

CEMI letter 2006

Foreword

2006 was an eventful year for CEMI. In our second year as a research group, the team has been busy in building the skills, research tools and infrastructure necessary to conduct excellent applied research in the field of economics of innovation, knowledge and technology change.

One of our significant accomplishments has been in the completion of the EPFL research and transfer activities database, which is part of our ongoing research project in the economics of science field (ExTra program). We are grateful to our partners who have helped us in this venture, in particular Jan-Anders Månson, Gabriel Clerc, René Bugnion and their respective teams, our colleagues at the Human Resources, and last but not least the Deans of the Schools. This endeavour would not have been possible without their collaboration and assistance.

Besides, we have made significant investments to use the EPO Worldwide Patent Statistical Database (PATSTAT) as well as the WIPO PCT database in our effort to provide valuable insights and empirical evidences for strategic analysis and policy advice in the field of innovation capacities, both for developed and developing countries.

In addition, the group has held seminars, conferences, edited and published books, applied for and been awarded grants, and provided consultations and policy advice. This momentum will continue in 2007.

In the early summer of 2007, CEMI is organising a major event on the Economics of Technology Policy at Monte Verità. Professors Philippe Aghion, Iain M. Cockburn, Alfonso Gambardella, Brownyn H. Hall, Luc Soete and Reinhilde Veugelers have helped build a strong program and will be participating in the conference as well. We hope you will be able to join us at that occasion.

Last but not least, we would like to welcome our new CEMI members, David Fischbach (new PhD candidate) and Julio Raffo (visiting PhD student), and wish well to Christian Zellner who left us in September to join the World Economic Forum in Geneva.

We wish you all the best for 2007!



Prof. Dominique Foray
Director of CEMI



Research operations

Economics of science and technology commercialisation

ExTra

This research program aims to explore the various channels through which knowledge is transferred from universities to industry. Patenting and licensing activities, research contracts, human mobility, creation of start-ups and scientific publications are of interest to us. Systematic data have been collected at the individual, laboratory and firm levels, allowing for the first results to be shared.

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License arrangements

The incentive of researchers to patent is linked to the possible rewards that academics can get with licenses arranged through TTOs. A major challenge is to bridge the gap between the supply side (EPFL) and the demand side (firms) of academic licenses. The first step of this research is to identify and jointly consider licensors' and licensees' characteristics; the second step consists in exploring the characteristics as determinants of license structures. In addition, we try to understand the complementarities between the contractual provisions by identifying classes of contracts and their determinants. To explore these issues, a set of 194 licenses between the EPFL and firms have been gathered as well as data on contractors for the 1995-2005 period.

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Towards efficient licensing and research contracts

This research analyses the conditions ensuring efficiency of licensing and research contracts between university and industry. We examine the reasons leading these two communities to conclude contracts and the characteristics of the process of knowledge transfer. Through theoretical and empirical analyses we will investigate how contracts should be structured to avoid problems of interests' misalignment and asymmetry of information arising from the different goals university and industry pursue and from the peculiar nature of knowledge.

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Human mobility

The literature on knowledge and technology transfer from public research organisations to firms tends to emphasise mechanisms such as publication activities and patenting. The literature on knowledge management addresses this issue but mainly focuses on processes that transfer knowledge in a disembodied way. Focusing on employees as the ultimate repository of knowledge, the link between internal knowledge processing and HR practices has been pointed out without

discussing in much detail who these employees are, and why they join the firm in the first place. The aim of this project is to explore the relationship between individual career patterns of Swiss PhDs and Masters, and the way in which the science-industry interface is shaped in different industries and local contexts. The role of mobility in knowledge transfer is explored by studying whether PhDs are different from other employees.
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User innovation and informal innovation

This project aims at investigating the role of users in the innovation process; in particular, firms as “user innovators”. The first stage of the research explores this as an informal (hidden) process. It shows that a large amount of this kind of (informal) innovation by user firms exists in the Swiss economy and that it has a strong economic impact. Further research will reveal more details on this process and its implications. Similar projects are run in parallel by Georg von Krogh (ETHZ) and Eric von Hippel (MIT). The research is supported by the Swiss National Science Foundation.

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Regional and national policies in the knowledge economy

The objective of this research is to compare the Swiss situation in Science and Technology (S&T) to other countries focusing especially on the EU. The analysis deals with three aspects that are to be considered in a knowledge economy: the knowledge infrastructure, the innovation capacity and the ability to capture the economic benefits of these innovations. S&T policy issues are also addressed. A report on “The place of Switzerland in a globalised economics of knowledge” has been prepared for the “Federal Office for Professional Education and Technology” (OFFT/BBT) and the “State Secretariat for Education and Research” (SER/SBF).

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Knowledge for development

This research examines whether the introduction and gradual strengthening of intellectual property rights changes the allocation of entrepreneurial activities in newly industrialising countries. Empirical analyses will be conducted to test for the effect of IPR on these countries, based on available IP database collected at the EPO, USPTO, JPO, WIPO and national patent offices. The results of this research will offer some insights of the potential impact of TRIPS on developing countries.

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The economics of R&D for neglected diseases

The purpose of this research is to develop a better understanding of which institutions lead to the efficient production of a specific type of knowledge: new pharmaceutical products against diseases mostly prevalent in developing countries (neglected diseases). A primary focus of interest will be the specially created not-for-profit ventures that support the development of drugs and vaccines against neglected diseases by integrating ideas, expertise and intellectual property from different sources and by contracting out research to academia, multinational companies, biotech firms and firms in developing countries.

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Measuring knowledge spillovers

The project aims at elaborating a novel methodological framework for evaluation of global R&D programs in the energy sector. More specifically, “spillover” effects of the research, development, demonstration, and deployment of Thermonuclear Fusion and Gen-IV Nuclear Fission technologies are being investigated; and the social rates of return of respective R&D

programs are being assessed using an integrated energy system and macroeconomic model.

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PhD and post-doc research projects

Spillover benefits and social rate of return of global R&D programs in energy sector: case of “Generation IV” nuclear fission and fusion power generation technologies. (*D. Bednyagin*)

On the conditions, processes and impact of informal innovation in business firms. (*M. Bogers*)

Research contracts: sources of inefficiency and possible remedies. (*A. Conti*)

Knowledge and technology transfer processes. (*D. Fischbach*)

The economics of R&D for neglected diseases. (*P. Gaulé*)

IPR and entrepreneurial activities: examining the influences and significances for Asian countries. (*I. Hamdan*)

The origins of high-technology start-up companies at EPFL. (*C. Zellner*)

Multitasking in an academic environment: understanding and modelling the dynamics underlying a reconciliation of teaching, research and entrepreneurial activities. (*J. Callaert - visiting PhD student from KU Leuven*).

CEMI events

Seminars



February 27th – Bronwyn H. Hall

“University-industry research partnerships in the United States”

May 22nd – Paul A. David

“Preserving the information commons for scientific research”

Workshops

September 29th / 30th

2nd ExTra workshop on “Technology transfer from universities: A critical appraisal of patents, spin-offs and human mobility”

with the participation of A. Geuna, R. Jensen, F. Lissoni, P. Llerena, K. Scally, M. Schankerman, P. Stephan, J. Thursby, M. Thursby, R. Veugelers and others.

After the success of the 2005 edition, CEMI organised a second international workshop in the field of the economics of knowledge production and distribution. This year the event was supported by the European network of excellence DIME - Dynamics of Institutions and Markets in Europe.

The workshop focused mainly on the mobility of researchers between university and industry, the management of multiple (and perhaps conflicting) tasks, as well as academic patents and licensing. Recently built datasets have also been presented on that occasion.

The event gave an opportunity to junior and senior economists from Europe and the US to meet again and to discuss the advances of their research. Thanks to the alternation of plenary and parallel sessions, twenty-one papers were presented during the workshop.

October 23rd / 24th

“SEISGE - Swiss and European innovation strategies in a global economy”

with the participation of F. Jaumotte, H. Lebet and F. Sachwald.



The objective of the seminar was to clarify the global economic role of innovation. During two days, Dr. Florence Jaumotte (IMF, Washington), Dr. Frédérique Sachwald (IFRI, Paris), Prof. Dominique Foray (EPFL) and Dr. Hervé Lebet (EPFL) presented the major results of their research, focusing on leading and fast-growing countries.

The audience was composed of scientific advisors from Swiss embassies, specialists from the Swiss federal offices in charge of education or S&T policies, academics working in the field, and people from the industry.

Four main topics emerged from the workshop. First, the discussions showed a special interest toward the organisation of public research and S&T policies in market oriented countries. A second topic was the determinant of the Asian tigers' growth, focusing on China. Then, the different environments and policies for high-tech start-ups were considered. Finally, the discussion also revealed the role of large multinational enterprises and the difficulties to monitor and forecast their global R&D and production strategies.

Main conference contributions

March 9th – S. Lhuillery

“The impact of governance practices on R&D intensity of firms: An econometric study of the French largest groups” - SSES (Swiss Society of Economics and Statistics) Annual Meeting 2006 - Lugano, Switzerland.

March 27th – D. Foray

“University-industry knowledge transfer: Switzerland” - Symposium on “University-Industry linkages” - Paris, France.

March 30th / 31st – S. Lhuillery

“The impact of governance practices on R&D intensity of firms: An econometric study of the French largest groups” - DIME workshop on “Motivations and incentives: Creating and sharing knowledge in organisational contexts” - Lisbon, Portugal.

March 31st / April 1st – P. Gaulé

“Towards patent pools in biotechnology?” - 2nd EIPIN Doctoral Meeting - Zurich, Switzerland.

April 13th – D. Foray

“Technology policy for energy and the environment” - Lugano Communication Forum - Lugano, Switzerland.

May 4th / 6th – J. Callaert

“Combining the production and the valorisation of academic research: A qualitative investigation of enacted mechanisms” - 2nd workshop on the Process of Reform of University Systems - Venice, Italy.

May 11th / 12th – S. Lhuillery

“The impact of governance practices on R&D intensity of firms: An econometric study of the French largest groups” - AFSE Conference - Strasbourg, France.

June 1st – D. Foray

“University-industry licensing: The expanding base of evidence” - ASTP Annual Conference - Turku, Finland.

June 13th / 14th – M. Bogers / S. Lhuillery

“The importance of non-R&D innovation and the role of learning by doing” - User Innovation Workshop 2006 - Munich, Germany.

June 21st / 24th – S. Lhuillery

“The R&D kiss of death: Empirical evidence of failure to cooperation” - 11th ISS Conference - Nice, France.

August 11th / 16th – M. Bogers

“Why do users innovate: A transaction cost economics perspective” - Academy of Management 2006 Annual Meeting - Atlanta, USA.

September 8th / 9th – D. Foray

“New challenges for the formation and accumulation of human capital” - International Conference on Science and Technology for Sustainability 2006 : Global Innovation Ecosystem - Kyoto, Japan.

September 18th / 19th – D. Foray

“A comprehensive strategy for sustainable growth and employment: A European perspective” - EU-China seminar on “The EU and China experiences of employment and social policies” - Brussels, Belgium.

September 20th / 21st – D. Foray

“Prioritisation and engagement: The political economy of organising ‘public goods’ policy responses” - Going Global 2006: The Challenges for Knowledge-Based Economies - Helsinki, Finland.

September 25th / 27th – D. Foray

“Enriching the indicator base for the economics of knowledge” - Blue Sky II Conference: What Indicators for Science, Technology and Innovation Policies in the 21st Century - Ottawa, Canada.

September 29th / 30th – S. Lhuillery

“The determinants of university license contractual arrangements” - 2nd ExTra workshop - Lausanne, Switzerland.

September 29th / 30th – S. Lhuillery / C. Zellner

“Mobility and early careers of Swiss PhDs” - 2nd ExTra workshop - Lausanne, Switzerland.

October 19th / 20th – S. Lhuillery / C. Zellner

“The integration of new scientific knowledge into the commercial knowledge base: What is the link to PhDs' private sector career dynamics?” - NSF workshop on “Using human resource data from NSF science resources statistics to study the science and engineering workforce” - Arlington, USA.

November 12th / 16th – D. Bednyagin

“Multi-regional long-term electricity supply scenarios with fusion” - 17th ANS Topical Meeting on “The technology of fusion

energy”, ANS 2006 Winter Meeting & Nuclear Technology Expo - Albuquerque, USA.

November 15th / 17th – M. Bogers / S. Lhuillery

“Measuring informal innovation: What can a standard innovation survey tell us?” - PRIME conference on “Indicators on Science, Technology and Innovation: History and New Perspectives” - Lugano, Switzerland.

December 11th – S. Lhuillery

“Measurement problems in the field of biotechnology and the way forward” - OECD workshop on “Measuring the Outputs and Impacts of Biotechnology” - Paris, France.

Main publications

CEMI insight

CEMI insight n°1 / August - 1) *The origins of high-technology start-up companies at EPFL* - 2) *Combining the production and the valorisation of academic research: A qualitative investigation of enacted mechanisms* - 3) *University-industry knowledge transfer: Switzerland*.

Working papers

LHUILLERY, S., and F. GALIA, *The R&D kiss of death: Empirical evidences on failed cooperation*, CDM working paper n° CEMI-2006-05.

LHUILLERY, S., *The impact of corporate governance practices on R&D intensities of firms: An econometric study on French largest companies*, CDM working paper n° CEMI-2006-06.

BOGERS, M. and S. LHUILLERY, *Measuring informal innovation: From non-R&D to on-line knowledge production*, CDM working paper n° CEMI-2006-09.

GAULÉ, P., *Towards patent pools in biotechnology?*, CDM working paper n° CEMI-2006-10.

AGHION, P., DAVID, P. A. and D. FORAY, *Linking policy research and practice in 'STIG systems': Many obstacles, but some ways forward*, SIEPR policy paper n° 06-09.

Edited books

ANTONELLI, C., FORAY, D., HALL, B. H. and W. E. STEINMUELLER. *New frontiers in the economics of innovation and new technology: essays in honour of P. A. David*, Edward Elgar, Cheltenham.

KAHIN, B. and D. FORAY, *Advancing knowledge and the knowledge economy*, MIT Press, Cambridge.

Papers in academic journals

LHUILLERY, S., “Voluntary technological disclosure as an efficient knowledge management device: An empirical study”, *Economics of Innovation and New Technology*, 15(4/5):465-491.

Chapters in books

FORAY, D. and S. LHUILLERY, “Une région apprenante dans le tournoi mondial”, in COMTESSE, X. and C. VAN DER POEL (eds.), *Le feu au lac*, NZZ Libro/Editions du Tricorne, Zurich/Genève.

FORAY, D. and H. L. PEREZ, “The economics of open technology: Collective organisation and individual claims in ‘fabrique lyonnaise’ during the old regime”, in ANTONELLI, C., FORAY, D., HALL, B. H., STEINMUELLER, W.E. and P. A. DAVID (eds.), *New frontiers in the economics of innovation and new technology*, Edward Elgar, Cheltenham.

Reports

FORAY, D. and S. LHUILLERY, “La Suisse dans l’économie globalisée de la connaissance”, prepared for the “Federal Office for Professional Education and Technology” and the “State Secretariat for Education and Research”.

FORAY, D., “Globalization of R&D: Linking better the European economy to ‘foreign’ sources of knowledge and making EU a

more attractive place for R&D investment”, prepared for the expert group “Knowledge for Growth”.

Policy advice

D. Foray is member of the expert group “Knowledge for Growth” - a group of economists established by the European Commissioner for Research, Janez Potocnik.

D. Foray contributed to the ICTSD policy seminar on “The future of IP system: Responding to the challenges for developments” - International Centre for Trade and Sustainable Development - Nyon, Switzerland (November 20th).

The team

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¹ Left CEMI in September to join the WEF.

² Co-supervision w/ the Laboratory of Energy Systems (LASEN), EPFL.

³ Joined CEMI in November.

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