Estimating the Patent Premium: Evidence from the Australian Inventor Survey

Paul H. Jensen Russell Thomson Jongsay Yong

Intellectual Property Research Institute of Australia (IPRIA)

The University of Melbourne VIC 3010 Australia

Abstract

Patents are intended to attenuate under-investment in invention by granting innovators a monopoly right over their technology for a finite period. However, empirical evidence suggests that the incremental private return facilitated by a patent (the "patent premium") may only be positive in a few industries (see Arora et al. 2008). This paper proposes a novel approach to estimating the patent premium using data on 1,803 patent applications collated from a comprehensive survey of Australian inventors.

In the survey, inventors were asked to estimate the monetary value generated by their inventions. Since most inventions are not traded in an open market, inventor surveys have become an increasingly popular way of understanding the distribution of invention values (see Harhoff et al. 1999; Gambardella et al. 2008). The major difference between our study and other inventor surveys is that we survey *patent applicants* rather than *patentees*. Since some patent applications were unsuccessful, we have information about the value of both patented and unpatented inventions. Moreover, there is considerable variation in the commercialization outcomes across patented and unpatented inventions. This is the key to our empirical identification of the patent premium.

We model the patent premium in the following way. Let V_{ij} denote the total private value of invention i in technology area j, $i = 1, \ldots, n_j$ and $j = 1, \ldots, J$. We specify a linear model where the value of an invention depends on whether a patent was granted.

$$\ln V_{ij} = \alpha G_{ij} + X\beta + \delta_j + \varepsilon_{ij}, \tag{1}$$

where G_{ij} is a binary variable taking the value of unity if a patent was granted and zero otherwise (including whether the application was refused or withdrawn), X is vector of explanatory variables, δ_j is a technology-specific term, and ε_{ij} is the error term.[1]

To identify a 'pure' patent premium requires separating returns to patent protection from the value of the underlying invention. We include a number of variables in an attempt to disentangle these two factors. First, we include a dummy variable, *Radical invention*, which relates to whether the inventor rated their invention as 'radical' or 'incremental' relative to the existing state of the art. Second, we construct a variable related to the number of products and processes for which the invention was used, which is denoted as *No. of uses*. Third, we include a variable *Other inventions used* to proxy for the complexity of the technology area. Fourth, we include a dummy variable, *PCT application* to capture whether the application was made through the Patent Cooperation Treaty (PCT).

The main finding is that inventions which are protected by a patent are 48 per cent more valuable than inventions without a patent, *ceteris paribus*. This result is robust to different definitions of 'value' and different empirical specifications. Thus, we conclude that we find robust evidence of the existence of the patent premium.

References

Arora, A., Ceccagnoli, M. and Cohen, W. (2008), "R&D and the patent premium," *International Journal of Industrial Organization*, 26, 1153-1179.

Gambardella, A., Harhoff, D. and Verspagen, B. (2008), "The value of European patents," *European Management Review*, 5, 69-84.

Harhoff, D., Narin, F., Scherer, F.M. and Vopel, K. (1999), "Citation frequency and the value of patented inventions," *Review of Economics and Statistics*, 81, 511-515.

[1] Pending applications are excluded from the analysis. However, we did run the model with pending applications included and the results did not change in any substantial way.