

Patent Markets in the Global Knowledge Economy

The development of patent markets should allow for a better circulation of knowledge and a more efficient allocation of technologies at a global level. However, the beneficial role of patents has recently come under scrutiny by those favouring 'open' innovation, and important questions have been asked, namely: How can we estimate the value of patents? How do we ensure matching between supply and demand for such specific goods? Can these markets be competitive? Can we create a financial market for intellectual property rights?

In this edited book, a team of authors addresses these key questions to bring readers up to date with current debates about the role of patents in a global economy. They draw on recent developments in economic analysis but also ground the discussion with the basics of patent and knowledge economics. Striking a good balance between institutional analysis, theory and empirical evidence, the book will appeal to a broad readership of academics, students and practitioners.

THIERRY MADIÈS is Professor of Economics at the University of Fribourg, Switzerland. He previously served as an economic advisor on the Council of Economic Analysis to the French Prime Minister. Professor Madiès' field of research is at the crossroads between public economics and public policy, regional economics and the economics of innovation.

DOMINIQUE GUELLEC is Head of the Country Studies and Outlook Division and Directorate for Science, Technology and Industry at the Organisation for Economic Co-operation and Development (OECD). He formerly held the post of Chief Economist at the European Patent Office (EPO) (2004–2005).

JEAN-CLAUDE PRAGER is the Chief Economist of the Greater Paris Corporation (a state-owned company in charge of the Greater Paris metropolitan area project). Prior to this, he was Director of the French Agency for the Diffusion of Technological Information (ADIT).





More information

Patent Markets in the Global Knowledge Economy

Theory, Empirics and Public Policy Implications

Edited by

THIERRY MADIÈS

Université de Fribourg, Switzerland

DOMINIQUE GUELLEC

The Organisation for Economic Co-operation and Development (OECD), Paris

JEAN-CLAUDE PRAGER Société du Grand Paris





Cambridge University Press

978-1-107-04710-5 - Patent Markets in the Global Knowledge Economy: Theory, Empirics and Public Policy Implications

Edited by Thierry Madiès, Dominique Guellec and Jean-Claude Prager Frontmatter

More information

CAMBRIDGE UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

Published in the United States of America by Cambridge University Press, New York

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org

Information on this title: www.cambridge.org/9781107047105

© Cambridge University Press 2014

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2014

Printed in the United Kingdom by Clays, St Ives plc

A catalogue record for this publication is available from the British Library

Library of Congress Cataloguing in Publication data

Patent markets in the global knowledge economy: theory, empirics and public policy implications / [edited by] Thierry Madiès, Dominique Guellec, Jean-Claude Prager.

pages cm

Includes bibliographical references and index.

ISBN 978-1-107-04710-5 (Hardback)

1. Knowledge management. 2. Intellectual property. 3. Patents. I. Madiès, Thierry. II. Guellec, Dominique. III. Prager, Jean-Claude.

HD30.2.P3764 2013

382'.45608-dc23 2013021188

ISBN 978-1-107-04710-5 Hardback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication, and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.



Contents

Lis	t of figures	page vii
Lis	et of tables	viii
Lis	et of boxes	ix
Lis	List of contributors	
	Introduction D. Guellec, T. Madiès and JC. Prager	1
1	Markets for patents: actors, workings and recent trends D. Guellec and Y. Ménière	9
2	Strategic intelligence on patents F. Caillaud and Y. Ménière	33
3	Microeconomic foundations of patent markets: the role of intermediaries, auctions and centralized markets <i>A. Perrot and A. Yvrande-Billon</i>	55
4	Structuring the market for intellectual property rights: lessons from financial markets O. Gassmann, M. A. Bader and F. Liegler	75
5	Valuation and rating methods for patents and patent portfolios M. Baudry	95
6	Dysfunctions of the patent system and their effects on competition D. Encaoua and T. Madiès	125
7	Valorization of public research results and patents: elements of international comparison <i>R. Lallement</i>	172

V



vi		Contents
intell	nness, open innovation à la Chesbrough a lectual property rights arraz, I. Nakayama and Y. Harayama	nd 209
	clusion Prager	235
Index The colour plates are situated between pp. 144 and 145		243 d 145



Figures

	sector.	page 36
2.2	Patent mapping for medical devices.	38
2.3	European public research organizations in recombinant	
	DNA.	39
2.4	Dichroic analysis of the patent filing strategies of two	
	companies from 1995 to 2009.	40
2.5	Selecting the most suitable partner.	41
2.6	Cross-mapping.	42
2.7	Generality and Originality Indices.	48
2.8	Acceleration coefficient.	49
2.9	Cross-citations.	50
4.1	Our framework: an indicative market structure.	78
4.2	Financial market criteria and financial product criteria	
	from our analysis.	80
4.3	Equity-based vehicle structure.	87
4.4	Debt-based vehicle structure.	88
4.5	Public-private vehicle structure.	89
4.6	Commoditisation vehicle structure.	90
5.1	Link between the optimal age of withdrawal and the	
	initial rent under the assumption of a single crossing-poin	ıt
	of the profile of the rent and the profile of renewal fees.	118
7.1	Licensing income in US universities (1996–2011).	182
7.2	The distribution of licensing income among 149 US	
	universities.	184
7.3	The ratio of licensing revenue to research expenditure	
	in 149 US universities.	185
7.4	The ratio of licensing revenue to research expenditure in	
	Australian, Canadian, European and US universities.	186

2.1 Detection of cosmetic innovations in the piezoelectric

vii



Tables

1.1	Use of European patents by category of owner	page 18
1.2	Rate of patent trade in the USA by category of	
	economic agent	20
1.3	Share of patents that are licensed or available for	
	licensing	21
1.4	Functions and business models of IP specialist firms	29
2.1	Main indicators of patent quality	47
4.1	Overview of tradeable financial products	91
5.1	Patent metrics and patent characteristics used in studies	
	mentioned	104
7.1	A taxonomy of the main stages, channels and indicators	
	of valorization (or diffusion) of public research results,	
	according to the level of maturity in the process of	
	science and technology (S&T) and to the degree of	
	proximity with industrial partners	178
7.2	Key performance indicators for university TTOs:	
	an international comparison	180

viii



Boxes

1.1	Patent markets in different industries	page 11
1.2	Intellectual Ventures	27
2.1	The financial valuation of patents	45
2.2	IPscore and similar systems	46
4.1	Background and methodology	77
7.1	The creation of shared valorization services for a group	
	of PROs: a major feature of a recent reform in Germany	196
7.2	Which profitability for which proportion of TTOs?	199
7.3	Alternative or broader approaches to tech-transfer	
	and valorization in the USA	203

ix



Contributors

MARTIN A. BADER is Managing Partner of the innovation and intellectual property management advisory group BGW AG, which is a spin-off from the Institute of Technology Management at the University of St Gallen, Switzerland. At the latter he is also Head of the Competence Centre in Intellectual Property Management. He is a European and Swiss Patent Attorney and holds a Master's degree in electrical engineering. Previously, he was Vice President and Chief Intellectual Property Counsel at Infineon Technologies, a leading high-tech semiconductor company worldwide that was carved out from Siemens. He is a visiting professor in several executive education programmes and has been key speaker in numerous expert groups and conferences on innovation and intellectual property management, e.g. for AIPPI, CEIPI, CIP, EC, EPO, IPI, LES, MCI, OECD, VPP, WEF and WIPO. Mr Bader has recently been selected by iam magazine as one of the world's leading 300 intellectual property strategists.

MARC BAUDRY is Professor of Economics at the University of Paris Ouest Nanterre la Defense. He was previously Professor at the University of Nantes and was formerly Assistant Professor at the University of Rennes. His research was initially in the field of environmental and resource economics with a special emphasis on the real option analysis of innovation in less polluting technologies and technological change induced by environmental policy. He gradually expanded his work to the study of patents. He has conducted empirical studies on the optimal design of patents. He more specifically made scholarly contributions to the patent renewal approach to patent valuation. He also worked on the measurement of the efficiency of R&D expenditure on the basis of patent counts. His current work deals with the study of the feasibility of a patent rating system, and also investigating how 'green patents' are valued in patent portfolios by

X



List of contributors

хi

investors. He has published articles in international peer-reviewed journals both in the field of environmental and resource economics and in the field of industrial economics.

FRÉDÉRIC CAILLAUD, MD PHD, is Head of the Licensing and Business Development Department at L'Oréal. He is an expert in licensing matters, partnership negotiations, patent monetization, patent analytics and rating systems. He regularly advises French and European policy-makers on open innovation, strategic management of patents and intellectual property monetization.

RENÉ CARRAZ is a junior economist at the OECD. In 2011–12, he has been involved as a consultant for the OECD with the Steering Group on the Governance of International Co-operation of Science, Technology and Innovation for Global Challenges (STIG). Before joining the OECD, Dr Carraz was a research fellow at the department of Managerial Economics, Strategy and Innovation (MSI), University of Leuven, where he was involved in a project that aims at measuring 'radical innovations'. He holds Master's degrees from both Kyoto and Strasbourg universities, and a PhD in economics from Strasbourg University (2011). Dr Carraz teaches and does research on science, technology and innovation. His recent work includes studies of university—industry linkages in Japan and Asia, the effects of patenting on faculty members and the role of patents and publications in university strategy.

DAVID ENCAOUA is Professor of Economics at University Paris I Panthéon Sorbonne, Emeritus since 2009. His research is conducted in two teams: Centre d'Economie de la Sorbonne (CES) and the Paris School of Economics (PSE). He has held various academic positions in different universities (visiting professor, scientific direction of a research laboratory, doctoral school) and institutions (OECD, Ministry of Economy and Finance, CNRS). He has also held an editorial responsibility in various economic journals. His previous research focused on different areas of microeconomic analysis and public policy, including the economics of innovation, industrial organization theory, the economics of science, the intellectual property system, and the European competition and technology policies. He has authored more than fifty articles and six books on these topics. His most recent



xii

List of contributors

research focuses on issues related to the implementation of patents, especially when their validity is a priori uncertain, through licensing agreements or through their inclusion as essential patents in technological standards.

OLIVER GASSMANN is Professor of Technology Management at the University of St Gallen, Switzerland and Director of the Institute of Technology Management. After completing his PhD in 1996, he was leading research and advanced development of Schindler Corporation, headquartered in Ebikon, Switzerland. Dr Gassmann has published in leading journals such as Research Policy, R&D Management, International Journal of Technology Management, Journal of World Business, European Management Journal, IEEE Transactions on Engineering Management, Journal of Technology Transfer and Harvard Business Manager. At the core of his research is the pervading question of how companies innovate and profit from innovation. Thus, he is dedicated to discovering new approaches to the management of technology and innovation that contribute to firms' competitive advantage.

DOMINIQUE GUELLEC is Senior Economist at the OECD, working on innovation policies and economic growth. From 2004 to 2005, Mr Guellec was Chief Economist of the European Patent Office (Munich). He has authored several books and many articles on patents, innovation and economic growth. His (co-) publications in English include The Economics of the European Patent System (2007) and From R&D to Productivity Growth: The Sources of Knowledge Spillovers and their Interaction (2004).

YUKO HARAYAMA is Executive Member of the Council for Science and Technology Policy (CSTP) in Japan. Prior to joining the CSTP, she was professor in the Department of Management Science & Technology at Tohoku University Graduate School of Engineering. She has also served as Deputy Director at the OECD Directorate for Science, Technology and Industry, while contributing as Editor-in-Chief of the *Journal of the Intellectual Property Association of Japan*. Her research and publications are mostly in the fields of science, technology and innovation policies.



List of contributors

xiii

RÉMI LALLEMENT has been since 2006 an analyst in the Economy and Finance Department of the Centre d'analyse stratégique (CAS, Paris), a research-based advisory institution under the authority of the French prime minister. Previously, he was Project Manager in the Department of Technological and Industrial Development of the Commissariat général du Plan (CGP), the predecessor organization to the CAS. Before that, he was guest scientist at the Institut für Wirtschaftsforschung Halle (IWH) – one of the main German institutes for economic research – and research fellow at the France-based Centre for Information and Research on Contemporary Germany (CIRAC), at the time of German unification. He holds a PhD from the University of Toulouse, after having studied economics at the University Paris 1 Panthéon-Sorbonne. His publications mostly deal with innovation economics and structural policy, as well as with international economics.

FLORIAN LIEGLER is Research Associate at the Institute of Technology Management, University of St Gallen (ITEM-HSG). Prior to this he worked at Sal. Oppenheim as Associate in Investment Banking – Mergers & Acquisitions. His prior work experience includes other investment banking firms such as Raiffeisen Investment AG and the Royal Bank of Scotland. Mr Liegler holds a Master's degree in economics from Vienna University of Economics and Business Administration and is currently enrolled in the University of St Gallen's PhD programme in business innovation.

THIERRY MADIÈS is Professor of Economics at the University of Fribourg in Switzerland. He was a member of the Council of Economic Analysis of the French Prime Minister and a consultant for the World Bank. His work focuses on public finance, international economics and economics of innovation. He has published extensively in peer-reviewed journals, and directed two reports for the Council of Economic Analysis, on innovation and regional development (2010) and on patent markets (2012).

YANN MÉNIÈRE is Assistant Professor of Economics at MINES ParisTech and heads the Mines-Telecom Chair on 'IP and Markets for Technology'. His research and expertise relate to the economics of



More information

Cambridge University Press 978-1-107-04710-5 - Patent Markets in the Global Knowledge Economy: Theory, Empirics and Public Policy Implications Edited by Thierry Madiès, Dominique Guellec and Jean-Claude Prager Frontmatter

xiv

List of contributors

innovation, competition and intellectual property. Besides his publications in academic journals, he co-authored a textbook on *The Economics of Patents and Copyright* (2004).

ICHIRO NAKAYAMA is a Professor in the School of Law, Kokugakuin University where he has been teaching intellectual property law courses. Mr Nakayama joined Kokugakuin University in 2009 after serving as an Associate Professor in the School of Law at Shinshu University from 2005 to 2009. Prior to his academic career, Mr Nakayama spent many years in the government of Japan. His last position in government was a Deputy Councillor in the Secretariat of Intellectual Property Strategy Headquarters, Cabinet Secretariat from 2003 to 2005. Mr Nakayama originally joined the Ministry of International Trade and Industry (MITI) in 1989. Then he worked in various fields including patent law reform, regulatory reform in energy industries, and defense technology cooperation. Mr Nakayama holds a Bachelor of Law degree from the University of Tokyo, and Master's degrees from the University of Washington and from Columbia University. He has published a number of articles and co-authored a book in the field of patent law.

ANNE PERROT joined MAPP, an economic consultancy, as a partner in 2012. She was previously the Vice President of the French Competition Authority (2004–2012). She belonged to several public thinktanks on competition policy, such as the Economic Advisory Group on Competition Policy (before the European Commission) and the 'group of experts' of the French energy regulator (CRE). She also was a member of several commissions appointed by the French government on subjects such as telecoms deregulation. Dr Perrot is a Professor of Economics at University of Paris I (Sorbonne) and ENSAE. She has also taught at the Paris School of Economics and the Brussels School of Competition. She earned a PhD in mathematics from the University of Paris VI and a PhD in Economics from the University of Paris I.

JEAN-CLAUDE PRAGER has been Chief Economist of the Greater Paris Corporation (the state-owned company in charge of the Greater Paris development project) since September 2010 and expert in innovation policies at the DG Regio. Before this appointment, he



List of contributors

ΧV

was executive manager of the French public agency of technological information. Previously, he had served in French government for three decades. He is the author of numerous papers and reports, and his most recent published books are 18 leçons sur la politique économique, written with F. Villeroy de Galhau (2nd edn, 2006) and The Unequal Development of Regions, with J.-F. Thisse (2012). He has been associate or visiting professor in numerous universities.

ANNE YVRANDE-BILLON has been Associate Professor in Economics at University of Paris I (Sorbonne) since 2003 and senior economist at the French Competition Authority since 2011. Prior to joining the French Competition Authority, she worked at the French Council of Economic Analysis, an independent advisory body reporting to the prime minister. She holds a PhD in economics from the University of Paris I. Her research and publications are mostly in the fields of economics of contracts and organizations, and regulation of utilities, with a particular interest in the public transport sector.