# 4. The Strategic Use of Patents: Implications for Antitrust

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## I. INTRODUCTION

The intersection between intellectual property (IP) and antitrust continues to be the subject of heated debate among academics and policy makers. The exercise of intellectual property rights has traditionally been viewed as a legitimate means to earn monopoly rents with respect to one or more products. Indeed, both US competition agencies have made it clear that the protection of intellectual property is essential to provide firms and individuals with incentives to innovate.[1] Thus, the IP guidelines explicitly recognize that intellectual property law and antitrust law share the common purpose of promoting innovation and enhancing consumer welfare.

Nevertheless, IP rights sometimes do come into conflict with antitrust, whose goal is to encourage competition so as to benefit consumers and producers. Yet, despite acknowledgement that these two traditions share a common purpose, there remains considerable tension between the property rights granted under IP laws and the antitrust laws' goal of promoting consumer welfare. In recent years the courts have become more assertive in laying out territory in which the exercise of intellectual property rights can violate the antitrust laws.[2] In 2003, the Federal Trade Commission (FTC) issued a report on intellectual property and antitrust that flowed in part from an extensive set of joint hearings on the subject by the Department of Justice and the FTC.[3]

As firms with substantial patent portfolios have become more aggressive in asserting their IP rights, it has been natural to pose the question of whether, and if so under what conditions, the antitrust laws might be violated through the leveraging of market power from one market to another, through the inappropriate creation or maintenance of barriers to entry, or through the encouragement of collusive behavior. While these questions have been raised by academics and by litigators, there remains little agreement on where the

line should be drawn regarding anticompetitive use of patents and other forms of intellectual property.[4]

In this chapter, we offer an economic perspective on one aspect of the IP–antitrust nexus – the ability of firms to use their IP portfolios to compete with rivals. We recognize, as have the courts, that the grant of IP rights gives the owner of that right substantial leeway to utilize those rights; these rights include: (*i*) the right to license or not in a broad array of circumstances; (*ii*) the right to change licensing terms;[5] (*iii*) the right to settle patent litigation;[6] and (*iv*) the right to offer package licenses. Nevertheless, we believe that there are and should be limitations to those IP rights. We are concerned with one particular type of strategic behavior – the ability to use one's IP portfolio to raise one's rivals' costs. We will explain that such a strategy can, under some circumstances, serve an anticompetitive goal – either through predation against one or more competitors, or by encouraging competitors to tacitly collude in raising prices.[7]

While a number of points that we will make are quite general, we will focus on a particularly interesting raising rivals' costs strategy – the use of package licensing of intellectual property to anticompetitively disadvantage rivals. We believe that such a strategy has the potential to succeed in industries where innovation and design are important elements of competition between rivals. We will suggest that whether or not such a strategy should be seen as anticompetitive necessarily involves a balancing of the IP rights (how likely they are to be valid or to have the appropriate scope) and the likely harm to competition (how likely it is that competitive firms will be harmed sufficiently to exit the industry or to no longer restrain competition, and/or how likely it is that a collusive arrangement can be encouraged).

The chapter is organized as follows. In Section II, we offer the foundation of our analysis, an economic discussion of ways in which the strategic use of IP can raise rivals' costs and generate anticompetitive effects. Section III offers a case study that develops these issues with specificity. In Section IV we conclude by offering an overview of the policy issues that arise in this most difficult subject area.

## II. THE STRATEGIC USE OF INTELLECTUAL PROPERTY – RAISING RIVALS' COSTS

### A. Using Intellectual Property to Raise Rivals' Costs

Amassing a large portfolio of intellectual property rights can be a profitable pro-competitive strategy for a firm to pursue its long-term economic interests.

However, it can also provide a way for a firm with sufficient market power to engage in activities that could substantially disadvantage competitors.[8] In the broadest terms, the antitrust concerns flow from occasions in which firms use patent portfolios to undertake strategic actions that *raise rivals' costs*. As the name implies, a raising rivals' costs strategy generally involves actions by one firm to increase the costs of one or more competitors in order to gain an advantage in the marketplace.[9] The advantage of strategies that raise rivals' costs over other strategies of unilateral monopolization (such as predatory pricing) is that such strategies may require little or no short-run profit sacrifice to achieve the desired long-term goal of lessening competition in the marketplace.[10]

The strategic use of intellectual property to raise rivals' costs could come in a number of forms. First, a firm could employ a litigation strategy that burdens its rivals with patent suits which are costly to defend and which increase the rival's uncertainty about its ability to sell competing products. Such a litigation strategy could entail substantial costs for the patent holder. However, the patent holder is in control of which patents to assert. One might suspect that the patent holder can take advantages of any economies of scale or scope and choose to assert claims that are costlier to defend than to prosecute. Second, short of litigating patents, a firm might threaten lawsuits to compel all or some of its competitors to accept licenses. Apart from the litigation costs that this imposes on others, the royalty payments associated with any patents that are licensed can also put rivals at a cost disadvantage. Moreover, forcing rivals to accept a license for a package of patents, some of which might include technology that the rival does not need or want, can be highly profitable. This is especially true if the royalty that the firm is able to obtain is an increasing function of the number, but not the relevance or quality, of patents in the package.[11]

A successful raising rivals' costs strategy can serve to foreclose competition and/or to be predatory; the higher costs imposed on rivals allows the predator to profitably undercut rivals' prices, to gain market share, and in some cases, to drive firms from the market. Further, in a dynamically competitive market, where innovation is an important aspect of the competition between firms, the abuse of intellectual property that reduces rivals' incentives to innovate may lessen innovation competition and thereby lessen consumer welfare.[12]

Strikingly, a raising rivals' costs strategy need not foreclose competition to serve an anticompetitive purpose. If rivals choose not to contest the strategy and are content to raise prices in response to the cost increase, a raising rivals' costs strategy can help to achieve a tacitly collusive outcome.[13] Specifically, if additional costs are imposed on virtually all rivals, each rival

would have a unilateral incentive to raise prices, and all firms, including the licensor, could enjoy supracompetitive prices.

This chapter emphasizes one particular raising rivals' costs strategy – coercive package licensing.[14] A firm with a large patent portfolio can offer to license patents on an all-or-nothing package basis. Individual competitors may not have a need for a license that includes the full package, either because they believe that certain patents are not valid or they do not infringe. If the patent holder refuses to license, the competition is faced with the choice of litigating and/or designing around all of the patents. The cost of either of these actions is increasing in the number of patents in the package. Even if there are no complementarities associated with the acquisition of the bundle of patents, the patent holder will be able to obtain a license fee for the package that is greater than it could obtain from licensing patents individually. In some sense, the risks and costs of litigation may induce a license fee that does not otherwise accurately reflect the value of individual patents in the portfolio.

To see more specifically how a firm could use a large patent portfolio to raise rivals' costs, consider the case of a differentiated product oligopoly where innovation and product design are important elements of competition among rivals. In this case, a firm with a large patent portfolio surrounding competitors' key technologies (i.e. a 'patent thicket') has the opportunity to use its patent portfolio to lessen competition in the final goods market.[15] Suppose, for example, that within a patent thicket are a number of patents of dubious merit (perhaps some were obtained through inequitable conduct) and it is costly to innovate around assertions of infringement. When combined with an all-or-nothing patent licensing strategy, this creates a situation in which rivals' costs will be raised simply as a result of a threat by the owner of the patent thicket to assert its patent rights against the rivals' products.

### B. Patent Thickets Can Increase the Ability to Raise Rivals' Costs

One use of a patent portfolio involves a 'patent flooding' strategy.[16] With patent flooding, a firm files a multitude of patent applications that claim minor variations on a competitor's existing technology. Because its patents surround competitors' key technologies, the firm is in a position to act (through litigation or the threat of litigation) to gain a strategic advantage over its rivals. There is considerable evidence that patent flooding has become more prevalent in recent years. One study notes that the annual number of microprocessor patents granted has more than doubled during the 1990s, and that over 25 000 patents were granted between 1988 and 1998.[17] There have also been several lawsuits involving allegations of patent flooding.[18]

Previous research recognizes a few ways in which a patent thicket can be used to strategic advantage. First, a company can patent new technology before potential competitors, including features and technologies that it never intends to commercialize (so-called 'submarine patents').[19] The patent thicket creates considerable uncertainty for competitors about whether their technology infringes, especially with respect to a hidden or submarine patent. Even if a firm is not practicing submarine patents, a patent thicket makes it hard to design and sell products without running the risk of infringing on a competitor's patent. The resulting uncertainty can allow a firm to threaten infringement suits against competitors. One beneficial outcome (perhaps for both firms, but not necessarily for the public) is a cross licensing arrangement with a competitor.[20]

Second, a firm creating a patent thicket can use the resulting uncertainty to threaten patent infringement suits against a competitor's customers.[21] Such a strategy is consistent with the raising rivals' costs strategy outlined above.

Third, a firm can pursue a strategy that threatens patent litigation against its competitors to gain a more direct strategic advantage over rivals. The uncertainty about the validity of each of the patents in the patent thicket along with the potentially substantial cost of litigation creates a strong incentive for the competitor to accept a licensing arrangement.[22] As described previously, the license fee or royalty raises rivals' costs, and in doing so, creates a strategic advantage.

A patent thicket is an especially effective means of extracting concessions from rivals. In certain instances, a rational response for a firm that sells a product in competition with a rival product that embodies patented technology is for the firm to design around the rival firm's technology. Such 'design competition' can benefit consumers by increasing the quality, variety, and diversity of product offerings. However, in industries where there are many patents issued and potentially more pending, a firm cannot be sure that its attempted design-around product does not also infringe. In such a situation, the firm may be willing to accept a license at unfavorable terms to bring its product to market rather than risk costly and uncertain patent litigation, even if the likelihood of a successful design-around solution is high.[23] The competitive offensive advantage associated with a patent thicket can be high. It follows, of course, that there is also a substantial defensive advantage as well. The result may be a 'race' to grow one's IP portfolio. Unfortunately, however, it is not clear whether that race will be 'to the top' (i.e. in the social interest), or 'to the bottom' (i.e. harmful from a social point of view).

## C. The Economics of Package Licensing

The competition authorities and the courts have recognized that package licenses can be efficient under certain circumstances.[24] For instance, package licensing can save resources and negotiation costs that would otherwise be necessary to determine the value of individual patents, and reach agreement on the prices of each individual patent. We have noted above, however, that asserting a patent portfolio against a competitor can increase that competitor's costs in any of three ways. It can cause the competitor to expend resources designing around patented technology, to delay the introduction of new products, or to accept a license that includes fees and royalties. The cost can be particularly high when the firm asserts an unbreakable, all-or-nothing package of patents against its rivals.

Not surprisingly, mandatory package licenses have long been recognized as being potentially anticompetitive by the US Department of Justice.[25] Indeed, there are cases in which courts have found mandatory packaging of patents to be anticompetitive. Perhaps the clearest articulation by the courts is the Third Circuit's decision in *American Security Company* v. *Shatterproof Glass Corp.*

> Mandatory package licensing is no more than the exercise of the power created by a particular patent monopoly to condition the licensing of that patent upon the acceptance of another patent but that is too much. The protection, or monopoly, which is given to the first patent stops where the monopoly of the second begins.[26]

Moreover, as the Third Circuit noted in *American Security*, and the Supreme Court subsequently noted in *Zenith* v. *Hazeltine*, package licenses can be used to inappropriately extend market power from legitimate patents claims to illegitimate patents.[27] Package licensing can also be used to coerce a party into licensing patents that it might have chosen to avoid or design around.[28] This is especially true when the license fee is invariant with respect to the number of patents.[29]

Bundling patents together into inseparable packages may also reduce a firm's incentive to challenge individual patents.[30] If the cost of challenging patents increases with the number of patents included in the bundle, a firm may have an incentive to include weak patents in the package. Weak patents in conjunction with inseparable bundles can lead to patent misuse if the bundle is used to extend a firm's monopoly power from the 'space' covered by a strong patent to the space encompassed by the strong and weak patents together. The package itself alters rivals' behavior in deciding whether it is efficient to license or design around individual patents, and raise costs

directly (through license fees) and indirectly by altering the incentive to invest in R&D and to innovate.

### D. Per-Unit versus Lump-Sum Royalties

Some commentators have argued that in markets characterized by a high degree of technological innovation, static measures of the impact of competitors' actions such as deadweight loss may offer an inappropriate view of the competitive impact of competition in intellectual property. Instead, in R&D-intensive industries, it may be more appropriate to consider whether firms with static market power can undertake actions that distort dynamic innovation competition.[31] In a dynamically competitive market, a license arrangement that requires only the payment of a fixed fee can successfully raise rivals' costs, even if the arrangement does not include a per-unit royalty.

Traditional raising rivals' costs arguments have been directed towards strategies that increase rivals' short run marginal costs.[32] However, there is no reason to so limit such an argument. In a market characterized by dynamic competition, even those license arrangements that affect only fixed costs can result in a lessening of competition for a firm with static market power. Indeed, despite the focus of the economics literature on marginal costs, the more general anticompetitive impact of raising rivals' fixed costs has been recognized for some time. Hovenkamp notes with respect to using patents as a raising rivals' cost strategy:

> A dominant firm leading the race in research and development intentionally selects a technology for which scale economies are substantial, knowing that the fringe firms will have to follow along. Alternatively, a firm may create an array of patents on marginal or even non-existent innovations, knowing that other firms will either have to invent around the patents or else litigate their validity.[33]

Consider how the owner of a package of patents might choose to license that package. First, it can offer to license in return for a per-unit payment. It is easy to see that such an arrangement increases the license's marginal cost, and provides for an opportunity to profitably increase price. Assuming that the package includes some patents that are unlikely to be valid or infringed, the package license with a per-unit royalty can, just like any raising rivals' cost strategy, achieve an anticompetitive outcome.

Second, the firm can license its patent portfolio in return for an up-front payment, with no continuing royalties. In dynamically competitive industries, where new product and features are an important part of competition, even licenses that include only fixed, or lump-sum payments, can result in an anticompetitive lessening of competition. In an industry where innovation and design competition are important, a large portion of costs are likely to be

fixed and sunk. With such dynamic competition, firms must expect to recover these sunk fixed costs in the long run through higher prices or they will have no incentive to invest in R&D. The result is that a license fee that raises fixed costs can reduce competition by causing rival firms to either raise prices or spend less on innovation. With respect to innovation, the lump-sum license fee may result in delay in introducing new product designs and innovations, which could have long-term competitive consequences, even if it does not result in higher prices. In either case, however, the patent holder gains an anticompetitive advantage over its rivals through its ability to coerce a license from its rivals through the imposition of a package that may include patents of questionable merit. In the end, a strategy that raises rivals' fixed costs can be just as damaging to competition as one that raises rivals' marginal costs.

## III. CASE STUDY: THE STRATEGIC USE OF PACKAGE LICENSES

In this section, we delve into the packing licensing issues in the context of a specific case in which both authors participated.[34] In 2001, plaintiff Yamaha brought suit against Bombardier, first in Federal District Court, and later at the International Trade Commission (ITC), alleging that Bombardier violated Section 337 of the Tariff Act by importing and selling in the US products that infringed on a number of Yamaha's patents involving Personal Watercraft ('PWCs'). If Yamaha had been successful, Bombardier would have been precluded from importing into the US all PWCs that infringed one or more patents.[35] In asserting a patent misuse defense, Bombardier claimed that Yamaha's patent claims, package licensing strategy, and its lawsuits (against Bombardier and others) were mere anticompetitive attempts to reduce competition in the market for PWCs. A trial was held at the ITC in December 2001, and the parties eventually reached a settlement prior to the Administrative Law Judge's issuance of an opinion. In the analysis, the authors reviewed Yamaha's behavior with regard to obtaining and asserting patent rights. Relying on the theory developed above, the defendant's expert offered to the court a framework for analysis that would allow the court to distinguish the legitimate use of Yamaha's patent rights from IP that was used strategically to reduce competition by raising its rivals' costs.[36]

We highlight the evidence supporting the analysis of the defense expert below, beginning with a description of the industry.

## A. Industry Background

Personal watercraft were first built by Bombardier in the late 1960s. A few years of lackluster sales, however, led Bombardier to withdraw its product from the market in 1970. Bombardier sold the basic patents to Kawasaki, which used the patents to create its original stand-up version (the 'Jet Ski') of Bombardier's original product. The Kawasaki stand-up version was somewhat successful, which encouraged a few other firms, notably Yamaha and Bombardier, to develop new products and to enter and reenter the market.

Both Yamaha and Bombardier entered within a few months of each other in the late 1980s with new sit-down PWC products.[37] These products were significantly improved over the existing stand-up versions, which were difficult to ride and required some athletic ability. The introduction of sit-down products sparked a rapid growth in industry sales. Along with rapid growth in sales, the early 1990s saw the entry of two new competitors – Polaris and Arctic Cat. Since the early 1990s, the industry has generally included between four and five competitors, with some exit and little entry.[38] The industry is relatively highly concentrated, with Yamaha and Bombardier being the market leaders. Both firms had sufficient market power, so that either a predatory strategy or a strategy to encourage a collusive arrangement was feasible for either. Table 4.1 lists market shares in the industry from 1992 to 2001.

The industry is best characterized as a differentiated products oligopoly. Design and technological innovation are important elements of the competition between all firms in the industry. A significant component of competition related to the introduction of new products and features. Design and innovation competition between the firms became particularly intense with the tightening of environmental regulations in the middle to late 1990s. Indeed, relatively stringent environmental regulations were one reason for the sales decline that occurred in the late 1990s (sales in 2000 were just 46 percent of peak sales in 1995; see Figure 4.1). The rapid decline in sales most likely heightened the competition between the firms, which, in turn, may have provided an incentive for Yamaha to pursue its IP strategy. While there was intense design competition, price was also an important competitive variable. In general, price competition during most of the period prior to the introduction of Yamaha's IP strategy could be described as highly competitive.

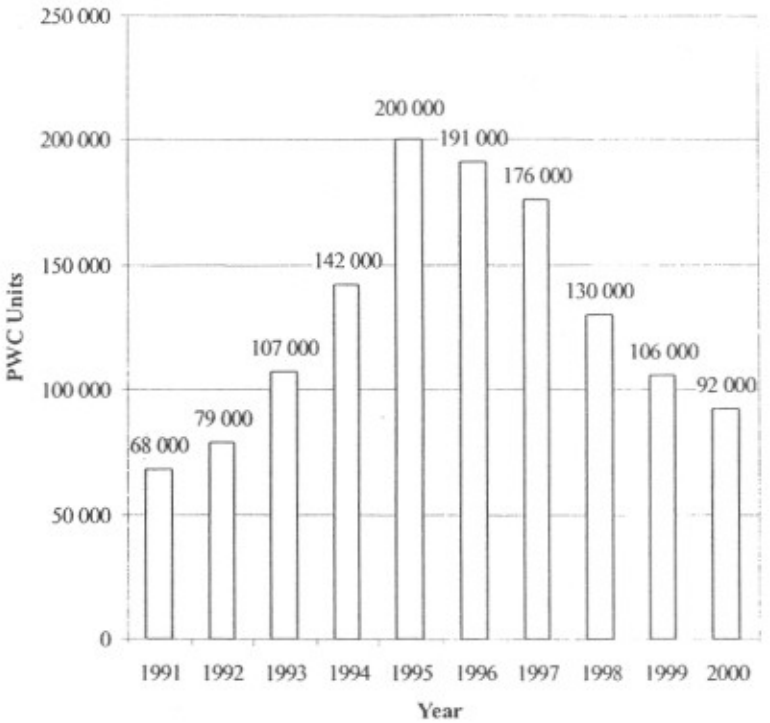
*Table 4.1 PWC percentage market share by manufacturer (1992–2001)*

| | Sea-Doo | Yamaha | Kawasaki | Polaris | Arctic Cat | Wet Jet and Other | Total |
|---|---|---|---|---|---|---|---|
| 1992 | 28.6 | 39.3 | 27.2 | 4.0 | 0.0 | 1.0 | 100 |
| 1993 | 35.1 | 33.7 | 20.8 | 8.4 | 1.8 | 0.2 | 100 |
| 1994 | 38.3 | 26.5 | 19.2 | 11.8 | 3.2 | 1.0 | 100 |
| 1995 | 39.1 | 23.7 | 14.8 | 15.0 | 6.0 | 1.4 | 100 |
| 1996 | 47.3 | 23.6 | 13.3 | 12.1 | 3.3 | 0.4 | 100 |
| 1997 | 43.4 | 25.1 | 17.2 | 10.7 | 3.6 | 0.0 | 100 |
| 1998 | 42.8 | 30.9 | 15.6 | 6.4 | 4.2 | 0.1 | 100 |
| 1999 | 39.9 | 30.4 | 17.6 | 6.8 | 5.3 | 0.0 | 100 |
| 2000 | 39.9 | 34.4 | 15.0 | 8.5 | 2.2 | 0.0 | 100 |
| 2001 | 43.6 | 32.3 | 14.0 | 10.2 | 0.0 | 0.0 | 100 |

*Sources:* For 1992–2000: 'USA PWC Market Share by Mfr. By Season' based on NMMA data. For 2001: Bombardier estimates.

Consistent with the differentiated product nature of the industry, and with the degree of design competition, each competitor's offerings had strengths and weaknesses. Yamaha's products were considered high in quality and reliability, but lacking in performance. Bombardier's products were strong in terms of performance, but perceived to be lacking in reliability. Other competitors, such as Kawasaki, relied upon brand recognition, rather than on particular distinguishing product features.

As with the automotive industry, new design and product innovations are generally introduced at the beginning of each new product year. Design and manufacturing is a long process, and a mid-design or mid-production change is difficult and ultimately time consuming. Delay in the introduction of new products and features can have a long-term detrimental impact on a firm's competitiveness. As we highlight below, strategic use of patents to delay competitors' new products, or cause changes to accepted designs, can significantly hinder competitiveness.




*Source:* National Marine Manufacturer's Association at: http://www.nmma.org/facts/boatingstats/2000stats/retailsales.html, visited 8 August 2001.

*Figure 4.1 Annual retail unit sales (1991–2000)*

## B. Yamaha's Strategic Use of Patents

Yamaha's ability to use its patent portfolio to threaten its rivals arose in part from its distinctly different patenting strategy. Yamaha was significantly more aggressive in seeking patents surrounding technology and components embedded in the product. In contrast, other competitors believed that their innovations were incremental and modest developments that did not rise to the level of patentable inventions; consequently, they rarely patented their innovations. At the time of the litigation, Yamaha held approximately 90 percent of all patents in the industry (over 1100 patents versus about 150 for the other four competitors combined). Bombardier and other competitors believed that Yamaha's behavior in obtaining its vast patent portfolio constituted patent flooding of the kind described above. In particular,

Bombardier believed that many of the patents in Yamaha's portfolio should not have been issued, either because they represented only trivial and obvious modifications of existing technology and prior art, or because they were obtained through fraudulent or inequitable conduct in the US Patent and Trademark Office.

Armed with its patent portfolio, Yamaha used a common approach which had the effect of coercing all of its competitors to take a package license. While the number and the identity of the patents claimed to be infringed varied across competitors, Yamaha's strategy was always the same. Yamaha approached every competitor with claims that their products infringed on a number of Yamaha patents.[39] Yamaha offered each firm an all-or-nothing package license for all the asserted patents. The offer consisted of a per-unit royalty that Yamaha admitted was unrelated to the underlying value of the individual patents, and that competitors claimed was more closely related to the price difference between their products and Yamaha's. Bombardier asserted that Yamaha had explicitly noted that the royalty fee could easily be passed on to customers through a price increase. Thus, Yamaha appeared to be pursuing a strategy that would lessen the industry's intense price competition.

Each of Yamaha's three competitors believed that at least some of the patents in the package were either invalid or not infringed. In some cases, competitors requested that some patents be excluded from the license, or that licenses be negotiated separately for individual patents. In other situations, some of Yamaha's patent claims became untenable. In response, certain patents were removed from the package and replaced with others. In some cases, competitors asserted that Yamaha claimed that it would agree to license a smaller set of patents, but that the price would be the same as for the larger set, making it uneconomic to dispute the status of individual patents in the package. If competitors refused to take the package license, Yamaha would threaten to file, or did file, lawsuits and administrative proceedings alleging patent infringement.

Yamaha eventually reached settlements with two of its four competitors. In one case, the competitor (Arctic Cat) had exited the market six months earlier, and agreed to a per-unit license for any product that it might sell in the future if it reentered, and a flat fee for alleged past infringement. In the second case, Polaris filed an antitrust suit after unsuccessfully attempting to get Yamaha to agree to negotiate individual licenses for the asserted patents. The parties agreed to a settlement that included an upfront payment for a three year license, after which time, if Polaris had not designed around the asserted patents, the parties would reopen negotiations for a new license.[40]

### C. Yamaha's Actions Raise Rivals' Costs

Yamaha's actions are consistent with the use of intellectual property to anticompetitively raise rivals' costs. In this particular case, whether by intent or not, Yamaha's actions seemed directed towards encouraging firms in the industry to increase prices until a coordinated outcome was achieved. The effect of such a raising rivals' costs strategy, if successful, would be to cause affected rivals to increase price and/or reduce output.[41] Yamaha would, according to this scenario, benefit not only from high prices, but also from an increased market share.[42]

Whether Yamaha's aggressive assertion of its IP rights was or was not anticompetitive depends crucially on one's view as to whether the asserted patents in Yamaha's patent portfolio were: (*i*) invalid; (*ii*) not infringed; or (*iii*) not practiced in the US. In the discussion that follows, we assume (consistent with our understanding of the IP issues in the case) that most, if not all, of the asserted patents fit into one of the three categories listed above. In that case, Yamaha's IP strategy might be characterized generally as follows.

Yamaha's strategic use of its patents left its competitors with three options: (*i*) proceed with the litigation to determine whether the patents are infringed, invalid, or not practiced; (*ii*) take a license and pay the license fee; or (*iii*) design around the patent. Any of these three options would have raised its cost relative to Yamaha.

If a competitor chose to litigate and was successful in having all of the patents declared invalid, unenforceable, or not infringed, that firm would have absorbed substantial costs related to the litigation. In addition to the direct costs for attorneys and experts, litigation would also require substantial internal resources, including the diversion of designers and business managers to litigation tasks, rather than designing next generation products or managing the business. These extra costs, although fixed, would substantially affect a firm's competitiveness in an industry characterized by design and features competition. By diverting money and personnel from product development and design, Yamaha would have delayed the development or introduction of a competitor's new designs or features. In a market where design and feature innovation are one of the hallmarks of the competitive process, this delay would have provided a competitive advantage to Yamaha that would have been difficult for other firms to overcome.

The second option was to accept the per-unit royalty that Yamaha offered. Such a license arrangement would have represented a sizeable cost increase. The per-unit royalty offered to Bombardier represented 7 percent of the average wholesale price of Bombardier's products. Furthermore, the per-unit royalty represented about 10 percent of Bombardier's average manufacturing

costs per unit, 25 percent of its averaged gross margin, and 65 percent of its average operating profit. Such a large increase in marginal costs would substantially reduce profits, and would likely necessitate a reduction in output, and/or cause Bombardier to increase prices.

The final option was to design around the patents. A design-around strategy would have been costly and risky. Redesign of all the models for all asserted claims would require a major effort with no guarantee as to a future court's ruling on the validity of the patents or the breadth of the existing claims. In fact, Bombardier believed that its products did not infringe any asserted patents. If Bombardier followed the design-around strategy to avoid litigation, it would have to change proven designs, even though it believed that those designs were not problematic. In addition, diverting resources to designing around patents might have affected a firm's ability to meet normal production schedules in a market where the timing of new product introductions was well established. Delay would cause dealers to fill showrooms with alternatives from other manufacturers (including Yamaha), and likely cause a loss of reputation with dealers and customers that would be difficult and costly to overcome. Finally, designing around (especially without a ruling as to the validity and breadth of the patents at issue) would not necessarily free the firm from litigation risk, because Yamaha might claim that the new designs did not avoid the asserted patents, or that they infringed on other patents in its portfolio.

Any patent settlements that did occur likely resulted in a lessening of competition to Yamaha's benefit. As we noted, one such settlement involved a firm that had exited the industry after the patent issues emerged. The terms of the settlement erected significant barriers to reentry for Arctic Cat. If Arctic Cat ever chose to reenter, it would have two choices – pay a per-unit royalty that would create marginal costs higher than its rivals, or make significant and largely sunk investments in designing around Yamaha's asserted patents. The second settlement with Polaris involved a large upfront payment for a temporary license. As noted above, even this lump sum payment has the potential to reduce the firm's competitiveness by reducing the resources available to design new products and features that are important to success in this industry.

## IV. CONCLUDING REMARKS

The laws that enforce patents and those that enforce competition need not be in conflict. They both have the potential to encourage innovation to the benefit of firms and consumers. There are, however, tensions between the two, as this chapter has described. On one hand, overly aggressive antitrust

enforcement could restrict the legitimate pro-competitive uses of a patent. On the other hand, a lack of appropriate antitrust enforcement could fail to penalize firms that use bundles of patents to harm the competitive process to the detriment of consumers.

In its recent report of the 2002 hearings on intellectual property and antitrust,[43] the FTC reached a number of conclusions and proposed recommendations that, if put into effect, will move policy in the right direction. Having seen how a firm can aggressively assert its patents to achieve an anticompetitive outcome, it is essential that the US Patent and Trademark Office tighten the legal standards and its procedures to reduce the likelihood that questionable patents will be issued. We are sympathetic, therefore, to the FTC's recommendation that the standard for challenging a patent be lowered from 'clear and convincing evidence' to 'a preponderance of the evidence'.

Finally, this chapter has offered a roadmap for thinking about antitrust concerns that flow from the exercise of raising rivals' costs strategies. There is much work to be undertaken to develop the underpinnings of these theories. The question of where one should draw the line between pro- and anti-competitive exercise of patent rights remains open, both as a matter of economics and as a matter of law.

## NOTES

† The authors wish to thank Robert Schwartzbauer for his inspiration and helpful comments. All views are our own and do not necessarily reflect the opinions of Bombardier.

1. See, for example, the DOJ/FTC *Antitrust Guidelines for the Licensing of Intellectual Property* (1995) and the DOJ/FTC *Antitrust Guidelines for Collaborations among Competitors* (2000).
2. See, for example, *Eastman Kodak* v. *Image Technical Services, Inc.*, 112 S. Ct. 2072 (1992), *Image Technical Services, Inc.* v. *Eastman Kodak Co.*, 125 F. 2d 1195 (9th Cir. 1997), *CSU LLC* v. *Xerox Corp.*, 203 F. 3d. 1322 (Fed. Cir. 2000), *Integraph Corp.* v. *Intel Corp.*, 195 F.2d 1346 (Fed. Cir. 1999), and *Intel Corp.*, FTC Docket No. 9288 (1999), http://www.ftc.gov/os/1999/9903/d09288intelagreement.htm.
3. See http://www.ftc.gov/os/2003/10/innovationrpt.pdf.
4. See, for example, Gilbert and Shapiro (1997), Carlson (1999), Shapiro (2001), and Gilbert (2002); for legal commentary, see Barton (2002.
5. Such changing of terms has, on occasion, been found to be anticompetitive. See *Integraph* v. *Intel, supra* Note 2.
6. The settlement of patent litigation has also been found to be anticompetitive under certain circumstances. See, for example, *In re Cardizem CD Antitrust Litigation*, 333 F. 3d 896 (6th Cir. 2003), (finding payments from a pharmaceutical manufacturer to a generic manufacturer per se illegal).
7. The FTC has noted some of these issues in its 2003 report, stating that 'Because a manufacturer needs a license to all of the patents that cover its product, firms can use questionable patents to extract high royalties or to threaten litigation . . . This . . . can deter

follow-on innovation and unjustifiably raise costs to businesses and, ultimately, to consumers, (Executive Summary at p.7).

. It is recognized that the risk of anticompetitive conduct in a patent pool increases as the number of patents included in the pool increases, since it becomes more likely that competing technologies (not just complementary ones) are pooled as the number of patents grows. In addition, as the pool grows, it is more likely that potential licensees are forced to take unneeded or unwanted patents as part of a package. See Carlson (1999), pp. 390–91.

. See Salop and Scheffman (1983), Krattenmaker and Salop (1986), and Ordover and Saloner (1989) for general descriptions of the theory of 'raising rivals' costs.'

0. See Krattenmaker and Salop (1986), p. 224.

1. Royalties could be increasing in the number of patents, regardless of the quality of individual patents, if the litigation costs (the threat point in the royalty negotiations) are increasing in the number of patents that are asserted against the rival.

2. See Pitofsky (2001). See also, Carlton and Gertner (2002), p. 20. The DOJ/FTC *Antitrust Guidelines for the Licensing of Intellectual Property* also acknowledges that the anticompetitive abuse of intellectual property can lessen dynamic competition and thereby reduce consumer welfare.

3. See Krattenmaker and Salop (1986), pp. 224, 244–45.

4. For further analysis on this issue, see Jacobson (2002) and Vistnes (2002).

5. Shapiro (2001) characterizes a patent thicket as a 'dense web of overlapping intellectual property rights that a company must hack its way through in order to actually commercialize new technology'.

6. See, for instance, Spero (1990), Wolfson (1994), Sankaran (2000), or Shapiro (2001).

7. See Shapiro (2002), pp. 4–5.

. See Sankaran (2000), pp. 411–17 for a discussion of the prior litigation involving claims of patent flooding.

. See Gilbert and Newberry (1982).

. See Sankaran (2000). See also Pitofsky (2001) and the references cited therein.

. Ibid.

. An analogous point has been made in the literature that spells out the potential benefits of 'suing to extract a settlement offer'. For a review, see Cooter and Rubinfeld (1989).

. Previous research has characterized the 'hold-up' problem from patent thickets. (See Shapiro (2001), pp. 124–26.) However, this research has not characterized how the hold-up problem may affect the incentives of parties to enter into license arrangements that potentially raise costs and allow the patent-holder to profitably increase prices *ex post*.

See Hovenkamp, Janis and Lemley (2002), §22.1, and DOJ/FTC *Antitrust Guidelines for the Licensing of Intellectual Property* (1995), §4.2. See, also Gilbert and Shapiro (1997), p. 318.

See Gilbert and Shapiro (1997), who note that the DOJ has considered mandatory package licensing of patents to be potentially anticompetitive since at least 1970.

*American Security Co.* v. *Shatterproof Glass Corp.*, 268 F.2d 769 (3rd Circuit, 1959), as quoted by Carlson (1999).

In *Zenith Radio Corp.* v. *Hazeltine Research*, 395 US 100 (1969) the Supreme Court condemned a licensing arrangement that included royalties based on a fixed percentage of sales of the end product, regardless of the number of patents in the package that a firm actually practiced. In *American Security*, the patent holder had an established practice of requiring licensees to license a whole package of patents, regardless of whether the licensee required access to all the patents. The patent holder later agreed to allow a license for individual patents, but stated that the price would be the same whether the licensee covered one or all the patents in the package.

Coercion is an important element of analyzing whether package licensing is anticompetitive. See Hovenkamp, Janis and Lemley (2002), §22.3a.

See *American Security*. See also, Hovenkamp, Janis and Lemley (2002), §22.3a.

See Farrell (2002).

31. 'Perhaps we should not worry about the static exercise of market power, or even the exercise of static market power over long periods of time, but we should worry about firms with static market power distorting the dynamic innovation competition for future market power' (Carlton and Gertner (2002), p. 20). See also the FTC/DOJ *Antitrust Guidelines for the Licensing of Intellectual Property* (1995), §3.2.3.
32. See Krattenmaker and Salop (1986), Salop and Scheffman (1983).
33. See Hovenkamp (1994), p. 286. In addition, Hovenkamp notes two other areas where raising a rival's fixed costs can be anticompetitive: forcing a competitor into litigation ('The costs of litigation in this instance must be considered as fixed costs . . .' (p. 286)), and forcing a competitor to increase advertising intensity ('By refusing to participate in a joint venture, the defendant may have forced the plaintiff to match its advertising and promotion expenses, even though the defendant could spread these costs over three mountains, while the plaintiff had only one mountain.' (p. 286)).
34. Maness and Rubinfeld served as consultants for the defendant, Bombardier; Rubinfeld testified in the ITC case. The description that follows presents the authors characterization of the case; it is based solely on publicly available information.
35. Bombardier is a Canadian company; most of its PWCs were designed and built in Canada.
36. For a discussion of some of the legal aspects of the patent misuse defense, see Hoerner (2002) and Barton (2002).
37. Bombardier uses the trade name 'Sea-Doo' to market its PWC products.
38. Honda, the only new entrant since the 1990s, entered in early 2002.
39. The number of patents asserted varied over time and by competitor, from a high of 52 to somewhere around ten. The proposed per-unit fee, however, was virtually the same, regardless of the number of patents asserted, about 5 percent of the average list price in the market.
40. As noted, Yamaha also settled with Bombardier after the ITC trial but before the ALJ's decision. Yamaha also asserted patent claims against Kawasaki; we are unaware of the eventual outcome of those claims.
41. See, for example, Ordover and Saloner (1989).
42. See Ordover and Saloner (1989), p. 588. See also Salop and Scheffman (1983) and Krattenmaker and Salop (1986).
43. See *supra* Note 3.

## REFERENCES

Barton, John H. (2002), 'Antitrust Treatment of Oligopolies with Mutually Blocking Patent Portfolios', 69 *Antitrust Law Journal*, **3**, 850–82.

Carlson, Steven C. (1999), 'Patent Pools and Antitrust Dilemma', *Yale Journal on Regulation*, **16** (327), 359–99.

Carlton, Dennis and Robert Gertner (2002), 'Intellectual Property, Antitrust, and Strategic Behavior', *NBER Working Paper*.

Cooter, Robert and Daniel L. Rubinfeld (1989), 'Economic Analysis of Legal Disputes and Their Resolution', *Journal of Economic Literature*, **27** (3), 1067–97.

Farrell, J. (2002), *IP Bundling and Antitrust*, available at: http://www.ftc.gov/opp/intellect/020514farrel.pdf.

Federal Trade Commission and US Department of Justice (1995), *Antitrust Guidelines for the Licensing of Intellectual Property*, available at: http://www.usdoj.gov/atr/public/guidelines/ipguide.htm.

Federal Trade Commission and US Department of Justice (2000), *Antitrust Guidelines for Collaborations among Competitors*, available at: http://www.ftc.gov/bc/guidelin.htm.

Federal Trade Commission (October 2003), *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy*, available at www.ftc.gov.

Gilbert, Richard (2002), *Antitrust for Patent Pools: A Century of Policy Evolution*, available at: http://elsa.berkeley.edu/users/gilbert/wp/patent_pools100302.pdf.

Gilbert, Richard and David Newberry (1982), 'Preemptive Patenting and the Persistence of Monopoly', *American Economic Review*, **72** (3), 514–26.

Gilbert, Richard and Carl Shapiro (1997), 'Antitrust Issues in the Licensing of Intellectual Property: The Nine No-No's Meet the Nineties', in Martin N. Baily, Peter C. Reiss and Clifford Winston (eds) (1998), *Brookings Papers on Economics: Microeconomics: 1997*, Brookings Institution Press, pp. 283–336.

Hoerner, Robert J. (2002), 'The Decline (and Fall?) of the Patent Misuse Doctrine in the Federal Circuit', *Antitrust Law Journal*, **69**, 669–85.

Hovenkamp, H. (1994), *Federal Antitrust Policy: The Law of Competition and its Practice*, West Publishing Co.

Hovenkamp, H., Janis, M.D. and M.A. Lemley (2001), *IP and Antitrust: An Analysis of Antitrust Principles Applied to Intellectual Property Law*, New York: Aspen Law & Business.

Jacobson, Jonathan (2002), *Counseling in Uncertainty: The Law of Tying and Intellectual Property*, available at: http://www.ftc.gov/opp/intellect/020514jacobson.pdf.

Krattenmaker, Thomas and Steven Salop (1986), 'Anticompetitive Exclusion: Raising Rivals' Costs to Achieve Power Over Price', *Yale Law Journal*, **96** (2), 209–93.

Ordover, Janusz and Garth Saloner (1989), 'Predation, Monopolization, and Antitrust', in Richard Schmalensee and Robert Willig (eds), *Handbook of Industrial Organization*, vol. I, North-Holland Publishing Company, pp. 565–66.

Pitofsky, Robert (2001), *Antitrust and Intellectual Property: Unresolved Issues at the Heart of the New Economy*, available at: http://www.ftc.gov/speeches/pitofsky/ipf301.htm.

Salop, Steven and David Scheffman (1983), 'Raising Rivals' Costs', *AEA Papers and Proceedings*, **73** (2), 267–69.

Sankaran, S. K. (2000), 'Patent Flooding in the United States and Japan', *IDEA, The Journal of Law and Technology*, **40** (3), 393–425.

Shapiro, Carl (2001), 'Navigating the Patent Thicket: Cross Licenses, Patent Pools and Standard Setting', in Adam Jaffe, Joshua Lerner and Scott Stern (eds), *Innovation Policy and the Economy*, National Bureau of Economic Research.

Spero, Donald (1990), 'Patent Protection or Piracy – A CEO Views Japan', *Harvard Business Review*, pp. 58–67.

Vistnes, Gregory (2002), *Bundling and Tying: Antitrust Analysis in Markets with Intellectual Property*, available at: http://www.ftc.gov/opp/intellect/020514vistnespp2.pdf.

Wolfson, Jeffrey (1994), 'Patent Flooding in the Japanese Patent Office: Methods for Reducing Patent Flooding and Obtaining Effective Patent Protection', *George Washington Journal of International Law and Economics*, **27** (2 & 3).