

Notes

Limiting the Anticompetitive Prerogative of Patent Owners: Predatory Standards in Patent Licensing

A patent owner possesses a legal right of limited duration to exclude competitors from using processes or manufacturing products that employ technology within the scope of his patent grant.¹ An important aspect of this legal right is the owner's discretion to license the patented technology² and to restrict the manner in which it is put to use.³ Patent licensing and licensing restrictions will generally permit the patent owner to exploit his patent monopoly more efficiently. When courts have found the effect of a licensing restriction to be anticompetitive, however, they have imposed antitrust sanctions to curb patent owners' licensing discretion.

In recent decisions, several courts have maintained that, unlike licensing restrictions, refusals to license patents are exempt from antitrust scrutiny.⁴

1. 35 U.S.C. § 154 (1976 & Supp. V 1981) (establishing term of patent grant and exclusionary right of patent owner).

2. See *Dawson Chem. Co. v. Rohm & Haas Co.*, 448 U.S. 176, 185 (1980). A license is any grant of a right to make, use, or sell a patent that does not constitute a complete transfer of patent rights. See 4 A. DELLER, *DELLER'S WALKER ON PATENTS* § 1 (2d ed. 1965). The licensing of a patent is not governed by any specific provision of the Patent Act. *Moraine Prods. v. ICI Am., Inc.*, 538 F.2d 134, 143 (7th Cir.), *cert. denied*, 429 U.S. 941 (1976). Rather, the rights and obligations of parties to a licensing agreement are construed in accordance with principles of contract law. 2 P. ROSENBERG, *PATENT LAW FUNDAMENTALS* § 16.01[1][b] (rev. 2d ed. 1983).

3. *General Talking Pictures Corp. v. Western Elec. Co.*, 305 U.S. 124, 126-27 (1938) (field-of-use restriction that prohibited licensee from manufacturing or selling amplifiers for use in talking picture equipment); *Ethyl Corp. v. Hercules Powder Co.*, 232 F. Supp. 453, 458-59 (D. Del. 1964) (sale restriction permitting non-exclusive licensees to manufacture and use products made using a patented process but reserving to exclusive licensee right to sell products made using patented process). For other types of restrictions that have survived antitrust scrutiny, see *infra* note 59.

4. *SCM Corp. v. Xerox Corp.*, 645 F.2d 1195, 1206 (2d Cir. 1981) (holding unilateral refusal to license patent cannot violate antitrust laws if patent was lawfully acquired), *aff'g on other grounds* 463 F. Supp. 983, 1014-15 (D. Conn. 1978) (Newman, J.) (holding unilateral refusal to license patent not basis for monetary recovery under antitrust laws), *cert. denied*, 455 U.S. 1016 (1982); *accord* *GAF Corp. v. Eastman Kodak Co.*, 519 F. Supp. 1203, 1233 (S.D.N.Y. 1981); see *United States v. Westinghouse Elec. Corp.*, 648 F.2d 642, 648 (9th Cir. 1981) (patent owner's right to refuse to license competitors in domestic market cannot be challenged under antitrust laws merely because he has licensed patent's use in foreign markets); *cf.* *Dawson Chem. Co. v. Rohm & Haas Co.*, 448 U.S. 176, 213-15 (1980) (allowing patent owner to maintain action for contributory infringement against seller of unpatented product that had no substantial use except in patented process that the patent

Surprisingly, these courts have adopted this position with little analysis of its legal foundations or of its economic consequences. A blanket exemption from the antitrust laws for refusals to license a patent appears inconsistent with the qualified exemption courts extend to licensing restrictions. Although this doctrinal inconsistency is arguably based upon congressional policy, it more likely reflects the inability of courts to surmount the practical obstacle of distinguishing refusals to license a patent that promote efficiency from those that are anticompetitive.

This Note presents an economic and legal analysis of the antitrust issues raised by a patent owner's unilateral refusal to license. It begins by demonstrating that, under certain conditions, a refusal to license a patent may facilitate a patent owner's effort to perpetuate beyond the patent's lifetime the market power derived from his patent. The Note then argues that a refusal for the purpose of enhancing future market power should be considered a form of patent misuse; it is not privileged conduct protected under the patent laws, and it should not be immune from antitrust prohibitions. Because a refusal that constitutes patent misuse will invariably satisfy the elements of an offense under section 2 of the Sherman Act,⁵ this form of misuse violates the antitrust laws. To enable courts to distinguish efficient patent exploitation from anticompetitive conduct aimed at perpetuating the patent owner's market power beyond the patent's expiration, this Note, drawing upon recent contributions to the predatory pricing literature, formulates a general test for evaluating a patent owner's refusal to license a patent.

I. A Welfare Analysis of Patent Licensing

The intersection of antitrust prohibitions and patent rights presents courts with a fundamental problem: how to reconcile antitrust policies, which foster competition, with the use of limited patent monopolies to

owner refused to license); *Mannington Mills v. Congoleum Indus., Inc.*, 610 F.2d 1059, 1069 (3d Cir. 1979) (expressing doubt whether arbitrary refusal to license unpatented know-how is actionable under Sherman Act). The Federal Trade Commission has concluded that a monopolist is under no duty to license or disclose his technology to rivals. See *In re E.I. DuPont de Nemours & Co.*, 96 F.T.C. 653, 748 n.40 (1980).

A "refusal to license," as used in this Note, refers both to a refusal at any price and a patent owner's choice of a licensing fee intended to discourage applicants. At least one court has concluded, that a patent owner is permitted to demand a royalty "so high as to preclude acceptance of a license offer," because such conduct is "not appreciably different from a refusal to license upon any terms." *W.L. Gore & Assocs. v. Carlisle Corp.*, 529 F.2d 614, 623 (3d Cir. 1976). Because the court in *Gore* assumed that a patent owner's refusal to license was unquestionably legal, it failed to consider the circumstances under which the royalties demanded by a patent owner might violate the antitrust laws.

5. 15 U.S.C. § 2 (1982) (felony to monopolize, attempt to monopolize, or combine or conspire with any other persons to monopolize any part of interstate or foreign commerce). The Clayton Act creates a private right of action for treble damages in favor of "any person who shall be injured in his business or property by reason of anything forbidden in the antitrust laws," *id.* § 15, or for injunctive relief "against threatened loss or damage by a violation of the antitrust laws," *id.* § 26.

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induce innovation. Although each statutory scheme seeks to promote social welfare,⁶ neither this common economic purpose nor conventional analysis of antitrust issues suggests an obvious social welfare standard to apply in patent-antitrust cases. The conventional economic approach to antitrust evaluates a practice by looking at the static tradeoff it creates between productive efficiency and allocative efficiency.⁷ Patent-antitrust analysis, in contrast, seeks to balance dynamic gains in productive efficiency induced

6. See *Reiter v. Sonotone Corp.*, 442 U.S. 330, 343 (1979) (noting that "Congress designed the Sherman Act as a 'consumer welfare prescription'") (citing R. BORK, *THE ANTITRUST PARADOX: A POLICY AT WAR WITH ITSELF* 66 (1978)); *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 480 (1974) (Congress established patent system to induce innovation in belief that it "will have a positive effect on society through the introduction of new products and processes of manufacture into the economy, and the emanations by way of increased employment and better lives for our citizens"); see also W. BOWMAN, *PATENT AND ANTITRUST LAW: A LEGAL AND ECONOMIC APPRAISAL* 1-7 (1973) (arguing that consumer welfare maximization is common goal of both antitrust and patent laws).

Whether the promotion of social welfare (sometimes referred to as "consumer welfare") is the exclusive goal of the antitrust laws, see R. BORK, *supra*, at 7, or merely an important factor to be considered along with other non-economic concerns, see, e.g., *MCI Communications Corp. v. American Tel. & Tel. Co.*, 708 F.2d 1081, 1177-80 (7th Cir.) (Wood, J., concurring in part and dissenting in part), *cert. denied*, 104 S. Ct. 234 (1983); Pitofsky, *The Political Content of Antitrust*, 127 U. PA. L. REV. 1051, 1052-58 (1979), there is no dispute as to the need for economic analysis in addressing patent-antitrust issues.

7. See, e.g., R. BORK, *supra* note 6, at 91-110 (arguing that antitrust analysis should focus on the effect of conduct on social welfare as measured by the sum of changes in allocative and productive efficiency); Williamson, *Economies as an Antitrust Defense: The Welfare Trade-offs*, 58 AM. ECON. REV. 18 (1968) (applying same social welfare standard to mergers); see also W. BOWMAN, *supra* note 6, at 3-9 (suggesting that antitrust and patent law pose similar tradeoffs between efficiency and trade restraint).

An economy exhibits productive efficiency when it is impossible to reallocate factors of production to produce more of one output without producing less of some other output. See W. NICHOLSON, *MICROECONOMIC THEORY: BASIC PRINCIPLES AND EXTENSIONS* 520-32 (2d ed. 1978). For a single industry, assuming all factor prices are fixed, productive efficiency means that output is produced at the lowest possible cost for a given level of demand.

A resource allocation is allocatively efficient when resources are employed in producing goods that consumers will most value. Allocative inefficiency exists when price exceeds marginal costs for the last unit of output produced. Marginal cost, the cost of producing another unit of output, represents the opportunity costs of output—that is, the value of the resources necessary to produce an additional unit of output in their next best alternative use. If consumers are willing to pay more than it costs to produce an additional unit of output, then resources are being employed in an alternative use that consumers value less. This allocative inefficiency reduces social wealth.

The net effect of a particular practice on productive and allocative efficiency determines whether the practice enhances or diminishes social welfare. This procedure is equivalent to adding up the net changes in consumers' and producers' surplus in a market for a particular practice. See R. BOADWAY, *PUBLIC SECTOR ECONOMICS* 58-61 (1979). Consumer surplus is defined as the difference between what consumers are willing to pay and the price they actually pay. An approximation is given by the area under an ordinary demand curve up to the quantity purchased, less the expenditures made by consumers in purchasing that quantity. Producer surplus is the difference between total revenue and total variable costs (the area under a producer's marginal cost curve) for the output produced. See, e.g., W. BAUMOL, *ECONOMIC THEORY AND OPERATIONS ANALYSIS* 497-500 (4th ed. 1977); J. HIRSHLEIFER, *PRICE THEORY AND APPLICATIONS* 212-24 (2d ed. 1980).

This social welfare standard, while generally illuminating, suffers from some well-known limitations. First, there is no consideration of how the misallocation of resources in one market affects resource allocation in other markets; thus, any conclusions are valid only for a partial rather than a general equilibrium. Second, it assumes society is indifferent to the distribution of resources among individuals. Finally, the social welfare standard is a static rather than dynamic measure of efficiency and thus does not take account of the current market equilibrium's effect on future social welfare.

by the patent system against static deadweight loss created by legal monopolies. The application of antitrust principles to the exploitation of patent rights must be tempered with an understanding of the economic basis of a patent system and the economic incentives of patent owners in exploiting their patents.⁸ This Part defines a standard of socially efficient patent exploitation and uses it to evaluate the role of the antitrust laws in promoting socially efficient patent licensing.

A. *The Economic Function of Patents*

The primary economic justification for a patent system is the belief that competitive markets will yield inadequate investment in innovation.⁹ Competitive economies tend to underinvest in innovation because of the inability of inventors to appropriate through the marketplace the marginal social benefits of their inventions.¹⁰ Patents overcome this appropriability problem and foster innovation by providing inventors property rights through which to control the commercial exploitation of patented processes or products.¹¹

8. Cf. Stiglitz, *Potential Competition May Reduce Welfare*, 71 AM. ECON. REV. PAPERS & PROC. 184, 189 (1981) (antitrust policy should be based upon complete analysis of functioning of competition in situations in which innovation is a crucial element because of possibility that simple policies may easily lead to pareto-inferior outcomes); Note, *An Economic and Legal Analysis of Physical Tie-Ins*, 89 YALE L.J. 769, 771 n.16, 776-77 (1980) (arguing that social welfare criterion incorporating dynamic factors should be used to analyze antitrust issues involving tradeoffs between innovation and competition in order to maximize long-run efficiency).

Dynamic efficiency extends the concepts of productive and allocative efficiency to describe the allocation of resources between current and future uses. In production, resources can be used either to satisfy present consumption or to produce future output (that is, to produce more machines that will produce more goods tomorrow). In consumption, consumers may wish to forego current consumption to raise their future consumption. Dynamic efficiency, in a pareto-optimal sense, exists if the marginal rate at which consumers substitute between present and future consumption equals the marginal rate at which the resources used in the production of present consumption can be transformed into the production of future output. See R. BOADWAY, *supra* note 7, at 24-27; J. HIRSHLEIFER, *supra* note 7, at 488-96.

Static deadweight loss is the dollar cost of allocative inefficiency in any period. In the case of a single-price monopolist, the deadweight cost of monopoly equals the sum of consumers' and producers' surplus lost on units of output not produced because of the monopolist's restriction of output.

9. Economists sometimes distinguish between invention and innovation. See R. NELSON & S. WINTER, *AN EVOLUTIONARY THEORY OF ECONOMIC CHANGE* 263-66 (1982). This distinction, however, is unimportant for the argument presented here, and therefore no distinction will be observed.

10. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in *THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS* 609, 615-16 (Nat'l Bureau for Economic Research 1962). The main impediment to appropriability is the free rider problem, caused by a competitor's ability to replicate inventions through imitation, and thereby to share in the inventor's rewards while incurring only a fraction of the development costs borne by the inventor. Arrow also argues that risk aversion is another reason why market economies systematically underinvest in innovation. If a firm is risk averse, it will require positive expected economic profits to undertake investment. *Id.* at 610-14. But see Hirshleifer, *The Private and Social Value of Information and the Reward to Inventive Activity*, 61 AM. ECON. REV. 561, 569-72 (1971) (distinguishing technological from pecuniary rewards to inventors).

11. Patent rights provide a direct remedy for the appropriability problem; a patent provides a means for the inventor to capture, in the form of economic rents, a larger fraction of the consumer and

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A patent system will increase the rate of innovation so that this rate more closely approximates the socially optimal rate.¹² The benefits of increased innovation, however, are not without social costs. By restricting the availability of technology already in the public domain, the patent system creates both allocative and productive inefficiency. Having a legal monopoly over economically valuable technology¹³ allows a patent owner to extract a premium for the use of that technology. This monopoly premium distorts the allocation of resources in the economy: Insufficient resources are employed to produce goods that employ patented technology.¹⁴ Furthermore, productive inefficiency is created because the diffusion of patented technology is restricted; the most efficient technology is not employed by all firms in an industry.¹⁵

producer surplus generated by his invention than he could have captured in the absence of patent protection. See W. BOWMAN, *supra* note 6, at 23-28.

12. The socially optimal level of innovation is related to the concept of dynamic efficiency. A necessary condition for this level is that the marginal benefits of innovation equal its marginal costs. See, e.g., Arrow, *supra* note 10, at 623; Stiglitz, *supra* note 8, at 184. The marginal benefits of innovation are the benefits society derives from having an invention sooner than otherwise would have been the case. See Gilbert, *Patents, Sleeping Patents, and Entry Deterrence*, in STRATEGY, PREDATION, AND ANTITRUST ANALYSIS 205, 231-33 (S. Salop ed. 1981) (criticizing view that proper measure of patent's value is total economic surplus contributed by new invention). The marginal costs of innovation are the resources expended by society to realize an invention sooner.

A patent policy that seeks to induce the optimal level of innovation should fix a reward that equates the costs and benefits of innovation at the margin. The marginal costs of using a patent system, however, must be adjusted to reflect the deadweight loss caused by monopoly exploitation. See W. NORDHAUS, *INVENTION, GROWTH & WELFARE* 76 (1969) (discussing economic factors that determine the optimal patent life). A patent system represents a second-best solution to the problem of inducing sufficient levels of innovation. It may be the most effective method of inducing innovation, yet the optimal level of innovation using a patent system will not be the same as the first-best optimum. See *id.* at 87.

13. A patent's legal monopoly does not necessarily make a patent valuable in an economic sense. See F. SCHERER, *INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE* 440 (2d ed. 1980) (suggesting that vast majority of patents are without value). An economically valuable patent must either introduce some cost savings over current production techniques or offer an improved or entirely new product. If it does neither, a patent will not have any value.

14. Allocative inefficiency occurs because the opportunity costs of making the technology available to an additional user—costs that are presumably negligible—are far less than the price consumers must pay to obtain the benefits of the technology. See Arrow, *supra* note 10, at 617. The social welfare-maximizing price of a patent is zero, because once the patented technology exists, the marginal costs of using it are zero. W. NORDHAUS, *supra* note 12, at 86-87. Restricting the supply of the technology embodied in the patent causes deadweight loss. Because a patent system necessarily entails this deadweight loss, that system can never be an allocatively efficient method of inducing technical change. *Id.*

Posner has argued in other contexts that the social cost of monopoly should also include expenditure of resources in rent-seeking behavior. See Posner, *The Social Costs of Monopoly and Regulation*, 83 J. POL. ECON. 807, 809-15 (1975). This argument does not apply to monopolies like patents, where the purpose of sanctioning the monopoly is to encourage investment in rent-seeking behavior related to innovation. See R. BORK, *supra* note 6, at 396 (arguing that some monopolies are by-product of socially desirable activity); Posner, *The Chicago School of Antitrust Analysis*, 127 U. PA. L. REV. 925, 935 n.27 (1979) [hereinafter cited as Posner, *The Chicago School*].

15. See R. NELSON & S. WINTER, *supra* note 9, at 330-31. The disclosure of the patented technology necessary in order to obtain the patent, however, ensures that, upon expiration of the patent, the average technology will coincide more closely with the best technology than if the patented technology had not been disclosed. On balance, it is difficult to reach any firm conclusion about the

A patent owner can appropriate the value of his patent from royalties paid to him by other firms that use the patented technology¹⁶ or from the additional producer surplus gained by using his patented technology in his own products.¹⁷ The value of any patent is thus dictated by the marketplace. By using the market to reward inventors, society encourages the types of innovation that consumers value most,¹⁸ without making it necessary for the government to determine the social value of inventions.¹⁹

B. *A Standard of Socially Efficient Patent Exploitation*

The patent system that Congress created reflects a tradeoff between dynamic and static efficiency. By establishing monopolies, Congress indicated its willingness to accept some deadweight loss as the price of increased innovation. At the same time, the limitations it placed on patent monopolies with respect to both the types of invention for which monopolies would be conferred²⁰ and the duration of these monopolies,²¹ express a countervailing concern that society should not ignore the social costs of inducing innovation.

Because the market determines both the value of the patent and its cost to society, the actual tradeoff between the rate of invention and allocative inefficiency will depend upon the manner in which a patent owner exploits his legal monopoly.²² In general, a patent owner's efforts to maxi-

benefits or costs of the effect of the patent system on innovation diffusion. See F. SCHERER, *supra* note 13, at 441-42.

16. In order to calculate the optimal royalty for a patent, the patent owner must find the quantity for which the marginal costs of providing the patent to an additional user are equal to the marginal revenues associated with the derived demand for the patented technology. See W. NORDHAUS, *supra* note 12, at 71-73; McGee, *Patent Exploitation: Some Economic and Legal Problems*, 9 J.L. & ECON. 135, 137-44 (1966).

17. A patent may increase producer surplus, see *supra* note 7, in two ways. First, it may reduce marginal costs over the relevant range of output and thereby increase the total difference between revenues and costs. Second, to the extent that a patent confers market power on a patent owner, the owner will be able to increase his profits by raising price and restricting output. The consumer surplus he captures from higher prices on the restricted output will more than offset the producer surplus he loses on foregone production.

18. W. BOWMAN, *supra* note 6, at 38; Baxter, *Legal Restrictions on Exploitation of the Patent Monopoly: An Economic Analysis*, 76 YALE L.J. 267, 274 (1966).

19. Baxter, *supra* note 18, at 273; cf. Coase, *The Theory of Public Utility Pricing and Its Applications*, 1 BELL J. ECON. 113, 116-21, 123-24 (1970) (arguing that regulatory schemes based on market signals reflect consumer satisfaction better than decisions made exclusively by government agencies). Arrow has questioned whether a market-oriented patent system will provide adequate incentives for firms to engage in basic research. Arrow, *supra* note 10, at 617-18. But see W. BOWMAN, *supra* note 6, at 26, 37 (noting that patent system's deficiencies with respect to encouraging basic research could be remedied by separate governmental initiatives).

20. Only inventions that are new, useful, and nonobvious are patentable. 35 U.S.C. §§ 101-103 (1976); cf. *Graham v. John Deere Co.*, 383 U.S. 1, 19 (1966) (noting notorious difference between standards applied by Patent Office and those applied by the courts).

21. 35 U.S.C. § 154 (1976 & Supp. V 1981) (limiting term of patent grant to 17 years).

22. This is obviously the case if a patent owner engages in collusive conduct with other patent owners, see W. BOWMAN, *supra* note 6, at 54-55; Priest, *Cartels and Patent License Arrangements*, 20 J.L. & ECON. 309 (1978) (distinguishing patent licensing arrangements that create industry cartels

mize monopoly profits will not minimize deadweight loss. Although certain licensing restrictions conceivably could both reduce allocative inefficiency and increase a patent owner's profits relative to other methods of monopolistic exploitation,²³ a patent owner is as likely to choose methods inconsistent with society's interest in minimizing deadweight loss. Certain economic aspects of the patent owner's decision make the divergence between private incentives and society's interests likely. These economic factors include the use of patented technology in variable proportions with other inputs,²⁴ the ability of patent owners to engage in price discrimination,²⁵ and the likelihood that patent owners will be motivated by strategic concerns.²⁶

from those that promote productive efficiency). This Note, however, is concerned with how this trade-off is affected by unilateral conduct. Bowman denies that vertical restrictions unilaterally imposed by the patent owner have any monopoly-extending potential. See W. BOWMAN, *supra* note 6, at 55. But see Williamson, Book Review, 83 YALE L.J. 647, 654-659 (1974) (criticizing Bowman's assertion).

23. Bowman offers several examples of licensing restrictions that might enhance efficiency: tying arrangements, W. BOWMAN, *supra* note 6, at 87, price discrimination, *id.* at 111-12, and resale price restrictions, *id.* at 131-39.

24. A variable proportion technology is one in which a given amount of final output can be produced using different mixes of factor inputs. In the vocabulary of microeconomics, the elasticity of substitution among inputs is greater than zero. See W. NICHOLSON, *supra* note 7, at 195-201 (defining elasticity of substitution). If *A* and *B* are substitutes in the production of *C*, but at least some of *A* is required to produce *C* and a patent owner has a monopoly only over input *A*, he will be able to increase his profits by extending operations into the production of *C* either through vertical integration or a tying arrangement. Whether this extension of monopoly power enhances or diminishes welfare depends on the elasticity of substitution and the elasticity of demand. See Warren-Boulton, *Vertical Control with Variable Proportions*, 82 J. POL. ECON. 783 (1974) (analysis of welfare implications using numerical simulations); see also Mallela & Nahata, *Theory of Vertical Control with Variable Proportions*, 88 J. POL. ECON. 1009 (1980) (clarifying Warren-Boulton's results through explicit analytical expressions of manner in which vertical control affects price of final output and input demands); Posner, *The Chicago School*, *supra* note 14, at 937 (conceding that vertical restrictions involving monopolized input used in variable proportions with other inputs could have adverse welfare consequences, but expressing reservations as to empirical significance of this possibility).

The ambiguous net welfare effect can be explained intuitively. If the patent owner charges a monopoly price for *A*, independent producers of *C* will choose an inefficient input combination for producing *C*. By imposing some sort of vertical control over these independent producers, the patent owner can improve the efficiency of producing *C*. See F. SCHERER, *supra* note 13, at 300-01 & n.7. While enhancing productive efficiency, monopolization of product *C*, made possible by the patent owner's monopoly, will affect the deadweight loss society incurs. The combination of gains in productive efficiency and the uncertain effect on allocative efficiency makes the total welfare effect uncertain.

25. A patent owner who discriminates among purchasers by charging different royalties for his patent based on the market in which the licensee operates (this is referred to as third-degree price discrimination, see F. SCHERER, *supra* note 13, at 316) will be able to increase his profits, but such a practice may diminish social welfare. See Posner, *The Chicago School*, *supra* note 14, at 935 nn.24-27 (criticizing R. BORK, *supra* note 6, at 397, for assuming that price discrimination will always be welfare-enhancing); see also J. ROBINSON, *THE ECONOMICS OF IMPERFECT COMPETITION* 188-95 (2d ed. 1969) (output effects of price discrimination will depend on relative shape of demand curves in markets served by discriminating monopolist).

Under certain circumstances, a patent owner may legally engage in price discrimination. See *USM Corp. v. SPS Technologies, Inc.*, 694 F.2d 505, 512 (7th Cir. 1982), *cert. denied*, 103 S. Ct. 2455 (1983); *Bela Seating Co. v. Poloron Prods., Inc.*, 438 F.2d 733, 738 (7th Cir.), *cert. denied*, 403 U.S. 922 (1971). But see *LaPeyre v. FTC*, 366 F.2d 117, 121 (5th Cir. 1966) (holding that evidence supported Commission's finding that discriminatory royalties diminishing competition violated § 5 of Federal Trade Commission Act).

26. See Gilbert & Newbery, *Preemptive Patenting and the Persistence of Monopoly*, 72 AM.

Antitrust policy provides a tool to resolve the conflict in patent policy created by this divergence of private and social interests. To some extent, courts have already employed the antitrust laws to police the manner in which patent owners exploit their patents.²⁷ These decisions, however, have failed to articulate a persuasive standard of socially efficient patent exploitation that recognizes the tradeoff between dynamic and static efficiency.

In the absence of explicit statutory guidance, courts must fashion a legal rule that balances these efficiencies and thereby reconciles the patent system with antitrust policy. At the very least, Congress intended that a patent owner be permitted to act like a monopolist who sets a single price for his monopoly output in order to maximize his short-run profits during the term of the patent monopoly.²⁸ The deadweight loss created by a single-price monopolist provides a benchmark for a standard of socially efficient patent exploitation.²⁹ If the deadweight loss a patent owner creates is less than this benchmark, his patent exploitation should be considered socially efficient; if the allocative inefficiency he causes exceeds the benchmark, his conduct must be deemed anticompetitive. Although this is not the only conceivable standard available to courts,³⁰ it is the only one that resolves

ECON. REV. 514 (1982) (arguing that current patent owner has incentives to engage in preemptive patenting and other entry-detering strategies if he fears competition from developers of new patents).

27. See *infra* pp. 846-49.

28. The single-price monopoly standard has frequently been invoked by commentators to evaluate the relative social efficiency of a particular form of patent exploitation. See W. BOWMAN, *supra* note 6, at 64 (various kinds of patent restrictions "will be shown to be . . . efficient socially, in terms of consumer interest when compared with the monopoly alternative where use restriction is outlawed and where a single uniform royalty rate is insisted upon for all prospective licensees"); Williamson, *supra* note 22, at 659 (implying that welfare properties of vertical market restrictions should be evaluated relative to case in which monopoly output is priced at uniform rate).

29. The reader is cautioned against regarding this standard of socially efficient patent exploitation as a purely economic standard. It does not define a first-best optimum because it does not explicitly evaluate the marginal benefits and costs of different forms of patent exploitation. Rather, it assumes that the 17-year patent grant established by Congress provides the proper economic incentives for innovation. Even as a second-best approximation, however, the conclusions derived from this standard are valid only in a partial equilibrium sense; in other words, the standard ignores the effects of the price distortion in other markets.

30. At one extreme, courts could make the preservation of patent owners' incentives their primary concern; deadweight loss could be minimized subject to the preservation of patent owners' incentives. This rule, strictly applied, would entirely exempt patent exploitation from antitrust scrutiny. Since incentives to innovate are an increasing function of reward, regardless of whether the reward has its source in efficient or anticompetitive conduct, no conduct would ever be prohibited if courts were concerned only with preserving incentives. Under such a blanket exemption, the patent owner's profit-maximizing calculus would not reflect the additional costs he inflicts on society by choosing discriminatory or strategic methods of exploitation.

The other extreme—to condemn all forms of patent exploitation that create allocative inefficiency—is equally unappealing. Such a policy would eliminate the patent system, since patent exploitation necessarily entails some deadweight loss.

Some commentators have suggested looking to the "competitive superiority" of a patent as a more palatable alternative for evaluating a patent owner's conduct than either of these extremes. See W. BOWMAN, *supra* note 6, at 54; Furth, *Price-Restrictive Patent Licenses Under the Sherman Act*, 71 HARV. L. REV. 815, 817 (1958). Furth narrowly defines this standard as the additional economic

the second-best problem society faces: It allows patent owners to maximize their returns subject to a given level of deadweight loss.

C. *The Welfare-Enhancing Properties of Patent Licensing*

The first step in assessing the social efficiency of a patent owner's licensing decision is to determine whether he has an incentive to license his patent efficiently. If a firm other than the patent owner has a cost advantage relative to the owner in the production of goods that use the patent technology, the patent owner who attempts to maximize short-run profits will benefit from a licensing agreement.³¹ In the absence of transaction costs, and given perfect information about production costs of competitors and consumer demand, licensing will lead to productive efficiency in exploiting the patent: The most cost-efficient firm will employ the patented technology.³² Under these conditions, the efficient producer's monopoly

rents a patent owner earns on patented products absent any suppression of rivalry among competitors because of the patent. *See id.* at 816-17, 838. This standard would essentially allow a patent owner to obtain a reward commensurate with the cost-savings attributable to the patent. *See id.* at 838-41. Bowman offers a broader interpretation of competitive superiority that looks to the added economic surplus created by a new invention as a measure of the deadweight loss society will tolerate from a patent owner's non-collusive efforts to maximize his profits. Thus, Bowman's approach differs from Furth's in two respects. Bowman would permit restrictions on unpatented products that enhance overall efficiency. More importantly, Bowman is willing to offset loss in consumer surplus with gains in producer surplus. *See W. BOWMAN, supra* note 6, at 128-30 (noting differences between his own and Furth's concept of competitive superiority).

The fact that the two definitions are slightly different is unimportant in weighing their merit against the standard of socially efficient patent exploitation proposed here. Bowman's version of competitive superiority will always be more permissive, and Furth's will generally be more permissive, than the socially efficient standard. For example, a unilateral refusal to license would always be tolerated under a standard of competitive superiority. Neither Furth nor Bowman offers any justification for this toleration. This shortcoming is most noticeable in Bowman's book, which seeks to demonstrate that some licensing restrictions will induce greater efficiency in exploitation than exploitation by a single-price monopolist. *W. BOWMAN, supra* note 6, at 113-16 (using diagrammatic exposition of price discrimination problem to argue that efficiency considerations favor a socially efficient standard). *See supra* note 29. When faced with a choice between standards of social efficiency and competitive superiority, however, Bowman inexplicably chooses the latter. *See W. BOWMAN, supra* note 6, at 88 (arguing that tying arrangement using inputs in variable proportions should be lawful, because such an arrangement can never violate standard of competitive superiority, even if arrangement is not socially efficient); *id.* at 112-13 (patent owner's price discrimination should not be condemned even if it leads to reduction in monopoly output, that is, diminished social welfare relative to welfare with uniform monopoly pricing).

Baxter has suggested an entirely different standard built around the commercial exigencies of patent exploitation: He would limit restrictions on utilization of unpatented goods as narrowly as is economically feasible given the legislatively determined balance between costs and benefits inherent in a patent system. *Baxter, supra* note 18, at 313. Like the standard of competitive superiority, Baxter's standard assumes that a patent owner's unilateral restrictions with respect to patented goods should be legal. Although Baxter's effort to minimize the economic effects on unpatented products appeals to economic intuition, it lacks any solid economic justification.

31. *See W. BOWMAN, supra* note 6, at 70.

32. *See McGee, supra* note 16, at 139-40.

price will be lower and monopoly quantity will be greater than the price-output combinations of less efficient producers.³³ With respect to productive efficiency, society's interests and the patent owners' incentives coincide: Firms' profit-maximizing behavior will encourage socially efficient patent exploitation.

Licensing arrangements will not always give the most efficient user access to the patent technology when the patent owner includes the costs of monitoring an agreement in his licensing decision, or when information necessary to exploit a patent efficiently—information regarding the patent owner's production costs, the production costs of prospective licensees, and the extent of market demand and growth—is unavailable to patent owners.³⁴ Neither the patent owner nor society benefits, however, from the social costs occasioned by the existence of transaction costs or imperfect information; the patent owner therefore has an incentive to minimize these costs.³⁵ Thus, while transaction costs and imperfect information contribute to the inefficiency of using a patent system to allocate intellectual property rights, they do not fundamentally alter the conclusion that the discretion of patent owners as to licensing generally enhances productive efficiency.

D. *Anticompetitive Incentives and the Patent Owner's Decision to License*

If patent owners were concerned only with short-run profit maximization, the welfare-enhancing properties of patent licensing would make fur-

33. This result can be demonstrated by comparing the output decisions of an efficient monopolist to those of a relatively less efficient monopolist. Both face the same negatively sloping demand curve: At lower prices there is greater demand. A total revenue function can be computed by multiplying price and quantity (q) for each point on the demand curve, and may be expressed (or graphed) as a function of q . The slope of the total revenue curve at any q is the marginal revenue, which will also decrease as a function of q . A monopolist chooses quantity at the point where marginal costs equal marginal revenue. By definition, the efficient monopolist's marginal costs are everywhere less than those of his less efficient counterparts. He will therefore choose to produce more than the inefficient monopolist because his lower marginal costs allow him to keep producing profitably beyond the less efficient monopolist's profit-maximizing level of output. At this higher level of output, consumers will face lower prices because of the negatively sloping demand curve.

34. Information known by licensees is relevant to the patent owner's choice of method to set royalties. Licensees have incentives not to reveal the true extent of their cost efficiency to a patent owner, except to demonstrate that they are at least as efficient as any other user. The combination of informational asymmetry (the two transacting parties have access to different information) and the fact that it is in the interest of one party to withhold information gives rise to information impactedness. See O. WILLIAMSON, *MARKETS AND HIERARCHIES: ANALYSIS AND ANTITRUST IMPLICATIONS* 26-35 (1975). The impediment to productive efficiency created by information impactedness can be diminished through imposition of price and output restrictions on licensees. See Priest, *supra* note 22, at 318-23.

35. Although the patent owner will try to minimize transaction costs subject to a given level of profit, occasionally he will choose to incur transaction costs in order to maximize profits in situations that diminish social welfare. See Williamson, *supra* note 22, at 659-60; cf. O. WILLIAMSON, *supra* note 34, at 10-13 (arguing perfect price discrimination may be welfare-diminishing in presence of transaction costs).

ther judicial scrutiny of the licensing decision unnecessary. If, as is more likely, a patent owner seeks to maximize long-run profits,³⁶ he may respond to incentives that will not induce socially efficient patent licensing. The limited duration of a patent is one factor that will make the patent owner's long-run profit-maximizing calculus diverge from its short-run counterpart. In the long run, a patent owner will try to maximize not merely the economic rents he derives from his legal monopoly—appropriately discounted³⁷—but, in addition, the value of any residual market power³⁸ attributable to his patent upon its expiration. If a patent owner is able to increase his residual market power through strategic behavior, there is no reason to assume that his licensing decision will be socially efficient.

Recent economic models of entry-detering behavior demonstrate that a firm already established in a market can make irreversible commitments of productive resources, such as plant capacity, in order to affect adversely the profit opportunities of potential competitors in a post-entry equilibrium.³⁹ By diminishing the potential profits of foreseeable competitors, ir-

36. F. SCHERER, *supra* note 13, at 229. Some economists have questioned the realism of assuming that the sole objective of firms is to maximize profits. See *generally id.* at 29-41 (surveying recent criticism of profit-maximization hypothesis). The implications of non-profit-maximizing behavior for patent licensing are unclear.

37. Throughout this Note, it is necessary to compare profits from different time periods. Strictly speaking, however, a dollar earned a year from now is worth less to an individual than the dollar he earns today. In order to make the dollar-denominated values from different time periods comparable, that is, to obtain the present value of each dollar, one must discount the value of future dollars earned by the time value of money. See *generally* R. BREALEY & S. MYERS, *PRINCIPLES OF CORPORATE FINANCE* 26-39 (1981) (explaining methods of calculating present value). For the remainder of this Note, all profits and costs are assumed to be in present value terms unless otherwise specified.

38. Market power, loosely defined by courts as "the power to control prices or exclude competition," *United States v. E.I. du Pont de Nemours & Co.*, 351 U.S. 377, 391 (1956), refers in economics to a firm's ability to increase profits by restricting its own level of output and maintaining prices above marginal cost.

The Lerner Index—the difference between price and marginal cost expressed as a percentage of price—is a frequently used approximation of market power for a single dominant firm. This measure can be used to show that market power is inversely related to the market elasticity of demand (the percentage change in quantity demanded for a one percent change in price) and the elasticity of supply of other fringe competitors (the percentage change in quantity supplied by competitors for a one percent change in price). In addition, holding all other factors constant, market power is directly related to a firm's market share. See Landes & Posner, *Market Power in Antitrust Cases*, 94 HARV. L. REV. 937, 944-51 (1981).

39. For excellent non-technical introductions to the relationship of binding commitments of resources to entry-deterrence, see Dixit, *Recent Developments in Oligopoly Theory*, 72 AM. ECON. REV. PAPERS & PROC. 12-14 (1982) [hereinafter cited as Dixit, *Oligopoly Theory*]; Salop, *Strategic Entry Deterrence*, 69 AM. ECON. REV. PAPERS & PROC. 335 (1979).

The commitment of resources can take a number of different forms. See Dixit, *The Role of Investment in Entry-Deterrence*, 90 ECON. J. 95 (1980) [hereinafter cited as Dixit, *Entry-Deterrence*] (production capacity); Prescott & Visscher, *Sequential Location Among Firms with Foresight*, 8 BELL J. ECON. 378 (1977) (plant location); Schmalensee, *Entry Deterrence in the Ready-to-Eat Breakfast Cereal Industry*, 9 BELL J. ECON. 305 (1978) (brand proliferation); Gilbert & Newbery, *supra* note 26 (patenting) (Their analysis includes an examination of the entry-detering potential of investments in excess capacity when coupled with preemptive patenting.)

reversible investments in plant and equipment can discourage entry by those competitors into the incumbent firm's market.⁴⁰ A patent that confers competitive superiority on its owner may permit him to act like an established firm in an entry-detering model.⁴¹ By using his technological superiority to gain first-mover advantages, which allow him to deter entry,⁴² the patent owner can augment his long-run market power and enhance the value of his residual market power upon expiration of his patent.

A patent owner who refuses to license his patent in order to deter long-run entry will diminish social welfare. During the term of the patent, the patent owner seeking to deter entry may reserve the patent for his own exclusive use when he is not in fact the most efficient user of the technology. The patent owner's relatively higher marginal costs will lead him to choose a smaller monopoly output than his more efficient competitors would have chosen.⁴³ Moreover, social welfare in the post-expiration period will be diminished because the patent owner will possess greater

40. See Dixit, *Entry-Deterrence*, *supra* note 39 (suggesting situations in which investment in capacity will allow firm to deter entry successfully); see also Spence, *Entry, Capacity, Investment and Oligopolistic Pricing*, 8 BELL J. ECON. 534 (1977) (arguing that investment in capacity can be used to affect potential entrant's competitive opportunities, and comparing excess capacity hypothesis with limit pricing strategies); Spence, *Investment Strategy and Growth in a New Market*, 10 BELL J. ECON. 1, 11-14 (1979) (examining investment in capacity as entry-detering strategy in growing market structure in which firms face financial constraints).

41. See Gilbert & Newbery, *supra* note 26, at 515, 519, 524. Although Gilbert and Newbery focus primarily upon the entry-detering potential of preemptive patenting, they explicitly note the applicability of their argument to other forms of entry-detering behavior, such as investment in excess capacity.

42. "First-mover advantages may be said to favor those firms which, for whatever reason, were there [in a market] early." O. WILLIAMSON, *supra* note 34, at 216. One such advantage is the ability to make binding commitments of resources in order to affect adversely the profitability of competitors. See Salop, *supra* note 39, at 335.

The initial or dominant firm in a market may receive other first-mover advantages that enhance social welfare but that can also be exploited so as to discourage entry. These benefits include: the opportunity to achieve economies of scale, see Schmalensee, *Economies of Scale and Barriers to Entry*, 89 J. POL. ECON. 1228 (1981) (suggesting for certain specifications of demand that effect of economies of scale in deterring entry will be limited by the size of incumbent's capital investments); gains from learning-by-doing, see Spence, *The Learning Curve and Competition*, 12 BELL J. ECON. 49 (1981) (discussing effect of learning curve phenomenon on competition); and brand loyalty among consumers, see Schmalensee, *Product Differentiation Advantages of Pioneering Brands*, 72 AM. ECON. REV. 349 (1982) [hereinafter cited as Schmalensee, *Product Differentiation*] (arguing that such advantages are likely to be substantial). Although these competitive benefits may be relevant to understanding the particular strategy undertaken by a patent owner, they will largely be ignored here because of the complexity they introduce into the analysis. While consideration of these factors may be important to the proper disposition of individual cases under the kind of legal standard advocated in this Note, these factors are irrelevant to assessing the merits of the legal argument advanced here.

43. During the term of the patent, whether there is a reduction in social welfare will depend on how a firm's investments in excess capacity affect its short-run cost functions. The patent owner could increase his pre-expiration output by investing in excess capacity. See Spulber, *Capacity, Output, and Sequential Entry*, 71 AM. ECON. REV. 503, 512 (1981). The owner's marginal costs may increase over the short run, however, and may lead him to produce less in that period. See Stiglitz, *supra* note 8, at 187-88. Regardless of its effect on output in the pre-expiration period, entry-detering behavior will always diminish social welfare.

market power as a result of his entry-detering activities.⁴⁴ License refusals that deter entry do not promote socially efficient patent exploitation and therefore are justifiably condemned as anticompetitive.

Even if one concedes that a patent owner's refusals to license could be anticompetitive in theory, one may continue to doubt that patent owners will engage in such conduct. It has been argued that entry-detering strategies requiring investment in excess capacity will rarely be employed because such strategies are seldom profit-maximizing.⁴⁵ A patent owner will bear the otherwise avoidable costs of maintaining excess capacity only if the additional profits from engaging in such a strategy exceed the costs of strategic investments. If the patent owner and prospective entrants are rational actors, two conditions must be satisfied for the patent owner to maintain excess capacity as a method of deterring entry: He must make his production decisions on the assumption that other firms will alter their own production plans in a predetermined fashion;⁴⁶ and his best strategy in the event of entry by a competitor must be to expand output.⁴⁷

If a patent owner comes to dominate a market during the term of his grant, the formal conditions that make entry deterrence profitable are more likely to be satisfied. While the effect on market structure of obtaining a patent is unlikely to be dramatic or immediate in most instances, there will be cases in which a patent owner can use his patent to displace competition in an existing market. In such cases, the patent owner is likely to recognize the effect of his own production decisions on the price and output decisions of competitors, thereby satisfying the first condition.

44. Entry-detering behavior enhances a dominant firm's market power by reducing both the supply elasticity of competitors and their market share. Because deadweight loss, *see supra* note 8 (defining deadweight loss), is an increasing function of market power, *see Landes & Posner, supra* note 38, at 954 n.32, 991-96, behavior that increases a firm's market power will adversely affect social welfare. *See Schmalensee, Another Look at Market Power*, 95 HARV. L. REV. 1789, 1790-92, 1809-10 (1982).

45. *See Spulber, supra* note 43, at 504, 512 (arguing that firms will maintain excess capacity only under quite limited conditions). Although Spulber's analysis is extremely valuable in formulating models that include investments in excess capacity, his conclusions should not be accepted without scrutiny. First, highly stylized models in which actors pursue rational game-theoretic strategies ignore the effects of uncertainty and financial constraints on firm behavior. Second, investment in excess capacity is only one type of strategy in a vast array of entry-detering models. Other forms of entry deterrence may be preferred to an excess capacity strategy, or other forms of entry deterrence may be used in conjunction with investment in excess capacity. *See Gilbert & Newbery, supra* note 26, at 519-21 (discussing use of investments in excess capacity in conjunction with preemptive patenting).

46. *See Spulber, supra* note 43, at 511-12. More precisely, the established firm acts as a leader in a model with a Stackelberg equilibrium. In one variant of a Stackelberg duopoly model, one player is cast as a follower, and the other player as a leader. The follower—here, the entrant—will make his output decision assuming that the leader will not change his production decision in response to the follower's production decision. The leader—the patent owner already established in the market—chooses his level of output knowing how the follower will react in terms of production, and thus will have an advantage. For an accessible explanation of Stackelberg gaming behavior, *see K. COHEN & R. CYERT, THEORY OF THE FIRM: RESOURCE ALLOCATION IN A MARKET ECONOMY* 240-43 (2d ed. 1975).

47. *See Spulber, supra* note 43, at 511.

Whether a patent owner is likely to increase output in response to entry will, of course, depend on his particular production function and the sensitivity of the entrant's production decision to the monopolist's choice of output.⁴⁸ Denying competitors access to patented technology may thus facilitate a patent owner's efforts to achieve market dominance.⁴⁹

II. Reconciling Patent Rights and Antitrust Restrictions

From an economic perspective, a unilateral refusal to license a patent can be the result of either efficient patent exploitation or anticompetitive conduct. Courts have consistently ignored the anticompetitive potential of such refusals, however, and have accorded immunity to the decisions of patent owners denying competitors access to patented technology.⁵⁰ Not only are the reasons offered to support such decisions fundamentally unpersuasive, they are inconsistent with the antitrust analyses courts have applied to other forms of patent-related conduct. A court faced with a refusal to license a patent should apply the same standards that are used to determine whether other patent-related practices are exempt from the antitrust laws. When it finds that a refusal is not entitled to antitrust immunity, the court should determine whether the refusal amounts to an antitrust violation.

A. *The Inadequate Foundation for Current Judicial Practice*

The willingness of courts to imply an antitrust exemption for refusals to license stems from their unwarranted fears that imposing liability would adversely affect incentives to innovate, and their underestimation of the anticompetitive potential of such refusals. These fears are most strongly expressed in the argument that subjecting some refusals to license to antitrust liability would seriously undermine the incentive structure of

48. A patent owner will increase output in the event of another firm's entry if the profit-maximizing level of output for the resulting Stackelberg equilibrium exceeds the pre-entry monopoly output.

If the other conditions of Spulber's analysis are disregarded, there are additional reasons why an owner may increase output in response to entry. For instance, the patent owner may engage in limit pricing, that is, attempt to inhibit entry by reducing prices to a level at which a potential entrant would find entry unprofitable. Although such a strategy sacrifices short-run monopoly profits, the strategy may nevertheless prove profitable if it succeeds in forestalling entry by competitors. See F. SCHERER, *supra* note 13, at 234-39. The success of this strategy depends upon the credibility of the established firm's threat to resist entry of competitors. Limit pricing also may be successful if entrants regard observed prices as a signal of the incumbent firm's marginal costs. See Salop, *supra* note 39, at 337.

49. But see Baxter, *supra* note 18, at 317 (arguing that patent owners will seldom gain long-run market power from refusal to license). The models discussed here are limited by the restrictive assumptions characteristic of game-theoretic models presupposing "super"-rational behavior. None of the formal models discussed here considers the effect of financial constraints on the entrant, with the exception of Spence, *supra* note 40, at 34. Thus, these models should not be interpreted to mean that other anticompetitive scenarios are impossible.

50. See *supra* note 4.

the patent system.⁵¹ This argument is clearly overstated. A rule that merely limits owners' discretion to deny patent licenses would not substantially affect the rewards of patent owners.⁵² Refusals that are socially efficient would be unaffected by such a rule.⁵³ Even in cases in which a court compelled licensing, a patent owner could still extract the value of his patent monopoly through royalties.

A weaker form of this argument asserts that such an extension, although perhaps justified in certain cases, risks sacrificing the economic benefits of the patent system.⁵⁴ While this argument must be considered in determining whether the benefits of imposing antitrust liability outweigh the costs, it does not address the threshold question of whether the law should scrutinize refusals to license. The practical issues of whether a rule can be formulated that accurately discriminates between socially efficient and anticompetitive licensing, and whether such a rule would provide adequate notice to patent owners who are in violation, should be postponed.

A final legal argument for exempting unilateral refusals to license treats a patent owner's freedom to refuse as a mere corollary of his recognized right to suppress a patent completely.⁵⁵ This analogy ignores the very different effects these two actions have upon competition. A refusal to license may allow a patent owner who reserves his patent for his exclusive use to enhance his future market power. In contrast, suppression gives him no strategic advantage, and therefore cannot be used for anticompetitive

51. See *United States v. Westinghouse Elec. Corp.*, 648 F.2d 642, 648 (9th Cir. 1981); *SCM Corp. v. Xerox Corp.*, 645 F.2d 1195, 1206 (2d Cir. 1981), *aff'd on other grounds* 463 F. Supp. 983 (D. Conn. 1978), *cert. denied*, 445 U.S. 1016 (1982); see also Comment, *Accommodating Patent and Antitrust Law: Monopolists' Lawful Patenting Conduct and SCM Corp. v. Xerox Corp.*, 60 B.U.L. REV. 78, 107-08 (1980) (criticizing district court's opinion in *SCM* because standard of liability adopted by court would have chilling effect on innovation).

52. See *Mannington Mills v. Congoleum Indus.*, 610 F.2d 1059, 1071 (3d Cir. 1979) (suggesting that added income from licensing restrictions that violate antitrust laws is unlikely to affect patent owner's incentives); Furth, *supra* note 30, at 829; Turner, *The Patent System and Competitive Policy*, 44 N.Y.U. L. REV. 450, 459 (1969).

53. But cf. Note, *supra* note 8, at 785 (overly broad rule of antitrust liability with respect to inventive activities may reduce expected return for legitimate forms of innovation). Although the expected return to legitimate innovative activities may be reduced by the possibility that courts will mistakenly impose antitrust liability, this possibility can be minimized by formulating precise liability standards.

54. See *SCM Corp. v. Xerox Corp.*, 463 F. Supp. 983, 1012-15 (D. Conn. 1978) (holding that damages, unlike injunctive relief, may not be obtained for refusal to license, because imposition of damage liability would affect legitimate activities of inventors), *aff'd on other grounds*, 645 F.2d 1195 (2d Cir. 1981), *cert. denied*, 455 U.S. 1016 (1982).

55. At least two cases support an unqualified right of owners to suppress their patents. See *Special Equip. Co. v. Coe*, 324 U.S. 370, 379-80 (1945) (holding patent owner entitled to receive patent that he intended to suppress in order to favor his other patent); *Continental Paper Bag Co. v. Eastern Paper Bag Co.*, 210 U.S. 405, 429 (1908) (holding that non-use of patent does not render its owner's rights unenforceable). These cases have in turn been used to argue that the patent owner enjoys an unqualified right not to license. See *Dawson Chem. Co. v. Rohm & Haas Co.*, 448 U.S. 176, 215 (1980) (citing *Continental Paper Bag* in support of patent owner's right to refuse to license).

purposes.⁵⁶

B. *Patent Exploitation and Antitrust Immunity*

The reluctance of courts to scrutinize refusals to license patents stands in sharp contrast with their willingness to police other forms of patent exploitation. Although courts have recognized that the patent system expresses a congressionally established exception to the antitrust laws,⁵⁷ they have limited this exemption to only those patent practices reasonably related to the reward Congress intended to provide individuals through creation of patent rights.⁵⁸ The "legitimate scope of the patent grant" constitutes the judicial standard for practices tolerated as reasonably related to the intent of Congress.⁵⁹

The concept of socially efficient patent exploitation provides an economic benchmark for determining the legitimate scope of the patent grant.⁶⁰ Under this interpretation, any method of patent exploitation not

56. Justice White, joined by three other Justices, distinguished patent suppression from a refusal to license a patent on these grounds:

The fact that respondent may not refuse to license competing sellers of propanil who do not purchase the product from it is not inconsistent with the notion that a patent holder is free to suppress his invention or to reserve it entirely to himself. Respondent may discontinue all sales of propanil and all licensing of its patented process and yet itself continue to use propanil in the patented process without being guilty of patent misuse. But it may not sell propanil to others, thus granting them patent licenses by operation of law, while refusing to license competing sellers of propanil, thus effectively excluding them from the market.

Dawson Chem. Co. v. Rohm & Haas Co., 448 U.S. 176, 234 n.10 (1980) (White, J., dissenting). Although Justice White's remarks addressed the exclusionary effect of the patent owner's practice in unpatented product markets, his analysis implicitly argues for distinguishing between suppression and other refusals to license based on their respective effects in markets after a patent expires.

57. Lear, Inc. v. Adkins, 395 U.S. 653, 663 (1969); see United States v. Line Material Co., 333 U.S. 287, 310 (1948); cf. Dawson Chem. Co. v. Rohm & Haas Co., 448 U.S. 176, 221 (1980) (patent and antitrust laws reflect compromise by Congress between equally important policies of stimulating inventions and protecting competition).

58. United States v. General Elec. Co., 272 U.S. 476, 489 (1926) (holding price-restrictive patent licenses immune from antitrust scrutiny when patent owner acts alone). The application to price-restrictive licenses of the general rule regarding the scope of a patent is controversial. On two occasions, the rule of *General Electric* relating to price-restrictive licenses narrowly survived challenge. See United States v. Line Material Co., 333 U.S. 287 (1948) (holding particular price-restrictive license illegal, but Court equally divided as to whether all such licenses are illegal); United States v. Huck Mfg. Co., 227 F. Supp. 791 (E.D. Mich. 1964), *aff'd per curiam by an equally divided Court*, 382 U.S. 197 (1965). The wisdom of *General Electric's* use of the legitimate scope of the patent grant as the test for antitrust liability, however, is generally accepted, even by critics of *General Electric*. See L. SULLIVAN, HANDBOOK OF ANTITRUST LAW § 185 (1976).

59. For examples of particular restrictions found to be within the scope of the patent owner's grant and therefore not subject to antitrust scrutiny, see *Dunlop Co. v. Kelsey-Hayes Co.*, 484 F.2d 407, 417 (6th Cir. 1973) (territorial restriction upon foreign licensees, prohibiting export of output to United States), *cert. denied*, 415 U.S. 917 (1974); *United States v. Ciba Geigy Corp.*, 508 F. Supp. 1118, 1149-50 (D.N.J. 1976) (packaging restrictions to prevent bulk sales); *Q-Tips, Inc. v. Johnson & Johnson*, 109 F. Supp. 657, 661 (D.N.J. 1951) (output restriction), *aff'd*, 207 F.2d 509 (3d Cir. 1953), *cert. denied*, 347 U.S. 935 (1954). But see *Transparent-Wrap Mach. Corp. v. Stokes & Smith Co.*, 329 U.S. 637, 647-48 (1947) (arguing that, although grant-back provision in patent license did not exceed the legitimate scope of patent, practice was not necessarily immune from antitrust laws).

60. See *supra* pp. 838-39 (discussing standard of socially efficient patent exploitation). The use of

socially efficient, and hence anticompetitive, is beyond the legitimate scope of a patent. Those refusals to license that do violate the standard of social efficiency should not be immune from the antitrust laws. The most persuasive justification for using this standard to define the scope of a patent is the lack of a coherent alternative: Defining the scope of a patent without reference to economic considerations will only lead to an imprecise and arbitrary rule.⁶¹

This economic condemnation of anticompetitive refusals to license a patent is fully consistent with the existing doctrine of patent misuse, which identifies and condemns certain practices used to extend illegitimately the scope of the patent.⁶² Although patent misuse will not always imply an antitrust violation,⁶³ once a practice is found to constitute patent misuse, it is no longer immune from the antitrust laws.⁶⁴ Patent-related

economic analysis in analyzing licensing restrictions has been implicitly endorsed by courts. See *USM Corp. v. SPS Technologies, Inc.*, 694 F.2d 505, 511-12 (7th Cir. 1982) (Posner, J.) (suggesting that determinations of patent misuse be based on evaluation of competitive effects of challenged restriction), *cert. denied*, 103 S. Ct. 2455 (1983); *United States v. Studiengesellschaft Kohle, m.b.H.*, 670 F.2d 1122, 1130 (D.C. Cir. 1981) (holding that challenged patent restriction violates antitrust laws only if it unreasonably restrains trade).

61. Compare the Court's conclusion in *Bement v. National Harrow Co.*, 186 U.S. 70, 91 (1902):

The very object of these laws is monopoly, and the rule is, with few exceptions, that any conditions which are not in their very nature illegal with regard to this kind of property, imposed by the patentee and agreed to by the licensee for the right to manufacture or use or sell the article, will be upheld by the courts.

with its conclusion in *United States v. Masonite Corp.*, 316 U.S. 265, 280 (1942): "Since patents are privileges restrictive of a free economy, the rights which Congress has attached to them must be strictly construed so as not to derogate from the general law beyond the necessary requirements of the patent statute."

Admittedly, these are rhetorical extremes, but they demonstrate the implicit danger of the legitimate scope standard: The standard itself may be used as a conclusory label rather than as a tool to analyze patent conduct. To treat the legitimate scope of the patent as a formal legal doctrine whose application is independent of policy considerations is to engage in the circular legal reasoning that Felix Cohen excoriated as the "thingification" of property." Cohen, *Transcendental Nonsense and the Functional Approach*, 35 COLUM. L. REV. 809, 813 (1935).

62. The patent misuse doctrine was formally recognized in *Morton Salt Co. v. G.S. Suppiger Co.*, 314 U.S. 488, 493 (1942). A long line of cases preceding *Morton Salt*, however—beginning with *Motion Picture Patents Co. v. Universal Film Co.*, 243 U.S. 502 (1917)—implicitly relied on the doctrine. The *Motion Picture* case established that the legitimate scope of a patent was the controlling issue in defining patent misuse. *Id.* at 516. The origins of the patent misuse doctrine are discussed extensively in both the majority opinion in *Dawson Chem. Co. v. Rohm & Haas Co.*, 448 U.S. 176, 189-99 (1980), and in Justice White's dissent, *id.* at 224-30 (White, J., dissenting).

63. See, e.g., *Zenith Radio Corp. v. Hazeltine Research, Inc.*, 395 U.S. 100, 140 (1969); *Morton Salt Co. v. G.S. Suppiger Co.*, 314 U.S. 488, 490 (1942). Dictum in *Mercoird Corp. v. Minneapolis-Honeywell Regulator Co.*, 320 U.S. 680, 684 (1944), suggesting that patent misuse amounts to an antitrust violation, has been criticized. REPORT OF THE ATTORNEY GENERAL'S NATIONAL COMMITTEE TO STUDY THE ANTITRUST LAWS 254 (1951).

64. See *International Salt Co. v. United States*, 332 U.S. 392, 395-96 (1947) (patent affords no immunity from antitrust sanctions when similar patent-related conduct has been condemned as patent misuse). The standards for patent misuse and antitrust immunity for patent-related conduct are virtually identical. Though this essential equivalence is rarely recognized explicitly, antitrust and patent misuse cases frequently cite to each other for authority in defining the legitimate scope of a patent owner's rights. Thus, in *United States v. Masonite Corp.*, 316 U.S. 265, 277 (1942)—an antitrust case—the Supreme Court cited *Morton Salt Co. v. G.S. Suppiger*, 314 U.S. 488 (1942)—a patent

conduct that does not constitute patent misuse cannot serve as the basis for an antitrust violation.⁶⁵

Anticompetitive refusals to license conform to a well-established pattern of conduct condemned by courts as patent misuse. Prominent among such condemned practices are tying arrangements between patented and unpatented products.⁶⁶ Courts perceive such arrangements as attempts by the patent owner to extend or leverage market power in the patented-product market to other product markets.⁶⁷ Although the economic underpinnings of leveraging have been severely criticized,⁶⁸ the tying cases provide legal precedent for the more economically justifiable condemnation of anticompetitive refusals to license.

An anticompetitive refusal to license and a tying arrangement differ in that the refusal is an attempt to perpetuate market power rather than to extend it across product markets. In *Brulotte v. Thys Co.*,⁶⁹ however, the

misuse case, asserting that monopoly beyond the scope of the patent constitutes patent misuse—to support its conclusion that a patent affords no immunity from the antitrust laws for a monopoly not within its legitimate scope. Similarly, in *General Talking Pictures Corp. v. Western Elec. Co.*, 304 U.S. 175, 181, *aff'd on rehearing*, 305 U.S. 124 (1938)—a patent misuse case—the Court cited *United States v. General Elec. Co.*, 272 U.S. 476, 489 (1926)—an antitrust case—for the proposition that conduct within the legitimate scope of the patent grant could not constitute patent misuse.

65. See *Zenith Radio Corp. v. Hazeltine Research, Inc.*, 395 U.S. 100, 140 (1969) (implying that injunction against patent owner sought under antitrust laws could not be obtained without finding of patent misuse); cf. *United States v. Glaxo Group, Ltd.*, 410 U.S. 52 (1973) (in allowing government to seek compulsory licensing of patent as remedy for patent misuse when antitrust violation arising from patent licensing restriction had been established, court implicitly recognized patent misuse as precondition for patent owner's antitrust liability).

66. See, e.g., *Morton Salt Co. v. G.S. Suppiger*, 314 U.S. 488, 491, 493 (1942); *Motion Picture Patents Co. v. Universal Film Co.*, 243 U.S. 502, 511 (1917); cf. *International Salt Co. v. United States*, 332 U.S. 392, 396 (1947) (tying arrangement involving patented input violates § 1 of Sherman Act, 15 U.S.C. § 1 (1982)); *International Business Mach. Corp. v. United States*, 298 U.S. 131, 136-37 (1936) (tying arrangement involving patented input violates § 3 of Clayton Act, 15 U.S.C. § 14 (1982)).

67. See, e.g., *Standard Oil Co. v. United States*, 337 U.S. 293, 305-06 (1949); *Carbice Corp. v. American Patents Dev. Corp.*, 283 U.S. 27, 31-32 (1931); cf. *Ethyl Gasoline Corp. v. United States*, 309 U.S. 436, 456-59 (1940) (licensing used to organize price-fixing conspiracy to leverage patent monopoly beyond patent's competitive superiority).

68. If capital markets are perfect, a firm with market power cannot increase that power through a tying arrangement so long as the tied products are used in fixed proportions. W. BOWMAN, *supra* note 6, at 70-76. The welfare effects of tying arrangements when inputs are used in variable proportion are less settled. At the very least, there are plausible explanations for tying arrangements other than leveraging, such as price discrimination or circumvention of government regulation. See R. BORK, *supra* note 6, at 372-81. Richard Schmalensee has examined a more general variety of tying arrangement in which a firm possessing a monopoly in a necessary input (the fixed input) used in variable proportions with another input (the variable input) ties sales of the two inputs. He shows that this tying arrangement will probably be welfare-enhancing if the variable input is priced above marginal cost, but that predation may be present if that input is priced below marginal cost. Schmalensee, *Monopolistic Two-Part Pricing Arrangements*, 12 BELL J. ECON. 445, 462-63 (1981).

Whether tying arrangements in fact permitted leveraging in cases in which they were condemned is beside the point in analyzing the leveraging potential of refusals to license patents. If a sound theoretical basis for leveraging with respect to certain practices can be constructed, then the law's sanctions should be directed at them. W. BOWMAN, *supra* note 6, at 60.

69. 379 U.S. 29 (1964) (holding license requiring royalty payments for output after patent's expiration unenforceable). The language of the majority opinion makes the analogy between market ex-

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Supreme Court held that such a distinction was without legal significance. Attempts to perpetuate the rewards of owning a patent beyond the patent's term exceed the patent's legitimate scope as much as attempts to extend the legal monopoly of a patent to unpatented products.

C. Patent Exploitation and Antitrust Liability

If a particular refusal to license is not immune from antitrust scrutiny, courts evaluating that refusal must proceed to determine whether it constitutes an antitrust violation. Section 2 of the Sherman Act,⁷⁰ which proscribes both monopolization⁷¹ and attempted monopolization,⁷² extends to unilateral conduct that would be lawful in the absence of any intent to create or maintain a monopoly.⁷³ Refusals to deal constitute one form of discretionary conduct repeatedly condemned as anticompetitive when employed by monopolists for the purpose of excluding competition.⁷⁴ Because a refusal to license a patent poses the same issue of misuse of monopoly power presented by a unilateral refusal to deal,⁷⁵ a refusal to license

tension and patent duration explicit:

A patent empowers the owner to exact royalties as high as he can negotiate with the leverage of that monopoly. But to use that leverage to project those royalty payments beyond the life of the patent is analogous to an effort to enlarge the monopoly of the patent by tying the sale or use of the patented article to the purchase or use of unpatented ones.

Id. at 33. For two different views on the economic merits of *Brulotte*, compare W. BOWMAN, *supra* note 6, at 232-35 (criticizing) with Baxter, *supra* note 18, at 327-29 (defending).

The Court's language allowing a patent owner to exact royalties as high as he can negotiate does not permit the owner to demand royalties so high as to discourage prospective licensees who are more efficient producers than the patent owner. His right to set high licensing fees is qualified; royalty structures set to facilitate leveraging should be prohibited. Although the *Brulotte* Court's holding specifically addressed royalties on products with technology on which the patent had expired, a patent owner who sets an unreasonably high royalty with the sole purpose of perpetuating his market power beyond his patent's expiration violates the spirit if not the letter of that holding.

70. 15 U.S.C. § 2 (1982).

71. "The offense of monopoly under § 2 of the Sherman Act has two elements: (1) the possession of monopoly power in the relevant market and (2) the willful acquisition or maintenance of that power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident." *United States v. Grinnell Corp.*, 384 U.S. 563, 570-71 (1966).

72. The offense of attempted monopolization consists of two elements: specific intent to monopolize, and dangerous probability of success. *See Lorain Journal Co. v. United States*, 342 U.S. 143, 153 (1951); *Swift & Co. v. United States*, 196 U.S. 375, 396 (1905).

73. *Lorain Journal Co. v. United States*, 342 U.S. 143, 155 (1951) (citing *United States v. Colgate & Co.*, 250 U.S. 300, 307 (1919)) (attempted monopolization); *see also United States v. United Shoe Mach. Corp.*, 110 F. Supp. 295, 343-44 (D. Mass. 1953) (holding that monopolist's leasing program constituted exclusionary conduct, a necessary element of the offense of monopolization, although conduct itself did not violate § 1), *aff'd per curiam*, 347 U.S. 521 (1954).

74. *See Otter Tail Power Co. v. United States*, 410 U.S. 366, 377 (1973) (refusal to sell or wheel electrical power to competing municipal power plants); *Lorain Journal Co. v. United States*, 342 U.S. 143, 154-55 (1951) (refusal to sell newspaper advertising space to patrons of radio advertiser); *Kodak Co. v. Southern Photo Materials Co.*, 273 U.S. 359, 375 (1927) (manufacturer-retailer refused to sell product to competing retail outlet); *see also Byars v. Bluff City News Co.*, 609 F.2d 843, 859-63 (6th Cir. 1979) (regional distributor of periodicals refused to deal with competing independent distributor) (vacating judgment for defendants).

75. This Note addresses only *unilateral* refusals to license a patent. A refusal to license that re-

should be analyzed using the same antitrust standards.⁷⁶

Proof of market power in a relevant market is a necessary element of the offense of monopolization.⁷⁷ Moreover, ascertaining the extent of a firm's monopoly power is an integral step in establishing attempted monopolization.⁷⁸ The competitive superiority of a particular patent—a measure of that patent's economic superiority relative to its nearest substitute technology—serves as an indication of the market power possessed by the patent's owner.⁷⁹ Even if a patent owner's market power is currently small, his patent may endow him with the potential to monopolize a particular product market successfully.⁸⁰

In addition to market power, some form of exclusionary conduct is necessary to establish liability for unilateral conduct under section 2.⁸¹ Al-

sults from collusion among competitors clearly violates the antitrust laws. *See, e.g.,* Zenith Radio Corp. v. Hazeltine Research, Inc., 395 U.S. 100, 118-19 (1969); United States v. Krasnov, 143 F. Supp. 184, 202-03 (E.D. Pa. 1956), *aff'd per curiam*, 355 U.S. 5 (1957); United States v. Besser Mfg. Co., 96 F. Supp. 304, 311 (E.D. Mich. 1951), *aff'd*, 343 U.S. 444 (1952).

76. One aspect of the antitrust doctrine condemning certain forms of unilateral refusals to deal prohibits holders of essential facilities or unique resources from arbitrarily discriminating among potential users or purchasers. *See* Otter Tail Power Co. v. United States, 410 U.S. 366, 377-79 (1973) (owner of regional power transmission equipment obligated to grant access to local power companies where access was necessary to preserve competition); United States v. Terminal R.R. Ass'n, 224 U.S. 383, 405 (1912) (association of competitors controlling geographically unique terminal facilities could not discriminate against non-member competitors); Hecht v. Pro-Football, Inc., 570 F.2d 982, 992-93 (D.C. Cir. 1977) (jury should be instructed as to special obligations of stadium owners to deal with competitors of lessee in event stadium facilities could not be duplicated and additional users could be accommodated), *cert. denied*, 436 U.S. 956 (1978). Application of the essential facility doctrine to patents, however, is inappropriate, because the doctrine would apply equally to efficient and to anticompetitive refusals to license. Employing such a broad doctrine would impair the efficient operation of the patent system. Although the essential facility doctrine may not be appropriate for condemning refusals to license a patent, application of other antitrust doctrines proscribing monopolists' unilateral refusals to deal should not be precluded.

77. *See* United States v. Grinnell Corp., 384 U.S. 563, 570-71 (1966); General Business Sys. v. North Am. Philips Corp., 699 F.2d 965, 971-72 (9th Cir. 1983); Byars v. Bluff City News Co., 609 F.2d 843, 849-53 (6th Cir. 1979).

78. Walker Process Equip., Inc. v. Food Mach. & Chem. Corp., 382 U.S. 172, 177 (1965) (to establish § 2 monopolization claim for fraudulent procurement of patent, court must appraise exclusionary power of illegal patent claim in terms of relevant market for product involved); *see, e.g.,* Edward J. Sweeney & Sons, Inc. v. Texaco, Inc., 637 F.2d 105, 117 (3d Cir. 1980), *cert. denied*, 451 U.S. 911 (1981); Photovest Corp. v. Fotomat Corp., 606 F.2d 704, 711-12 (7th Cir. 1979), *cert. denied*, 445 U.S. 917 (1980). *But see, e.g.,* General Business Sys. v. North Am. Philips Corp., 699 F.2d 965, 975-76 (9th Cir. 1983) (holding failure to establish market power in a relevant market precluded finding of liability for attempted monopolization, although proof of market power would be unnecessary for some types of conduct); William Inglis & Sons Baking Co. v. ITT Continental Baking Co., 668 F.2d 1014, 1029-30 & n.11 (9th Cir. 1981) (suggesting proof of market power may be relevant but not essential in establishing dangerous probability of success), *cert. denied*, 103 S. Ct. 57 (1982).

79. The relevant product market for determining a patent owner's market power may include more products than the patented product itself. *J.T. Gibbons, Inc. v. Crawford Fitting Co.*, 704 F.2d 787, 796 (5th Cir. 1983).

80. *See* Landes & Posner, *supra* note 38, at 954-55.

81. While, historically, courts insisted that purpose or intent to exercise existing monopoly power was sufficient to trigger liability under section 2, *see* United States v. Griffith, 334 U.S. 100, 107 (1948), in practice, they always inferred intent from conduct, *see, e.g., id.* at 109 (unlawful acquisition of market power); Standard Oil Co. v. United States, 221 U.S. 1, 75-76 (1911) (conclusive presump-

though the acquisition of market power through superior skill or business acumen may have the effect of eliminating competitors, such conduct is not condemned as exclusionary.⁸² A refusal to license a patent, however, should not be considered privileged competitive conduct merely because the patent is attributable to an owner's superior skill. Rather, courts must inquire whether monopoly power legitimately achieved is being unlawfully maintained.⁸³ A monopolist's conduct that unnecessarily excludes competitors is sufficient to satisfy the conduct requirement of section 2.⁸⁴ A refusal to license is unnecessarily exclusionary when a patent owner seeks to extend the benefits of his monopoly beyond the appropriate measure of reward for his superior skill. This measure is provided by the previously defined standard of socially efficient patent exploitation.⁸⁵ The violation of this standard by a patent owner's refusal to license indicates that he could have procured his proper reward through a less restrictive method of exploitation. Thus, a finding of patent misuse with respect to a particular refusal to license provides conclusive evidence of a patent owner's willful maintenance of monopoly power.⁸⁶

Making patent owners liable for anticompetitive refusals to license a patent is not inconsistent with the decision of the Second Circuit in *Ber-*

tion of exclusionary intent based on firm's conduct both in acquiring and exercising monopoly power).

More recently, courts have phrased the intent requirement for monopolization in terms of conduct. *See, e.g.,* *United States v. Grinnell Corp.*, 384 U.S. 563, 570-71 (1966) (willful acquisition or maintenance of monopoly power); *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 275 (2d Cir. 1979), *cert. denied*, 444 U.S. 1093 (1980). Similarly, courts will not find the requisite specific intent for attempted monopolization in the absence of any conduct supporting such an inference. *See* *William Inglis & Sons Baking Co. v. ITT Continental Baking Co.*, 668 F.2d 1014, 1030-31 (9th Cir. 1981) (discussing relevance of conduct in establishing specific intent and probability of success), *cert. denied*, 103 S. Ct. 57 (1982); *Northeastern Tel. Co. v. American Tel. & Tel. Co.*, 651 F.2d 76, 85 (2d Cir. 1981) (anticompetitive or exclusionary conduct necessary to show attempted monopolization), *cert. denied*, 455 U.S. 943 (1982).

82. *See* *United States v. Grinnell Corp.*, 384 U.S. 563, 570-71 (1966); *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 274 (2d Cir. 1979) ("only considerations of fairness and the need to preserve proper economic incentives prevent the condemnation of § 2 from extending even to one who has gained his power by purely competitive means"), *cert. denied*, 444 U.S. 1093 (1980).

83. *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 274 (2d Cir. 1979), *cert. denied*, 444 U.S. 1093 (1980); *see* *United States v. Griffith*, 334 U.S. 100, 107 (1948) (lawfully acquired monopoly power may serve as basis for § 2 violation).

84. *United States v. United Shoe Mach. Corp.*, 110 F. Supp. 295, 344-45 (D. Mass. 1953) (holding defendant's practices unnecessarily excluded actual and potential competition), *aff'd per curiam*, 347 U.S. 521 (1954); *see* *California Computer Prods. v. International Business Mach. Corp.*, 613 F.2d 727, 735-36 (9th Cir. 1979); *Greyhound Computer Corp. v. International Business Mach. Corp.*, 559 F.2d 488, 505 (9th Cir. 1977), *cert. denied*, 434 U.S. 1040 (1978); *see also* *Transamerica Computer Co. v. International Business Mach. Corp.*, 698 F.2d 1377, 1383 (9th Cir.) (affirming lower court's determination that design changes were not unnecessarily restrictive of competition), *cert. denied*, 104 S. Ct. 370 (1983).

85. *See supra* pp. 838-39.

86. *See* *Carpet Seaming Tape Licensing v. Best Seam, Inc.*, 616 F.2d 1133, 1141-42 (9th Cir. 1980) (implying that patent misuse necessary to establish patent owner possessed specific intent to monopolize), *cert. denied*, 104 S. Ct. 78 (1983); *United States v. General Elec. Co.*, 80 F. Supp. 989, 1015-16 (S.D.N.Y. 1948) (holding proof of patent misuse necessary and sufficient to establish that patent owner who possessed monopoly power by virtue of his patent had violated § 2).

key Photo, Inc. v. Eastman Kodak Co.,⁸⁷ in which the court held that an inventor has no duty under section 2 to disclose trade secrets about a product prior to its retail marketing. Although the creation of enforceable legal interests in patents and the protection of trade secrets arise from the common goal of promoting innovation,⁸⁸ the possibility for a patent owner to exploit efficiently his property rights through less restrictive means distinguishes for antitrust purposes a patent owner's refusal to license from a firm's refusal to disclose trade secrets. The commercial value of a trade secret is lost once the secret is publicly disclosed. Patent protection, by contrast, provides a mechanism for enforcement of an owner's intellectual property rights even after the invention's public disclosure.⁸⁹ Thus, the commercial exigencies requiring exclusive possession of a technology are diminished for a patent owner.

III. A Predatory Standard for Patent Licensing

Because a refusal to license a patent can evidence either efficient patent exploitation or anticompetitive conduct, a per se approach either condoning or condemning a patent owner's refusal to license his patent is unwarranted.⁹⁰ Antitrust scrutiny of refusals to license can promote social welfare only if courts are able accurately and consistently to discriminate between efficient and anticompetitive refusals, and patent owners are left free to make efficient refusals.

The predatory conduct literature provides a useful model for developing judicial standards to evaluate a patent owner's behavior when his conduct gives an ambiguous signal of his competitive intent.⁹¹ Just as a refusal to license a patent may be consistent with either efficient or anticompetitive patent exploitation, conduct such as price cutting and product innovation

87. 603 F.2d 263, 281 (2d Cir. 1979), *cert. denied*, 444 U.S. 1093 (1980). Although the *Berkey* court did not explicitly invoke principles of trade secret law in finding that a monopolist had no duty to predisclose confidential business information, the court's citation of *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470 (1974), a leading trade secret case, suggests that it considered the information at issue a type of trade secret. The information referred to by the court clearly embraces what is commonly known as a trade secret. See RESTATEMENT OF TORTS § 757 comment b (1939) (defining trade secret but noting that trade secrets do not embrace all secret business information).

88. See *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 480-82 (1974) (patent and trade secret law share common goal of encouraging innovation); *id.* at 475-78 (comparing differences in protection afforded trade secrets under state law to that accorded patents by federal law).

89. See 35 U.S.C. § 271 (1976) (defining patent infringement); 35 U.S.C. §§ 281-293 (1976) (describing patent owner's legal remedies for infringement).

90. *Cf.* Gilbert & Newbery, *supra* note 26, at 528 (preemptive conduct related to patent exploitation is difficult to distinguish in practice from patent conduct evidencing superior skill).

91. For a helpful introduction to this vast literature, see Brodley & Hay, *Predatory Pricing: Competing Economic Theories and the Evolution of Legal Standards*, 66 CORNELL L. REV. 738 (1981) (surveying economic literature and problems courts are likely to encounter in applying economic standards); Hurwitz & Kovacic, *Judicial Analysis of Predation: The Emerging Trends*, 35 VAND. L. REV. 63 (1982) (summarizing burgeoning case law).

can indicate either cost efficiencies or predatory intent. To analyze predatory conduct, commentators have employed economic theory to characterize the behavior of firms that are genuinely efficient and competitive.⁹² Firm conduct that deviates from certain economic relationships between pricing and production costs is considered evidence of anticompetitive behavior.⁹³

Comparing a firm's conduct to a behavioral benchmark is likely to be both complex and imprecise.⁹⁴ Some commentators have therefore supplemented their behavioral standards with a preliminary examination of market structure.⁹⁵ Market structure provides additional information regarding the competitive effect of a firm's conduct⁹⁶ and an indication of the costs of errors in classifying conduct as either efficient or anticompetitive.⁹⁷ An initial examination of market structure facilitates courts' evalu-

92. The economic standards for analyzing predation include: simple cost-based standards, see Areeda & Turner, *Predatory Pricing and Related Practices under Section 2 of the Sherman Act*, 88 HARV. L. REV. 697, 704-15 (1975); a sustainable price-reduction rule, see Baumol, *Quasi-Permanence of Price Reductions: A Policy for Prevention of Predatory Pricing*, 89 YALE L.J. 1, 4-6 (1979); a combination of cost-based standards and market structure requirements, see Joskow & Klevorick, *A Framework for Analyzing Predatory Pricing Policy*, 89 YALE L.J. 213, 242-55 (1979); profit-sacrificing criteria coupled with market structure requirements, see Ordover & Willig, *An Economic Definition of Predation: Pricing and Product Innovation*, 91 YALE L.J. 8, 9-13, 15-22 (1981); and an output-restriction rule, see Williamson, *Predatory Pricing: A Strategic and Welfare Analysis*, 87 YALE L.J. 284, 297-99 (1977). But see R. BORK, *supra* note 6, at 145-59 (arguing that rule proscribing predatory pricing is undesirable because of improbability of its occurrence and rule's potential to discourage honest price competition); Easterbrook, *Predatory Strategies and Counterstrategies*, 48 U. CHI. L. REV. 263 (1981) (analyzing strategic models of predation and concluding that predatory behavior should be *per se* legal).

93. See, e.g., *William Inglis & Sons Baking Co. v. ITT Continental Baking Co.*, 668 F.2d 1014, 1035-36 (9th Cir. 1981) (plaintiff bears burden of showing that prices are predatory when they are below average total costs and above average variable costs, while defendant bears burden of showing that prices are not predatory when they are below average variable costs), *cert. denied*, 103 S. Ct. 57 (1982); *Chillicothe Sand & Gravel Co. v. Martin Marietta Corp.*, 615 F.2d 427, 432 (7th Cir. 1980) (although pricing below average variable costs is sufficient to establish *prima facie* case of predatory pricing, predatory character of pricing above average variable costs depends on presence of other factors).

94. See Scherer, *Predatory Pricing and the Sherman Act: A Comment*, 89 HARV. L. REV. 868, 890 (1976) (arguing that simple cost-based rules cannot substitute for a thorough factual examination of alleged predator's behavior if court decisions are to be economically justified). A cost-based approach to predatory pricing that compares prices to costs may require different behavioral standards for different ranges of costs. Compare Joskow & Klevorick, *supra* note 92, at 250-55 (advocating tripartite behavioral standard: prices below average variable cost deemed sufficient but not necessary for liability; prices between average variable cost and average total cost presumed illegal if defendant is dominant firm and cannot show that strategy maximizes short-run profits; and prices above average total costs presumed legal subject to sustainable price reductions rule) with Areeda & Turner, *supra* note 92, at 712-13, 716-17 (necessary and sufficient condition for predatory pricing is price reductions below average variable costs).

95. See Joskow & Klevorick, *supra* note 92, at 242-49; Ordover & Willig, *supra* note 92, at 10-13.

96. See Joskow & Klevorick, *supra* note 92, at 227-31.

97. *Id.* at 218, 225-31. Joskow and Klevorick consider two types of error: the classification as anticompetitive of conduct that is in fact competitive, and the classification as competitive of conduct that is in fact anticompetitive. *Id.* at 223. Costs of the former type of error are measured in the increased market power gained through anticompetitive conduct; costs of the latter type are reflected

ation of firm conduct in two respects. First, it minimizes the costs of errors associated with misclassification.⁹⁸ Second, because of the complexity of applying behavioral standards, structural analysis functions as a screening mechanism to economize judicial resources.⁹⁹

The structural and behavioral standards used to analyze predatory conduct can be captured in a two-tiered test that determines whether a patent owner's refusal to license a patent is socially efficient.¹⁰⁰ The first tier looks at the incentives of patent owners to engage in anticompetitive patent licensing and the structural characteristics of the industry in which the patented technology is employed; this tier seeks to determine whether a patent owner would profit from anticompetitive refusals. Using the standard of socially efficient patent exploitation, the second tier develops a behavioral criterion to evaluate a firm's competitive intent. This behavioral standard tests the consistency of the royalty structure established by a patent owner against the prices he charges for products he manufactures using the same patented technology.

A. *First Tier: Is Anticompetitive Behavior Profitable?*

The profitability of anticompetitive behavior for a patent owner will depend on the structure of the market in which he competes.¹⁰¹ To be profitable, an anticompetitive refusal must generate sufficient additional profits in the post-expiration period to offset any profits a patent owner sacrifices in the short-run by refusing to license his patent.¹⁰² Thus, determining whether an anticompetitive refusal is profitable requires an evaluation of the effects a refusal will have upon market structure in the post-expiration period.

Courts should examine two factors to evaluate these consequences: the market power created during the term of the patent, and the conditions of market entry that will exist upon the patent's expiration. A patent own-

in discouraged productive efficiency. *Id.* at 223-24.

98. See *id.* at 224-31 (discussing relationship between market structure and error costs). Joskow and Klevorick invoke decision theory—the study of optimal decision-making under conditions of uncertainty—as the basis for their predatory pricing rules. *Id.* at 217-19. While the principles of decision theory are suggestive, their application is possible only in an informal sense: Actual estimates of the probabilities and costs of errors are extremely rough.

99. Cf. *Arizona v. Maricopa County Medical Soc'y*, 457 U.S. 332, 343-44, 354 (1982) (application of per se rule justified by need to economize judicial resources).

100. See Joskow & Klevorick, *supra* note 92, at 240-45; Ordoover & Willig, *supra* note 92, at 12-13 & n.17.

101. See Joskow & Klevorick, *supra* note 92, at 235.

102. Thus, if *A* equals pre-expiration profits with licensing, *B* equals pre-expiration profits with refusal, *C* equals post-expiration profits with licensing, and *D* equals post-expiration profits with refusal, then in order for an anticompetitive refusal to be profitable, *A* plus *C* must be greater than *B* plus *D*. Since an anticompetitive refusal implies that *B* is less than *A*, it follows that *D* must be greater than *C*, and furthermore that *D* minus *C* is greater than *A* minus *B*.

er's market power during the term of his patent provides an upper bound estimate of residual market power upon expiration of the patent; market power attributable to a patent can only diminish with time.¹⁰³ The absence of substantial market power during the term of a patent therefore precludes an inference that a refusal to license will be anticompetitive.

If a court finds that a patent leads to substantial market power, it should focus on the conditions of entry into the market when the patent expires.¹⁰⁴ The conditions of entry affect the rate at which a patent owner's residual market power will deteriorate.¹⁰⁵ If the patent owner's market is perfectly contestable upon the expiration of his patent¹⁰⁶—that is, if the market does not favor established firms over entrants—courts should presume that a patent owner's refusal to license is efficient, for his self-interest will lead him to license efficiently.¹⁰⁷ If the market will not be perfectly contestable, however, courts should consider whether the impediments to entry that will exist upon expiration of the patent are significantly greater than the impediments existing at the time of the refusal.

With the passage of time, several factors may present increasingly for-

103. Schmalensee, *supra* note 44, at 1793-94. Because market power is inversely related to supply elasticity, *see supra* note 38, and the elasticity of supply increases over time, J. HIRSHLEIFER, *supra* note 7, at 311, market power will decline in the long run.

104. It has been argued that the term "condition of entry" is more appropriate than "barriers to entry." Joskow & Klevorick, *supra* note 92, at 227 (arguing that traditional "barriers to entry" concept is easily misinterpreted and not suited for dynamic analysis of entry). The classic definition of a barrier to entry is any cost of production that must be borne by a firm seeking to enter an industry but is not borne by firms already in the industry. G. STIGLER, *THE ORGANIZATION OF INDUSTRY* 67 (1968). The problem with this definition is its failure to recognize that the time at which incumbents and entrants incur costs is just as important in describing entry as the magnitude of their respective costs. Incumbents can change the conditions of entry faced by potential competitors through pre-entry investments in such resources as capacity. These commitments constitute entry barriers in a strategic sense: Their purpose is to reduce the long-run profits of prospective entrants below zero, even if that means smaller monopoly profits in the near term for the incumbent. *See* Salop, *supra* note 39, at 335; *see also* F. SCHERER, *supra* note 13, at 229-60 (discussing entry in dynamic framework); *supra* pp. 841-42. Thus, in analyzing conditions of entry, courts should look not solely at the costs entrants face in entering a market, but also at the way in which those costs increase as their entry is delayed.

105. *See* Schmalensee, *supra* note 44, at 1794 (suggesting that rate at which market power decays will be inversely related to size of entry barriers).

106. "A contestable market is one into which entry is absolutely free, and exit is absolutely costless." Baumol, *Contestable Markets: An Uprising in the Theory of Industry Structure*, 72 AM. ECON. REV. 1, 3 (1982). Firms in such a market will make zero economic profits, exhibit productive efficiency, and generally set prices equal to marginal costs. Unlike perfect competition, which shares these properties, perfect contestability does not depend on the number of competitors in a market. In order for a market to be perfectly contestable, several strong assumptions must be made. Potential entrants must have access to the same technology as incumbents, and there can be no sunk costs. *See infra* note 109. In other words, there must be perfect markets in durable goods. Also, consumers must be able to react to the new entrant's prices more quickly than established firms can match the entrant's prices. *See* Bailey & Friedlaender, *Market Structure and Multiproduct Industries*, 20 J. ECON. LIT. 1024, 1040-41 (1982).

107. A profit-maximizing patent owner will license efficiently if his market is perfectly contestable because he cannot acquire any strategic advantages during the term of his patent. Because exit is costless in a perfectly contestable market, competitors will enter whenever positive economic profits exist. A patent owner would be unable to establish a credible threat against entry.

midable impediments to entry. Although the need for commitment of large amounts of capital may not itself inhibit entry, it may have such an effect when coupled with other factors. Late entrants face a severe handicap if they must pay higher risk premiums than incumbents to obtain the financial capital necessary for entry,¹⁰⁸ or if sunk costs comprise a significant fraction of an entrant's capital requirements.¹⁰⁹ Similarly, if the scale of the minimally efficient plant is large relative to total demand, and the cost disadvantage of not operating at that scale is substantial, late entry may be discouraged. Thus, whether a potential competitor foregoes entry could depend on its assumption as to how the incumbent will respond to entry.¹¹⁰ Another disadvantage likely to be exacerbated by postponed entry, but unrelated to capital requirements, is the unwillingness of consumers to switch from the products of established firms.¹¹¹

108. When considered in an intertemporal context, capital costs can pose an entry barrier even in the absence of imperfect capital markets. See Williamson, *supra* note 22, at 657-58 & n.30 (arguing that incomplete information in capital markets could permit incumbent firm to inhibit entry by imposing vertical restraints); see also Posner, *The Chicago School*, *supra* note 14, at 945 (conceding that risk premium faced by later entrants constitutes barrier to entry, but questioning significance of barrier for competition). But see Demsetz, *Barriers to Entry*, 72 AM. ECON. REV. 47, 50 (1982) (suggesting that interest rate differential between incumbents and entrants should not be considered an entry barrier when difference can be explained by established firm's reputation). The risk premium competitors must pay on all capital borrowed to finance entry into a market after a patent expires may be substantially higher than the risk premium they would have faced had the patent owner granted them licenses during the term of the patent. The higher risk premium may accurately reflect the increased chances of an entrant's failure; nevertheless, potential competitors are penalized for later entry when they may, in fact, have been willing to enter the market at a time when the risk premium was low.

109. See Baumol & Willig, *Fixed Costs, Sunk Costs, Entry Barriers, and Sustainability of Monopoly*, 96 Q.J. ECON. 405, 418-19 (1981) (arguing that sunk costs constitute barrier to entry). Sunk costs are those costs that an entering firm must bear in the short run even if it decides to cease production. They are closely related to, although distinct from, fixed costs. Fixed costs are those production costs that do not vary with the level of output in the short run; some of these costs may be recoverable through resale or leasing if a firm decides to shut down. See *id.* at 406-07, 416-18.

110. See F. SCHERER, *supra* note 13, at 243-48 (arguing that the larger the minimum optimal plant size relative to overall capacity, and the greater the disadvantage of not operating at that scale, the more effective an established firm will be in deterring large scale entry, as long as entrants believe that established firm will maintain its output in response to entry).

In industries in which the optimal plant size is large relative to demand, entry by a potential competitor will significantly reduce the competitive price. The reduction in price caused by a firm's entry into a market might make entry unprofitable in the first place unless an incumbent reduced its own output to accommodate entry. Alternatively, entrants can enter and operate at a less than efficient scale. Many economists have argued that it is implausible for a firm to deter entry by threatening to maintain its output. See, e.g., Dixit, *Entry-Deterrence*, *supra* note 39, at 95 (arguing assumption unpersuasive because it requires either irrational or non-strategic behavior by incumbent firms); Spulber, *supra* note 43, at 503-04 (criticizing assumption because of its inconsistency with rational behavior in model of dynamic entry).

111. Consumers frequently obtain information about a specific brand of product through purchases. The expense of determining the quality of a new brand as it enters the market may inhibit a consumer's purchases of new brands and thus have the effect of imposing additional costs on new entrants. See Schmalensee, *Product Differentiation*, *supra* note 42 (showing that pioneering brands may receive long-lived advantages over other brands through simplified theoretical models in which consumers learn about product quality from their own purchases); see also Joskow & Klevorick, *supra* note 92, at 228-29 (arguing that potential competition will be less effective in constraining

B. *Second Tier: Are a Patent Owner's Prices Consistent with His Royalty Structure?*

The second tier employs a behavioral test to determine whether an owner's refusal to license is in fact anticompetitive in those cases in which use of the first tier has determined that an anticompetitive refusal might be profitable. This behavioral test has its foundations in the standard of socially efficient patent exploitation. A patent owner violates this standard by sacrificing short-run monopoly profits to obtain long-run market power.¹¹²

Choosing to be the exclusive producer of goods employing patented technology is profit-sacrificing for a patent owner if that decision yields less profits than would licensing during the term of the patent. In other words, a patent owner who refuses to license is sacrificing profits whenever a prospective licensee is willing to pay him more to produce a unit of patented output than the patent owner could realize producing it himself.¹¹³ A patent owner would never willingly sacrifice short-run profits in the absence of anticompetitive purposes. Thus, a licensing decision that willingly makes such a sacrifice cannot be socially efficient.

A rule prohibiting profit-sacrificing behavior requires that a patent owner entertain offers from prospective licensees for use of a patent that he is actually using or that he already has licensed.¹¹⁴ The patent owner retains the right to set his own royalty structure, but the licensing fees must be consistent with the prices at which he chooses to market patented goods.¹¹⁵ This rule is nothing more than a requirement of competitive

incumbent's market power in highly differentiated product markets).

112. Profit-sacrificing behavior is an important corollary of predatory conduct. See *Ordover & Willig*, *supra* note 92, at 9 (defining predatory behavior as "a response to a rival that sacrifices part of the profit that could be earned under competitive circumstances, were the rival to remain viable, in order to induce exit and gain consequent additional monopoly profit"); see also *Joskow & Klevorick*, *supra* note 92, at 254 (pricing above average total costs may be predatory if it entails profit sacrifice).

113. Imposition of a rule prohibiting patent owners from establishing a royalty structure that is profit-sacrificing would not be unprecedented. In *Ansul Co. v. Uniroyal, Inc.*, 306 F. Supp. 541, 563-64 (S.D.N.Y. 1969), *aff'd in part and rev'd in part*, 448 F.2d 872 (2d Cir. 1971), *cert. denied*, 404 U.S. 1018 (1972), the court compared the price at which a manufacturer sold an unpatented product coupled with an implied license to use the product in a manner protected by the manufacturer's patent, with the royalty fee he charged for an express license and his own cost of producing the unpatented product. Since the cost of the royalty fee and the unpatented product far exceeded the cost of the unpatented product with an implied license, the court concluded that the patent owner had misused his patent. *But see Dawson Chem. Co. v. Rohm & Haas Co.*, 448 U.S. 176 (1980) (patent owner entitled to withhold patent necessary for use of unpatented product).

114. The rule is applicable regardless of whether the patent owner himself happens to be the most efficient user of the technology he has developed. A sacrifice of profits barred by the rule occurs when the patent owner or any licensee he has designated as the exclusive user of his patent is less efficient than the prospective licensee denied access to the technology.

115. The consistency of a patent owner's prices and his royalty structure may be difficult to ascertain when the licensing fee is not calculated on a per-unit basis, or when the license contains additional non-price restrictions. While a licensing fee can be levied as a lump sum or as a combination of a lump sum and per-unit charge, an average licensing fee can be calculated if the level of output is

consistency between prices and royalties: The expected per-unit profit on output produced by the patent owner must be equal to or greater than the per-unit royalties offered by licensees.¹¹⁶

Proscribing anticompetitive refusals to license a patent is less vulnerable to the types of objections frequently levelled against rules imposing liability for predatory pricing. If the market conditions for an anticompetitive refusal are met, such conduct enjoys a high probability of successfully excluding competitors: A patent owner's exclusionary power is legally en-

known.

Restrictions on output, field of use, and end-product prices provide additional means by which a patent owner can discourage prospective licensees. Patent holders should be entitled to use restrictions to enhance efficient exploitation during the life of the patent, but they should not be allowed to use restrictions to circumvent antitrust prohibitions meant to promote access to markets involving patented technology. Courts should therefore determine whether challenged restrictions serve a commercial purpose for patent owners and the extent to which these restrictions discourage licensees' production.

116. Although testing for competitive consistency appears simple, courts will almost surely encounter some difficulty applying it in particular cases. To obtain a reliable estimate of a patent owner's per-unit profit, courts will have to examine his costs. Problems of apportioning costs over time and across product lines will make any calculation somewhat uncertain. See Joskow & Klevorick, *supra* note 92, at 254 n.84. This uncertainty will never be entirely alleviated by the use of expert witnesses.

An example might clarify the more fundamental problem of defining the appropriate standards to use for different cost structures. Suppose a patent is necessary to produce a certain product and a patent owner has begun production. In evaluating the competitive consistency of a patent owner's price and licensing fee, a court should disregard the fixed costs a patent owner has already incurred, because his profit-maximizing licensing decision does not depend on those costs. Instead, courts, like patent owners, need consider only two factors: the licensing fee, R , and the difference between price, P , and the patent owner's average variable costs, AC . There are three simple short-run cases. *Case 1*: AC is constant. If AC is constant, P minus AC will be an exact measure of a patent owner's profit on each unit of output. Competitive consistency would be violated if the patent owner rejected an R that is greater than P minus AC . *Case 2*: AC is always decreasing over the relevant range of output. If AC is always decreasing, then the production of the patented good is a natural monopoly and the most efficient solution is to have only one producer. Unless a prospective licensee can offer an R greater than the average per-unit profit a patent owner would earn on his final unit of output Q_f —that is, an R greater than P minus AC at Q_f —the refusal to license is efficient. *Case 3*: AC is U-shaped, and a patent owner without any licensees would produce beyond his minimum AC , that is, in the region where AC is increasing with quantity. This case is perhaps the most troublesome. In the previous cases, the choice of R effectively fixed the licensees' level of production; the licensee could earn no economic profits not attributable to his superior efficiency in using the technology. Here, however, if the patent owner fixes an R based on output exceeding the output at minimum AC , the licensee can always earn positive profits—even if his efficiency is merely equal to the patent owner's—by reducing his output and producing at lower AC . The patent owner could attempt to increase his own output to cover his licensees' shortfall, but there is no guarantee that the resulting output of the patent owner and licensee would be productively efficient. This problem can be remedied by making the licensing fee a function of quantity.

If the patent owner has not begun production, a court will have to consider long-run cost and use the difference between price and average total costs as the relevant measure of profit. Some difficulties in allocating fixed costs may arise when the cost of producing the patented product in conjunction with other products is cheaper than producing all of the product separately. See generally Panzar & Willig, *Economies of Scope*, 71 AM. ECON. REV. PAPERS & PROC. 268 (1981) (discussing relevant measures of cost in multiproduct context).

The problem of competitive consistency can easily escalate if a patent owner is intent upon hampering a licensee's effort to remain in the market. For instance, the patent owner could engage in predatory pricing after granting a license. To detect such behavior, courts could use ordinary predatory pricing tests and adjust the patent owner's costs by imputing his licensing fee to his costs.

forceable at little cost.¹¹⁷ In contrast, a firm employing predatory pricing must rely on market mechanisms to exclude competitors, and therefore will face a huge financial burden with no assurance of success. A test for competitive consistency between a patent owner's prices and his licensing fee will be easier for courts to apply correctly than any behavioral test for predation. Predatory pricing tests can be criticized for assuming that current output and investment do not affect future profitability and for ignoring sudden changes in business conditions that affect pricing decisions.¹¹⁸ The test proposed here escapes this deficiency because it is not a test of the consistency of costs and prices but rather a test of the consistency of two different sets of prices, a product price and a licensing fee.¹¹⁹

C. *Effect on Incentives*

The extension of antitrust principles to unilateral refusals to license patents might be challenged for diminishing the incentives of firms to engage in innovation. From an economic perspective, however, greater incentives are not always socially desirable.¹²⁰ In the absence of express direction from Congress, courts should be wary of interpreting the patent laws as exalting incentives to innovate at all costs.¹²¹ Innovation should be encouraged only to the extent warranted by legislative policy. The test proposed here uses the deadweight loss that would be created if a patent owner behaved as a single-price monopolist to measure the costs a patent owner should be permitted to impose on society. This standard is consistent with the intent manifested by Congress through its decision to grant inventors only limited monopolies.

A more sophisticated objection to the imposition of antitrust sanctions is that a selective prohibition of refusals to license patents might affect firms' innovation strategies.¹²² Although imitation and other less aggressive re-

117. See R. BORK, *supra* note 6, at 149-55, 159-60, 347-49 (arguing that predation through governmental process is likely to be a far more effective strategy of predation than predatory pricing).

118. For examples of some of these assumptions, see Areeda & Turner, *supra* note 92, at 713-15 (asserting that dominant firm will not benefit from promotional pricing except when used for predatory purposes); Joskow & Klevorick, *supra* note 92, at 251 n.77 (assuming that temporary shut-down costs will not exceed costs of operating below average variable costs).

119. One reason why Easterbrook opposes a rule prohibiting predation is because it is impossible to distinguish between efficient and anticompetitive conduct in situations involving strategic non-price behavior. See Easterbrook, *supra* note 92, at 290. This criticism is not applicable to anticompetitive refusals to license a patent because of the availability of a test for competitive consistency. The test offers a reasonably clear standard that identifies when a patent owner's conduct is anticompetitive.

120. See Stiglitz, *supra* note 8, at 184.

121. *Cf. Deepsouth Packing Co. v. Laitram Corp.*, 406 U.S. 518, 530-31 (1972) (when considering rights of patent owners seeking to expand their privilege, courts must consider these claims "in light of this Nation's historical antipathy to monopoly," and should not expand those rights in the context of prior case law "unless the argument for expansion of privilege is based on more than mere inference from ambiguous statutory language").

122. A recent simulation study examined the effect of a number of economic factors on the rate of

search strategies will be more attractive to firms if the antitrust laws guarantee firms' access to all significant innovations in a market,¹²³ society benefits from imitation because fewer resources are wasted in duplicative research. Because patent owners could still obtain royalties for the duration of their patents, selective compulsory patent licensing is unlikely to discourage inventors.¹²⁴

While prohibiting anticompetitive refusals to license will not diminish incentives to innovate below the levels prescribed by Congress, the introduction of antitrust sanctions will affect a firm's incentives to disclose innovations through application for patent protection.¹²⁵ Inventors may choose to rely on protection under trade secret law, but they would do so only if they were not the most efficient users of the technology. Moreover, an inventor who eschewed patent protection would risk all potential royalties on the chance that non-disclosure of his invention would forestall entry. Although the possibility of antitrust liability conceivably could diminish the rate at which innovation is diffused throughout an industry,¹²⁶ this diminution in patent activity will not affect the rate of innovation itself.¹²⁷

Conclusion

Prevailing case law treats a patent owner's decision to license and his choice of licensing restrictions as fundamentally different. This Note draws upon recent developments in the economic theory of entry deter-

innovation and productive efficiency in a market that offered no patent protection. The factors included market structure, the relative ease of imitating innovation, the latent potential of innovation to improve productivity, and the relative degree of aggression with which innovators and imitators pursued market share. Although the results varied with different parameter specifications, in a remarkable number of cases imitation did not affect the rate of innovation, especially if imitators did not seek market share aggressively. See R. NELSON & S. WINTER, *supra* note 9, at 337-48.

123. See F. SCHERER, *supra* note 13, at 444-47 (arguing that firms may invest without patent protection because of lags in imitating innovation, "advantages of competitive product leadership, and the existence of nonpatent barriers to the emergence of a competitive market structure").

124. It has been argued that the potential for damage liability will further diminish the incentives of inventors to innovate over and above the diminution in incentives caused by compulsory licensing. See *SCM Corp. v. Xerox Corp.*, 463 F. Supp. 983, 1014 (D. Conn. 1978) (distinguishing equitable and damage remedies for compulsory licensing), *aff'd on other grounds*, 645 F.2d 1195 (2d Cir. 1981), *cert. denied*, 455 U.S. 1016 (1982). This argument is only partially correct. It assumes that patent owners will be uncertain whether their own conduct violates the law. This assumption is inapplicable where the standard of competitive consistency is clearly defined.

125. F. SCHERER, *supra* note 13, at 457 (firms' incentives to disclose innovations may be diminished although level of innovation may be maintained).

126. See Cheung, *Property Rights in Trade Secrets*, 20 ECON. INQUIRY 40 (1982) (arguing that complete elimination of patent system and inventor's consequent reliance on trade secret protection would lead to greater static inefficiency because inventors would be more reluctant to license their technology and would devote more resources to protecting their trade secrets, and imitators would employ greater resources to discover them).

127. See F. SCHERER, *THE ECONOMIC EFFECTS OF COMPULSORY PATENT LICENSING* 66-75 (1977) (study of companies compelled to license patent as part of antitrust decree shows companies reduced patenting activity but maintained research and development expenditures).

rence and predatory pricing to show that the same economic approach used to analyze licensing restrictions should also be used to analyze a patent owner's licensing decision. This decision will have anticompetitive consequences only under exceptional conditions. The Note therefore provides an economic justification for the current reluctance of courts to condemn refusals to license. By identifying the anticompetitive problem associated with unilateral refusals with greater precision, however, this Note holds out the promise that antitrust prohibitions can be extended to conduct that is in fact anticompetitive without adversely affecting the legitimate rewards of patent owners.