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***The (Complex?) Relationship between
Art 82 (a) and Intellectual Property Rights***

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I. Introduction

Article 82(a) of the EC Treaty prohibits the abuse, on the part of one or more undertakings, of a dominant position by “directly or indirectly imposing unfair purchase or selling price or other unfair trading conditions”. In spite of the reference to possible “indirect” channels, the provision has mostly been interpreted quite narrowly as prohibiting exploitative pricing by dominant concerns. It does not cover constructive refusals to sell or any exclusionary practice that might result in high prices by affecting the structure of competition in the relevant markets. This standard view is the one that I will take. Throughout this note, then, applying Article 82(a) simply refers to penalizing dominant undertakings that are found to enjoy unacceptably high price-cost margins.

This note, as with all other papers in this symposium, must be read in the context of the Commission’s ongoing efforts to modernize the application of Article 82. Although many influences are at play, one dominant concern behind this review is to put the application of Article 82 more in line with the current guidelines on the application of Article 81 by moving toward a more effects-based approach. In this light, it seems useful to ask what might, or should, become of competition policy under Art 82(a) once the new regime is in place. My purpose is, however, more modest as I limit myself to the specific issue of the relationship between Article 82(a) and intellectual property. This is of special interest given the broadly held view that technological progress is essential for sustained economic growth and because the encouragement of innovation and its diffusion are themselves important objectives of the Treaty.

The relationship between Article 82(a) and intellectual property rights can be construed more or less broadly. At one extreme, one might discuss how Article 82(a) should be applied to any dominant firm when it prices any IP or IP-based products. Alternatively, one might look at all aspects of the pricing behaviour of dominant firms – IP-related or not – when dominance is rooted in the ownership of intellectual property rights. Finally, one could restrict attention to the pricing of IP or IP-based products by firms for which the corresponding IP rights are a main source of dominance. I adopt this third, narrowest, perspective.

There are two main reasons why the presence of intellectual property rights might be relevant to the application of Article 82(a). The first reason is that establishing IP-based dominance and/or identifying excessive pricing of IP or IP-based products runs into difficulties that either might not arise or might be less severe when IP is not involved. The second issue is that, since it imposes a direct constraint on the prices that a dominant firm might charge, Article 82(a) has often been seen as a potential source of conflict between competition law and intellectual property law. After all, the basic approach of patent law, for example, is to grant monopoly rights for a limited period of time in order to provide adequate incentives to invest in the pursuit of innovation, as well as incentives to disclose the fruits of such investigations. For this system to work, it must be that, in some cases at least, the intellectual property rights confer enough market power to support a price-cost margin that allows investors to justify their initial investments.¹ If application of Article 82(a) limits the recoupment ability of inventors, then it would seem to make intellectual property law less effective in light of its basic purpose.

The organization of this paper reflects these two sets of issues. Section II briefly reviews the economic arguments for and against a strict application of Article 82(a). Section III looks at market definition and discusses how IP-based dominance might best be established. Section IV then turns to some difficulties that might arise in assessing what constitutes an exploitative price for an IP-related transaction. The possible systemic conflict between Article 82(a) and IP law is addressed in section V. While this note is mainly written with patents in mind, copyright protection is briefly discussed in section VI. Section VI also considers some IP-specific aspects of Article 82(a) in the case of joint dominance, and section VII concludes.

II. Should We Apply Article 82(a)?

Economists have never been wildly enthusiastic about Article 82(a). Should exploitative pricing be labelled and pursued as an independent form of abusive conduct? It is not, of course, that economists feel that high prices do not deserve antitrust scrutiny. The adverse welfare consequences of prices that far exceed competitive levels are, after all, one of the main economic bases for competition laws. The two principal difficulties are the competition authority's ability to correctly identify this kind of abuse and the type of remedy that might effectively deal with a recurrence of the abuse. Not much needs to be said about measurement issues. It is always perilous to embark on complex cost-allocation exercises, but in industries with significant sunk costs and where methods of production might vary across competitors, it is not even clear how one would define a sensible "competitive" benchmark.

¹ The cost of investment must of course be computed so as to reflect the *ex ante* risk of failure faced by any innovator.

The second issue is how the abuse might best be prevented. This involves both deterrence and remedies. While large penalties could in principle deter firms from engaging in exploitative pricing, the very fact that the diagnosis is bound to remain imprecise limits the possibility of determining the optimal level of penalties. One is therefore faced with the problem of designing remedies that would prevent a recurrence of the abuse even though economic conditions are likely to change over time. It seems likely that designing such a remedy and monitoring its continued application would require regulators with significant industry-specific knowledge.

Because of these obstacles, the dominant opinion among economists seems to be that exploitative pricing should be dealt with through a two-pronged approach. On the one hand, competition policy should concentrate on conduct that is likely to adversely affect market structure, eventually leading to high prices. This would involve both merger regulation and enforcement of the prohibition against non-exploitative abuses covered under Article 82. An extreme version of this view prevails in the US, where exploitative pricing is not in itself an abuse. On the other hand, direct regulation should be exercised by a specialist agency in the few industries where one feels that excessive pricing is likely to be a recurrent issue.² My own opinion is slightly different. While the two-pronged approach makes a lot of sense, one should remember that merger control and the enforcement of the rest of Article 82 are themselves very uncertain exercises. In particular, establishing an abuse with the precision required to convince courts can be difficult. There is therefore some value in maintaining a rule against exploitative pricing as an additional tool to help restrain the behaviour of dominant undertakings.

The Commission's position on the future of Article 82(a) is hard to guess. While this provision has been used in the past,³ so far, it has been conspicuously absent from the debate on the revision of the application of Article 82. This reflects the Commission's decision to exclude exploitative abuses from the (already long) Discussion Paper. However exploitative abuses will eventually be covered by a separate review by the Commission. For the sake of this paper, the first interpretation will be retained. It would not make much sense to be discussing the future of a legal dodo.

² Note, however, that – even in these industries – exploitative pricing is not necessarily the main issue (except for legal or natural monopolies). In practice, there tends to be much emphasis on excessive pricing of interfaces (access pricing) because of its potential anticompetitive (but not exploitative) effects.

³ See, e.g., the Commission Decision's decisions in *General Motors* (1975 OJ L29/14) or in *United Brands* (1976 OJ L95/1) and the corresponding appeals. See also the judgment of the Court of Justice in Case 110/88, *Lucazeau v Sacem* [1989] ECR 2811.

III. IP-Based Dominance

Since Article 82(a) only applies to dominant (or jointly dominant) concerns, we first need to discuss how one would go about defining IP-based dominance. When discussing intellectual property from the point of view of competition law, it is traditional to distinguish between the three types of vertically related markets shown in the graph below.⁴ Clearly, this distinction is better adapted to patented material and know-how than to traditional copyrighted material.⁵ The following discussion should therefore be read as applying mostly to the first two types of intellectual property.

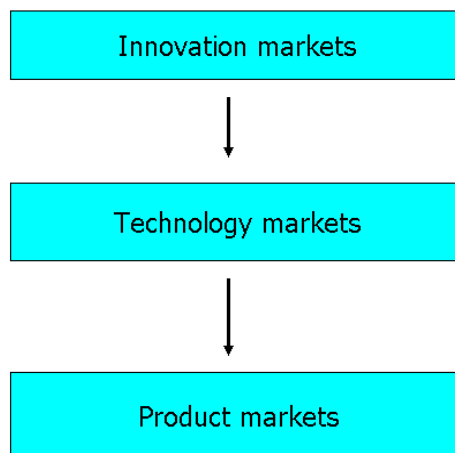


Figure 1

While the definition of product markets is standard, the notion of technology and innovation markets needs to be clarified before we proceed. Technology markets are markets where technology itself is (potentially) traded. Such transactions can be loosely referred to as “licensing”, although it can cover a wide variety of agreements, from straight licensing to cross-licensing or even the formation of (research) joint ventures. As a first cut, the definition is functional: any piece of intellectual property that enables companies to “do the same thing”, e.g., to introduce a foreign gene into a host cell, or to produce any low-calorie substance that tastes like sugar, belongs in the same technology

⁴ See, e.g., Steven Anderman and John Kallaugher, *Technology Transfer and the New EU Competition Rules*, Oxford University Press, 2006.

⁵ Traditional copyrighted works would not include software, which, although protected under copyright law in the EU, is in many respects a hybrid case.

market. However, as is the case for any other input market, it is often hard to rely exclusively on such a functional approach without eventually tying the definition of the technology market to the downstream product markets in which the technology can be usefully deployed. A gene insertion technology might be more suitable for plant cells than for animal cells, or it might be more effective for introducing herbicide-resistant genes than genes modifying the nutritional content of plants. Similarly, not all sugar-replacement substances are equally soluble or fare equally well when baked.

In the case of IPRs, the need to link the definition of the “input” market to specific downstream markets is also reinforced by the fact that IPR holders are typically allowed (and able) to offer different licensing terms for different fields of use. Hence, even if a given patent, for example, were equally useful to design surgical equipment or develop data-reading devices (think LASER), the patent holder will usually license its intellectual property to a given company for only a limited number of specific uses, and this will be reflected in the agreed upon price. This is rather different from the situation in other input markets. If, for example, ball bearings can be used in several different product markets, the possibility of resale would still lead to a single price across the various uses so that the relevant upstream market for ball bearings can be defined independently of the precise downstream markets for which they are destined. In the case of intellectual property, the lack of arbitrage makes it more reasonable to define different upstream technology markets for each field of use and, therefore, for each set of corresponding downstream markets. This means that the same piece of intellectual property, for example a given patent, can easily belong to several distinct technology markets.

Supposing that technology markets have been properly defined, how would dominance be assessed? A widespread view is that, when it comes to technology markets, market shares are essentially useless.⁶ The general idea seems to be that the number of “units” of IP sold in the technology market is not an operational concept because the same unit of IP can be re-used indefinitely. This is not completely correct. Following our discussion of technology markets, one could – in principle at least – obtain useful estimates of a technology’s market share by computing the downstream market shares of the products that rely on the (licensed) technology.⁷ In other words, since technology markets are closely tied to the downstream product markets that they serve, downstream market shares would be a good indicator of market power in the upstream market. Hence, the lack of measurable market share in the technology market itself is not an insurmountable issue. There are, however, some practical and conceptual difficulties with this approach. On the practical side, computing the market shares in a given technology market would involve tracking down not only who uses who’s technology but also computing market shares for each of the users in each of the downstream markets relevant to a given field of use. The problem is compounded by the fact that, as licensing contracts

⁶ See, e.g., Steven Anderman, *EC Competition law and Intellectual Property Rights*, Oxford University Press, 1998, pp. 142-143.

⁷ In this sense, see the Commission’s Technology Transfer Guidelines, 2004 OJ C101/2, para. 23.

do not always involve volume-related royalties, downstream usage cannot always be inferred from data on royalty payments. On the conceptual side, the main issue is that intellectual property is not always licensed in order to be used by the licensee. Licensing agreements are also reached in order to step out of the shadow of possible infringement and litigation, bringing the benefits of legal certainty.⁸ Such licensing does not translate into any downstream market share, but the fact that other companies feel the need to obtain such a license anyway surely reflects some degree of dominance on the part of the licensor.

Because of these difficulties, computing technology market shares is likely to be cumbersome and might not give an adequate picture of whether an IP right-holder is dominant. One might therefore prefer to adopt an *essential facility*-like approach, where dominance is assessed more directly. Since, in practice, exploitative pricing is only likely to be investigated – and punished – when it is fairly extreme, I believe that such an approach would make sense.⁹

Exploitative pricing can also, in principle at least, arise in innovation markets. While these “markets” are often just a convenient term to summarize competition policy’s concerns about dynamic efficiency, one can also think of them as places where actual transactions occur. In particular, *ex ante* licensing agreements or research joint ventures, where the parties agree on the sale or sharing of intellectual property assets that are yet to be developed can be regarded as trades occurring in innovation markets. One could then imagine that a firm that happens to be dominant in an innovation market could abuse this dominance by imposing unfair prices or conditions in order to enter into such trades. Still, both the very definition of dominance in innovation markets and the concept of excessive pricing of assets yet to be developed raise such difficulties that applying Article 82 in this context would seem unwise.¹⁰ I will therefore not consider this issue any further in this paper.

IV. Assessing Exploitative Pricing of IP

Let us now assume that dominance in a properly defined technology market has indeed been established. Let us also leave aside for now the fundamental question of whether pursuing exploitative pricing as an independent form of abuse is in fact desirable. Let us suppose that it is. Does the fact that the dominance and abuse are IP-related cause any special difficulty in diagnosing the abuse or in imposing adequate remedies?

⁸ This corresponds to the notion of “design freedom” found in the Commission’s Guidelines, cited in previous footnote, e.g. at para. 148.

⁹ It would also have the merit of imposing some coherence between the treatment of excessive pricing and the determination of fair access prices as remedies in cases of refusal to supply.

¹⁰ I am unaware of any case ever having been brought on such a basis.

As background for this discussion, it is useful to establish a few stylized facts about technology licensing. Unfortunately, reliable data about licensing behaviour is not widely available. Probably the most extensive study to date is Anand and Khanna (2000).¹¹ They rely on publicly available US data that indicate the industry where the licensing occurs (according to 2- or 3-digit SIC codes) and a number of characteristics of the contracts. These characteristics refer to the nature of the contract (licensing, cross-licensing or joint venture agreements) and to contractual clauses such as exclusivity or use restrictions. There is unfortunately no information about the structure of the payments involved. The data set includes 1612 licensing agreements signed between 1990 and 1993.

The first striking feature is industry concentration. At the two-digit SIC level, three sectors, “Chemicals” “Industrial and Commercial Machinery” and “Electronic and Electrical Equipment and Components” account for more than 80% of the agreements. At the three-digit level, “Drugs”, “Computer and Office Equipment”, “Communications Equipment”, “Electronic Components” and “Surgical Equipment” jointly represent 72.7% of the total number of licensing deals. “Drugs” alone make up more than a third of the total. These shares are much larger than the corresponding shares of patents obtained by these sectors. One can therefore conclude that there are many innovative sectors where licensing is scarce. A second feature of interest is the prevalence of exclusivity. Clauses granting exclusivity were found in more than two-thirds of the contracts for which their presence could be checked. In a third of the cases, exclusivity was worldwide. There are also quite significant differences across industries, with exclusivity being granted much less frequently for the machinery and electronic sectors than for the rest of the data set, especially drugs and chemicals. Finally, about 12.6% of all licensing agreements were cross-licensing agreements.

Two main points are relevant to our discussion of Article 82(a). Firstly, there are significant sectoral differences in the level of effective protection provided by IP law. The consequences of such differences will be discussed in section V. Secondly, except for the drugs and chemicals sectors, licensing appears to be relatively scarce. Moreover, when licensing occurs, it often takes the form of exclusive agreements. This seems to suggest that there are two market structures that we are most likely to run into: one where the patent holder is the only one to exploit the patented technology in downstream markets, and another where the right is exclusively licensed to a third party.¹² This immediately raises the question of *where* Article 82(a) should be enforced. Should the focus be on

¹¹ Bharat Anand and Tarun Khanna, “The Structure of Licensing Contracts”, in 48(1) *Journal of Industrial Economics* 103 (2000).

¹² Given the nature of intellectual property, such a pattern should not be surprising. We know that an upstream supplier faces a potential commitment problem. If it cannot guarantee exclusivity, then buyers know that they will eventually be competing downstream with many other firms that have also obtained the same input. This commitment issue is especially serious for intellectual property because the upstream vendor’s ability to “keep on selling” the upstream input is not limited by any capacity constraint. Hence, we would expect an IP-holder to either avail itself of the fairly broad legal tolerance for exclusivity clauses or to avoid the commitment issue altogether by vertically integrating into the downstream market.

excessive pricing in the technology market itself or on excessive pricing in the related downstream markets? This choice is not neutral, at least when the right-holder also has the ability to operate on the downstream markets. Suppose, for example, that – due, perhaps, to some of the measuring difficulties to which I will refer shortly – enforcement of Article 82(a) is mostly focused on excessive pricing in downstream markets. This might lead the right-holder to choose the licensing route even when vertical integration would be more efficient. Conversely, shifting attention to technology markets might prevent efficient licensing, pushing the firm to exploit the intellectual property internally. In other words, giving undue weight to enforcement either upstream or downstream invites inefficient bypass.

Let us now take the licensing arrangements – or lack thereof – as given. If the firm does not license its intellectual property and decides to develop it itself for downstream markets, Article 82(a) can only be meaningfully applied in those markets. On the other hand, if the right-holder does license his intellectual property, then one could in principle enforce rules against exploitative pricing in either – or both – upstream and downstream markets. The practicality of focusing on downstream markets depends on how the courts are likely to compute downstream margins. To see this, suppose that the downstream market is currently perfectly competitive and that the licensed technology lowers (constant) unit costs from c_0 to c_1 (see figure 2). Assume for simplicity that the innovation is not drastic in the sense that the pre-innovation downstream price $p_0 = c_0$ is lower than the monopoly price corresponding to the lower cost c_1 , i.e. $p^M(c_1)$. The licensor maximizes its profits by offering the license, exclusively or not, at a per-unit royalty equal to the cost difference $c_0 - c_1$ imputable to the use of the protected IP. If downstream margins include all operating costs, including the royalty paid to the licensor, then there would be no abuse under Article 82(a) in the downstream market. If on the other hand, downstream margins do not factor in the cost of gaining access to the IP, then applying Article 82(a) downstream would have exactly the same effect as applying it directly to the level of the royalty in the technology market. Since it is hard to imagine that the courts would not consider royalty payments as part of the legitimate costs of downstream firms, this equivalence is unlikely to hold. Overall then, a good rule of thumb might be that Article 82(a) should be enforced in downstream markets when the right-holder does not license and in the technology market when he does.¹³

¹³ Of course, both types of enforcement would be relevant if the right-holder were competing downstream with some of his licensees. However, in this case, the main concern is likely to be foreclosure, rather than exploitative pricing.

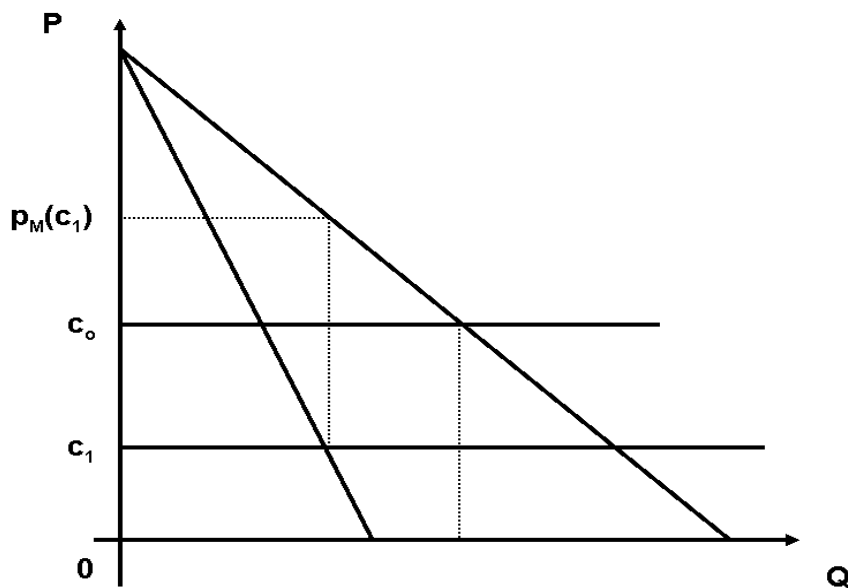


Figure 2

Except for the traditional concern about ensuring an appropriate reward to innovators, which is discussed in the next section, the case of vertical integration without any licensing does not present any IP-specific aspect. Let us therefore concentrate on the application of Article 82(a) to the terms of licensing contracts.

The first, frustrating issue is what the right benchmark for assessing excessive pricing in technology markets is. Clearly, as the cost of actually delivering the IP to the licensee is usually quite low, enforcing a price that is close to marginal or variable unit costs would be inappropriate. In practice, however, we can safely assume that, as in downstream markets, the actual enforcement of Article 82(a) would allow for significantly higher margins than that meaningless competitive benchmark. Still, licensing contracts present some additional difficulties.

As we learned from Annand and Khanna (2000), a majority of licensing contracts are exclusive. The terms of such contracts are not set unilaterally by the licensor but are negotiated on a bilateral basis. We should therefore think of the process in terms of bargaining theory, not in terms of models of posted prices. We would therefore expect that the parties would do their best to find contractual clauses that allow them to maximize the size of the total surplus to be shared between them. Given the pervasive moral hazard and adverse selection problems that plague IP transactions,¹⁴ the resulting contracts are complex not only in terms of their pricing structure but also because of the

¹⁴ See Nancy Gallini and Brian Wright, "Technology Transfer under Asymmetric Information", 21 (1) *Rand Journal of Economics* 147 (1990); Katharine Rockett, "The Quality of Licensed Technology", 8 (4) *International Journal of Industrial Organization* 559 (1990).

conditions on use, litigation or grant-backs that are often imposed. Evaluating the true value/price of any given licensing contract is therefore a fairly major and hazardous undertaking. Concretely, would an *ad valorem* royalty of 12% without grant-back requirements be considered excessive pricing while a royalty of 6% with grant-backs is not?

Using royalties charged for similar products is unlikely to be much of a help either, as intellectual property that is significant enough to be the source of dominance is likely to be fairly unique. Moreover, since EU competition law has long recognized that patent-holders should generally be able to discriminate by field of use, comparisons with the conditions offered to other (exclusive) licensees of the right-holder are unlikely to be informative.

A final difficulty is that, while barter is not common in other “input” markets, cross-licensing of intellectual property is not rare. In fact, there are fields where it is the norm rather than the exception. The problem is not simply that assessing excessive pricing in such cases appears to be nearly impossible. If one does give up on such assessments, it also provides incentives to use cross-licensing in lieu of more transparent arrangements, even if the latter would be more efficient.

The bottom line of this section is quite simple: there are some reasons to believe that enforcing Article 82(a) in an appropriate manner is likely to be even more challenging when the basis of dominance is rooted in IP. This is especially true when the intellectual property is licensed rather than used by the innovator himself.

V. The Systemic Conflict between Article 82(a) and IP Law

In this section, I assume that the difficulties discussed above can be overcome: dominance in a properly defined market has been established and the antitrust authority measures the relevant price-cost margin accurately. In this context, an effective application of Article 82(a) would limit the firm’s ability to charge high prices for the intellectual property that is the source of its dominance. As discussed in the previous section, this pricing constraint would in principle apply both to the pricing of the technology itself and to the prices of the products made by the firm using its own intellectual property. Since the intellectual property system works by using the rewards of exclusivity to induce effort and diffusion, one might legitimately wonder whether enforcing Article 82(a) would in fact make it difficult for IP law to achieve its objectives. To assess this systemic interaction between IP law and competition law, it is useful to review, however briefly, the economics literature on optimal intellectual property protection. My focus will be on patents (mostly) and copyrights. In both cases, the basic structure of the protection is that the right-holder

can exclude others from use for a limited period of time.¹⁵ I should also mention that I only consider a “reasonable” application of Article 82(a), which, in line with the approach suggested above, would only catch situations of fairly extreme dominance. Clearly, using Article 82(a) to effectively force all firms to make zero operating profits would completely undermine the intellectual property rights system. The paucity of IP-related Article 82(a) cases suggests that this interpretation probably captures any likely level of Article 82(a) enforcement.

Article 82(a) and the Breadth of Patent Protection

Consider first a very simplified description of the patent granting process, where the patent-granting authority can only determine two dimensions: the length of protection and its breadth. For now, following Gilbert and Shapiro (1990),¹⁶ let us simply define patent breadth as anything that makes it possible for the right-holder to profitably charge a higher price during the lifetime of the patent. Let us also assume that we know the level of “reward”, call it R, that we want to procure for the right-holder. The issue of optimal patent (or copyright) design then involves finding the combination of length and breadth that provides the necessary reward to the innovator at the least possible social cost.

What is relevant for our discussion is that Gilbert and Shapiro’s notion of patent breadth maps very easily into the possible effects of implementing Article 82(a). After all, enforcing Article 82(a) amounts to imposing a ceiling on the prices (or price-cost margins) that the firm can earn while its IP-based dominance lasts.¹⁷ This is true irrespective of where Article 82(a) would actually be applied. If the effective price limit arises in the downstream markets, then the analogy with Gilbert and Shapiro (1990) is complete.¹⁸ If, on the other hand, the price limit is imposed in the technology market, then this is equivalent to imposing an upper bound on royalties, which is essentially equivalent to the situation analyzed by Tandon (1982).¹⁹ Interestingly, Gilbert and Shapiro (1990) and Tandon (1982) reach the same conclusion: the welfare-maximizing manner of ensuring a given reward to the patent-holder is to issue patents of infinite length but of a breadth that is just sufficient to obtain the required compensation.

¹⁵ In order to side-step IP law subtleties that are not especially relevant to the discussion in this paper, I will also assume that patent and copyright protection actually allow the right-holder not only to exclude others but also to use the asset himself.

¹⁶ Richard Gilbert and Carl Shapiro, “Optimal Patent Length and Breadth”, 21(1) *Rand Journal of Economics* 106 (1990).

¹⁷ As already mentioned, I regard Article 82(a) as essentially constraining operating profit margins, without explicit allowance for the resources expended in obtaining the intellectual property. The issue of whether such an allowance should be made is discussed separately later.

¹⁸ In fact, Gilbert and Shapiro analyze just such a special case, where limited breadth is modelled as a ceiling on the price of the patent-related product.

¹⁹ Pankaj Tandon, “Optimal Patents with Compulsory Licensing”, 90 (3) *Journal of Political Economy* 470 (1982). However, Tandon’s analysis is slightly narrower, as it treats the case of *compulsory* licensing to a perfectly competitive downstream industry.

One could read this analysis as good news for the potential conflict between IP law and Article 82(a): except for cases where the necessary reward R is very high, patent breadth should be small enough that the resulting price levels are unlikely to be construed as exploitative. In other words, intellectual property protection designed around these principles should only rarely give rise to the kind of dominance and pricing behaviour that would warrant scrutiny under Article 82(a). This interpretation would in fact be consistent with the scarcity of IP-related Article 82(a) cases.

However, upon closer examination, such a view proves to be rather superficial, for several reasons. The first issue is that actual patent systems are not designed according to the Gilbert-Shapiro-Tandon (hereinafter, “GST”) prescription. Most obviously, the length of protection is not infinite. The main reason for this is that, beyond a point, additional length does not help the patent-holder because new generations of innovations eventually arise that make the initial invention obsolete. To capture this aspect of cumulative research, economists distinguish between two notions of breadth. *Lagging* breadth protects the patent-holder against *imitation*, while *leading* breadth sets a minimum novelty standard that offers protection against improvements.²⁰ If leading breadth were infinite, then one could indeed use extra length in order to provide additional compensation to inventors. However, a very large leading breadth is undesirable: while it does help pioneering innovators to capture some of the returns from the follow-on innovations that they have effectively spawned, it also tends to slow down the rate of future innovation and can limit the diffusion of knowledge.²¹ Not surprisingly, then, actual patent systems only offer limited leading breadth and therefore can only offer a limited length of effective patent protection. If the length of patent protection cannot be infinite, then lagging breadth must be greater than in the GST scheme in order to ensure any given level of reward R . Since higher lagging breadth leads to higher prices, infringement of Article 82(a) becomes more likely than what GST’s analysis would suggest. This also means that, in order to preserve the same level of reward R , any enforcement of Article 82(a) that would effectively constrain price levels during the period of patent protection would require an extension of leading breadth, with possible adverse consequences for future innovations.

The literature on optimal patent design also gives too stylized an image of how actual patent systems operate. Firstly, patent systems are not explicitly designed to implement different levels of “reward” for different (types of) inventions. The reward R must therefore be seen as the reward that one might want to assign *on average*. This means that it is only if that average level of reward is quite high that a well-designed patent system would implement patent breadths that are likely to trigger the application of Article 82(a).

²⁰ For a more precise definition of these concepts, see Pierre Régibeau and Katharine E. Rockett, “The Relationship between Intellectual Property Law and Competition Law: An Economic Approach”, in Steven Anderman (ed.), *Intellectual Property Rights and Competition Policy*, Cambridge University Press, 2007, pp. 505 – 552.

²¹ See *ibid.* for a more extensive review of the relevant economic literature.

Secondly, what economists call lagging and leading breadth result in fact from the application of a series of *technical* requirements that determine both patentability and infringement.²² The application of similar criteria to different types of innovations can therefore result in widely varying “breadth” of patent protection in the economic sense. We have already evoked Ahnand and Khanna’s quite convincing argument that, under current technical standards, the protection granted in relation to drugs and chemical patents, for example, tends to be significantly stronger than for electronic component patents. Hence, a more appealing way to look at the patent system is that it aims to ensure what is judged to be, *on average*, a sufficient level of reward but that the application of the criteria meant to achieve this average still leads to very different levels of effective protection for different types of innovations. These variations do not arise by design, i.e., they do not reflect any judgement that some types of innovations are worthier of protection than others. An important implication of this view is that the differences observed in the amount of resources that are invested in the pursuit of (patentable) innovation are, to some extent at least, the result of the varying degrees of protection that are effectively available. In other words, the fact that R&D outlays in, say, the pharmaceutical industry tend to be high is not necessarily an exogenous feature of this industry that simply follows from its underlying technology. It can also result from the greater profitability of pharmaceutical patents due to the stronger patent protection enjoyed in that sector. A corollary is that the greater investment observed in sectors that *de facto* enjoy greater IPR protection does not necessarily reflect any inherently greater social desirability of innovation in these fields.

How “Directed” is Innovation?

In order to disentangle the implications of this pragmatic conception of patent protection, we need to distinguish between different views of the innovation process. At one extreme, one might believe that the whole R&D process is essentially *undirected*. According to this view, while the likelihood of success (or speed) of innovation can be improved by investing more, the outcome of research is completely random. Not only might a given project succeed or not, but there is essentially complete uncertainty as to what might be produced in the end. An attempt to discover a new medically useful compound might as well produce aspartame or some mechanical innovation. In such a context, incentives to invest in any given project are driven by the potential rewards that could be expected from success across a broad section of fields. Hence only the expected returns *averaged across fields* matter. This means that the fact that the strength of patent protection might differ across types of innovations has no effect on incentives to invest. Similarly, the fact that Article 82(a) might constrain pricing behaviour in one sector more than in another is irrelevant: applying Article 82(a) would not bias the allocation of resources across innovation projects. Moreover, since the number of cases to which Article 82(a) is

²² For a detailed discussion of this issue, see Suzanne Scotchmer, *Innovation and Incentives*, MIT Press, 2004.

realistically likely to be applied is rather small, its effect on the average expected return to R&R – and thus on R&D incentives” is likely to be very minor: applying Article 82(a) would not significantly affect IP law’s ability to provide innovation incentives.

This view of the innovation process is of course extreme. More reasonably, one might think that, while there can indeed be a lot of uncertainty as to what a successful outcome of a given project might be, projects are directed towards specific fields of research and are more likely to yield positive outcomes in that field. In such a “semi-directed” context, it is important for the combined impact of patent policy and Article 82(a) to be neutral across sectors of innovative activities so that the relative private returns to R&D projects accurately reflect their relative social value. Any induced discrepancy between the ranking of private and social returns would result in a bad allocation of R&D effort. Unfortunately, the implications of such neutrality for IP law and Article 82(a) cannot be discussed in any great generality. Still, a simple example helps to make a few useful points.

Imagine that all research projects lead (if successful) to the creation of new products. Further assume that the projects only differ in the size of the new markets that are created. This market size may be designated as the “size of the project”. Suppose that sectors of innovative activity are known to differ in (the distribution of) project sizes. For example, imagine that drug-related research projects are on average “larger” – and hence more socially worthwhile – than research projects in electronics. Abstracting from R&D competition between firms,²³ let us assume that the only effect of investing more in a given project is to reduce the time required for the project to bear fruit. In a world without Article 82(a) and with infinite lagging breadth, each successful inventor would simply charge the monopoly price in the relevant market. Given our assumption that markets only differ in their size, this monopoly price is the same in all markets. Under these conditions, private investment will be allocated across R&D sectors in a manner that equalizes the marginal benefit of investment. This marginal benefit is just the gain from speeding up the project a little bit more. Since firms typically cannot extract the full social value from the new products that they sell, social surplus in each market is a multiple of the firm’s expected profits. Again, with markets that are identical except for size, this multiple is the same for all markets and hence for all sectors of research. The socially optimal allocation of investment across sectors is such that the marginal benefit derived from bringing the corresponding expected social value forward is equalized across sectors. But since social surplus is simply a multiple of expected profits, this optimality condition must be achieved because a private investment decision already equalizes private marginal benefits across fields: the privately optimal allocation is also socially optimal. At this

²³ Considering R&D competition complicates matters a lot because it can break the link between greater private profitability and greater social desirability, e.g., due to greater duplication of effort for larger projects. The uncertain welfare properties of R&D competition is the main reason why this part of the argument cannot be made more general.

stage, let us simply note that equilibrium investment will be higher in larger sectors, *even though the operating profit margins are the same in all markets.*

Now let us impose a uniform upper limit on operating price-cost margins in all markets. This limit can be seen as resulting from the definition of patent breadth and/or the application of Article 82(a). Imposing this limit simply reduces the ratio between profits and social surplus in each market, but this lower proportion is still the same in all sectors. Hence, applying the same reasoning as above, private investment incentives still lead to a socially optimal allocation of resources across sectors. This in turn implies that, as long as the limit is applied to *operating* profit margins, Article 82(a) would not induce any inefficiency in the pattern of investment. In this context, giving more favourable treatment to sectors where R&D outlays are larger (for example by including R&D costs in the computation of the profit margins) would be a mistake, as it would inefficiently channel more resources into sectors with larger projects.

However, we have seen that IP law itself will, in practice, effectively grant broader patent protection in some areas of research. This has two main implications. Let us now, for simplicity, assume that the distribution of project size is the same in all sectors so that, in the absence of inequalities in patent protection, investment levels per project would be the same across fields. The first consequence of uneven patent protection is an undesirable bias in the allocation of resources: (relatively) too much investment will take place in the favoured sectors. The second implication concerns the application of article 82(a). Since greater patent breadth leads to greater operating price-cost margins, innovations in favoured sectors would be more likely to be caught by Article 82(a). Application of Article 82(a) would then help reduce the abnormal expected returns in “high breadth” sectors, moving the allocation of innovative investments across sectors back towards the social optimum. Treating sectors with higher investments more favourably would be exactly the wrong policy, as it would work against this welfare-increasing effect.

Finally, at the other extreme of the spectrum lies a view of *perfectly targeted* R&D investment, where innovators choose not only a field of research but a very specific project for which they know the expected size of the market. The analysis of this situation is almost the same as for semi-directed research. As above, implementation of Article 82(a) as a limit on *operating* profit margins would be neutral in terms of the allocation of resources across projects, so conditioning the application of Article 82(a) on the size of the investment undertaken would be counterproductive. The point about counteracting possible IP law-induced biases in this allocation also remains valid.

These are strong conclusions: any reasonable application of Article 82(a) is unlikely to have large effects on the levels of investment in R&D, and it is in itself neutral in terms of the allocation of R&D resources across sectors or projects. It might even help to correct some of the biases created by IP law itself. How robust is this analysis? The simple example on which it is based has two key elements. Firstly, large projects do not

require disproportionate incentives. This comes from our assumption that the proportion between private and social surplus is independent of project size. If this proportion were lower for larger projects, then – at least in the semi-directed and directed views of R&D – larger projects would need to receive a more-than-proportionate reward in order for the allocation of investment across projects (or sectors) to be efficient. Hence, higher operating price-cost margins would have to be guaranteed (on average) for large successful projects. Since larger projects also involve larger (equilibrium) outlays, there would be an argument for greater Article 82(a) leniency for firms that have expended significant resources. One should point out, however, that there is absolutely no convincing evidence that the ratio of private to social surplus is indeed negatively related to project size. In the absence of any such evidence, our neutral benchmark seems a safer basis on which to develop policy guidelines. The second important feature of our example is that agents that invest in larger R&D projects do not need to enjoy higher operating profit margins in order to secure the same return on investment as agents that pursue smaller projects. The extra profit required to compensate them for the greater expense simply comes from applying the same profit margin to a larger market. This ensures that, provided that IP law is itself neutral, a given level of enforcement of Article 82(a) is not more likely to “catch” larger projects. Absent a convincing reason why large projects would systematically require a higher operating price-cost margin to ensure a socially efficient allocation of R&D investment, this does not seem like a bad benchmark.

Efficient Innovation

The previous argument in favour of applying Article 82(a) (in moderation) without explicit regard for the resources invested was based on the idea that any bias would result in a bad allocation of resources across projects. Another, more familiar, reason for advocating an “investment-blind” policy has to do with the *ex ante* incentives to run any given project efficiently. Stated bluntly, a policy that treats right-holders who spend a lot more leniently than those who do not would not exactly reward efficiency in research and development. Such concerns have long been part of the debate on regulation, where schemes like rate of return regulation are known to provide incentives for “gold plating”.²⁴

²⁴ For an early discussion of the economics of “gold plating”, see E.E. Zajac, “Note on ‘Gold plating’ or ‘rate base padding’”, 3(1) *Bell Journal of Economics and Management Science* 311 (1972).

VI. Remarks

Copyrights

This paper has been written with patents as the running example of intellectual property. The main difference between patents and copyrights is that patent protection offers both greater lagging breadth and greater leading breadth, but it is of shorter duration.²⁵ This means that, in principle, copyright protection is even less likely to result in the type of dominance and high price-cost margins that would be likely to trigger the application of Art. 82(a). However, in other respects, the arguments presented above readily apply to cases of copyright-based dominance. In particular, the idea that the application of a given legal regime of protection to various sectors of activity might result in rather different degrees of *effective* protection is still appealing: copyright protection is unlikely to grant the same amount of market power when applied to movies as it does when applied to software.

Joint Dominance: Patent Pools and Collecting Societies

A distinguishing feature of intellectual property rights is their uncertainty. In the case of patents, this often leads to situations where several patents might be mutually infringing, creating a so-called patent “thicket”.²⁶ When the number of patentees involved is small, such thickets can be cleared through bilateral cross-licensing deals. However, this approach is not feasible when the number of parties concerned is large. In such cases, a natural response is the formation of patent pools. Typically, members of the pool have access to all of its patents on pre-established terms. Patent pools also set conditions for pool membership and for third party access to pooled patents. Patent pools raise a number of significant competition law issues ranging from the potentially anticompetitive exclusion of third parties to the fear that they facilitate tacit collusion.²⁷ However, most of these relate either to Article 81 or to exclusionary abuses under Article 82. The only relevant aspect from the perspective of Article 82(a) is that patent pools (or collecting societies) can be a source of joint dominance that might lead to abusively high prices charged to third parties.²⁸ In this respect, Lerner and Tirole (2004) offer significant reassurance: even if one allows for asymmetries between parties, blocking patents and a mixture of substitute and complementary rights, stipulating that individual right-holders must remain free to license their intellectual property outside of the patent pool arrangement is a sufficient condition to ensure that the pool will be welfare-enhancing. In

²⁵ For a discussion of the economic rationale for these differences, see Régibeau and Rockett, cited *supra* note 20.

²⁶ For a recent discussion of patent thickets, see Mark Lemley and Carl Shapiro, “Probabilistic Patents”, 19(2) *Journal of Economic Perspectives* 75 (2005).

²⁷ On this last point, see Régibeau and Rockett, *supra* note 20.

²⁸ To make this a “pure” Article 82(a) issue, let us assume, somewhat unrealistically, that these third parties do not compete in the same downstream markets as members of the patent pool.

that sense, in the presence of jurisprudence that requires that such independent transactions be allowed, application of Article 82(a) might be superfluous.

VII. Conclusions

The conclusions drawn from this paper are simple. Applying Article 82(a) in a fairly reliable manner is bound to be hard in any context, which suggests that use of the provision should be reserved for fairly extreme cases. The situation is even less pleasant when intellectual property assets are the source of dominance and (indirectly at least) the object of excessive pricing. There are two types of additional difficulties. Firstly, assessing dominance in technology markets might be harder than it is in the case of traditional input markets. This is mostly due to the practical difficulties in computing meaningful market shares. This first difficulty could be minimized by relying on a more direct “essential facility” type of approach. The second difficulty is that the public good aspect of intellectual property and the fuzzy nature of intellectual property rights make for rather complex licensing arrangements. Determining which arrangements amount to exploitative pricing and which ones do not is bound to be extremely challenging.

On the other hand, I find little merit in the claim that applying Article 82(a) (reasonably) is undesirable because it undermines the socially desirable properties of the system of intellectual property rights protection. In particular, I argue that applying Article 82(a) more leniently when the intellectual property involved was obtained after significant investments is likely to be counterproductive, as it would interfere with the efficient allocation of investment across R&D projects and weaken incentives to conduct these projects efficiently.

Overall, then, Article 82(a) is hard to love, especially in the context of IP, but not because of some supposed conflict between IP law and competition law. Still, as other approaches to abuse of dominance are also imperfect, Article 82(a) is probably worth keeping as part of the competition authority’s arsenal ... provided that it is wielded with moderation.