

Do firms patent to protect or transfer
knowledge in support of their innovations?
An analysis of the fourth UK Community
Innovation Survey

Odile E.M. Janne and Marion Frenz
Birkbeck, University of London

“Intellectual Property Rights for Business and Society”, London,
September 14-15, 2006

Topic

- The role of patents for firms in relation to the exchange and transmission of knowledge –knowledge diffusion?
- Management of patents as strategic assets for knowledge exchanges (Blind *et al* 2006, Hagedoorn 2003)
- Patents/patent citations to measure knowledge spillovers (Jaffe 1986, Jaffe *et al* 1993, 1996, Baptista 2000)
- Patents for protection and/or participation in knowledge exchanges? Innovation performance?

Outline

- Background: public justifications of patents and debate on the role of patents, the two faces of the patent portfolio?
- Research questions: patents for knowledge exchange and cooperation?
- Hypotheses
- Data and methodology: CIS4, regressions
- Results
- Discussion and conclusion

Public justifications of patents

- Often framed as a trade-off between promoting the creation and diffusion of innovation
 - Public good nature of knowledge
 - Issues of appropriability and market failure
- Information spillovers: disclosure and reduced transaction costs in knowledge trade

The debate

- Effectiveness of patents? (Scherer 1980, Mansfield 1986)
- However, increase in patenting (Mansfield 1986, Hall and Ziedonis 2001)
- However, reinforcement and widening of IPRs: TRIPS, USPTO, EPO
- Overemphasis on the appropriability value of patents & on the tension between innovation and diffusion.
 - Public and tacit nature of knowledge: complementary codified and tacit knowledge
- Patents for exchanging knowledge? Patents providing incentives to provide assisted learning when knowledge has to be transferred

The two faces of the patent portfolio?

- Needed knowledge transfers and exchanges: interactive innovation process, number and complexity of needed new technologies
- Reminiscent of the role of R&D for innovation and learning (Cohen and Levinthal 1989), applied to the corporate management of patent portfolio
 - Patents to access the technology of others, and provide access to one's own technology (in addition to providing protection)

Patents for knowledge exchange and cooperation?

- The role of patents not only in information spillovers, but also in inter-organisations interactions and knowledge exchanges?
- The use of patents to protect innovations and/or the participation in knowledge exchanges?
- Does it differ across industries? Hall and Ziedonis (2001), Cohen *et al* (2000) Vs. Blind *et al* (2006)
- Impact on innovative performance?

Main hypotheses

Hypothesis 1

Enterprises that use patents are more likely to engage in knowledge exchange with suppliers/customers, competitors and research organisations.

Hypothesis 2

The positive impact of knowledge exchange with other organisations on innovation performance is greater in the case of enterprises which at the same time use patents.

Data and Methodology

The fourth UK Community Innovation Survey (UK CIS4)

- European wide large-scale surveys into enterprises' innovation activities conducted in the UK by the DTI
- Data is collected at enterprise level (10 emp+)
- The CIS covers manufacturing and most private services
- CIS4 was conducted in 2005; the reference period is 2002 to 2004; the total sample size is 16,445
- For the purpose of our paper we examine a sub-set of CIS enterprises: 4,790 enterprises which had a new product not necessarily new to the enterprise's market
- The sample was collected using stratified random sampling by size, industry and region

Data and Methodology

Hypothesis 1

- DV Indicators of knowledge exchange: vertical cooperation, horizontal cooperation and research cooperation
- IV Indicator of patent activity: enterprise used patents

Hypothesis 2

- DV Indicators of direct innovation performance: enterprise introduced a new-to-market product and share of turnover from new-to-market innovations
- IV Indicators of patent activity and knowledge exchange as well as the interactions between patent activity and knowledge exchange

Control variables

Internal R&D, enterprise size, industry and regional dummies

Data and Methodology

Method

- Single equation regression method based on cross-sectional data
- Probit and tobit models
- Reporting marginal effects
- Issues of causality and endogeneity

Results

Dep. Var.	VERTICAL COOPERATION	HORIZONTAL COOPERATION	RESEARCH COOPERATION
Est. Model	PROBIT	PROBIT	PROBIT
Indep. Var.	<i>M.E.</i>	<i>M.E.</i>	<i>M.E.</i>
Patents	0.05***	0.04***	0.08***
Internal R&D	0.14***	0.07***	0.11***
Enterprise size	0.01***	0.01***	0.001
N	4,779	4,779	4,779
Model χ^2 (d.f.)	227.82(28)***	142.30(28)***	380.30(28)***

* p<0.10; **p<0.05; ***p<0.01.

Results

Dep. Var.	NEW-TO-MARKET INNOVATOR	TURNOVER FROM NEW-TO-MARKET INNOVATIONS
Est. Model	PROBIT	TOBIT
Indep. Var.	<i>M.E.</i>	<i>M.E.</i>
Patents	0.06***	0.04***
Vertical cooperation	0.02***	0.02**
Horizontal cooperation	-0.003	-0.003
Research cooperation	0.02***	0.01**
Patents and vertical cooperation	0.01	0.01
Patents and horizontal cooperation	-0.002	-0.004
Patents and research cooperation	0.01**	0.01
Internal R&D	0.15	0.11***
Enterprise size	-0.002	-0.01***
N	4,779	4,778
Model χ^2 (d.f.)	461.98(34)***	375.36(34)***
No of left censored observations	-	2,408

* p<0.10; **p<0.05; ***p<0.01.

Discussions and conclusions

- Our results confirm that firms which patent show a higher propensity to cooperate on innovation
- It may be the case that patents are used as a strategic tool, not solely with the aim to protect innovations but, also to encourage and aid knowledge exchanges
- It seems more likely that patenting and knowledge exchange are complements rather than substitutes
- Industry specificity
- Importance for innovation performance; firms which patent and exchange knowledge with research organisations exhibit an increased innovation performance over and above firms that exchange knowledge or patent per se

Discussions and conclusions

Policy implications

- Broadening the understanding of the effects of the patent regime to not only act as an incentive to invest in R&D but to help the exchange of knowledge
- In order to benefit fully from patent regimes firms may need a wider range of managerial as well as technological capabilities

Limitations

- Strategic motives of why firms patent cannot be directly observed
- Findings may be country specific
- Limitations of quantitative research designs