‘professor privilege’ to an ‘economic-oriented’ approach, but the regulatory frameworks are far from harmonious, hindering the full exploitation of international research projects. There seems to be a clear need for a harmonised and comprehensive legal framework at the EU-wide level.

Chapters 5 and 6 both focus on new technology-based firms. Chapter 5 explores how country differences in legal environments influence market entry choices. Using a panel data set of 400 Belgian, British and German firms, the authors conduct logistic regressions and find that the legal environment is indeed an important strategic variable for these firms in their early internationalization processes. This suggests that legal diversity across EU countries might limit technology diffusion and induce heterogeneity in technology spillovers.

Chapter 6 analyses to what extent the value of R&D of high-tech start-ups is valorised outside their home country and why. Using data from a structured questionnaire administered to company founders or CEOs of start-ups in the Belgian region of Flanders, multivariate regression analysis is used to test a number of hypotheses that might explain the percentage of total firm sales derived from international markets. Interestingly, only two (out of four) hypotheses are supported empirically. The findings contradict the premise behind a number of current government polices aimed at fostering high-tech start-ups. However, I would question whether the experience of a sample of firms from one European region can be generalised, and to what extent the results can be believed. It would have helped if the authors had stated the number of observations in their sample!

Chapter 7 shifts to focus away from Belgium. It tests a model that tries to assess the effects of human and social capital on innovation at the country level. The regression analysis is conducted on a sample of 59 countries from all five continents. The authors find strong support for a positive impact of human capital on innovation, and also for some, but not all, types of social capital. The analysis raises more questions than it answers, and I do not find it very convincing for a number of reasons. For
example, we do not know how sensitive the findings might be to data outliers. Also, the interaction effect between human capital and social capital variables is not tested. Last but not least, it is not stated which estimator is used in the multiple regression analysis!

The next two chapters return to the analysis of foreign MNEs in Belgium. Using patent statistics, chapter 8 analyses the main determinants of the R&D activities of foreign MNEs and assesses their impact on the local labour market for highly skilled workers in terms of ‘brain drain’, ‘brain grain’ and ‘brain exchange’. The findings suggest that MNEs mostly invest in Belgium to take advantage of the local science base, and that their R&D investment activities indisputably generate positive spillovers through demand for highly qualified people. Location decisions by MNEs about R&D conducted in Belgium are further analysed in chapter 9, using mainly firm-based R&D budgets of over 2000 firms. The data are mostly from the OECD R&D survey. Firms are distinguished by type of ownership (foreign subsidiaries, domestic subsidiaries, independent firms). It is again found that the main driving force for R&D location is the absorption or use of local technology. However, the authors find few noteworthy differences between firms by ownership type, resulting in the main policy conclusion that “a good R&D policy does not need to focus on foreign subsidiaries separately” (p. 228).

Chapter 10 is the only one that uses a case study methodology. Analysing four ‘radical’ innovation projects in four established firms located in Flanders, the authors find that partnerships with overseas companies, not domestic companies and/or research institutes and universities, are the preferred way to undertake such projects. There seems to be a surprisingly high degree of isolation of firm within the Belgian NIS. Also surprising is the lack of efficient Intellectual Property (IP) strategies and management which results in Belgian firms losing out on much of the profits generated by the projects.

The next chapter, written by one of the editors, is the third that places ownership structure at the centre of analysis, and the first to openly admit that any policy conclusions drawn are likely to be highly country specific (p. 263). Using data from the Third European Community Innovation Survey, it finds that ownership structure seems to matter relatively little in terms of firm performance and innovation, and innovation collaboration. This leads to a rather weak discussion of policy options which is not so much based on the analysis but on assertions from the literature. The chapter also suffers from weak editing! The large number of cross-tabulations makes it tedious to read, some references are missing and there are English mistakes, including some that distort meaning and/or are simply odd.

In Chapter 12 the focus shifts again away from firms. It analyses the commitment of Belgian research teams to pre-competitive and near-to-market S&T cooperate agreements under successive Framework Programmes of the EU and under the European Research Co-ordination Agency (EUREKA) initiative. The data set of approximately 28000 such agreements is analysed at length and in almost overwhelming detail. Belgian participation in the cooperative agreements is very high. However, there is weak intra-national collaboration and the under-representation of the private sector is seen as the main challenge for policy makers. There is a general
call for more targeted policy measures, but no specifics are provided. The policy conclusions seem more of a token gesture in responds to the request of the editors.

Both chapters 13 and the pen-ultimate chapter are based on patent data analysis. Chapter 13 uses a binary choice qualitative response model to analyse backward and forward patent citations of Belgian corporate patent applicants to the US and European patent offices during 1995-2003. It is an attempt to track down knowledge spillovers by following some of their trails. Such spillovers turn out to be very industry specific and not correlated with the degree of foreign ownership. However, this does not deter the authors from drawing the conclusion that industry specific regulation policies and measures to stimulate R&D cooperation, e.g. tax breaks or subsidies to facilitate knowledge spillovers, are required. It is simply assumed that all industries should have a high (and similar) degree of knowledge spillovers. However, this might not be warranted. We really need to know details of the main technologies involved and of the way patents are used (both vary greatly by industry). Also, policies aimed at patent citations in isolation might not be appropriate when a more comprehensive collection of spillover measures is considered.

The pen-ultimate chapter yet again returns to the question of foreign ownership of firms. The authors develop what they regard as improved and more complete indicators of the internationalisation of technology. They find the ratio of domestic inventions controlled by foreign firms increases from 40% to 70% when the new indicators are used and suggest this should be of major concern to policy makers. I wonder why it should be, especially as other authors in this volume have found positive effects of foreign ownership. Thankfully it is acknowledged that further research is needed before effective policy measures to deal with this ‘problem’ can be proposed.

In the final chapter entitled “Turning Facts into Policy” the editors try to provide an overview of the policy-related issues raised in the book and suggest some preliminary policy guidelines and priorities. They conclude by saying that “...the policy guidelines we offer for small open economies in response to the internationalisation of R&D might seem blurred at first sight... We have the uneasy feeling that we have only begun to scratch the surface, ...” (p. 413/14). This reviewer couldn’t agree more!

To sum up, the book should be of interest to anyone working on issues of the internationalisation of R&D and its impact on small open economies in the EU, or someone particularly interested in the Belgian economy. However, there are a number of problems. Given the shortcomings of most policy suggestions, the book does not seem particularly successful at fulfilling the editors’ aim to be a useful policy report. Also it is not clear how relevant the findings for the Belgian economy are for other economies. The contributors themselves seem to have conflicting views on this. Furthermore, the book does not contribute much, if at all, to economic theory. There is better coverage of the relevant management literature compared to the economics literature. Many economists will probably find the book rather disappointing. These impressions are not helped by some chapters containing too much detail on Belgian R&D spending, some repetition of common issues, and generally insufficient attention to editing.
Some of my unease about the book is also due to what I perceive as excessive political correctness as far as EU policies and aims are concerned, resulting in too much emphasis on R&D, high-tech industries, S&T. I suggest the EU’s Lisbon and Barcelona summit goals can be questioned. Not only might they be unrealistic, but they may also be misguided, diverting urgently needed attention from other crucial aspects of innovation and innovation-related policies.

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