Preface

There is a close relationship between welfare and industrial dynamics and innovation policy. A good innovation policy is a prerequisite for economic growth through technological progress. Indeed, many policies currently aiming to increase the pace of technological change make use of instruments that traditionally target innovation activities. Such an evolution points to the crucial role played by innovation activities in the performance of firms, sectors, and nations. Such a trend is further strengthened by the peculiarity of sector-level innovation dynamics, which require design and implementation of policies taking into account sector-specific characteristics. This does not, of course, preclude a causal relationship going from industry structure to innovation and R&D activities of firms. Finally, all these dynamics and relationships are influenced by the level of economic development of nations and may well differ between developed and developing nations. Contributions collected in this book address these important issues from different perspectives.

This book is organized into three sections and 19 chapters. Section 1 addresses issues related to Foreign Direct Investment (FDI). In the globalization era, FDI flows are presented as a major means of international technology diffusion via knowledge spillovers occurring in host countries where foreign firms establish production units or more directly through establishment of R&D units by multinational firms abroad. The first chapter of this book, “Drivers and Policies for Increasing and Internationalising R&D Activities of EU Multinational Enterprises” (Michele Cincera) studies a recent trend among the large Multinational Enterprises (MNE), the off-shoring of R&D activities and what determines that direction of change. The main results of the study can be summarized as follows. The author shows that competitive pressures from US companies appear to be the major determinant among the factors that explain why firms delocalize their R&D activities outside the EU, as the US companies are the technological leaders. Among the determinants of home country location and in particular the location in the EU, the author finds that public intervention to support and encourage R&D and the proximity to other activities of the company are prominent. The author also finds that the main factor that appears to play a significant role in locating the emerging country to locate itself, the cost of the R&D personnel, does matter significantly. Cincera shows that the positive impact of indirect public aid and product market regulations on R&D in the EU is important as a policy instrument.

The second chapter is "Foreign Direct Investment as a Development Strategy: Knowledge Diffusion and Innovation Capability in Competing Emerging Economies" by E. Nur Özkan-Gunay and Yusuf Cukurçayır. This chapter investigates the spillover effects of Foreign Direct Investment (FDI) on innovation capability in four competing emerging economies in the districts of Eastern Europe, the Czech Republic, Hungary, Poland, and Turkey, for the period 1995-2008. The authors employ panel data models to test two competing hypotheses regarding the impact of FDI on innovation capability: does FDI improve the
innovation capability of host countries via spillover channels or does it lead to the crowding-out effect through the importation of technologies via joint ventures? The authors find that FDI inflows generate spillover effects on domestic innovation capability in competing emerging countries, supporting the hypothesis that inward FDI brings knowledge spillovers, new technologies, and products into the host country, and promotes the innovation capability of domestic firms. In addition, the chapter shows that the level of human capital stock and qualified researchers play a crucial role in stimulating innovative capability and technological progress.

The third chapter is titled “Foreign Direct Investment and Technology Spillovers in the Turkish Manufacturing Industry.” Literature suggests that technology spillovers from foreign to local firms in emerging economies are the most important channel through which FDI influence the host economy. However, empirical evidence about the existence, magnitude, and direction of FDI-related spillovers in host countries is contradictory, which requires the necessity of conducting more econometric studies using firm-level data. In this study, Alper Sönmez and Mehmet Teoman Pamukcu conduct an econometric analysis to assess the impact of FDI-related horizontal technology spillovers, on output growth of local firms in the Turkish manufacturing industry over 2003-2006. When the authors adopt a broad definition of foreign ownership, they find that horizontal spillovers occur from foreign to local firms in the sector of activity. Export-oriented firms do not benefit from these spillovers in contrast to firms producing mainly for the local market. However, when foreign ownership is defined according to whether the minority or majority of capital is detained by the foreign partner, horizontal spillovers seem to originate from foreign firms with a majority or full foreign ownership while no such effect is associated with minority-owned foreign firms.

The second section of this book deals with major issues related to the economics of innovation and R&D: To this end, up-to-date econometric techniques using firm-level and cross-country data are implemented, and a number of policy-related issues are discussed. The fourth chapter is “International Evidence on Financing of R&D” by Halit Gönenc. This chapter examines the financing patterns of R&D expenditures using data from 38 countries for the period 1980-2006. The major hypothesis of the author is that higher equity financing and higher past stock market valuation are associated with higher R&D expenditures. The evidence supports the hypothesis of the author. The chapter shows that the sensitivities of equity financing and internal funds are different between financially constrained and unconstrained firms. The results are robust when the effect of patent rights protection, which has a nonlinear effect on R&D, is controlled.

The fifth chapter of the book is by Francesco Lissoni on “Academic Patenting in Europe: Recent Research and New Perspectives.” The chapter summarizes the results of the project titled Academic Patenting in Europe (APE-INV). The project aims at answering how to create and diffuse a harmonized database on academic patenting in Europe. Such a database has several uses. First, it allows for the investigation of the economic returns of academic patenting at the scientist, university, and industry level. Second, it helps to investigate the extent of synergies and trade-offs between patenting and other technology transfer, means such as consultancy, mobility of personnel, as well as teaching, conferencing, and publishing. Finally, it provides the basis for the creation of a larger database on inventors in Europe, to be used in studies on knowledge diffusion and labour mobility. The basic evidence from the database is opposed to the view that European universities are lagging behind the US in terms of universities’ contribution to patenting. The bulk of academic patents remained in the hands of the companies having strong ties with academic scientists. The European policies mainly addressed the narrow issue of technology transfer and patent ownership, and were not strong enough to change the fundamentals of the research systems.
The sixth chapter of the book is on “R&D Productivity and Firm Size in Semiconductors and Pharmaceuticals: Evidence from Citation Yields.” In this chapter, Burak Dindaroglu explores the relationship between firm size and R&D productivity for two important and R&D-intensive industries, namely semiconductors and pharmaceuticals, by using firm-level panel data from the US. The author employs two measures of a firm’s R&D performance: the number of citations received per patented innovation, and the number of citations received per dollar of R&D expenditures. The former is a measure of the average quality of a firm’s patents, and the latter is a measure of total R&D output obtained per dollar of investments. He finds that the average quality of patents (citations received per patent) falls with firm size in Pharmaceuticals, but there is no relationship between patent quality and firm size in Semiconductors. Citations received per R&D dollar decrease with size in both industries, which is due to the well-documented negative relationship between patents per R&D and firm size.

The seventh chapter is titled “The Potential Role of Government in Development Process of a Cluster Policy.” Recent evidence strongly suggests that firms’ joint action may be insufficient for the creation of clusters in order to face the competitive pressures of globalization. In this chapter, Hadi Tolga Goksidan, Ioannis N. Katsikis, and Erkan Erdil argue that governments can play an important role in the process of creating the development of clusters in order to cope with these pressures. Based on a theoretical framework, the authors examine the way in which governmental intervention and public policies to foster cluster creation may provide positive outcomes. They study the different approaches developed in cluster theories and provide an insight into the set of governmental and policy roles that may facilitate the formulation of local clusters. Finally, the authors propose a re-conceptualization of cluster theory that will potentially increase its value as a comprehensive tool for regional economic development.

The eighth chapter is on “Innovation Cluster Development Potential in the Regions of Turkey: A Spatial Approach” by A. Orcun Sakarya. The assessment of firms’ innovativeness levels in a specific territory can be assumed to be an important indicator of future innovative collaboration, some of which might also be cluster setup initiatives. In this chapter, assuming that geographical proximity can also provide a favorable opportunity for strengthening inter-firm ties, the goal is to discover the best innovation variables for Turkish firms in terms of being members of potential innovative cluster formations. Following an overview of the innovation parameters used in the chapter, the current situation of the firms in question and their problems are briefly stated. The analysis section of the chapter includes a regression test to discover the variables affecting firms’ innovativeness in order to tackle the problems stated. The results have shown that intellectual capital, technology infrastructure, and geographical concentration levels affect the innovation performance of the firms in different regions. The author concludes that further policy improvements are needed for empowering regional innovation capabilities.

The ninth chapter studies the “Impact of SME Policies on Innovation Capabilities: The Turkish Case.” Elif Bascavusoglu-Moreau and Mustafa Colakoglu aim to explore the determinants of innovative capabilities in an emerging country context in this chapter. The authors focus more particularly on the impact of recent changes in SME policies in Turkey. Using a unique firm-level survey conducted on 45000 SMEs, innovative capabilities of firms are assessed at three different levels: their innovation efforts, innovation decision, and innovative intensity. Bascavusoglu-Moreau and Colakoglu analyze and compare the impact of two different incentive schemes: one a purely financial support, and the second, consultancy and technological assistance coupled with financial facilities. Whereas all firms seem to benefit from financial support, only less innovative firms take full advantage of the advisory services. The authors show that the determinants of innovative capabilities depend considerably on the type of firms overall, suggesting the need for differentiated policy measures.
Bahar Bayraktar Saglam and Selin Sayek study "Skill and Foreign Firm Premium: The Role of Technology Gap and Labor Cost" in the tenth chapter. In this chapter, the authors construct a model that allows for joint discussion of foreign firm and skill premium in wages, and their evolution upon increased foreign firm activities. They allow for (1) dynamic interaction between the domestic and foreign firms in the labor market, via a two-sided search model, (2) technology differentials between domestic and foreign firms, and (3) varying cost of doing business between domestic and foreign firms. Analytical and numerical results point to the importance of modeling all three features. The authors find that both the level and the changes in the relative wages depend on the productivity differential (technology gap) and the job creation costs.

The third section of this book addresses a set of issues related to the nature of technological progress together with its impact on a number of outcomes. Chapter 11 studies "RCA vs. RTA and Sectoral Import vs. RTA: First Empirical Evidence for Turkey." The mainstream literature argues that technological specialization patterns of countries should be in accordance with their trade specialization pattern. In empirical applications, Revealed Technological Advantage (RTA) index and Revealed Comparative Advantage (RCA) index are used to measure technological specialization and trade specialization patterns, respectively. In this chapter, Ummuhan Gokovali and Burhan Medettin provide an extensive analysis of the relation between RTA and RCA of seven developed countries (Germany, France, Italy, Japan, The Netherlands, the UK, and the USA) for twenty-one manufacturing sectors. RCA indexes are calculated by using worldwide export data, whereas RTA indexes are measured by patents granted in Turkey over the period 1990-2006. Although a bird's eye view supports a relation, there has not been a strong statistical validation of the relationship between these two variables; in addition, this chapter investigates whether RTA is related to the sectoral import ratio of Turkey for each country. Empirical findings indicate that the direction of the relationship between sectoral import ratio and RTA varies according to the technological composition of sectors for each country.

Ewa Minska-Struzik and Szymon Truskolaski study “The Effectiveness of Stimulating Innovativeness in Poland through Science and Technology Parks” in Chapter 12. The authors aim to examine the effectiveness of S&T parks after five years of the Polish presence in the EU in this chapter. The results of their empirical research show that the effectiveness of enhancing innovativeness is hardly satisfactory. For instance, in 2007-2009, almost 400 incumbents of 25 existing Science and Technology parks in Poland were only able to claim 18 patents. The authors argue that the main drawbacks of Polish S&T parks are: 1) specialization mostly comprising general ICTs, which, as they argue, is too broad, 2) insufficient research equipment, 3) the lack of co-operation with R&D institutions other than universities, and 4) focusing on fulfilling the EU funds’ criteria as to provide the exact number of jobs created or to rent a particular office space. It is important to note that 53% of incubators’ and S&T parks’ income originates from European funds—methods of raising income must be developed by these institutions or they will cease to exist. The authors conclude these policy issues are relevant not only for Poland but for any economy contemplating active government involvement in R&D.

In Chapter 13, Bert Droste-Franke, Jörg Krüger, Stephan Lingner, and Thomas H. W. Ziesemer discuss problems in diffusion of a specific technological advancement in “Explaining the Lack of Dynamics in the Diffusion of Small Stationary Fuel Cells.” It is now well known that fuel cell technology is using the reaction of hydrogen with oxygen to water in order to produce electricity and heat, and promises a high electrical efficiency even in small devices, which can be installed close to the consumer. This approach seems to be an impressive idea to contribute to a viable future energy supply under the restrictions of climate change policy. Major reasons currently hampering the diffusion of such technologies for house
energy supply in Germany are analyzed in this chapter. The barriers revealed include high production costs as well as economic and legal obstacles for installing the devices so that they can be operated in competition to central power plants and beside others in tenancies.

Chapter 14 discusses "The Impact of Research and Development Expenditures on the Growth of Turkish Manufacturing Industry" and is by Rukiye Yilmaz and Jülide Yildirim. Emerging markets depend on technological development and innovation rather than a cheap labor force, as they are important instruments for sustainable economic growth. The most common indicators of technological development and innovation are the Research and Development (R&D) expenditures and the number of employees participating in research and development activities. In this chapter, the authors aim to measure the impact of research and development expenditures as a technological innovation indicator on the growth of firms in the Turkish manufacturing and non-manufacturing industry for the time period 2003 and 2007. In this framework, labor, investment, and R&D expenditures are used as factors, which affect the growth of the firms. Then, economic activities of manufacturing industries are classified with respect to technology intensity as high, medium-high, medium-low, and low technology level. Empirical findings indicate that R&D expenditures enhance firm growth, especially for the firms in low and medium technology level sectors.

Chapter 15 is on "Value Creation with Wood-Based Energy Business Models." Wim Westerman, Jeffrey Paays, and Satu Pätäri note that renewable energy sources, such as wood-based energy source, which is a non-food based biomass source, are increasingly coming into use. In this study, the authors discuss this trend with an example in the mature Finnish pulp and paper industry. A Delphi study helps authors to identify the main industry- and company-level factors that influence the forest-based energy sector, its value-creation potential, and the future roles of forest and energy companies in it. An economic-value analysis draws upon a risk-oriented production unit positioning analysis that is modeled with multiple scenarios. Results of the study show that innovative business models can fruitfully be identified with multiple experts in sophisticated Delphi rounds and dynamic resource-based approaches appear to look promising. Authors also find that bio-refinery production chains are economically feasible with relatively small production units with multiple applications. The study gives way to a management view that integrates resource-based and economic value perspectives on wood-based energy sources for firms. In that sense, it adds to the literature on value creation with innovative business models.

In Chapter 16, which is titled "'Lex Lata' and 'de lege Ferenda' for the R&D Law of Turkey," Serdar Türkeli analyzes the content sophistication (legislative-executive and techno-economic conception and implementation) of the R&D Law No. 5746 of Turkey by the constructed general framework of reference for content sophistication analysis with respect to the framing principles of neo-classical (optimizing) and evolutionary (adaptive) policy making and policy implementation approaches through their distinct underlying conceptions and implementations regarding to the "nature of technology," "using, creating, diffusing technology and knowledge," "specificity, variety, and mode of transfer," "externalities," and "risk/uncertainty." According to the results of the analysis, the author shows that, for the time being, the R&D Law No. 5746 of Turkey exhibits features of neo-classical (optimizing) policymaking frames from conception to implementation in the legislative-executive and techno-economic spheres of research and technology development. The author also exemplifies features of evolutionary (adaptive) policymaking frames in other economies around the world in comparison to these neoclassical features. Through this, this chapter aims to contribute to discussions and recommendations on "Lex Lata": "the current law" and "de lege Ferenda": "future law" for R&D and innovation in any country where "the future cannot be predicted, but futures can be invented" through legislative-executive terms of techno-economic demand and imagination.
In chapter 17, Emilie-Pauline Gallié and Renelle Guichard discuss “How Do Starting Attributes Impact the Economic Performance of Young Innovative Companies?” in France. The purpose of the chapter is to study the effects of the starting attributes on the economic performance of the Young Innovative Companies (YICs) in France. The economic performance is measured by two traditional indicators: the sales turnover (after three and five years) and the mortality rate. The indicators of performance diversity make it possible to identify specificities in terms of economic development patterns. For the empirical part of the study, the authors use a very specific database from the French Ministry of Research. Their results show that the initial conditions do not have the same impact on both performance indicators. The legal status and the level of initial equity capital mainly influence the mortality rate. The 3-year-turnover can be explained by the previous activities (1-year-turnover and initial equity capital), the age of the entrepreneur, and the sector. The 5-year-turnover depends on the previous activities, the age of the entrepreneur, and the type of the legal status. These results may indicate important lessons for new entrepreneurs while setting up their establishment strategies.

Chapter 18 is on “User Acceptance of eGovernment Services: Analysis of Users’ Satisfaction Level Based on Technology Acceptance Model.” In this chapter, Serdar Yarlikas, Ibrahim Arpaci, and Gulgun Afacan aim to identify users’ satisfaction level from the eGovernment services in Turkey. Technology Acceptance Model (TAM) deals with the prediction of the acceptability of an information system. TAM posits that perceived usefulness and perceived ease of use determine an individual’s adoption to a system with intention to use serving as a mediator of actual system usage. This study uses a modified version of the TAM to predict the acceptability of eGovernment services and to identify the modifications that must be brought to the system in order to make it acceptable to users. E-school, one of the most used eGovernment projects, is investigated according to TAM. The authors applied an Internet-based survey questionnaire to identify factors that influence users’ satisfaction. The sample size was 30 teachers, who are working in public and private schools. Factor analysis was undertaken on questionnaire items, and regression analysis, dependent on factor analysis, was performed to determine and evaluate the effects of factors on user satisfaction. The authors found that five main factors have significant affect on users’ satisfaction related to the e-School system. These factors are utilitarian ease of use, system usefulness, system content, system usability, and ease of use. The contribution of this chapter to the existing literature is the addition of a new construct, which refers to utilitarian ease of use.

In chapter 19, Emek Baris Kepenek studies “Socio-Technical Issues in Youth Employment in SMEs: The Case of the Furniture Sector in Turkey.” His objective is to examine how technological developments implemented in the production processes and organizational structures of small and medium sized enterprises affect the skills and employment of young workers. To this end, the rapidly growing furniture sector in the greater region of Ankara in Turkey, where young workers face severe problems due to the significant technological developments and organizational changes is chosen for the field study. As advanced by the deskilling theory, the negative impact of technical change, along with the new management techniques, on low-skilled young workers is observed in the furniture sector: technological changes implemented by small firms as a result of managerial decisions, have definitely exerted a negative effect on the status and working conditions of youngsters. Most of them are employed in very simple duties, resulting in detrimental effects on their physical and mental capacities. Some of them even lost their jobs due to the introduction of new machinery and equipment.

The contributions collected in this book and made by authors from different countries point to the vitality of research in the field of economics of innovation and R&D. They examine the nature of the process of technological change in different sectors in a diverse array of countries, analyze the impact
of innovation and R&D activities on different outcomes in different fields, and assess the design and impact of policies aimed at enhancing the innovativeness of firms. The use of modern econometric methodologies together with data collected at different levels of aggregation enables testing of different assumptions. To conclude, we sincerely hope that the analyses and the findings of the studies presented in this book will contribute to the advancement of knowledge in the field of industrial dynamics, innovation policies, and economic growth.

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