Discussion of "Do patents over-compensate innovators?" by Vincenzio Denicolò

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"Do Patents Overcompensate Innovators?" by Vincenzio Denicolò

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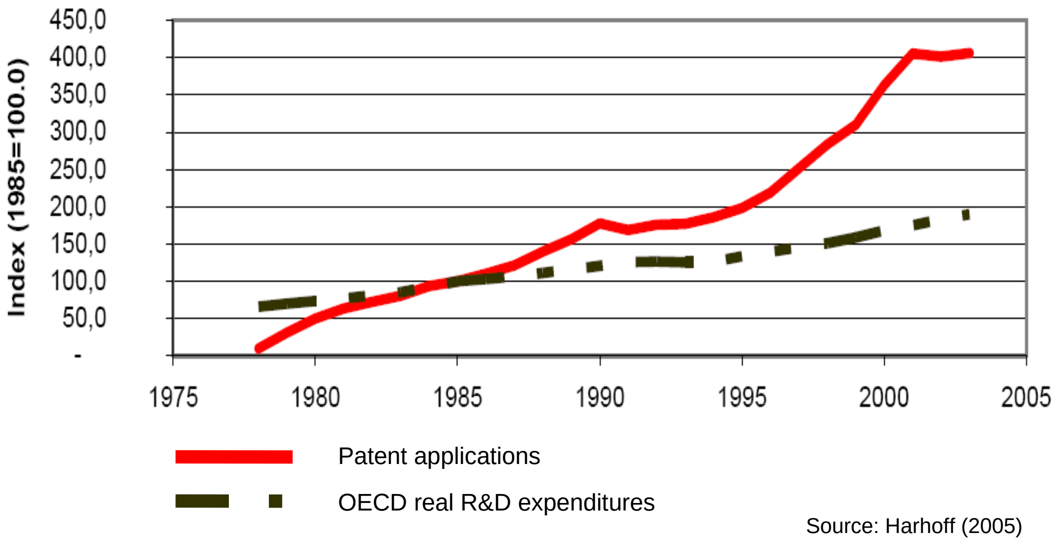
Vincenzo's paper addresses the question whether current patents systems compensate innovators appropriately. It establishes a simple rule according to which the highest possible level of social welfare is obtained when the profit ratio (present value of actual profits relative to present value of hypothetical profits under maximum protection) equals the elasticity of the R&D output with respect to R&D costs. Patents leading to R&D activities such that this rule is satisfied compensate innovators just right.

This is a nice model. It does not only lead to a very simple rule but also integrates nicely more general cases and discusses their implications in a meaningful and interesting way. Concerning the R&D elasticity, the empirical literature has typically found that estimates of the elasticity of the supply of inventions are on the order of 0.5 to 0.7. Concerning the profit ratio no such estimates are available but the paper convincingly argues that it is rather unlikely that the representative patentee gets more than 50 percent of the profits under maximum protection. Patents have a finite duration, the scope is limited and effective life may be much shorter than statutory life not least because a patent holder may be displaced by future innovators. Hence the paper reaches the punchline that the typical patentee is under-rewarded and concludes (with caution) that policy reforms should strengthen patents.

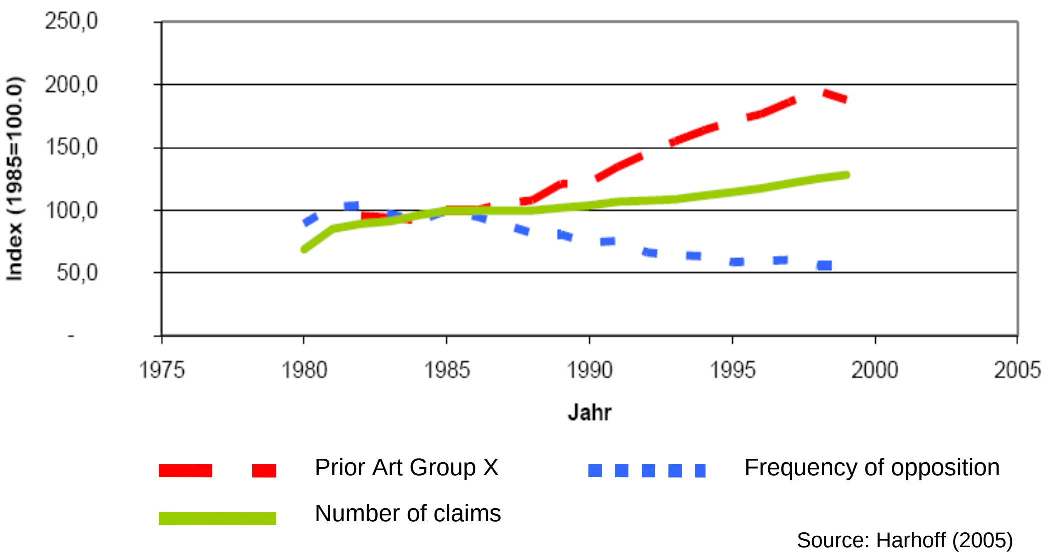
Figure 1: EPO patent applications, OECD R&D expenditures



I have some concerns about this main conclusion. *First*, that model basically assumes that inventions are equal to patents and much of the empirical literature uses patent activity as a measure of R&D. Hence both the model and the interpretation of the empirical evidence is based on the assumption that patent activity is a meaningful measure for higher R&D output. This assumption is certainly questionable. For instance, patent applications in the US have grown much stronger than R&D expenditures. Until the mid 1980s there is no trend in US patent application, but since 1985 applications have grown at a rate of 5 % per year. In contrast, US R&D expenditures over the same period have grown at an annual rate of only 2.4 %. Patents have also been increasingly used in Europe in recent decades. Between 1990 and 2000 the number of patent applications have more than doubled and while real R&D expenditures rose by much less than 40 percent.

One could argue that this reflects an increase in R&D productivity but it is unlikely that this is the case. The innovative content of patents is hard to measure but there are some indicators suggesting that the quality of the average patent has decreased rather than increased.

Figure 2: Quality of EPO patents



The middle graph of Figure 2 shows how the number of claims associated with the average EPO patent application has evolved over time.[1] The fact that the number of claims per patent has been increasing does not mean that the scope for a particular patent has become larger but that is has become increasingly difficult to ensure appropriate protection for the typical patent applicant. The upper graph is more directly – and inversely – related to the quality of the typical patent application. It indicates the number of serious objections against the novelty of the application found by the technical staff at the EPO in the evaluation process. This evaluation involves checking the novelty of the application relative to previous patents, publications in scientific journals etc. The graph clearly shows that the above increase in claims per application was associated with an increase in the number of serious objections, hence with a reduction in the quality of these claims. The lower graph shows that frequency of patent challenges. Rule at the EPO include a 9 months period after a patent was granted during which third parties can challenge a patent. This procedure has the obvious advantage that valuable information of third parties enters the process and provides a mechanism to sort out non-novel and obvious inventions. In other words, it helps to avoid that innovators are overcompensated (and high litigation costs later on). Between 1980 and 1995, roughly 7-8 percent of all EPO applications were challenged and about a third of all challenges lead to revocation; and another one third of these challenges lead to substantial restriction of the scope of the patents. The fact that the fraction of challenges have reduced by 50 percent

1 My discussion here closely follows the one in Harhoff (2005).

during the 1990s despite lower quality patents means that is it has become less costly (in expected value) to obtain a patent, encouraging lower quality patent applications.

A *second* problem concerns the interpretation of the empirical evidence. The crucial parameter is the elasticity of R&D output with respect to R&D costs but this elasticity is notoriously hard to estimate. Many of the previous studies estimating this elasticity have relied on patent application data and have generally reached high elasticities. But simply equating R&D output with the number of patent applications may be quite misleading. In fact, if the innovative content of the typical patent has decreased, estimates based on patent application data may seriously overestimate the true elasticity.

If patents are not directly associated with R&D output, there must be reasons other than protection of intellectual property (and appropriation of R&D returns) that motivate firms to apply for patents. Hall and Ziedonis (2001) study the increase in patent applications in the US semiconductor industry. Interestingly, they find that firms do not rely heavily on patents to appropriate returns to R&D which strongly suggests that R&D output and patents are only weakly associated. They argue that the dramatic increase in US patent applications since the mid 1980s has occurred for strategic reasons. The strengthening of U.S. patent rights in the 1980s has lead to ‘‘patent portfolio races’’. Firm build up such portfolio to increase bargaining power in litigation cases and licensing negotiations or to have a credible threat that deters competitors to enter a patent litigation. This incentive for strategic patenting is further enhanced as many technologies require the use of multiple patents and it is often uncertain and/or hard to determine whether a particular process infringes a patent.

The increase in patent applications together with the decreasing average quality in patents is consistent with increasing importance of strategic patenting also in Europe. In sum, there are good reasons to believe that R&D elasticities which are estimated using data on patent applications may be seriously flawed. The decreasing innovative content of patents may indicate that R&D elasticities may be seriously overestimated.

A *third* comment concerns the set up of the model. The model uses a partial equilibrium framework to analyze a question that essentially involves general equilibrium considerations. While this is common in the literature as no convincing and/or tractable general equilibrium model of patents exists this might generate misleading results. The basic model assumes that the deadweight losses, consumer surpluses and profits are exogenously given. However, from a general equilibrium perspective, these quantities are clearly endogenous. How inputs in innovation are (and should be) rewarded will depend on the supply of and the demand for ideas, on the imperfections in the R&D (and other) markets, and on how R&D activities interact with other activities. Patents policies have to solve the complicated problem of aligning the reward to innovators with his/her contribution to social welfare. In modern societies in which intellectual property becomes increasingly important, such general equilibrium effects are becoming increasingly relevant. While the presented model clearly captures very important aspects of reality, a full answer to the question of whether patents should become weaker or stronger to ensure an appropriate reward for innovators has to take account of such general equilibrium considerations.

A *final* comment concerns implications for economic policy. Suppose we believe that the average innovator is strongly undercompensated. Does this mean we should strengthen patent protection? Not necessarily. What matters is not the reward on average, but the reward at the margin. Stronger patents might not only induce additional innovations they might also increase the demand for strategic patents reducing social welfare. A policy move towards stronger patents needs to be accompanied by improved screening in the application/evaluation process, by strengthening third parties who challenge a patent, and by increased sanctions for the abuse of the system for opportunistic reasons.

References

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