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Patent Incentives

Returns to Patenting and the Inducement for Research & Development (R&D)*

Executive Summary

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Executive Summary

The UK has one of the oldest and best regarded intellectual property rights (IPR) regimes in the world. Yet there is little evidence on private returns to patenting for firms operating in the UK, and on the incentive effects of patenting in encouraging R&D investment in patenting firms. Using available data from the UK innovation survey (known as the Community Innovation Survey or CIS) and linked business performance data the report assesses both the additional returns firms achieve by patenting, and the effects on R&D spending.

This report tests an economic model built upon the following intuition. The monopoly power conferred by a patent provides a firm a price premium in new product revenue, thus increasing profitability. At the same time this increased profitability also acts as an inducement to increase R&D spending by the firm. Using this idea we try to jointly estimate the extent of the premium and the inducement to R&D. In this way the research builds and extends work in two literature streams, viz. the economic literature on the value of patents and the literature on effect of patents on R&D expenditures.

The analysis uses two approaches derived from Arora et al. (2008) for estimating the patent premium. The first approach relates innovation survey data on new product revenues to R&D investments and measures of patent effectiveness (self assessed by businesses). It then measures the incremental revenue (from new products) earned by a firm that can be attributed to patent protection. We term this the *revenue patent premium*. The second approach estimates what we call the *profit premium* (the additional profitability on account of patent protection) and the inducement to invest in R&D due to patent protection by building a model of profits generated by innovative products that are patented.

To make the assessment empirically requires estimates of:

- The value of new product / service revenue firms achieve and their R&D expenditure (from the innovation survey);
- The effectiveness of patents in exploiting each firms technology in its market (self assessed within the innovation survey);
- The 'propensity to patent' a term used to capture the proportion of innovations which firms choose to patent. Data on this are currently unavailable for the UK and we were forced to rely on imputation from the US CMU surveys to establish a range for the patent propensity. Thus, we could make only broad predictions (within a range) on the extent of premium and the inducement for R&D.

The UK innovation survey data shows support for the theoretical model. Patent premiums for UK are positive, and in the case of larger firms, comparable to the premia demonstrated in similar US studies. Furthermore, the prospect of patent protection provides inducement for R&D. The extent of the patent premium and inducement to R&D varies by type of firm and industrial sector.

There were some variation in estimates when we grouped firms by size and industrial sector. The premia estimated, in terms of additional returns to R&D associated with patents, are less pronounced for smaller firms, and for firms outside the biotech and pharma industries. In computers and equipment, and in instruments, the premium is around half the biotech level. The premium and incentive effects appear to apply equally to younger and older firms, suggesting the patents can be as great an incentive to new innovators as to established businesses. These broad conclusions suggest that the role and importance of patents varies considerably across industries, and a 'one size fits all' approach may not be appropriate.

There is also some evidence that the increasing numbers of service businesses in the most recent innovation surveys have led to some drop-off in patent premia and incentive effects. To the extent that all service firms are not persistent R&D performers this result is unsurprising. At present there is insufficient data to look separately at impact by business size and by sector at the same time.



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